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# Blossom: a Tangible Voice Messaging System for Improving Intergenerational Communication for Ageing Population

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**Abstract**

Leading to severe social isolation and other mental health problems, the lack of communication between the elderly and their children has already become a prevalent issue among the older generation. Through a design study with elderly living apart from their family members, we extract the underlying reasons for lacking communication, design and implement a prototype asynchronous communication system named Blossom inspired by the commonly used voice messaging systems from mobile devices. The Blossom system has novel tangible interfaces and two specially designed feedback mechanisms for the elderly and young users.

**Author Keywords**

Ageing population; tangible interface; mobile device; intergenerational communication

**ACM Classification Keywords**

H.5.2. Information Interfaces and Presentation (e.g. HCI): User Interfaces.

**Introduction**

Social isolation has already become a prevalent issue among the elderly [11]. Reflecting the condition of lacking in communication with other humans, social isolation always includes the symptom of decreasing communication with family members [7]. Thus, for the

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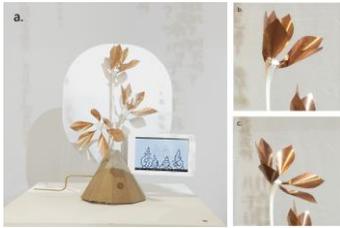


Figure 1. Blossom system. a) One of the two vases with flowers and family photo in Blossom system. b) Close-up status of flowers. c) Blossom status of flowers.

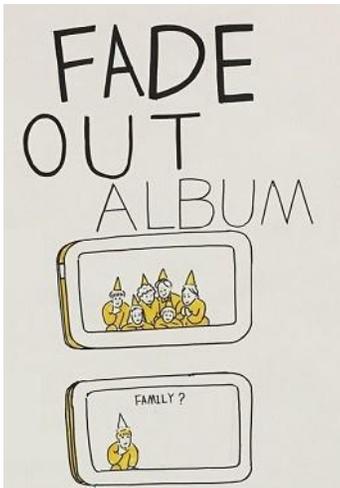


Figure 2. Poster of fading-out figure of parents in the frame.

elderly, intergenerational communication with their family members is important.

The major communication tool among the ageing population is telephone [2, 10], one of the representatives of synchronous communication systems. Requiring synchronization in timing and immediate responses [3], synchronous systems could cause inconvenience in intergenerational communication for the elderly.

Allowing intermittent information exchange, asynchronous communication systems are widely chosen to compensate the inconvenience from synchronous communication by younger generation [1, 3, 4]. However, commercially available asynchronous systems, for instance, text messaging on mobile phone [1] and social messaging such as Facebook posting [8] usually do not take the special needs from the ageing population into consideration. Although some previous works [5, 10, 12] have already generated new asynchronous communication software for the elderly, they still suffer from either complexity in real use [9] or asymmetry in information sharing [10, 13].

With the objective to overcome these limitations, we analyze the intergenerational communication problems among the elderly and propose a special asynchronous communication system for them.

### Design Process

We conduct a design study with 10 older adults (six females, aging 70-86) from an elderly center (five out of 10) and an elderly home. We first validate the needs from the elderly after a five-hour interview and then generate our own design concepts. Finally, we take a

revisit to them and collect their feedbacks to improve our design and exhibit our prototype system at an art gallery.

### Problems the Elderly Face

From our study, all the participants excluding one old lady with her son also living in the elderly home said "yes" or "kind of" to the question "Do you have problems in communicating with your own children?" The main reasons underlying the hesitation and unwillingness among the elderly to contact their children through telephoning could be summarized as follow:

- *Lack of shared topics.* The elderly usually struggle to find a topic to start the conversation and they also do not have enough new things to share.
- *Being unaware of the children's availability.* The children could sound reluctant when answering the phone, which causes guilty feelings from the elderly because they think they are interrupting.
- *Requirement of immediate responses.* The two sides involved always need to exchange information in real time. If their children refuse to communicate, the communication is thus cancelled, which brings in much depression for the elderly.

Almost all participants from our work expressed negative feelings to existing asynchronous communication platforms such as emails, text messaging, teleconferencing embedded in mobile devices because of the following reasons:

- *Access issue.* 8 out of 10 participants are unfamiliar with mobile phones because they do not have access to them. The other two participants only send text messages sporadically via the mobile phone.
- *Afraid of new platforms.* Due to the degeneration in eyesight, memory and learning ability [14], some participant mentioned that they are afraid to learn



Figure 3. Fading-out of old parents' figures in a cartoon family photo in prototype system in exhibition.



Figure 4. Exhibition installation at an art gallery.

and use the mobile Apps because of the complex interfaces which may bring in unsolvable problems. They prefer daily-used objects like a piece of paper to those Apps on mobile devices.

- *Overburden of sharing.* Some participants said that sharing photos via social media platforms such as Facebook with their children is a heavy burden to them, let alone starting a teleconference meeting. They pointed out that their needs are quite simple, just to talk with their children.

#### *Design Concepts*

Bearing all the needs and preference from the elderly in our mind, we propose an asynchronous voice messaging system named Blossom which consists of two identical vases with metal flowers and digital family photos (see Figure 1). This pair of easy-to-use vases is designed to be the media of transmitting voice messages. The microphone inside the vase records the voices through the action of rolling the handle on the vase and the newest recorded message will be sent by pressing the button. Upon receiving a new message, the flower in the other side will close up as a flower bud indicating an unread new message but will not play the voice message automatically, which serves as an ambient hint for the receiver (see Figure 1.b). When the receiving side has already listened the message, the flower will blossom again (see Figure 1.c).

As an asynchronous system could be comparatively loose, it is easy for either of the two sides to postpone responding to the other. Thus we decide two different feedback mechanisms to keep and trigger more communication. We integrate a photo frame displaying a cartoon family photo in each of the vases (see Figure 2). According to previous work [13], young adults report guilty feeling of knowing the huge gap between

their willingness to communicate with old parents and the reality. According to the conclusion from [6] that negative feedbacks are sought and responded more if users have gained expertise (perceived or actual) in pursuing a goal, we choose negative feedback for the children as a punishment to uncover their hidden sad and guilty feelings. If they neglect or refuse to respond for a long period, the figures of their old parents in the family photo will gradually fade out based on a previously set Half-Life Time coefficient (see Figure 3). It is inappropriate for the elderly to see anyone gradually fade out because it may cause depression. Instead, a positive feedback is designed that every time when the message has been read by their children, the family photo in the photo frame at the elderly side will become more colorful.

Regarding the user interaction in our system, we try to make Blossom very easy to learn and use. Only one handle and one button is integrated inside the vase and semantics are utilized to help. Rolling the handle means recording while pressing the button means sending or listening. A flower bud means receiving new unread messages while blossom flower means already listened. All these concepts are natural and consistent with people's common sense.

#### **Future Work**

Besides revisiting all the 10 participants to collect feedbacks, we also exhibit Blossom at an art gallery for one week with more than 200 visitors (see Figure 4). At this stage, both the elderly and young users appreciate the design novelty and did not express any uncomfortable feeling about the feedback mechanisms. In the future, we will conduct quantitative user evaluations to validate the generality and effectiveness

of our system and discuss the feasibility of transferring other existing mobile-based systems to special-designed tangible interfaces for assisting the ageing population.

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