Media, Meaning, and Context Loss in Ephemeral Communication Platforms: A Qualitative Investigation of Snapchat

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ABSTRACT

Most social media platforms are persistent in nature, enabling users to re-visit content at their discretion. Platforms with design features that support ephemeral communications, such as Snapchat, have become increasingly popular. During the course of our empirical study, we interviewed 15 Snapchat users about their experiences and practices. Our data reveal that Snapchat users experienced different types of loss, including *media, meaning, and context loss,* and developed workarounds to deal with those losses, including *preemptive action* and *collaborative saving practices*. Our findings revealed a conflict between the user's expectation of the affordance the ephemeral platforms would provide, and the actions user's followed.

AUTHOR KEYWORDS

Ephemerality; persistence; media practices; media loss; meaning loss; context loss; social media; Snapchat; ICT.

ACM CLASSIFICATION KEYWORDS

H.5.m. Information interfaces and presentation (*e.g.,* HCI): Miscellaneous;

INTRODUCTION

Millions of people are adopting social media platforms, like Snapchat, Wickr, and Silent Circle, that allow them to send ephemeral communications, including texts and media [3,5,22]. By ephemeral communication platform, we refer to social media platforms that enable interpersonal communications, but do not by default permanently store them. Communications on these platforms cannot be easily saved, and the amount of time to view them is frequently constrained. These platforms are often lightweight

mediums for sharing spontaneous, mundane experiences with close social ties [3]. People often use them because they foster fun and fleeting interactions, while their impermanence supports privacy [1,3,11,17].

In this paper, we examine people's usage of Snapchat, an ephemeral communication platform and mobile application. Snapchat allows people to share photos or videos that, because they are time-limited, eventually disappear. Per their designers, Snapchat communications are meant to "…. make conversation[s] more spontaneous, visual and fun!" [5].

In this work, we examine the relationship between ephemerality and loss. Despite the fact that people who use these systems understand and expect that their communications will be transient and ephemeral, they still experience forms of loss associated with the platform's ephemeral aspects. Our data suggests that people have complicated social needs for persistence and ephemerality. Related work has focused on the impact of ephemeral communication in interpersonal relations [6,10,20], but very little research has investigated how people understand and respond to loss with these social media platforms. A better understanding of how ephemeral communication platform users experience loss and how loss affects their relationships to content and media will provide important resources to re-think not only how information is stored and shared, but also the way users deal with the information as a whole.

In what follows, we explain in depth what Snapchat is and how its design affords ephemeral communication. Next, we situate this work in the literature on ephemeral and persistent data in social media. Next, we present our empirical findings of three types of loss participants experienced: *media loss, meaning loss, and context loss*. We use *media loss* to refer to the loss of an artifact, for example, a photograph. *Meaning loss*, meanwhile, refers to the loss of emotional and social significance of the shared content. Finally, *context loss* refers to a lack of understanding of the conversation's flow. Following the different types of loss, we discuss the strategies participants employed to cope with the aforementioned loss. Lastly, we present a discussion on social media and ephemerality and our conclusions.

SNAPCHAT & EPHEMERALITY

Media and information ephemerality is not a new topic, but has gained attention with a small number of ephemeral communication platforms (*e.g.,* Snapchat, Silent Circle, and Wickr) which have recently grown in popularity [27]. Snapchat, available as a mobile app on iOS and Android, launched in 2011 (under the previous name Pictaboo), [7] and has attracted over 100 million users worldwide [16]. Reaching more than 60% of US smartphone users between the ages of 13 and 34 [22], it has achieved an exceptionally high adoption rate for teenagers and young adults. Often, people use Snapchat to communicate with friends, maintain relationships, provide co-presence by sharing "slices" of their life, and share content that they consider fun or creative [3,27].

Like many messaging applications, Snapchat allows users to send text and media, specifically pictures or videos that can be augmented with text and filters, which are called "snaps."[1] Snapchat's ephemerality distinguishes it from other messaging services; the service does not save media, and limits viewing times for snaps.

In a typical scenario, the user captures a snap or video (limited to 10 seconds) using the application camera, and adds text labels, emoji's or filters before sending it to a particular friend or posting it on their "Story". The receiver is allowed to view the received snap for a limited period of time (up to 10 seconds, defined by the sender) after which the snap is no longer accessible to the receiver.

Snapchat reinforces ephemerality through the design of core features; this is most evident in the exchange of snaps that are only visible for a small amount of time, after which the media is deleted from the devices and no longer viewable [15]. Typically, users take photos or videos using the application, and then specify the number of seconds (up to ten) for which the recipient is allowed to view the content. After this time, the content 'disappears' (*i.e.,* it is no longer accessible via the Snapchat user interface), and the recipient can no longer see it [5,22,27]. Each user can configure their settings to specify a default for the snaps they send, or the view time can be changed when they send an individual snap.

Snapchat allows a user to save photos they take, but this is far from the default behavior. With this application users can press a button to save the picture before sending it, [27], but this button is not part of Snapchat's functionality. Users cannot save or forward snaps they receive through the application. Instead, they have discovered that they can use the device's built in screenshot function to "save"

[1] Throughout this paper we use "snap" or "snaps" to refer to the media and "Snapchat" to refer to the application and platform.

media snaps to the device. This workaround has enabled users to save and forward snaps. In response, and in order to preserve norms around ephemerality, Snapchat now identifies when a recipient takes a screenshot of a snap and alerts the sender.

Despite the design features that support ephemerality, Snapchat has introduced two notable features that enable users to revisit snaps. First, Snapchat released the Stories feature in 2013, allowing users to create a personal sequence of snaps from the last 24 hours that are available to all of a user's contacts. Second, the Replay feature, also released in 2013, allows users to replay the last snap received from a contact [7,22]. Thus, while ephemerality is its main design metaphor, Snapchat's new features support a degree of content persistence.

As ephemeral platforms grow in popularity, it brings new challenges to the design and development of communication platforms that adopt this paradigm. We examined people's experiences and practices with such applications.

Imagine a common use scenario of Snapchat, in which two friends share snaps throughout the week, maybe three or four per day. At some point, one of them tries to remember part of the conversation. He recalls sending a snap to his friend, but cannot remember why, or exactly when. Since neither friend can review or restore the shared content, both might feel a sense of loss and frustration.

This paper investigates how and what types of loss Snapchat users experience, and what strategies they adopt to deal with those losses.

EPHEMERAL & PERSISTENT DATA IN SOCIAL MEDIA

Prior work has highlighted information, data, and communication as always to some degree ephemeral. From face-to-face interactions to paper registers, each medium has a different expected time frame of persistence [4,20]. Over the last 15 years, as the internet has become a common medium for personal expression and communication, we have seen that people's expectation of data persistence greatly increased, where the default offered tends towards saving rather than deleting [20]. Researchers often describe the "networked publics" created by social network sites and social media more generally as having four interrelated key features: persistence, searchability, replicability, and scalability [5]. These four features have fundamentally shaped both the design of social media, as well as its users' expectations.

While there can be a large social benefit to automatic data and information saving [10,12,23], an overabundance of persistent media has led to new risks and problems. Some have argued that the ability to persist data has resulted in a loss of the ability to forget, which is replaced by information-seeking and recovery practices [4,17]. Changes in how much control users have over content is associated with new concerns over access permissions, secure storage,

and data privacy [4]. An unflattering photo or highly-contextual status update can be misinterpreted and damage a person's reputation. In more extreme cases, persistent data can negatively impact people's job prospects or social lives [13,25]. Further, now tacit assumptions of persistent information have changed the way users approach content; over the years' users have been conditioned to believe that the content on the web will always be there. Users may need to archive and access their growing collections of media, but are unmotivated to invest personal time and effort into manually organizing their collections; they require automated methods for managing these media libraries [10,14].

In response to persistent data's potential risks, a number of services have designed their platforms around ephemeral data. Methods for making data ephemeral vary, including "off the record" chats and expiration dates for shared content. By changing the affordances around persistence (and subsequently other features of networked publics), ephemeral platforms, such as Snapchat, create new relationships to audience, context, and public/private boundaries. The rise of ephemeral communication platforms conflict with our expectations of data access and use. As our ability to collect, store, and process data increases at an unprecedented rate, so does our desire to ask questions about previously held data [21,23,23].

The constraints and new affordances of ephemeral communication platforms have facilitated distinctive sharing practices that emphasize in-the-moment and brief communication [27]. Ephemeral data lends itself to more casual communication practices and the private sharing of content. However, ephemeral data is not entirely impermanent. During the albeit brief interval of time when content can be viewed, it can be duplicated and published [2].

The ability to persist data, even when it is shared via an ephemeral platform, may result in conflicting expectations, such as when a user tries to adapt persistent practices to save and refer back to ephemeral content. Our study of loss investigates how expectations of ephemerality and persistence directly impact how users manage content/media in the ephemeral platform, resulting in experiences of loss and the adoption of strategies to circumvent the ephemerality.

METHODS

The initial methodological challenge for designing this research was that analyzing the shared content itself would be difficult, given the data's ephemerality. Yet, since our primary interest was in gathering insights related to users' experiences with loss of data and their sentiments towards it, we designed an exploratory qualitative study based on semi-structured interviews with the participants. Prior to conducting the interviews, researchers drafted and piloted the interview protocol with open-ended questions related to the participants' experiences of data loss.

College students and young professionals in the Indianapolis area from the age range 18 to 31 (M: 23.3y; SD: 2.75) were recruited via social media and phone. Three researchers conducted these interviews with 15 people (8 women; 7 men) that actively used Snapchat over the course of two weeks in December 2015. Participants in this study had been using Snapchat for as little as two months to as long as three and a half years (M: 1.25y; SD: 0.94).

We followed a semi-structured interview protocol, with emphasis on gathering insight related to participants' ephemeral social media practices and their experiences related to loss, which are discussed in depth in the data analysis section to follow. Questions such as, *what do you think of communication platforms that delete your data after some period of time (examples: Snapchat, Wickr, Silent Circle, etc.)? What are your thoughts on losing data in general? What are your thoughts on not having control over what data is lost or saved?* gave us insight into the participants' practices and perceptions of ephemeral platforms. Questions such as, *are there types of media data that are more important or valuable to you*? helped categorize the data into three distinct categories that we describe in the data analysis section of the paper. Directed follow-up questions such as, *do you think it is important or useful for the data to be recoverable? Why or why not?* highlighted the contradiction in participants' practice and their sentiments towards ephemeral communication platforms.

We transcribed the recorded conversations for deeper analysis of the gathered data. Then, two of the authors conducted open-coding on the transcribed interviews. During weekly meetings with the research team, they discussed emergent themes and insights, which included participants' Snapchat practices, interactions, strategies, and the complex relationship of when participants engaged in practices to engender more ephemeral or persistent media experiences. Our initial codes focused on the types of loss described by our participants, and subsequent coding and memoing helped distinguish the relationship between the types of loss described and strategies for addressing or preempting actual or potential loss.

MEDIA, MEANING, AND CONTEXT LOSS

There are many reasons why people use ephemeral media applications in their day-to-day activities (*e.g.,* desire for private conversations; the fun and fleeting interactions ephemeral platforms provide) [3,4,11]. People tend to use multiple social media platforms, and our data indicates there are conflicting norms and expectations across these platforms. We found that even though people expect media and communication on platforms like Snapchat to be fleeting, nonpermanent, or ephemeral, people still sometimes want to save and recover certain media.

In this section, we look at three types of loss experienced by participants: *media, meaning, and context loss*. We use *media loss* to refer to the loss of an artifact, such as a

photograph. *Meaning loss*, meanwhile, refers to the loss of emotional and social significance of shared content. Finally, *context loss* refers to a lack of understanding of the conversation's flow. We then discuss the strategies participants employed to deal with the losses.

Media Loss

All of our participants experienced *media loss,* the loss of an artifact, while using Snapchat—after all, loss is a feature of the platform. However, in our analysis we focused on scenarios in which participants reported surprise, frustration, and/or regret with media loss. This form of media loss was common—both when sending and receiving snaps—which may reflect prevailing norms across other social media platforms, where media is automatically saved [4,12,20].

Participants certainly understood that the media sent and received would be lost, however, that did not preclude them from experiencing a sense of loss. One major reason is that while Snapchat is premised on loss, that loss is not guaranteed. Previous work has discussed the practice of taking screenshots to save snaps [5,11,27]. When discussing media loss, our participants focused on the snaps' view time as a core component of producing more ephemeral or persistent media experiences. Snaps have a customizable view time for the recipient (*i.e.,* one to ten seconds), after which the snap is no longer viewable. When the view time is short, it can be purposefully challenging to "save" a snap with the mobile device's screen shot feature:

> *My friend and I try to send the most unflattering selfies and I have pretty great ones that I could have used later but it disappeared too quickly [two seconds] and I couldn't get them. - Alexia, 22*

Rather than attributing these losses to the platform, participants often talked about the sender's choices in terms of view time and their own inability to take a screenshot within the allocated time. This was especially pointed when participants discussed risqué photos, for which users intentionally severely constrained view time to discourage attempts at saving:

> *Some people know that you will take a screenshot of the snap so they make the timer so fast that you can't take one. - Steve, 23*

Since users control the ephemerality of the platform by reaching a common understanding with people before capturing a snap, the control over when and how a snap is ephemeral is shared across individuals. In these cases, the interpersonal relationship shapes the expectations around ephemerality. As individuals respond to each other, they co-develop norms about how and how long to share media to foster different types of media experiences.

Loss was not limited to the snaps our participants received. Participants also discussed losing media they sent. Snapchat allows users to save a snap they are about to send, but only by toggling to save before posting each snap. Given the speed at which people send and reply to snaps, almost all participants complained about forgetting to save their own snaps.

> *Sometimes I send out my snaps too quickly, and after I send it I think 'Damn! that was a good photo; I should have saved it. - Felix, 21*

Frequently, participants realized too late that the media they wanted to share was not available because they did not save it. In 2013, Snapchat introduced the Replay feature to partially address media loss. The Replay feature only applied to the most recent snap received, and people could not review older snaps. If a user received several snaps in quick succession, only the most recently received snap could be replayed. Another point to note here is that the Replay feature does not work for snaps sent by the user. While this may help in slower conversations, often the speed and quantity of snaps sent, as Felix described, renders the Replay feature ineffective.

Participants' expectations of persistence and ephemerality evolved throughout the course of each interview. Participants were accustomed to more persistence in media management, since this has been the prevailing norm, and expressed dissatisfaction with their inability to save or recover media in Snapchat. Ronaldo, for instance, when asked what he liked about Snapchat, initially highlighted the content's ephemerality.

> *I like the fact that I can text people and it doesn't save the conversation. It [Snapchat] gets rid of it and others [i.e., other platforms] don't. - Ronaldo, 26*

Later on during the interview, though, when asked about his experience on the platform, he expressed negative emotions about media loss, revealing a desire for both ephemeral and persistent media.

> *It happens quite a lot [not saving a snap]. I feel bad when I lose it. - Ronaldo, 26*

Ronaldo's desire for both ephemerality and persistence exemplifies many of our participants, and harkens to the complex social needs people have around their use of information and communications technology (ICTs). People have conflicting expectations of Snapchat in use, even though they understand that it is an ephemeral platform and use it for that reason. These expectations stem from people's need to emotionally and socially connect with each other. In the following sections, we detail the emotional and social significance of the snaps as we discuss how and under what contexts participants experienced meaning loss.

Meaning Loss

While media loss, such as an unsaved photograph in Snapchat, invokes users' conflicting desires for persistence

and ephemerality in a social media context, the loss often extends beyond issues of raw data and media management. Here, we focus on the loss of emotional and social significance of the content sent over Snapchat, and the subsequent *meaning loss* that accompanies media loss.

Prior work has highlighted the social and emotional significance that platforms like Snapchat foster. Bayer *et al.* found that people typically shared mundane content with their strong ties to "provide a window into each other's daily lives" via Snapchat [3]. Similarly, *Chen et al* established that constant sharing of content on social media brought people together and strengthened feelings of closeness and connectedness [28]. In the following section, we highlight two aspects of meaning loss: emotional significance, which we define as content that evokes emotions, such as joy, to help build and foster existing relationships, and social significance, which we define as shared content between individuals to reinforce existing relationships by experiencing the same moment together.

Emotional Significance

Since a snap captures a shared experience, revisiting a snap helps people reminisce moments they have shared. Thus, media and meaning loss are closely connected, since losing media could possibly mean losing out on the ability to revisit its meaning. Alexia, for example, explained how media was a great way to cherish memories.

> *Few weeks ago I was scrolling way past when I had taken pictures, Snapchats I had saved since I got my phone and they were stupid pictures but I was glad that I had saved them because it reminded me of good times. I'm a sentimental person and that applies to technology too. - Alexia, 22*

Alexa shows emotions of happiness when she revisits snaps that remind her of good times. Participants followed practices such as revisiting previously sent snaps to orient towards remembering the past. However, there is a conflict between the Snapchat's affordance of ephemerality and the expectation of persistence of the content. The tension around this affordance brings to the forefront the need to design systems that take into consideration the emotional significance of the content before subjecting it to ephemerality. To meet their emotional and social needs while using ephemeral platforms, participants incorporated workarounds to hold on to their memories; this is discussed in detail in the strategies section.

Social Significance

Snaps and other content-sharing often reinforce existing relationships by allowing people to "experience the moment together" [3], which also found to be true with our participants.

> *[In] most of the snaps… there's definitely something meaningful, it means that a friend is thinking of you at a particular moment. - Elena, 22*

While people commented that they often enjoyed communicating via Snapchat, sometimes the quick, rapid communication practices meant they missed out on "sharing a moment" with their social ties. They sometimes did not notice a snap until long after "the moment" had passed. However, with the increasing use of ephemeral communication platforms, the social norms co-evolve with people's expectations as participant Pooja described.

> *I used to feel like I have to respond as soon as someone sends me a snap but now since snap chatting has become so regular with my friends it does not matter that much. They want to share stuff with me and I don't have to respond to everything they ever send. If we ever have a phone conversation, I'm sure it will come up again. But in the application my response rate has gone down as I've gotten more comfortable using it. And my friends and I have developed an unsaid code of use. They don't respond to every Snapchat I send them. I don't want them to. I send them really mundane everyday stuff so I don't expect them to respond. - Pooja, 23*

Everyday interactions like Pooja's back-and-forth snaps with friends can reinforce relationships; as a result, participants lamented the inability to share certain content with others. Our participants appeared to see Snapchat as trivial, funny, and silly, but found themselves missing out on the potentially deeper interactions due to the platform's inability to allow further sharing. The expectation of persistence that can insert itself into decidedly ephemeral spaces and the way it is used results in loss of meaningful social connection. As people do not necessarily view received snaps immediately, the time difference between when a snap is received and viewed potentially increases the loss of social connections.

Meaning making and meaning loss

Meaning loss can also occur independent of media loss, when the snaps are still available (through the use of the Replay feature, or because it has not yet been viewed). It is still possible to experience loss in the meaning of the content, as a consequence of changes in significance. The significance is often personal and time sensitive to each user, and can impact the meaning-making process. In addition, meaning-making occurs in more than just a specific snap; it can occur in relationship to streams of snaps sent and/or received. Jennifer, for example, used snaps to keep her friends aware of her anticipation and plans surrounding an upcoming visit to her country of origin:

> *Starting last week, I have been giving people a glimpse of how much time [there is] until I go visit home [foreign country], you know, every other day I have been like, Ok, two more weeks". - Jennifer, 22*

The importance of streams of snaps, however, highlights some of the unique challenges in interpreting meaning across pieces of snaps. Streams of content present in snaps often provide more texture and details; our interviews revealed that meaning in individual snaps can become undecipherable if there is a delay in the time the snap is sent and the time it is received. A snap that is sent two days ago, holds varying levels of significance to the receiver, possibly reducing the meaning held by the snap than if it was viewed immediately (*e.g.,* A snap sent by a friend while attending a concert can trigger varying levels of meaning if seen during the concert as opposed to the next day.) Often, interpretations of social and emotional significance relate to specific moments.

I mean there is a sense like, my perspective kinda shifts, I mean it doesn't always mean that to the other person. - Elena, 22

Such scenarios demonstrate both the complexity of managing communication in ephemeral platforms, as well as the meaning-making practices around snaps. The ephemerality of snaps on Snapchat restructures the potential meaning of the snaps' content, which can include meaning loss, even when the snap itself and the context are still available, but the snap's significance and meaning is lost. The loss of meaning can be noted when our participants deleted their older snaps, or when it automatically disappeared during normal Snapchat use. Said another way, the content lost its significance with the passage of time. In some cases, participants experienced meaning loss as well as loss of context.

Next, we discuss in detail how asynchronous usage disrupts the stream of snaps sent or received, leading to an incoherent understanding of the messages in different moments and a third loss type termed "context loss."

Context Loss

Every participant we talked to mentioned that they frequently lost track of a Snapchat conversation's situated flow, which we define as *context loss*. While the assumption of ephemerality is a major reason to adopt Snapchat [3, 17, 27], the lack of message history presents a challenge when trying to situate the latest snap into a broader conversational context. Some participants described feeling responsible for remembering prior messages, while others did not expect replies or feel pressured to reply.

Sometimes I forget what I said because once you send something you cannot review what you sent. - Felix, 21

I don't have many friends on Snapchat so I don't feel pressured to respond quickly, I can take my time. - Ana, 25

However, other participants said that the fact that messages disappear prompts them to quickly respond to snaps (and wait for a response) to avoid context loss in a conversation.

One of the reasons I use Snapchat is that I get a response faster because when they receive the message, they must reply back or they will forget what it was about. - Ronaldo, 26

To sustain a conversation, and thus maintain context, some participants would instantaneously reply. Yet, a time delay between when a snap was sent by the sender and responded to by the receiver, meant that users that sent the snaps lost track of the previous snaps they had sent.

There have been times when I have sent something to somebody and they didn't check it for three hours and after several hours when they responded I had no idea what the question was! - Kim, 31

Many participants also stated that it was easier to recover meaning when the previous content was a photo snap, rather than text-based Snapchat messages.

Pictures and videos not staying is fine [easier to remember] but messaging… If you want to go back [remember], you can't. - Ana, 25

In either case of using text-only or photo-based snaps, participants reported difficultly in tracking a conversation's flow, including messages sent and received, making long asynchronous communication challenging.

It's really annoying. It's really frustrating. Like if you add someone and send something, they reply 'Oh, they have read it', you tend to forget what you said because you were busy doing something at the moment. - Natasha, 22

The inability to remember what was previously said, even by the snap's sender, was a regular and frustrating experience reported by almost all participants. For participants, this lack of context was a key reason why they shared less relevant content on Snapchat.

I think, if in a conversation there were important details that I needed to remember I would write them down or probably send stuff through text instead of snap. - Kim, 31

If it is really important, I want them to call me. - James, 24

Previous research suggests that Snapchat does not provide a cohesive way to maintain asynchronous communication, or to recover coherent and meaningful context or content [11,27]. Our investigation revealed that the participants understand these limitations and perceive Snapchat as a

platform for casual communication evident from sentiments displayed by several of our participants.

> *It's kind of fun, kind of stupid. It is like texting but more fun and silly. - Alexia, 22*

The participants adopted the platform to maintain a more spontaneous and carefree form of expression, while adopting persistent platforms to exchange more significant content.

Another factor in context loss is the sheer volume and different types of dialogue adopted by people while using the service. For example, while some Snapchat stories evoke a consistent narrative, many snap stories are often uncorrelated and lack an explicit, or readily discernable, relation between each snap.

> *I started creating a lot of [Snapchat] stories, until people commented on how dope my snaps stories were. But I continued using it. - Steve, 23*

All of our participants talked about context loss that restricted them from using snaps for prolonged conversations. The lack of conversational history and sheer volume of snaps were the most common reasons articulated for not using snaps as a primary form of communication for asynchronous or long conversations. To cope, participants often replied quickly and limited the content they sent via snaps to bolster conversational continuity.

The different types of loss experienced by the participants lead them to adopt different strategies and workarounds to recover and recollect information. In the next section, we present the strategies that we mapped during the interviews, and relate them to the kinds of loss participants experienced.

STRATEGIES FOR DEALING WITH EPHEMERALITY
Given the challenges of ephemerality – from the loss of content to maintaining a coherent conversation – over half (N=9) of our participants described strategies they had developed to compensate for Snapchat's designed limitations. During our analysis, we identified two key types of strategies used by the participants to prevent loss: *preemptive actions* and *collaborative saving practices*. The first type includes actions taken individually to preemptively save data and prevent loss. These include avoidance of sharing critical content, screenshot capture, adoption of third party applications that save data, saving every picture sent and received, and so on. The second type of strategy focuses on collaborating with another person to determine how to prevent data loss, which includes negotiation prior to taking a screenshot, switching platforms, relying on other people to save snaps, and so on. In this section, we will discuss each strategy and highlight how individuals deal with media, meaning, and context loss. The adoption of these strategies reveal that users are

aware of loss, even when they intentionally adopt ephemeral platforms designed to erase content.

Preemptive Action
We define *preemptive action* as actions actively taken by participants to prevent all instances of loss (media, meaning and context) at an individual level. In a first attempt to prevent media loss, participants refrain from sending important content via Snapchat. Instead, they assume that content shared over Snapchat should be typically lightweight and in-the-moment.

> *It's like quick images rather than scram [something critical], it is more like entertaining. Is more like quantity over quality. - Adrián, 25*

As we discussed previously, significance and meaning of media changes over time between participants, which can make this strategy ineffective. For instance, you may consider a snap sent to a friend insignificant, but it can be emotionally relevant to them, prompting them to save it. To address these scenarios, some users adopted multiple platforms, sharing more emotionally significant content on persistent rather than ephemeral platforms.

Once again, though, the relativity in meaning between users seems to be a problem even when adopting different platforms. It is impossible to be sure of the significance of the content shared to other users, thus making it necessary to adopt strategies to prevent loss on Snapchat. Users state that the most common strategy to prevent media loss was to capture screenshots of snaps sent or received. For example, Alexia, saved "pretty" snaps her boyfriend sent by taking screenshots.

> *The other day my boyfriend who lives in Colorado sent me a picture of the mountains, it was all snowy and pretty so I screen-shotted it. Whenever they are pictures that I don't want to disappear, I save them. - Alexia, 22*

As our account of meaning loss would predict, saving snaps for sentimental reasons was very common, especially between family members. For example, Kim saved snaps that her daughter sent to her.

> *The snaps my daughter sends me I screenshot those. ... I am looking at the pictures right now and it had pictures of my daughter playing basketball, random pictures of resume, pictures of my computer so that I could text them to somebody. - Kim, 31*

Participants also saved snaps using screenshots when they wanted to avoid losing humorous or amusing content.

> *If I am going to save a snap is probably because is a good picture and I want to keep it or something that is really funny, or something that is nice to blackmail later. - James, 24*

Even though Snapchat is broadly recognized as an application for lightweight interactions, participants said that they use it, when necessary, as a faster way to send significant information, such as phone numbers, addresses, appointment set-ups, and so on.

> *Sometimes I only have their Snapchat contact info, so my primary communication modality is Snapchat. So, sometimes, they give me their number. - Felix, 21*

Additionally, our participants revealed that they exchanged sensitive content over the platform, such as intimate snaps, personal feelings, information related to their children, license plate numbers, details related to their house, and so on.

To prevent the loss of such critical information, participants were prepared in advance to take screenshots. Snapchat's developers were aware that screenshot capture would be one of the strategies employed to save content. Since it was not possible to avoid this practice, the developers built in a feature that notified the sender when the receiver took a screenshot. As a strategy to circumvent this, some users resorted to third party applications that discretely saved media without notifying the sender. None of the participants we interviewed admitted to using such applications, but they were aware of them.

> *I just take a screenshot on my phone. I've never used one of those apps that do that thing. They have an app where you can secretly save the photos whereas if you screenshot the Snapchat, the other person gets a notification saying you screenshot it. - Felix, 21*

Felix felt that using a third party application to capture snaps was similar to stalking somebody, therefore he refrained from using such applications.

> *I only use the screenshot. I don't have the other app [third party application]. If I'm going to steal something I am going to let them know I stole it. - Felix, 21*

Snapchat privacy policy admits that such practices are prevalent, but it takes no responsibility or liability, declining to prevent users from saving media through screenshots or third party applications [22]. Such a policy reflects the users' vulnerability, since the responsibility falls on individuals to control their media content. Our interviews reveal that taking a screenshot without the consent of the sender is not well received by most users. This seems to indicate that ephemeral platform users not only typically suffer loss events, but that there is a new set of rules and norms for managing ephemeral media and reinforcing trust between users.

> *Usually, [it is] just a trust thing. There are some people who don't believe me, but I'm like you can come look at my phone and I'll prove it to you. I'd*

> *probably take a screenshot of my recent photos and send that to them, because it wouldn't be there. – James, 24*

Finally, in an attempt to completely avoid loss, a few participants adopted a strategy in which they saved every picture sent or received, in effect counteracting the purpose of an ephemeral platform. In this strategy, the user don`t differ any media or the meaning it holds, just saving everything. For example, when Adrián was asked if she saved snaps, she said that she saved each and every snap sent or received on Snapchat to avoid loss and therefore possible regret.

> *Yeah, all of the time, I usually save all the photos and videos. - Adrián, 25*

However, this was not a common strategy employed. In most cases, the adoption of a specific strategy to prevent loss was based on the individual expectation of the snap`s significance, subject to change over time. Participants adopting these strategies usually re-visit their saved content a small number of times, usually to remember what is stored or during special occasions, such as birthdays.

> *If it's someone's birthday, I collect all the embarrassing pictures of them from the last year and then expose them. - Alexa, 22*

Thus, even though saving a snap may start out as a casual and seemingly insignificant form of communication, with the passage of time its sentimental value and meaning can increase or decrease. A snap considered insignificant can be missed in the future while a saved snap can lose meaning and therefore deleted later.

On the surface, saving snaps may be seen as contradictory to the platform's ephemeral nature, but, as digital media affordances suggest them to be persistent, people are still looking for ways to accomplish this persistence. Saving snaps is one of the only ways Snapchat users can access their content after the moment has passed. This conflicted affordances and co-evolving social norms may lead to unclear expectations of an ephemeral platform.

Given the variability of significance and expectation a snap holds for users, preemptive strategies alone are insufficient to cover every aspect of loss, even with the adoption of additional applications to support saving content. As ephemeral platforms presented new interpersonal rules and etiquettes regarding media, we found users too adopted collaborative saving practices as an additional strategy to prevent loss, as described in the next section.

Collaborative Saving Practices

In our interviews, we identified that our participants are accustomed to adopting collaborative practices as a second way to prevent loss. We define people's collaborative practices of coordinating and deciding on loss prevention techniques as *collaborative saving practices*. These

practices are subdivided into *seeking permission* to prevent loss, *choosing alternate platforms* with more built in persistence*, and *collaborative saving* of media.

Seeking Permission

Adopting individual strategies for saving snaps with screenshots can be considered "bad manners," as it violates the shared expectation of ephemerality. Therefore, some participants consult with the other party to seek permission before taking a screenshot, especially in instances of *sexting*—creating, sharing, and/or forwarding sexually suggestive nude or nearly nude snaps [13,15]. Participants use their personal judgment to determine how acceptable it is to save a snap in a given scenario. Since sexting comprises an intimate exchange of snaps, participants usually ask for permission before saving the snap.; rarely will the screenshot be taken before the permission is granted, as seen in Felix's case, when a screenshot was captured without previous consent, the receiver informed the sender and asked if it was acceptable to save the snap.

> *I always ask before I screenshot it. Or if it was a surprise picture, I'll screenshot it immediately and then ask if that was ok. - Felix, 21*

There are no set rules or guidelines that define situations in which a participant should seek permission; on the contrary, this decision is subjective and based on the participant's personal opinion.

Choosing Alternate Platforms

Another way we observed our participants saving context and media was by switching to persistent platforms, such as SMS, Facebook Messenger, or WhatsApp, to continue chatting. As opposed to the preemptive strategy to use multiple platforms, which is an individual decision, here both or multiple users decided together that the information being shared was too important for an ephemeral platform and that they should move to a persistent communication channel. Usually, this happened when they exchanged critical information (*e.g.,* address of a specific location, passport information, SSN details, contact information, and so on) or needed to keep track of the conversation content (*e.g.*, conversation around work, travel plans, and so on).

> *If you come back to Snapchat after two or three hours or at the end of the day, it is hard to remember what was said. So, that's why my friends and I have decided that if the message is more than just a comment, a real conversation that is back and forth then we should just move it to text messages because Snapchat does not support the context. Like, they say "Okay, cool" and at the end of the day I have no idea why they are saying okay cool in Snapchat. - Pooja, 23*

This is a similar practice to a call or conference call in which the participants decide to discuss some topic over email so they can revisit and recover the content. This strategy reveals that users may have adopted the use of Snapchat without a clear or well-defined vision of their communication goals. When they noticed that the ephemeral platform was inadequate to their conversation, they would switch back to other platforms to accomplish their task.

Collaborative Saving

In a subtler interaction for saving content, participants relied on rules that were implicit between specific friends (or groups of friends). For instance, a user who knew her mother saved every snap sent to her felt no need to save any of their shared content. In the absence of this implied understanding, some participants relied on requests to their friends to take screenshots.

> *Yeah, that's kind of annoying, so you either ask the person if they saved the picture before sending a Snapchat or then you just don't have it. - Natasha, 22*

> *I try to not post or send anything that is important or something that can easily be lost, but in case I do, I ask people to send it back to me. - Jennifer, 22*

Our findings suggest that participants adopted additional collaborative practice rules to prevent loss. While participants adopted preemptive strategies at an individual level, they also established social rules and practices as a way to save their content and context. If they could not adopt a preemptive measure, this social agreement would allow them to recover from the potential event of loss. These adopted strategies are contradictory to the ephemeral platforms primary function i.e. to erase content. In instances where participants share lightweight and disposable media, users expect their ties to save content and help them recover it.

Loss seems to be both a consequence of imported expectations from persistent platforms, as well as a lack of clear expectations about the available uses of the ephemeral platform. To prevent loss, participants adopted different strategies at individual and collaborative levels. These strategies helped users leverage ephemeral platforms such as Snapchat in their daily lives with a reduced occurrence of loss.

DISCUSSION

Even though users of platforms like Snapchat intentionally engage these platforms knowing that their content is ephemeral, they still report regrettable losses. This experience might seem counterintuitive, and we certainly saw inconsistencies in our data between participants' described need for ephemerality and their actual reported practices. These inconsistencies highlight people's complicated social needs and desires for persistence and ephemerality that are often contextualized and shifting from moment to moment. Based on our findings, we identified two key areas of discussion that can lead to future design opportunities. First, the unclear norms surrounding

ephemerality and, second, different ways to work this ephemerality with base on the media itself or the situation of use.

Developing Norms for Ephemerality

An open question, however, is *what* users consider to be ephemeral. Snaps sent on Snapchat may be ephemeral, but photos (the media itself) are not. Photos, and other media artifacts that are sent across multiple platforms, may still be considered in terms of persistence.

While expectations around Snapchat as an ephemeral platform were clear across our participants, norms[26] around the impact and role of ephemerality within their use are clearly still developing. The experiences of loss may be the byproduct of a default norm of persistence that users carry with them from other platforms and interactions.

In some cases, it seems clear that our participants simply wanted to capture fleeting moments, which is not entirely surprising. We have all had moments when we wished we had had a camera, or when we wished we could remember a conversation [9]. Most communication is ephemeral (*e.g.*, in-person, over the phone, video chats, and so on). However, even if ephemerality is actually more common than persistence, the reactions of our participants to loss highlights the dominant expectations around persistence with digital content.

Working with Ephemerality

Despite the cause of the loss, we noted users developed workarounds to deal with ephemerality and developed new strategies for saving, along the same lines as new online sharing practices were developed on persistent platforms. These practices highlight a design space for ephemerality with nuanced social needs in which neither absolute persistence nor absolute ephemerality is desired. Based on our data, we argue for a deeper consideration of how to enable people to *perform ephemerality* in their communication practices, and to make possible to be ephemeral in a persistent world, when desired. We focus on two areas: *media ephemerality,* the emergent practices that develop in response to how systems represent ephemerality; and *situational ephemerality,* the potential for enabling situated enactments of ephemerality.

Media ephemerality

We use *media ephemerality* to describe how the transitory nature of content is represented in services like Snapchat. While scholarship has already advocated for forms of ephemerality [19], we start with this design area to emphasize the importance of continued and diverse explorations. The playful interactions that users have developed around the way in which Snapchat designed loss (*e.g.*, intentionally taking a screenshot as a way of communicating to the sender that you are saving their Snap) evidence the potential of new representations within the media and platforms themselves. We find this a exciting site of design opportunities, particularly because of

unexpected re-appropriation by users. For example, Xu [27] describes the taking of screenshots as "selective saving," a form of saving that circumvents ephemerality, while still preserving it as a social norm of the platform. However, ephemerality can be represented to users in a variety of ways. For example, posts and representations could appear to decay overtime with use, fading like an old paper photograph every time a person encounters that particular media [8].

Situational ephemerality

The ephemerality of content can also be designed to leverage and support different social, physical, and temporal contexts, which we call *situational ephemerality.* Mobile applications could be aware of the these different contexts in which ephemeral conversations are taking place to provide further controls for ephemerality. For example, if a system knows a user will always try to screenshot photos, the system could recommend to other users that they shorten view times. Doing so would still enable the same core features and experiences, but may help individuals make more informed decisions by providing them with additional insight into how their expected ephemeral experiences might be impacted.

Another way ephemeral communication platforms could be situationally aware would be to focus on the interpersonal contexts rather than on the specific media objects. Drawing from our section on meaning loss, designers could focus on allowing conversation partners to establish and apply gradients that help produce more persistent or ephemeral experiences. This might enable the preservation of meaningful content, while at the same time not impeding meaningful exchanges enabled by light-weight and spontaneous snaps.

CONCLUSION

In this work, we examined the relationship between ephemerality and persistence and loss in ephemeral social media use. People use ephemeral communication platforms expecting their communications to be fleeting, but nevertheless experience different forms of loss associated with the platform's ephemeral aspects. While experiences of loss may seem paradoxical in relation to expected ephemeral communication platforms, we found in our data that people have complicated and shifting social needs and desires for persistence and ephemerality.

We discussed how people experience three types of loss (*media loss, meaning loss, and context loss*), as well as their strategies to attend to those loses, including *preemptive action* and *collaborative saving practices*. In our discussion, we discussed how we interpreted people's expectations and experiences with the different types of loss and people's complicated social needs. Lastly, we provided design recommendations for ephemeral communication platforms.

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