http://dx.doi.org/10.14236/ewic/HCI2018.197

Exploring Post-mortem Storytelling Applications

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Post-mortem storytelling, a process of remembering deceased loved ones has attracted research attention from the HCI research community recently. Much work done by the community covered most aspects related to the use of social networks. However, little is known how social networks could have limited how bereaved persons are willing to express themselves. In light of this, this doctoral thesis is aimed at investigating how mobile digital storytelling could be designed to support people grieving in private and social spaces and evaluate them extensively.

Post-mortem, HCI, Grieving Spaces, Storytelling, Designs.

1. INTRODUCTION

The HCI community has investigated how social networks can support people who remember their deceased loved ones. However, less attention has been paid on the way in which design can support people having both private and social reflections during the grieving period. Indeed, it is extremely important to consider this because of the changes in the mourning process [19], which suggests a constant consideration of alternative ways of providing support [11]. These changes can either be private when a bereaved person expects to self-reflect on past memories or social when a bereaved person engages in a reflection with other people on social networks [19]. Hence, it is important that the bereaved person remain expressive during this process.

This doctoral thesis is driven by the goal of supporting the changes in the mourning process by considering how storytelling applications can provide a balance between private and social spaces for the bereaved. The thesis is based on a mixed-method approach and grounded on three main theoretical frameworks:

1. Continuing bonds [21], which suggests staying connected to the deceased
2. Letting-go [4] for breaking such connections with the deceased.
3. Grief progression theory of Kubler-Ross [23] that suggests five (not necessarily sequential) stages of grieving are: denial, anger, bargain, depression and acceptance.

In addition to these, the design aspect is based on a participatory design methodology inspired by the conceptual framework of Sellen and Whittaker [42] for designing memory related systems for recollection, reminiscing, retrieving, reflection and remembering intentions. Participatory design methodology suggests the inclusion of potential users and stakeholders which is capable of meeting the multiple needs [20] that this thesis will be considering.

1.1 Storytelling Applications

Storytelling application is a broad name for describing technologies that are used to create or generate stories meant for different purposes [40]. In the context of remembering a deceased loved one, we draw upon memory-based storytelling applications. This is because it serves the intended purpose of recollection, reminiscing, retrieving, reflection and remembering intentions [42].

In this domain, storytelling applications can be mobile [36] or tangible-based [43]. Typical components of these applications are: media (images, video, audio and text) and storage [16, 17, 38, 41]. These applications are capable of creating stories in different spaces depending on how they are designed.

1.2 Grieving Spaces and Technologies

Grief spaces are important to bereaved persons for remembering a deceased loved one. These spaces arise from private and social changes described in [19]. This may be dependent on the relationship of the bereaved person to the deceased which in the

case of grieving on social networks could even be triggered by fans-celebrity death relationships [39]. Nevertheless, these assumptions are yet subject to further research [8]. Grieving spaces can also be particularly necessary besides the relationship to the deceased to the cause of death as traumatic deaths [27].

Most social media technologies have been investigated within the context of social spaces including: Facebook [7, 14, 22], MySpace [5, 26], and Twitter [39]. Hence, what constitutes a private space has limitedly been explored in bespoke tangible artefacts such as: StoryShell [30] and Pensive Box [9]. In addition, a little exploration has been done on the application of theoretical frameworks in identifying design components by engaging users or other stakeholders.

1.3 Doctoral Thesis Main Research Questions

This doctoral thesis adopts a three-phased approach: empirical, conceptual and exploratory phases. The main purpose is to explore in depth design issues for including both private and social spaces while seeking to answer the following two main research questions:

1. How can we better conceptualize a storytelling application model that supports both private and public spaces for remembering deceased loved ones?

2. What are the perceptions of users about such a technology?

2. KEY LITERATURE

The related works are articulated in three main areas drawn from interdisciplinary concepts of the Psychology and HCI communities.1. Psychology of grieving, 2. Technology and grieving, and 3. Natural language processing and grieving.

2.1 Psychology of Grieving

Grief has been described by psychologists as the response to loss which is the reason for memorialization [15, 31, 44]. Psychologists recognizes the impact of losses from economic, personal, social and cultural or religious contexts [35, 37, 39, 45]. Hence, Machin [25] described this in a grief trajectory (Fig. 1) relating to how such factors are interrelated and responsible for the way people respond to grief. Prior to this, other theorists with this foreknowledge proposed coping strategies that suggests whether an individual or group(s) can continue bonds [21], break bonds [4] or progress in stages [23] although not necessarily sequential.

The theory of continuing bonds recommends remembering the dead and continuing the relationship that mimics the deceased presence. Contrary to this view is the detachment theory which is concerned with breaking such bonds even while remembering the dead. Both theories are not completely deviant from the grief progression theory that encourages remembering the dead to express denial, anger, bargain, depression and acceptance. Nevertheless, it has become useful for detecting extremity in cases associated with complicated grief [24].

Fig. 1: Loss Trajectory suggesting significant aspects that influences one's experience with losses. Image Source: [25]

Psychologists have put forward many other theories apart from the ones covered in this section. Because these theories are beginning to manifest in the use of technology, this shift has drawn the attention of computer-mediated researchers.

2.2 Technology and Grieving

The HCI community has reported the role of technology in grieving as support-seeking [28], grief-facilitation [40], simulation of the deceased [1], maintaining communication [10, 33] and legacy making pre-mortem [18]. Nevertheless, much attention has been given to social networks and social spaces.

Support-seeking technologies designed by Massimi [28] provided a medium for connecting persons who are grieving socially as a way of supporting one another. Sas et al. [40] suggested grief

facilitation through an investigation of relevant technologies that gradually resolve grief of individuals. Hence, the technology conceptualized in [40] supports the bereaved person to let-go emotionally charged artefacts while interacting with them. Furthermore, the simulation of the deceased concept was proposed by Ahmad [1] as a conversational technology that imitates the deceased while the bereaved person interacts with such technology. Hence, the bereaved person will appear to be communicating with the deceased in a real sense. Odom et al. [33] and Chen [10] on the other hand, carried out research on maintaining communication with technologies by encouraging the bereaved person to remain expressive socially even beyond words. All these studies suggest the post-mortem implications of technology.

The pre-mortem implications of technology was investigated in a study by Hall et al. [18]. This study considered making memories to be bequeathed post-mortem using location-aware memory systems (Fig. 2). Results reported by Hall et al. [18] revealed how people while making memories pre-mortem still consider grieving spaces since these memories convey most often not public data. Thus, considering the use of social networks in preserving memories post-mortem, there is a possibility that people would have loved making some memories in private spaces while sharing others in social spaces.

Fig. 2: Location-aware systems for capturing memories pre-mortem [18]

2.3 Natural language processing and Grieving

Following from Bos [3] debates on the talking photo of the deceased, the application of natural language in grieving began. Bos debated on designing text to speech applications that uses the deceased picture in a frame to communicate with bereaved persons. By this, Bos meant the collection of pre-recorded voices and memorable artefacts of persons before death. Hence, these will be used to further create a match between text descriptions of artefacts and related pre-recorded voice contents.

However, further works were carried out by Pennebaker et al. [34] in the area of text processing subsequent to discovery of the natural language processing framework – Linguistic Inquiry Word Count (LIWC) [13]. Pennebaker et al. [34] reported the presence of language patterns that are common with persons who narrate their grieving experiences. These include: cognitive words that suggests '*self-reflection'* and '*casual*' thought, and emotional words that can either be positive or negative. Similar patterns were also reported by Brubaker et al. [6] on social networks for detecting grief indicators for bereavement experts. This report covered in [6] described categories of words that suggest emotional distress and non-emotional distress from narratives of a grieving social crowd.

One other related work done in the area of grief progression by Malenkovich [26] extracting text using some rule of thumb shows great potentials for systems in the future in using grief-related language patterns. This is because little has been done in exploring topic classification in the area of natural language processing compared to other topics as health. Hence, all related work discussed within this context reveals the promising role of language in designing grief-related technologies with bereavement experts in the future.

3. METHODS AND PRELIMINARY FINDINGS

This doctoral thesis applies a mixed method approach to the three research phases: empirical, conceptual and exploratory phases. Each phase is aimed at providing answers to specific questions and the methods are combined based on the research objectives.

PHASE 1: Empirical Phase. This phase aimed to make an initial investigation from theoretical framework of [21] by carrying out a study to answer these two research questions:

RQ1. What affects the bereaved?

RQ2. What affects the story telling length of the bereaved?

This phase was driven by the need of designing with bereaved persons while understanding overlapping features surrounding death and storytelling which has not been explored by the HCI community. I investigated specific issues: time since death, comfort of bereaved persons in talking about it, years of relationship to the deceased, age of the deceased, type of relationship to the deceased and stories. Thus, thirty-six (36) participants were recruited and asked to complete a semi-structured questionnaire based on these issues.

Data collected was analysed using content analysis, descriptive and inferential statistics respectively. Thus, the key result from this phase revealed that bereaved persons wrote more about

the deceased as time since death progressed [2]. This result informed design implications to investigate space and expressiveness based on the conceptual framework of [42] which was applied subsequently in phase 2. This is because this framework shares overlapping features for recollection, reminiscing, retrieving, reflection and remembering intentions, which are useful requirements for bereaved persons to remain expressive over time. However, phase 2 further investigates this concept.

PHASE 2: Conceptual Phase. In this phase, a further investigation is carried out to elicit design ideas from bereaved users of social and non-social media based on the conceptual framework of [42] while considering expressiveness and space. This phase proposes to answer the research questions:

RQ3. What are the design considerations for engaging bereaved persons in private and social spaces?

RQ4. What is the impact of such technology on bereaved persons?

This phase is articulated in four steps: design and development of a mobile storytelling application[1], opening interview[2], mobile application interaction[3] and semi-structured questionnaire (to evaluate the prototype impact)[4]. The development of the storytelling application was driven by the conceptual model (Fig. 3). This model is a combination of the conceptual framework of [42] and the theoretical frameworks of [4, 21, 23] for:

1. Making memories as legacy for continuing bonds
2. Sharing stories for continuing bonds and as grief progression
3. Deleting stories for letting go

An opening interview was used to gather responses from twenty-two (22) bereaved persons about grief spaces and also to introduce the mobile storytelling application. During the interview session, the bereaved persons talked about different ways they will be using the application to write stories about their deceased loved ones.

Furthermore, the participants were asked to indicate their interest in using the application for the period of eight (8) weeks while sharing stories with the researcher throughout this period. Out of the twenty-two (22) bereaved persons that participated in the opening interview, thirteen (13) persons went on to engage with the application and shared stories afterwards. Thus, nine (9) persons were excluded from the mobile application interaction step (Three (3) persons reported issues related to time constraints, while the other six (6) persons did not share their stories). At the lapse of 8-weeks, these thirteen (13) bereaved participants were asked to fill a semi-structured questionnaire which will be useful for evaluating the application.

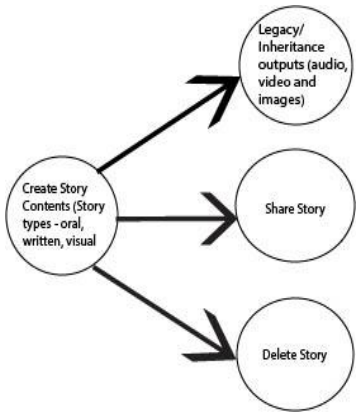

Fig. 3: Conceptual model for evaluating bereaved engagements in public and private spaces.

This phase is still on-going, and I will be able to show some results at the moment of the conference. Nevertheless, dataset collected from this phase will be analysed using content analysis and descriptive statistics. Also, data collected and the design from this phase will be fed into phase 3.

PHASE 3: Exploratory Phase. This final phase will explore design components from bereavement experts in order to answer the following research questions:

RQ5. How can a natural language processing model be developed from the bereavement experts' theories capable of evaluating grieving technologies in private and social spaces?

RQ6. What are the requirements for designing storytelling applications in private and social spaces for bereaved persons with bereavement experts?

This phase will be based on the theoretical framework of [23] and conceptual model in phase 2 (Fig.3). This will involve using case study documents to extract text features from bereavement experts' theories. Also, participatory design and semi structured interview will be used to elicit design requirements from bereavement experts. However, this phase will cover two major activities to answer these questions:

1. Text features based on grieving theories will be collected from case study documents and will be used to develop a natural language processing model. This model will be used to determine the extent to which evolving grieving technologies are providing therapies. This is necessary considering the fact that HCI has since been concerned with designing and evaluating technologies using people. Instead, this activity considers what it means to use natural language processing models to evaluate

technologies before reviewing designs with people. Hence, stories collected from phase two will be used to test this model. Also, the model will be used to answer RQ5.

2. Based on the application designed in phase 2, a participatory design approach will be used to sketch a Lo-fi version of this application on paper. This Lo-fi prototype will be used together with the natural language model to engage bereavement experts in a semi-structured interview in order to answer RQ6.

Hence, data collected from these activities will be analysed using content analysis and reported together with all other phases as outcomes of the main research questions of this thesis.

4. THESIS MILESTONES

At the moment, phase 1 and phase 2 have been completed. Analysis of phase 2 is ongoing and results will subsequently feed phase 3. Nevertheless, this analysis is run along with some activities of phase 3 such as:

1. The natural language models based on grieving psychological theories.
2. Lo-fi prototyping for eliciting design ideas from bereavement experts

Thus, results from phase 3 on the natural language models and the design ideas from bereavement experts on the Lo-fi prototypes will be expected to merge findings from phase 2 in order to generate a broad knowledge for which this thesis seeks.

5. EXPECTED CONTIRBUTIONS TO HCI

This research is expected to make three key contributions to the HCI community from the three phases covered in the thesis:

First, it provides an empirical basis for investigating other factors useful for understanding and designing future systems in the field of grieving in private and social spaces.

Secondly, the conceptual model will create knowledge on the future design needs of bereaved persons. It will further create opportunities for understanding the relationship to the deceased on storytelling spaces that has been debated in the HCI community.

Lastly, the exploratory phase will bring about designs ideas with experts currently not existing in social spaces. This phase will further expand research around participatory design approach in the field of grieving. This is very important as HCI researchers continue to identify therapeutic design needs of bereaved persons in the future [6].

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