

What Happens to My Instagram Account After I Die? Re-imagining Social Media as a Commemorative Space for Remembrance and Recovery

Soonho Kwon^{1[0000-0002-2783-6364]}, Eunsol Choi^{1[0000-0002-4397-5751]}, Minseok Kim^{1[0000-0002-9631-9803]}, Sunah Hwang^{1[0000-0002-3266-5790]} and Dongwoo Kim^{1[0000-0002-5354-0620]}

¹ Yonsei University, Seoul, Korea, Republic of
`{harrykwon98, jupiteraca, minseokdaniel}@yonsei.ac.kr`
* Corresponding author: Youngh Kang, `yakang@yonsei.ac.kr`

Abstract. This research explores the relationship between social media and mortality, focusing on social media as a thanatosensitive technology that promotes death preparation and commemoration. Employing concepts from the Value-Sensitive Design approach, our research identifies three main stakeholders surrounding the online commemoration experience. As an exploratory study, we conducted in-depth interviews and observations ($n=9$) to better understand key stakeholders' experiences in online and offline commemorations. After analyzing the qualitative data, we extracted design requirements that were used to create a conceptual commemorative system and a functioning prototype. An informal user testing ($n=6$) yielded positive feedbacks on the new system for it offers the unique opportunity to reflect existence, prepare for death, and create a community of commemoration that helps memorialize the deceased and recover from grief. The study suggests that commemoration via social media aids in maintaining user volition, induces active and interactive participation, and allows for a continuation of the digital legacy. Such findings may help deepen the understanding of humans' perception of death and commemoration within the context of social media.

Keywords: Design Research; Death; Commemoration; Social Media; User Experience

1 Introduction

Death is perhaps the only experience that all humans go through. The human species has been trying to understand and explore the concept, preparation, and aftermath of death from many different perspectives. Scholars in the field of Human–Computer Interaction (HCI) have recently started to emphasize the importance of ‘thanatosensitivity’ to create and discuss designs that allow us to comprehend, reflect, and discuss mortality [1–3]. These attempts were often in the form of memorializing the deceased through technology such as digital family heirlooms, digital cemeteries, and digital gravestones [4–8].

While they successfully opened up new schemes to reconcile the living and the dead, implementing such ideas into our everyday lives still seems quite out of reach, as it is difficult to have users prevalently using digital screens as their family tombstones or replacing their family heirloom with a USB stick. Preceding studies also lack the opportunity to address all involved parties and to incorporate their different values in a unanimous design space. Thus, in an attempt to imagine a thanatosensitive design solution that can easily be implemented in our lives, we conducted an empirical study from which value-sensitive design insights were drawn.

In this research, we identify three stakeholders surrounding the experience of death on social media: the to-be-dead, the after-death account manager, and the bereaved, and we incorporate their values in designing an online commemorative system. We hope to broaden horizons for researchers and designers in considering social media as an effective commemorative space in catering to users' various value priorities.

The contributions to our research include the following:

- Through an empirical study, we investigate how each of the three stakeholders perceives death and commemoration in digital space
- Based on the empirical study, we discuss how social media is/can be utilized as a death preparation and commemoration tool by establishing design requirements
- We suggest a new design system for death preparation and commemoration
- We evaluate the users' reactions to the newly proposed system on death and online commemoration

2 Background

2.1 Thanatosensitive Design

The term “thanatosensitivity” was first coined by Massami and Charise [2] to “recognize and actively engage with the facts of mortality, dying, and death in the creation of interactive systems.” The HCI community has recognized the importance of the concept and urged people from diverse backgrounds to get involved with thanatosensitive design [3]. The concept initiated much research and many projects including Shoebox, an application that hands down the digital traces such as Gmail archives and YouTube videos of the deceased to the bereaved [9].

In discussing thanatosensitive designs, Bassett [10] suggests an interesting perspective of eternal life in the digital sphere. The research emphasized the users’ desire to be remembered by the bereaved (or live eternally) and suggested the importance of investigating its impact on the bereaved. Similarly, Ellis Gray [11] emphasized the importance of recognizing the complicated relationship between the deceased and the remaining data traces of the deceased. The suggestions can be related to various works that discussed how the bereaved used social media technology to cope with close ones’ deaths and the digital presence of the deceased [12–15]. Our research aims to expand these discussions by proposing the concept of commemoration through social media and establishing a series of guidelines and design requirements.

2.2 Social Media and Death

Existing studies on online commemoration discuss the possibility of utilizing network-based technologies to commemorate and prepare for death. Krysinska and Andriessen [16] analyzed how members of nuclear families often create online commemoration pages through memorialization services such as Faces of Suicide and Gone too Soon.

Relatedly, many researchers have turned their attention to social media to investigate its relationship with mortality. As introduced by Wagner [17], the incorporation of technological features within cultural norms seems necessary in expanding the collective nature and interactive privileges of social media. Popular social media platforms such as Facebook and Instagram both have an account memorial account conversion system upon the account owner's death report. In the case of Facebook, contents that were posted by the deceased remain on the memorialized account based on the privacy settings. The bereaved are allowed to post writings or pictures to commemorate on the timeline, which is managed by the legacy contact assigned by the account owner before death.

Compared to Facebook, Instagram's commemorative services are somewhat limited. To a report death, a family member must submit the account owner's birth and death certificate, and proof of authority under local law that one is the lawful representative of the deceased owner. After that, they can either to completely delete or memorialize the account from Instagram. Once memorialized, no one can log into the account, and posts remain visible to authorized viewers; in other words, nothing much changes.

The role of social media in relation to mortality includes the bereaved actively utilizing the deceased's accounts for news dissemination, preservation, and community [18]. It was also found that commemorating on Facebook allows for the bereaved to 'expand' the meaning of commemoration temporally, spatially, and socially [19].

2.3 Digital Volition

Barve and Bhalerao [11] suggest it is necessary to improve the user experience of the bereaved when using social media. Elliott [20] contends the importance of creating a fundamental solution for social media platforms on how to handle the account of the deceased and the remaining data, as most users are fairly young and are not likely to leave a will. Similarly, Maciel [21] stresses that digital legacy in the virtual world should concur with the 'volitive' element by the deceased, wherein the user may decide what will become of their account after death [22]. With the current problem, that digital life goes beyond the physical life and is limited due to software constraints, the study also claims for the need of a person 'in charge' for the remains. The aforementioned studies collectively assert the importance of digital 'volition'. Thus, designers are expected to identify the many actors involved [23] behind the tangible line of the system and take careful considerations when dealing with social media and interactions after death.

Our research will focus on the problems previously identified and propose a design solution that provides both a better commemorative experience by considering multiple

stakeholders' values as well as a chance for the younger users of social media to ponder their death and decide on what will happen to their accounts after their demise.

2.4 Value-Sensitive Design

Value-Sensitive Design emphasizes how our technologies shape and deal with human values as a means to safely combine human values with technology. It aims to establish a solid, logical, and socially acknowledgeable structure based on morality and ethical values to build and incorporate any ideas. A central tenet of this design methodology is to discover and use stakeholders' core values into technologies during early-stage research and development [24]. Researchers first undergo extensive research to identify these stakeholders and their fundamental values, after which they conduct empirical investigations to carefully unravel the ethical implications and value-driven conflicts in a system. Finally, with the collective insights, the researchers institute grounded settings to reconcile the technical efficiencies and central values of the stakeholders [25].

In our research, we utilized the approach and perspective of the Value-Sensitive Design, identifying the key stakeholders as well as the values they deem important. While the widely acknowledged Value-Sensitive Design methodology aims to identify the possible ethical conflicts in an attempt to bridge them by design, the main focus of our approach lies in identifying and deeply analyzing the key values each stakeholder takes into account. The aim also lies in ultimately reducing the gap between user's social volition and technical constraints. Our research aspires to make sense of the interactions that take place on social media regarding death preparation and commemoration, finally creating a sensitively designed system based on the examined values.

3 Exploratory Study

3.1 Methods

As the first step of our research, we conducted an exploratory study to better understand users' perceptions on commemoration and death, as well as the purposes and behaviors of commemoration. We conducted in-depth interviews with three groups of stakeholders: the to-be-dead (or, all users), the bereaved, and the legacy contact, incorporating concepts of Value-Sensitive Design. A total of 9 social media users (specifically, Instagram, Facebook, and Twitter users) in their 20s were recruited through online survey distributed across Korean online university communities which was used to gain preliminary information on the participants such as their previous experience in social media usage and experience of losing their friend or family. Based on the information, we recruited interviewees from a fairly younger generation because social media was more likely to be a major part of their social lives, which was important for our purposes.

The specific criteria used for each stakeholder group are explained below along with the general questions and the tasks given during the interview. The hour-long sessions

were conducted either online or offline and were recorded under consent. The recordings were later transcribed, and a six-phase thematic analysis was conducted, drawing themes to make sense of the qualitative data [26]. Based on the themes identified from the analysis, we tried to categorize the empirical values of commemoration and drew design considerations for social media-based commemoration services.

To-be-Dead (T1, T2, T3). Three social media users were recruited to represent the 'to-be-dead.' The interviews for the to-be-dead explored preferences for managing social media accounts after death. In this process, we aimed to identify how users wish to be remembered in an online environment. Additionally, there was an observation on the user behaviors of preparing for death on social media. We observed how users change their social media accounts to the scenario in which they have a limited amount of time left to live, thus identifying the key values in preparing for death on social media.

Bereaved (B1, B2, B3, B4, B5). Five interviewees, all of whom have an experience of losing someone close to them, were recruited to represent the 'bereaved.' The interviews focused on their experience of processing death through various commemorative behaviors. We explored the purpose and motive of commemoration and the specific emotions, behaviors, and practices (both online and offline) that consist of them, identifying the key values in commemorative behaviors.

Legacy Contact (L1). One interviewee, who had the experience of running Facebook and Twitter memorial accounts for his deceased best friend, was recruited to represent the 'legacy contact.' As the culture of using Legacy Contact is still unfamiliar in Korean society, a limited demographic was used for the interview. In order to complement such limitation, the To-Be-Dead interviewees and the Bereaved interviewees were also asked several hypothetical questions on the concept of Legacy Contact to identify users' perception and potential needs as a Legacy Contact. We explored how the legacy contact manages the digital presence of the dead and investigated various aspects that consist of the legacy contact's user experience.

Records. Finally, various records were consulted to deepen our understanding of the values and insights discovered through the interviews. These records, which were in the form of writing, photographs, or music, were posted by the bereaved after the death of loved ones. The materials were willingly provided by the interviewees. These qualitative data were coded and used as additional material for the six-phase thematic analysis to create richer insights.

3.2 Findings

Below is the report of the interview findings based on the categories identified through thematic analysis.

Processing death. The processing of death begins the moment the user receives an obituary. Most interviewees received the news through digital media such as social media postings, either directly (via announcements) or indirectly (via commemorative posts). General emotional responses to the death of a close one were denial, fear, sorrow, and regret. In most cases, the emotions in response to death were often emotionally exhausting and defined as something to be recovered from.

Purposes and practices of commemoration. The purpose of commemoration was twofold: to remember and to recover. Some interviewees focused on the idea of commemoration as a tool to remember and memorialize the deceased, while others found it to be a phase that helps the bereaved to overcome their pain. Following such purposes, interviewees reported multiple commemorative behaviors. Interviewees stated that the size or form of commemoration did not matter as long as these purposes were met. “*It doesn't have to be something big. Either alone, or together, thinking about the deceased, that is a commemoration*” (B3).

Commemorative behaviors often involve a medium, which can be an object, a place, or digital remains. Some interviewees shared their experience of going through objects that belonged to or were given by the deceased to remember them by. They also commemorate by visiting the places that they used to go to together, where the deceased is buried, or where the deceased passed away. These objects were not confined to the physical realm but included digital traces such as online conversations with the deceased or social media postings.

Commemorative communities. An important part of commemoration was to form a community. These commemorative communities have two purposes: forming emotional solidarity and confirming the deceased's existence. As for the emotional solidarity, interviewees often reported the urge and experience of giving hands to the fellow bereaved to develop in them an emotional sense of belonging and engagement, along with the hope to receive one. “*I was worried about my mom. He was grandpa for me but for her, he was dad. So, I hugged her and asked her if she was okay*” (B1). Interviewees also found it reassuring to know that they were not the only ones who knew the deceased, preventing the denial of the deceased's existence by death. “*It was like confirming my own memory. This person knows him too...*” (B4).

Communities were found to break the barrier between online and offline spheres. The legacy contact interviewee remarked how he befriended the friends of the deceased at the funeral and still meets them to this day to remember the deceased. Other interviewees reported that online commemoration motivated them to attend offline funerals.

Online commemoration: pros and cons. Interviewees recounted the positive aspects of online commemoration as easy participation and collective experience. Social media lowers the barrier for commemoration and provides a shared experience between the commemorating individuals. Yet, not many interviewees were positive toward online commemoration. Much of such rejection came from the notion of online space as being more casual than offline. Many interviewees claimed to have witnessed imprudent re-

marks and were concerned for the potential belittlement of death, such as disclosing private matters of the deceased and the bereaved. An additional source of negativity toward online commemoration was related to the sensitivity of the matter and the public nature of online space. Interviewees contended that sharing such private, sensitive, and potentially negative experiences in an online environment may be inappropriate. Additionally, an interviewee expressed opposition for its being a mere replica of offline commemoration. *"We saw a lot of online memorial services due to COVID-19 this year. You just drag a flower icon and place it with your mouse. It was... I don't know, I am negative toward those"* (B3).

Using social media after death. Interviewees were interested in leaving a digital legacy for the bereaved to pick up and commemorate fond memories. When preparing for their death, they wished to organize data that can represent their identity on social media for others to utilize for commemoration, which is an example of digital volition.

There were concerns about no longer being able to control the account after death. Such apprehension was related to unwanted exposure, attacks from followers, identity thefts, and unauthorized access. In that context, the role of the legacy contact came to the fore. They wished their legacy contact to protect their accounts from being abused or bombarded with advertisements and vulgar contents, and to make announcements regarding their death and commemoration with minimal changes to the account. Users preferred to keep the contents intact and expected the legacy contact to not alter them. As for the legacy contact designation, users considered those with whom they can share their honest thoughts and emotions as candidates for their account management.

3.3 Insights and Discussion

Role of writing and community in recovery. Most interviewees responded that social media commemoration often involves posting media. The act of posting consists of two aspects: writing and sharing. The bereaved goes further than simply writing to organize their thoughts and emotions by sharing it with the fellow bereaved. We identified two motives for posting which are closely related to the two purposes of commemoration: remembrance and recovery.

Sharing memories compiles individual memories into a collective memory that the community shares. Such community-based sharing activities remind us of the Western culture of funerals, at which close friends and family members publicly recite their loving memories of the deceased to the fellow bereaved. This allows for the member of the community to find the previously unknown sides of the deceased. *"I liked it the most when someone posted a picture that I have never seen (...) When his family member posted his pictures when he was young, it really felt good. It was like seeing a side of him I never knew"* (B3).

Additionally, by sharing their emotional experience, interviewees hoped to provide a sense of solidarity to the people who are going through similar difficulties. Such behaviors are closely related to the power of support groups in grievance procedures. Existing research emphasizes the importance of individuals' sharing their experience with

peers who suffered from loss for quick recovery [27]. “*If someone is facing the same experience as I am, if that person reads what I wrote, that person might find his own way of going through with it*” (B5).

Aperiodic space for commemoration separated from daily activities.

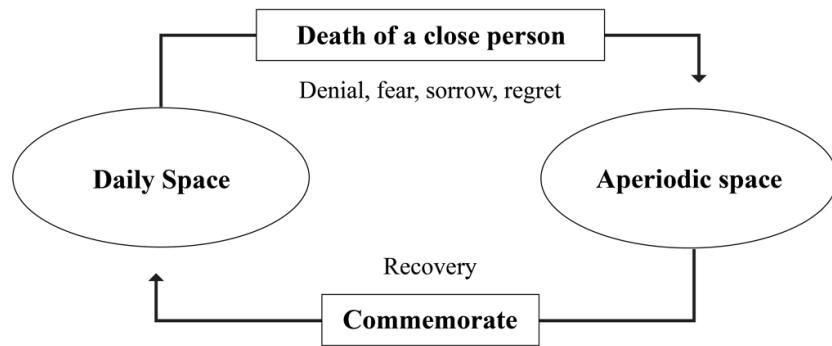


Fig. 1. Recovery process from negative emotions caused by death

Many interviewees used the phrase “returning to daily life” when they successfully recovered from the negative feelings caused by death. This suggests that while the bereaved are processing death, they consider themselves as being in an aperiodic space, separated from their daily place. The act of commemoration allows them to recover and return to their daily lives. This suggests the necessity of separated space solely dedicated to commemoration.

Fig. 1 provides a recovery process model for the bereaved after the loss of their close ones. The arrows signify the unilateral events with accompanied emotions. The main finding derived from our interviews was that the incipient agony comes from the realization of the absence of the loved ones in his or her regular daily activities. Then feelings of voidness, denial, fear, sorrow, and regret follow, irrespective of the order of occurrence. Finally, the bereaved enters the phase of eventual recovery once they have processed their feelings and emotions in an aperiodic space. This is identified as a space solely dedicated to mourning and commemoration that ultimately lessens their emotional distress. The significance is that they require a phase that is separate from ‘daily’ lives, while close enough to everyday space, to immediately return during and after the recovery. “*I think death, sorrow, and such topics are difficult to discuss in an offline daily environment. The fact that you have space to comfortably talk about those (issues) is positive*” (B4).

The separation is also important insofar as it prevents users from unwanted exposure to extreme sorrow caused by continuous exposure. “*(for the celebrity who recently passed away) I kept seeing commemorative posts on social media and it made me feel*

even sadder. The videos that commemorated them kept coming up which only aggravated my sorrow” (B2).

Changing the nature of the account after death. We observed that social media accounts were often regarded as the representation of one’s identity in the digital space—a finding consistent with existing research [14, 28]. As the account owner posts his or her thoughts via different media, the account becomes a vessel that reflects the ever-changing identity of the owner. Yet, when the owner passes away, the digital identity is no longer updated and the use of the account changes; it turns into a space that shares the news regarding the deceased, memorialize the deceased and, above all, becomes an aperiodic space visited by the bereaved for commemoration. The overall findings reconfirm previous research [18], who discuss the role of the deceased’s account as news dissemination, preservation, and community. The account also serves as a ‘notification board’ to share reasons for death or annual memorial services. Some interviewees drew a parallel between the act of creating a monument for the deceased and using their social media account. “*I think the essence of leaving something behind to commemorate someone will always be the same (...) we may only feel strange and unfamiliar since it is so new, but the act itself may not be so different in essence*” (B5).

4 Design Solution

4.1 Design Requirements

Our previous key findings included that the goal of commemoration is to recover from negative emotions and to remember the deceased, both done through posting media to share their sentiments with a community and perpetuate their memories. A ‘space’ that is familiar yet detached from everyday space, helps the users to remember and recover, given that the deceased’s account itself can be a memorializing space. Social media can reconcile technology and cultural norms with collective interactions [17] and ‘image-based’ social media can aid collective remembrance through archives of memories in visual media and sharing them with a bereaved community, given its high-level simulated social presence among other forms [31]. Thus, we have selected Instagram, a photo and video based social media, to implant a structured commemorative space. Instagram is void of death preparations, or any other commemorative supports, suitable to design a system in which the users will encounter the chance to prepare for their death and commemorate for the first time. Following are our main design requirements and key values to be considered and incorporated, jointly shown in Table 1.

A SPACE to recover and to perpetuate the memory. The system must provide a space solely dedicated to commemoration, separated from day-to-day Instagram experiences for an effective and healthy recovery of the bereaved. This space must aid the bereaved in forming a commemorative community. To do so, allowing them to post their thoughts and memories about the deceased is essential. Additionally, the system should go beyond mimicking the offline commemoration rituals, creating a system of

sincerity. Also, we must keep in mind how private these experiences are and thus provide a private commemoration outlet for the bereaved.

A SYSTEM that could set up the commemorative space before death. When creating such a space, the volition of the deceased must be of utmost priority. Thus, the system needs to ask the users what should happen to their accounts after their death. They should be able to decide whether or not they want to leave their digital identity behind after their death. Also, since users have different preferences based on their definitions of commemoration and privacy, options to fine-tune their commemorative space should be available.

A MANAGER to run the commemorative space. After the death of the account owner, it is important to have a manager who supervises and leads the running of the commemorative space and secures the account from inappropriate activities. The managers should be provided with permissions and tools that aid them in performing the tasks assigned by the deceased to aptly execute the owner's volition, but only to an extent where they do not invade the owner's privacy. Additionally, these managers should have the authority to report the death of the account owner, mitigating the currently complex death-reporting system and securing the account from falling into the wrong hands.

Table 1. Design Requirements and Key Values of the Commemorative System for Instagram

System	Requirements	Features	Values
A SPACE to recover and to perpetuate the memory	Must be separated from day-to-day experience	Commemoration Account	Recovery
	Must aid in collective commemoration in a community	Commemorative postings made by the bereaved	Remembrance Community
	Must allow the bereaved to commemorate privately	Direct Message (DM) to the Commemoration Account	Privacy
	Must be sincere and focused on the essence of commemoration	Do not simply mimic the offline commemoration rituals	Sincerity
A SYSTEM that could set up the commemorative space before death	Must prioritize the account owner's will		Privacy
	Must provide options of deleting their digital presence	Commemoration Account setup system	
	Must provide options to fine-tune their commemorative space		Volition
A MANAGER	Must be provided with the authority to run the commemorative space	Managing account for the Account Manager	Protection

to run the commemorative space	Must be able to know what the account owner wished the commemorative space to look like	Account Manager accepting process	Volition
	Must be able to report death of the account owner	Death reporting system	Security

4.2 Design Proposal and Prototype

Based on the design requirements, we propose a new conceptual commemorative system for Instagram. A functioning prototype of this system was created using Figma.

Encountering the Commemoration Account. Once the death of the account owner is reported to Instagram by the Account Manager, assuming that the owner wished to create a Commemoration Account, the original Instagram account is converted into a Commemoration Account. Here, the bereaved can use various features to remember the deceased and recover from emotional distress. The detailed and collective snapshots of how users see the Commemoration Account is provided in Fig. 2. The user interface on the very front page of the account presents the Commemoration Account indicators (Fig. 2-A). It first displays a pop-up to alert that this is a Commemoration Account to raise awareness and familiarize users with the system. To help the followers readily recognize the account's status as a Commemoration Account, the account is labeled 'Remembering.' Unique technical features such as 'Create a Commemoration Post' and 'Contact Manager' are easily seen and incorporated on the profile page.

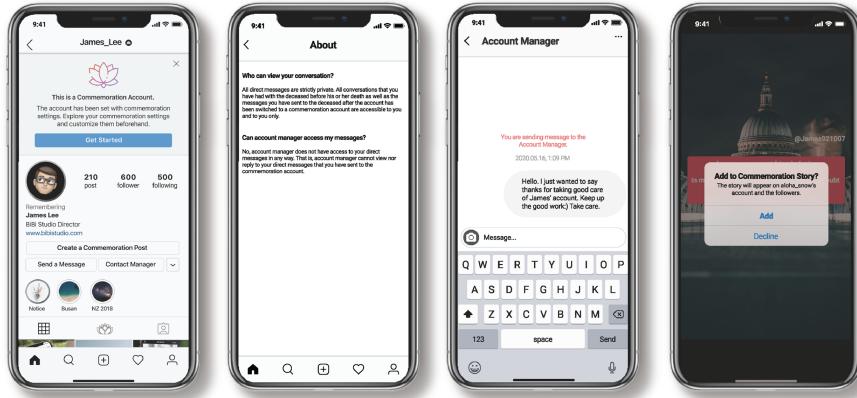


Fig. 2. (A) Encountering the Commemoration Account **(B)** Notification when sending the Direct Message **(C)** Contacting the account's Account Manager **(D)** Posting a Commemoration Story

In the Commemoration Account, followers can directly post commemorative posts on the commemoration tab by tapping “Create a Commemoration Post.” This allows followers to directly post feeds on the Commemoration Account to enable a more active and affluent commemorative interaction, ultimately creating a community of commemoration. Created posts are archived on a separate tab within the profile page.

The bereaved could also create a commemorative ‘story’ by tagging the Commemoration Account (Fig. 2-D). When someone tags a Commemoration Account in their story, they can choose to share it with the deceased’s followers. If they choose to share it, the story will appear on the Commemoration Account. Followers can also send DMs to the deceased privately (Fig. 2-B). Through the button “Send a Message,” they will be able to talk to the deceased or recall memories by looking at their previous conversations. A privacy notice will be provided to let followers know that this DM is private, meaning that it cannot be accessed by anyone else—not even the Account Manager. Additionally, followers can contact the Account Manager if needed (Fig. 2-C).

Setting up the Commemoration Account. Commemoration Account setup process is required for the users to enact their volition before death. A brief and concise walkthrough is provided with a preview for the users to familiarize themselves with the concept of Commemoration Account. General settings are provided to select whether the users wish to leave their digital traces and to what extent. A more ‘advanced’ settings are provided during the customization section to accustom their detailed preferences to their account after death. Fig. 3 provides the snapshots of each procedure to set up the Commemoration Account.

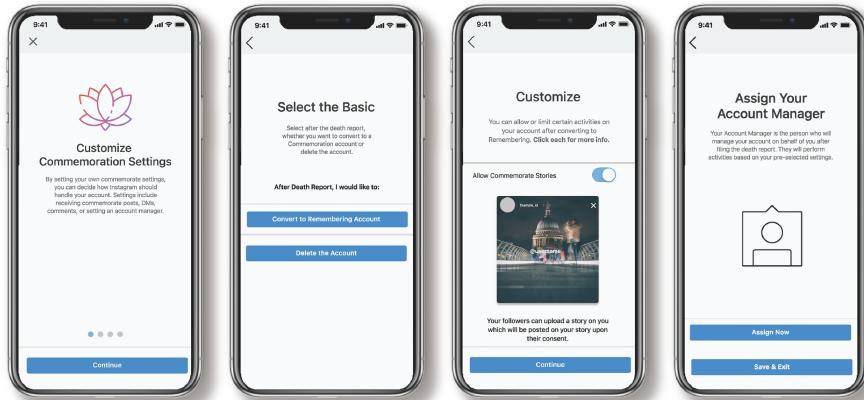


Fig. 3. (A) Commemoration Account Walkthrough (B) Commemoration Account Basic Settings (C) Commemoration Account Customization (Fine-Tuning) (D) Account Manager Assignment

The setup screen can be accessed by tapping on the pop-up that appears on other Commemoration Accounts, or through Instagram’s account settings menu (Fig.2-A). When

the user enters the setup menu, he or she will go through a tutorial on how to set up the Commemoration Account (Fig. 3). Users can either delete the account or create a Commemoration Account after their death (Fig. 3-B). Should users choose to create a Commemoration Account after their death, they can allow or limit certain activities according to their preferences; for example, they can decide whether they wish to receive commemoration posts, stories, DMs, comments, and new followers (Fig. 3-C). Users can always revisit the setting to edit their preferences. They are also asked to assign an Account Manager, who will file their death report and run their Commemoration Account according to their will (Fig 3-D). Users can precisely set the Account Manager options to allow or limit certain activities for the manager.

Managing account for the Account Manager. The Account Manager is the legacy contact assigned by the account owner during his or her Commemoration Account setup. Provided that the Account Manager has accepted the request and filed the owner's death report, the Account Manager specialized account is generated for he or she can switch between his or her account by clicking the profile. The Manager performs a series of tasks to run and manage the account for the bereaved under the volition of the account owner. Fig. 4 displays the snapshots of the series of activities that can be performed by the Account Manager.

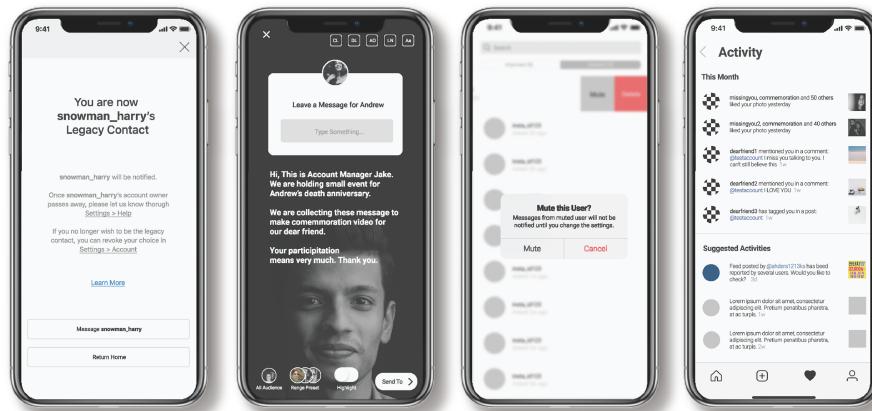


Fig. 4. (A) Accepting the role of Account Manager (B) Posting of management-related stories (C) Managing Direct Messages and the list of Followers (D) Activity tab to alert general notifications as well as suspicious activities for the Account Manager to manage

Once the account owner requests a user to become an Account Manager, a push notification is sent. Accordingly, the Manager goes through a brief guidance to what are the key roles and settings left for the Manager to perform, under his or her own willingness. After the acceptance, a notification is sent to the owner, and the system directs the user to send a DM to the owner to express his or her thoughts and emotions, as well as to

discuss further details (Fig. 4-A). When the Account Manager discovers the death of the account owner, he/she can report it to Instagram. Once the report goes through, the Commemoration Account is activated, and the Account Manager can log into the managing account (Fig. 4-D). We expect their roles to be about creating a safe and sincere commemoration platform for the bereaved and honoring the deceased. Block and report functions are also provided to help the manager efficiently run the account.

The manager is expected to respond to inquiries through the manager DM (Fig. 4-C). The manager DM is separated from the deceased's original DM, meaning that this function is solely dedicated to answering inquiries from the followers. The bereaved will be able to ask questions on diverse matters such as funeral events or how to commemorate in the Commemoration Account. Lastly, the Account Manager can utilize the story feature to deliver a wide range of content such as—but not limited to—general announcements, anniversaries, and any other information that is deemed important (Fig. 4-B). One story highlight—an Instagram feature that stores the stories after 24 hours if the user wishes—can be generated to keep the important notices.

5 Evaluation

5.1 Methods

We conducted six user testing sessions on the newly proposed system, based on the three main systematic features. Six Instagram users in their 20s were recruited and were asked to use the prototype and were interviewed intensively before and after the task to investigate perception and acceptance. Each test was conducted through Zoom and lasted between 60 and 90 minutes. The session was recorded and transcribed under consent for analysis. General aims and instructions for each feature are guided as below.

Setting up the Commemoration Account. We aimed to see how participants engage in learning the primary ways to access commemorative settings and set up a Commemoration Account. They were told to identify the entry point for the Commemoration Account setup and customize their account based on our system. They were also asked to assign an Account Manager and decide on his or her scope of responsibility.

Managing the account as an Account Manager. We aimed to explore how participants engage as Account Manager, from accepting the role to performing the given roles. Participants were asked to take a glance at what an Account Manager can do with the account and how it can altogether affect the commemorative interactions of Instagram and its environment.

Commemorating with the Commemoration Account. We aimed to discover how participants utilize different features of the Commemoration Account. They were given access to different ways of commemoration and were asked to widely utilize diverse options while voicing their impressions and thoughts aloud.

5.2 Results

We investigated the users' reactions to the system's concept as well as the comprehensive responses to each specific feature. Participants recognized the importance of the system and were positive about the idea of being able to decide what to happen to the account after death. They also found the proposed system suitable for commemoration for it allows them to share memories in a space dedicated to the deceased and helps recover from grief through the given commemorative features. Below are the detailed results of the user testing sessions investigated through thematic analysis [26].

Chance to Contemplate Death. The account setup process provided users with a unique opportunity to contemplate death. As the participants were in their 20s, they reported that they have rarely thought about their death let alone what would happen to their social media account after death. Going through the setup procedure for the Commemoration Account, they were given the chance to ponder their existential objectives and ideals. They asked themselves how they want to be remembered, how they want their friends and family to commemorate them, and who they trust the most to give the position of the Account Manager.

Volition Before Death. Participants were also satisfied with how detailed the setup process was. Since users are obviously unable to change the settings after their death, they desire to have control over even the most minute details. When it comes to designing their deaths, users do not appreciate the service making decisions for them.

The necessity of an Account Manager was highlighted when users deemed the function necessary, for they felt that someone must have the capacity and responsibility to ensure, as a safety measure, that the account is upheld. A participant said that "*someone has to have the wheel to ensure that the car keeps running as a safety measure*" (P2).

Varying Expectations on Account Manager's Role. Users' desires for the role of Account Manager vary vastly. Some users wish for theirs to actively lead the commemoration and hold events, while others wish for their Account Manager to simply look out for information abuses. Given individual disparities, participants emphasized the importance of communication between the Account Manager and the account owner. The function that enables their conversation is helpful since it also establishes the premise of manager authority and duties, while it could be improved via intuitive walkthrough of their duties and owner's volition. Some also expressed concerns about the feature of the Account Manager. They wondered what would happen if the Account Manager passed away or found themselves incapable of managing the account, as already addressed [21]. Additionally, some participants found it uneasy to have no other safety measures other than personal trust toward the Account Manager to run the account and to protect their digital identity.

Commemoration Account as an Aperiodic Space. Users wished for the Commemoration Account to be made very different in relation to the current Instagram profile page so that they could easily acknowledge that they are in a space of commemoration.

In anticipation of sorrow caused by continuous exposure to the Commemoration Account, they also wanted the option to mute it if needed. Such a reaction once again confirms the importance of creating a separate aperiodic space devoted to commemoration, parted from daily Instagram activities.

Space for Sharing. Users found the function of commemorative posting very intriguing. They expected that such participation will not only foster stronger emotional commemoration but also encourage interactions amongst the followers, creating a community of commemoration. Additionally, participants expressed the aptness of Instagram as a commemoration tool because it is a photo-based social media. Users expected that should someone wish to make a commemorative posting, they must upload a picture, which will enable reminiscence for the fellow bereaved. A participant reported that Commemoration Account “*feels like an opportunity for users to share warm feelings and emotions, decreasing the fear and sorrow of death*” (P1).

6 Discussion

There exist valuable discussion points regarding the identified values of each stakeholder and their relationships with the qualities of social media. We discuss to what extent its role can make the online commemoration functional and effective, as well as the potential prerequisite to future studies.

6.1 Social Media—Apt Tool for Commemoration

This research unveiled the possibility of social media as an apt tool for death preparation and commemoration. As we utilize social media daily, we are archiving our identity and ingredients to be memorialized on our social media. This readily prepares a space that could be used for commemoration in the future. It also reaffirms the existing research that introduced the broader concept of hosting funerals through Instagram, creating a less formal and less institutionalized ritual [30].

It was also discovered that community and interpersonal relationships are key elements in commemoration. As social media is already a place where friends and family members establish, strengthen, and continue their relationships, it is an efficient tool to gather the bereaved together. Such findings are consistent with the previous report by Contentworks Agency [31], which identified a sense of belonging and love as one of the prime motivations for posting on social media.

6.2 ‘Living Forever’ (Perpetual Communication)

Our finding also corresponds to the proposition of Moore, Magee, Gamreklidze, and Kowalewski [15], in which mourners use social media for immortality communication and connection with the deceased. As Bassett [10] argues, immortality is no longer an option confined to pharaohs or kings and is available for everyone through digital tools.

Participants affirmed their desire to be remembered forever by the loving people and found our system an appropriate modern adaptation of realizing such a desire.

The users' desire went beyond perpetuating their existence to communicating with the people they cared for after they die. Surprisingly, four out of six user testing participants suggested the feature of 'scheduled posting' in which they create posts to be uploaded after their death. An interesting point is that this communication is technically one-way. Despite not being able to hear back, the users expected to send a final message (or multiple messages annually) to the bereaved and considered it a communication. In a way, they are communicating without their physical presence and only digitally. Further research is necessary on how the users perceive and define the concept of communicating with the dead, and on the root of the desire to communicate with the living.

6.3 Enriched Bonding and Mutual Respect

In reaching the goal of commemoration, personal relationships are significant. Users collectively memorialize the deceased by gathering fragmented memories that each member possesses and actively aiming to help others recover. Such behaviors could be linked to the concept of 'technospirituality', which contends that such spiritual bonding could take place in daily life among the bereaved [14]. This once again emphasizes the importance of social media as a link for friends and families [32].

In addition, the relationship between the account owner and the Account Manager is also found to be extremely important. The act of asking one to become an after-death Account Manager and accepting that role could potentially become a huge bonding experience in which two people show mutual trust and loyalty. Thus, the system needs to create an environment that encourages these two to communicate intensively. Further, as it is almost solely dependent on the goodwill of the Account Manager, we must not overlook the chance of an Account Manager not being available for the duties and should prepare safety measures to realize the volition safely and sincerely.

6.4 Memento Mori and Amor Fati.

Discussing the topic of death using daily social media service provoked users to ponder diverse existential topics. Users were able to think about how they want to be remembered and commemorated, who will take care of the digital traces they leave behind, and to what extent they want to secure their existence. While death is an experience that all humans will experience, the majority of the research participants were fairly unfamiliar with discussing the topic of their death, let alone its stance and treatment in social media. On such a note, using daily technology to give the users a chance to think and plan their death is a new possibility for a thanatosensitive design. Designers and technicians should go further than simply developing functions after death, and instead aim to guide users to think about their existential reality, social volition and the moment they are living in through the topic of death.

While death and technology co-exist in our lives, many users fail to consciously acknowledge this reality. Thus, the system needs to surface these ideas to the users and

encourage them to employ conscious choices about what will happen to their digital presence after their death. In doing so, the system promotes a greater degree of responsibility among users. Such discussion points are also in line with previous research on mortality and reflective design, as the reflection itself becomes a form of the design outcome and allows users to bring unconscious values and cultural norms to the surface and make choices consciously [33–35].

6.5 Limitations

There exists a number of limitations. The VSD methodology could have been further investigated prior to the exploratory study. While it did attempt to transcend technical constraints for a value-sensitive commemoration, the main purpose of our VSD approach was to mainly understand and incorporate the values of each stakeholder. Additionally, the present research was conducted on a narrow pool of participants that consisted of adults in their 20s living in the Republic of Korea. We involved a young group of people as the participants who have existing familiarity and adaptive ability with social media, but we also must acknowledge the results can drastically vary with different age groups. Death is also a topic that involves multiple perspectives and explanations in different cultures; thus, it is difficult to generalize the results of the study globally. An ethnographic and cross-cultural approach is prerequisite to future studies.

7 Conclusion

Our research empirically explored the topic of death and social media via assessing the potential of social media as a space for death preparation and commemoration. The findings suggest that social media is a prospective platform to memorialize one's identity and convalesce through the commemorative community. As the research was largely based on the conceptual and value-sensitive system design of an existing service, we were able to observe users' reactions in a realistic manner and provided a potential guideline to shape a novel culture of commemoration and death preparation.

At an age where technology is actively shaping our daily lives, we discussed how the universal experience of death could be mediated through the lens of technology and social media. We hope that our findings provide for a deeper understanding of human behaviors regarding the concept of death in the sphere of social media, ultimately helping to shape a more positive commemoration and death preparation experience.

References

1. Massami, M., Odom, W., Kirk, D., & Banks, R. (2010). HCI at the end of life: understanding death, dying, and the digital. *CHI '10 Extended Abstracts on Human Factors in Computing Systems*, 4477–4480. <https://doi.org/10.1145/1753846.1754178>
2. Massimi, M., & Charise, A. (2009). Dying, Death, and Mortality: Towards Thanatosensitivity in HCI. *CHI EA '09: CHI '09 Extended Abstracts on Human Factors in Computing Systems*, 22459–22468. <https://doi.org/10.1145/1520340.1520349>

3. Massimi, M., Moncur, W., Odom, W., Banks, R., & Kirk, D. (2012). Memento mori: technology design for the end of life. In CHI'12 Extended Abstracts on Human Factors in Computing Systems (pp. 2759–2762).
4. Gauler, M. (2006). Digital Remains [Design Output]. Museum of Modern Arts, New York, New York.
5. Kirk, D., & Banks, R. (2008). On the design of technology heirlooms. SIMTech'08.
6. Malkin, E. (2006, November). Cemetery 2.0. Dziga.Com. <http://dziga.com/hyman-victor/>
7. Uriu, D., Takahiro, O., Naohito, S., & Naohito, O. (2006). MASTABA: the household shrine in the future archived digital pictures. SIGGRAPH '06: ACM SIGGRAPH 2006 Sketches, 151-es. <https://doi.org/10.1145/1179849.1180038>
8. Häkkilä, J., Colley, A., & Kalving, M. (2019, June). Designing an interactive gravestone display. In *Proceedings of the 8th ACM International Symposium on Pervasive Displays* (pp. 1-7).
9. Wiley, C., Wang, Y., Musselman, R., & Krumm, B. (2011, July). Connecting Generations: Preserving Memories with Thanatosensitive Technologies. In International Conference on Human–Computer Interaction (pp. 474–478). Springer, Berlin, Heidelberg.
10. Bassett, D. J. (2015). Who wants to live forever? Living, dying and grieving in our digital society. *Social Sciences*, 4(4), 1127–1139.
11. Ellis Gray, S. (2015). Remains in the network: reconsidering thanatosensitive design in loss (Doctoral dissertation, Lancaster University).
12. Barve, M., & Bhale Rao, J. V. (2017) Discourse Centered Online Ethnography (DCOE) study to understand online mourning on Social Networking Sites (SNS) and Thanatosensitivity.
13. Bovero, A., Tosi, C., Botto, R., Fonti, I., & Torta, R. (2020). Death and Dying on the Social Network: An Italian Survey. *Journal of Social Work in End-of-Life & Palliative Care*, 16(3), 266–285.
14. Brubaker, J. R., & Vertesi, J. (2010, April). Death and the social network. In *Proc. CHI Workshop on Death and the Digital*.
15. Moore, J., Magee, S., Gamreklidze, E., & Kowalewski, J. (2019). Social Media Mourning: Using Grounded Theory to Explore How People Grieve on Social Networking Sites. *Omega*, 79(3), 231–259.
16. Krysinska, K., & Andriessen, K. (2015). Online Memorialization and Grief After Suicide. *OMEGA—Journal of Death and Dying*, 71(1), 19–47. <https://doi.org/10.1177/0030222814568276>
17. Wagner, A. J. M. (2018). Do not Click “Like” When Somebody has Died: The Role of Norms for Mourning Practices in Social Media. *Social Media + Society*. <https://doi.org/10.1177/2056305117744392>
18. Rossetto, K. R., Lannutti, P. J., & Strauman, E. C. (2015). Death on Facebook: Examining the roles of social media communication for the bereaved. *Journal of Social and Personal Relationships*, 32(7), 974–994.
19. Brubaker, J. R., Hayes, G. R., & Dourish, P. (2013). Beyond the Grave: Facebook as a Site for the Expansion of Death and Mourning. *The Information Society*, 29(3), 152–163. <https://doi.org/10.1080/01972243.2013.777300>
20. Elliott, A. (2014). Death and social media implications for the young and will-less. *Jurimetrics*, 55, 381.
21. Maciel, C. (2011). Issues of the Social Web Interaction Project Faced with Afterlife Digital Legacy. In: *Proceedings of IHC+CLIHC 2011*, 2-12. ACM Press.
22. de Toledo, T. J., Maciel, C., Muriana, L. M., de Souza, P. C., & Pereira, V. C. (2019). Identity and volition in Facebook digital memorials and the challenges of anticipating interac-

- tion. IHC '19: Proceedings of the 18th Brazilian Symposium on Human Factors in Computing Systems, 1–11. <https://doi.org/10.1145/3357155.3358454>
23. Jamison-Powell, S., Briggs, P., Lawson, S., Linehan, C., Windle, K., & Gross, H. (2016, May). "PS. I Love You" Understanding the Impact of Posthumous Digital Messages. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 2920–2932).
 24. Umbrello, S. (2020). Imaginative Value Sensitive Design: Using Moral Imagination Theory to Inform Responsible Technology Design. *Sci Eng Ethics* 26, 575–595.
 25. Friedman, B., & Hendry, D. G. (2019). *Value Sensitive Design: Shaping Technology with Moral Imagination* (The MIT Press) (Illustrated ed.). The MIT Press.
 26. Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International journal of qualitative methods*, 16(1), 1609406917733847.
 27. Forte, A. L., Hill, M., Pazder, R., & Feudtner, C. (2004). Bereavement care interventions: a systematic review. *BMC Palliative Care*, 3(1), 3.
 28. Braman, J., Dudley, A., & Vincenti, G. (2011, August). Death, social networks and virtual worlds: a look into the digital afterlife. In *2011 Ninth International Conference on Software Engineering Research, Management and Applications* (pp. 186–192). IEEE.
 29. Pittman, M., & Reich, B. (2016). Social media and loneliness: Why an instagram picture may be worth more than a thousand twitter words. *Computers in Human Behavior*, 62, 155–167. doi:10.1016/j.chb.2016.03.084
 30. Gibbs, M., Meese, J., Arnold, M., Nansen, B., & Carter, M. (2015). # Funeral and Instagram: death, social media, and platform vernacular. *Information, Communication & Society*, 18(3), 255–268.
 31. Contentworks Agency. (2018, October 24). The Psychology of Social Sharing—Contentworks Agency. Medium. <https://contentworks.medium.com/the-psychology-of-social-sharing-82be5fe08436>
 32. Leaver, T. (2015). Researching the ends of identity: Birth and death on social media. *Social Media+ Society*, 1(1), 2056305115578877.
 33. Foong, P. S., & Kera, D. (2008). Applying Reflective Design to Digital Memorials. *SIMTech'08*.
 34. Kaptelinin, V. (2016). Making the Case for an Existential Perspective in HCI Research on Mortality and Death. *CHI EA '16: Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, 352–364. <https://doi.org/10.1145/2851581.2892585>
 35. Sengers, P., Boehner, K., David, S., & Kaye, J. J. (2005, August). Reflective design. In *Proceedings of the 4th decennial conference on Critical computing: between sense and sensibility* (pp. 49–58).