

**AFTER YOU PRESS “SHARE”:
SUPPORTING IDENTITY MANAGEMENT AND IDENTITY
REFLECTION THROUGH SOCIAL MEDIA**

by
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DEDICATION

To my parents, Xiumei Zhang & Chuanhua Zhao

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TABLE OF CONTENTS

DEDICATION	ii
ACKNOWLEDGEMENT	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF APPENDIXES	ix
ABSTRACT	x
CHAPTER 1: INTRODUCTION.....	1
CHAPTER 2: IDENTITY MANAGEMENT	7
Related Work	7
Goffman’s Dramaturgical Approach	7
Unpacking Management Work: Interpersonal Process Matters	10
Unpacking Management Work: Temporality Matters	13
Unpacking Management Work: Spatiality Matters	15
Empirical Work	19
Study 1: The Many Faces of Facebook.....	19
Background	19
Method	20
Main Findings	21
Discussion	25
Conclusion	30
Study 2: The Social Media Ecology	31
Background	31
Method	31
Main Findings	32
Discussion	40
Conclusion	43

CHAPTER 3: IDENTITY REFLECTION.....	45
Related Work	47
The Psychological Approach to Reflection	47
The HCI Approach to Reflection	49
Reflecting on the Past: Temporal Perspective	52
Study 3: Curation Through Use	53
Background	53
Study Design	55
Main Findings	57
Discussion	61
Conclusion	60
Reflecting From Different Platforms: Spatial Perspective	65
Study 4: “Know Thyself” from Communication Traces	65
Background	67
Study Design	73
Findings	77
Discussion	105
CHAPTER 4: CONCLUSION	114
Identity Management: Personal Data in Public	114
Sociotechnical Gap Revisited	114
Curating Personal Data in Public: Systems and Users.....	116
Identity Reflection: Personal Use of Personal Data	119
Making Sense of Personal Data: Systems and Users.....	120
Limitation and Future Work	122
APPENDIXES	126
REFERENCES	159

LIST OF TABLES

TABLE1: AN OVERVIEW OF MY THESIS WORK	4
TABLE2: PARTICIPANTS AND THEIR FREQUENTLY USED SOCIAL MEDIA (STUDY 2)	34
TABLE3: PARTICIPANTS AND FREQUENTLY USED COMMUNICATION APPLICATIONS (STUDY 4).....	79

LIST OF FIGURES

FIGURE1: ANONYMIZED EXAMPLE OF A DIGITAL “KEEPSAKE” PRODUCED BY A PARTICIPANT (LEFT); PARTICIPANT MAKING HER DIGITAL KEEPSAKE DURING THE STUDY (RIGHT)	56
FIGURE2: INTERFACE OF DAYS7 AND INSTRUCTIONS SENT TO PARTICIPANTS	74
FIGURE3: SCREENSHOTS FROM P17, STUDY 4	86

LIST OF APPENDIXES

APPENDIX A: THE MANY FACES OF FACEBOOK: EXPERIENCING SOCIAL MEDIA AS PERFORMANCE, EXHIBITION, AND PERSONAL ARCHIVE.	126
APPENDIX B: THE SOCIAL MEDIA ECOLOGY: USER PERCEPTIONS, STRATEGIES, AND CHALLENGES.	136
APPENDIX C: CURATION THROUGH USE: UNDERSTANDING THE PERSONAL VALUE OF SOCIAL MEDIA.	148

ABSTRACT

Research on the use of social media often highlights the value of social connectedness and communication (e.g. [29,63,151]). A significant part of the discussion of users' motivation to connect to and interact with their social network members has been situated in their use of social media in the “present,” as a snapshot in time. However, this dissertation argues that content sharing on social media goes beyond a decision made at the moment – it is followed by a continuous effort to manage one's outwards presentation across platforms over time, and presents unique opportunities for future personal use of the data, for purposes such as reminiscing and reflection.

My thesis draws on work from sociology and psychology, but mostly on work from human-computer interaction (HCI) to examine the long-term relationship between individuals and their social media data, with a special focus on the role of technology.

The first goal of this dissertation is to unpack the identity management work on social media from both the temporal and spatial perspectives. To accomplish this goal, I conducted two qualitative studies with active social media users that reveal tensions and strategies related to how people manage content sharing on social media, across platforms, over time. Results show that identity management work encompasses negotiating with other individuals in the space (e.g. [180]), negotiating with ever-changing self-presentation needs on a single social media platform over time (Study 1), and negotiating different audiences and practices across multiple social media platforms (study 2).

- People manage their needs for performance, exhibition and personal archiving simultaneously on social media, and temporal change causes tension between different regions;

- People manage both content and network information across platforms, and tensions arise when people carefully calibrate the permeability of boundaries between platforms;

The outward-facing, public perspective nicely frames how people approach social media, in that social connections and interpersonal communication are major driving forces for people using these sites. However, prior literature suggests that people are increasingly revisiting past shared data for their own personal use.

The second goal of my dissertation is to further explore the potential benefit of repurposing one's social media content for "personal use" – reminiscing and reflection. Study 3 and Study 4 examine the "personal use of social media data." More specifically:

- Over time, social media holds a valuable collection of personal content as users carefully select and curate content for their social media profiles; social media is unique in supporting revisiting of past content and offering opportunities for reflection.
- Besides as a source of positive memory, reflecting on how one shares on social media in relation to other communication traces could potentially support one's mindfulness of communication, relationship, and life goals, support the coping with psychological stress, and motivate behavioral change.

My dissertation broadly contributes to the existing knowledge in bridging multiple theoretical perspectives and work from Communication, HCI, and Psychology in investigating how individuals maintain a long-term relationship with their personal data shared through social media. My work provided empirical evidences that the effort that goes into managing one's social media identity over time, across platforms, presents unique opportunities for designing tools for identity reflection. Tensions discovered in Study 1 and Study 2 show a sometimes uneasy relationship between the system and users engaging with identity management work, and the need for better designs and more effective metaphors for supporting dynamic needs, multiple regions, multiple platforms, and the co-existence of these aspects of social media.

My dissertation will contribute to the field's understanding of how people value and manage their online presence as part of their digital archive, as well as how to advance the design agenda to help people deal with more devices, more types of digital belongings, and more diverse places for storing and encountering personal data.

CHAPTER 1: INTRODUCTION

With the prevalence of social media, hundreds of millions of users are sharing personal content on the web. As people take advantage of the social connectedness afforded by online social media, they also leave behind a huge number of digital traces of themselves and their relationships with others.

Research on the use of social media often highlights the value of social connectedness and communication. This network-centric view emphasizes the role of social media as facilitating purposeful social interactions and identity performance (e.g. [29,63,151]), in which user activities are shaped by different audiences present online [29, 80].

A significant part of this discussion of users' motivations to connect to and interact with their social network members has been situated in their use of social media in the "present," as a snapshot in time [53]. This focus on the "present" in the research community might be partly affected by the unique architecture of social media sites, which both encourages and relies on immediacy and newness in user-posted content [24]. Particular features of social media sites, such as newsfeeds and real-time notifications, might have shaped the social norms in these online environments, leading users to focus on tailoring their posted content as "breaking news" to create immediate, interactive value and attract public attention to the maximum extent possible [109]. Berry [25] suggests that social networking sites "*in a certain sense, abolish history and shift our focus to the event, the happening or the now*"(p366).

However, most social media do not just facilitate sharing and social interactions at the moment, but also present an aggregated history of user-generated content and interaction traces between users [123]. The fact that this space affords data persistence makes

identity presentation more challenging; while the same shared content persists, the online social contexts in which the content is embedded could change over time. Changes originating from the self, the audience, site norms, and interpersonal relationships, could all lead to the need to alter how one wants to present the self in public. Recognizing this challenge, more theoretical and empirical has started to explore not just how people share, but what happens after they share.

Hogan's work [47] nicely elaborates on how data persistence on social media might affect the nature of the platform for self-presentation, and points out an interesting direction for social media research. He takes a temporal approach in examining the relationship between individuals and their social media content. He points out the importance of seeing social media as an "exhibition" of personal data, which is subject to different and ever-changing time-space contexts. Recent work around deletion behaviors on social network sites provides evidence that people need to put in extra management effort to deal with challenges brought about by data persistence (e.g. [124,136,162]). Both Hogan's theoretical idea of "exhibition" and empirical evidence show that it is increasingly important to investigate how people live with their own social media data in the long run.

Therefore, content sharing in social media is no longer simply a performance in the moment, but something to be revisited and re-evaluated in response to changes in the online environment. In this thesis, I use the term "identity management" to describe the continuous, strategic effort one puts into managing one's overall content sharing strategy. The first goal of my thesis is to unpack the work that goes into identity management from several different perspectives: interpersonal, temporal and spatial.

The second goal of my thesis is to bridge this outward-facing identity management work with the inward-facing reflective value in social media.

Much of the data people share on social media – photos, check-ins, status updates, conversations with friends and family, all capturing different parts of our lives – has

important personal meanings, whether representing mundane everyday life or major life events. “Personal” use of one’s social media content is gaining more attention in the research community. Researchers argue that a variety of social media such as Flickr, last.fm, twitter, and Blogger contain important autobiographical memories and could be repurposed to encourage reminiscing [114]; that social media have the potential to be considered a form of ‘virtual possession’, which people desire to have control over in preparation for future personal use [107]; and that social media could be considered an archive people use to hold meaningful personal content [79]. The recently released Facebook Lookback¹ video and the #FirstTweet² application on Twitter demonstrate that this focus on the personal value of social media extends beyond the research community.

Due to the unique nature of social media, digital traces on these platforms are often socially generated, which makes them an even better trigger for understanding and reflecting on personal relationships. Since June 2011 I have conducted a few studies exploring how people in close relationships interact with and value personal data archived on social media. In Sosisk, Zhao and Cosley [128], I co-led a study that looked at how Facebook content, more specifically the "See Friendship" page that aggregates a history of interaction between two users, could be used to encourage both individual and collaborative story telling. In another study I explored how people negotiate co-owned content on Facebook in the context of romantic relationships [180]. This study found that romantic partners take a variety of content shared on Facebook (such as relationship status and photos) as cues to understand the development of their relationships, and that the way they negotiate content sharing is deeply entangled with their relational goals.

One interesting finding from Zhao et al [180] shows that people sometimes need to retrospectively delete data from Facebook in response to changes such as the termination of a relationship. This inspired me to seek a deeper understanding of the phenomenon of users revisiting and managing their personal content on social media, both in terms of

¹ <https://www.facebook.com/lookback>

² <https://discover.twitter.com/first-tweet>

managing their outwards presentation over time as well as in terms of getting personal benefit via reminiscing and reflecting on particular content.

	Temporal	Spatial (social and technological contexts)
Outwards (identity management)	How and why do people manage personal content shared on social media over time ?	How and why do people manage sharing of their personal content across platforms ?
Inwards (identity reflection)	How do we support people reflecting on (and getting value from) meaningful personal content archived in social media over time ?	How do we support people reflecting on (and getting value from) digital traces across platforms (including social media)?

Table 1: An overview of my thesis work

My thesis includes two major parts:

In the first part (“**Identity Management**”), I mainly draw on theoretical ideas of self-presentation from Goffman [37], and argue that Goffman’s writing about self-presentation and norms is actually contested in the context of social media. More specifically, I argue that content sharing on social media goes beyond one-time decision making; identity management work is needed both in terms of managing one’s personal data on one single social media platform (in this case, Facebook) over time, and managing content sharing across multiple social media platforms. Both a temporal analytical lens (Study 1) and a spatial analytical lens (Study 2) reveal a series of tensions people face and specific strategies they employ, which point to the need for discussion of the role of technology and how future designs could better support identity management practices.

In the second part (“**Identity Reflection**”), I mainly draw on work from psychology to argue that interactions one has on social media offer a unique social mirror for understanding the self. The focus here is to situate social media content in the context of other valued personal data, and explore the value of this particular content for reflection. Even though reminiscing and reflection through social media are emerging phenomena and are becoming what drive people to use some of these systems, I do not intend to directly study people’s current practices. The purpose here is not to understand how and why people do it, or how prevalent the current practices are, but to better understand the potential value of doing it – How do people extract meanings from this personal content? What do they perceive as valuable and what do they think are throwaways? How do they re-interpret their traces, gain self-knowledge or even plan future behaviors based on the re-visitation of such content? In order to achieve this purpose, both Study 3 and the Study 4 will use design prompts to purposefully encourage interaction between people and their own data. Study 3 focuses on how people use and value personal content on social media as part of their digital archive in the long run; Study 4 aims to explore how a collective presentation of one’s social media content, in the context of other communication traces, triggers people to self-reflect and potentially motivates behavioral change.

The four elements this thesis comprises could fall into the following quadrants (as shown in Table 1):

- Study 1 and 2: Identity management entails efforts to manage one’s outward-facing performance responding to specific temporal and spatial contexts.
- Study 3 and 4: Identity constructed via social media has inward-facing reflective value.
- Study 1 and 3: Identity and needs for identity presentation change over time.
- Study 2 and 4: Identity is managed across platforms to reflect different needs and goals.

Even though I currently organize the four pieces according to “outward-facing” vs. “inward-facing,” connections will also be made along the “temporal” vs. “spatial” dimension. Findings from Study 1 on how the need for self-presentation changes over time provide a nice ground to discuss how people find reflective value in social media content that documents “change” over time, while Study 2 shows how people have been navigating multiple social media to fulfill their informational and relational goals, which gives them reasons to reflect on digital traces drawing from multiple sources: people can potentially reflect, re-interpret, and re-discover goals and motivations that guide their use of multiple systems.

In the rest of the dissertation, I will organize work on Identity Management (Studies 1 and 2) and Identity Reflection (Study 3 and Study 4) into Chapter 2 and Chapter 3. Related work will be reviewed in each corresponding chapter to provide a better narrative flow, because findings from Studies 1 and 2 partly motivated and informed how we conducted Studies 3 and 4, in conjunction with other relevant literature. One expected contribution of this thesis is to bridge the “personal” and “social” use of content sharing on social media, and I think the current organizational approach could help contextualize and potentially make that connection stronger. The conclusion chapter will revisit research questions, reflect on the thesis approach, and discuss the broader impact of this work.

CHAPTER 2: IDENTITY MANAGEMENT

The first goal of my dissertation is to explore the complexity of identity management on social media from two perspectives: looking at social media as a public space that extends in time (temporal dimension) and viewing it as different social and technical contexts (spatial dimension) where people manage their identity expression across platforms. Below, I will firstly review the theoretical framework, mostly from Goffman's dramaturgical perspective on self-presentation, and justify why the temporal and spatial dimensions of self-presentation are particularly challenging. Then I will unpack the work that goes into identity management from three perspectives: interpersonal, temporal and spatial.

2.1 RELATED WORK

Goffman's Dramaturgical Approach

In *The Presentation of Self in Everyday Life*, Erving Goffman [37] conceptualizes people's everyday behaviors as "performances," which are bounded by specific social contexts. He argues that people put on different "faces" when they encounter different audiences or engage in different social interactions. In his dramaturgical approach, he defines "front stage" as where a performance is given in front of an audience. On "front stages," people need to selectively present themselves in order to meet specific social expectation and cultural values. In comparison, "back stages" are where only the performer exists without the audience. For example, when people are at the front stage of the workplace (e.g. in office or meeting rooms), they behave in a certain way so that more personal characteristics might be hidden in the back stage – while at parties or

informal gatherings, their professional self might be hidden at the back stage, while other sides of their characteristics become appropriate to be presented on the front stage.

Symbolic interactionism is the fundamental sociological perspective that Goffman draws on. Broadly, this perspective is concerned with how humans create and negotiate meanings as they interact with others, and argues that people act based on such meanings [97]. The perspective of symbolic interactionism argues that the “self” is a fluid concept in that people constantly reassess their environment for changes and adjust their behaviors accordingly [153]. Goffman’s framework built on this perspective and he specifically studied face-to-face interactions. He argues that social norms and individuals’ desire for self-presentation govern their behaviors through “*reciprocal influence of individuals upon one another’s actions when in one another’s immediate physical presence*” (p15). Conversational partners work collaboratively to pursue their preferred self-presentation of each other, through strategies like encouraging social norms or “saving” face. Similar to how children monitor their parents’ responses when they cry, individuals subconsciously monitor others’ responses in social situations and adjust their behaviors based on their expectations of how others might react. Therefore, individuals constantly make choices about what to reveal and what not to reveal depending on the audience, the relationship, and the goal they have for each interaction.

The dramaturgical approach [37] has been widely cited in studies on how people interact with each other in online spaces [14,26,45,70,122]. From the symbolic interactionism perspective, people interact through symbols – in the context of social media, sharing of personal content becomes one of the primary symbols via which people interact. Research has identified a variety of primary purposes of people sharing content, and most of them highlight social connection and social surveillance as being the primary motivations for and gratifications of use (e.g. [17,53,55,142]). Work along this line focuses on how individuals use social media as a tool for the purpose of self-presentation (e.g. [29]) and accumulating social capital (e.g. [28,63]).

Consistent with what Goffman argues about contextualized performance, a significant part of this discussion of users' motivation to interact with social network members has been situated in their use of social media in the "present," or to offer a "snapshot" in time. However, social media sites do have more complex temporal characteristics. Not only do these sites facilitate social exchange in various formats in the moment, they also afford a history of user-generated content that aggregates in user profiles (e.g. Facebook Timeline).

The fact that social media accumulate and archive huge collections of user data challenges how we conceptualize the use and value of such systems. Even though Goffman's approach is appealing in emphasizing how one's self-presentation is closely related to specific social contexts online, archiveable and searchable social media [13] might expose digital traces to an ever-changing online context and audience. Therefore, an extra management effort might be needed. We call this extra effort that goes beyond the in-the-moment decision as "identity management," similar to how Silverberg et al. [136] define "profile work." Specifically, we want to build on how Goffman's dramaturgical approach has been applied in social media research, yet focus on the part where users consciously revisit, re-evaluate, re-appropriate, or re-distribute their personal content.

Below, we will unpack this management work in three ways: 1) understanding challenges and strategies of individuals negotiating content sharing with other people (interpersonal); 2) understanding the ever-changing self-presentation needs on one single social media platform (temporal), and 2) understanding challenges and strategies of individuals managing multiple platforms (spatial).

The interpersonal perspective is relevant to some of my previous work (not included in this thesis), so only a brief review of literature is included. I will present two empirical studies, Study 1 and Study 2, following the review on temporal and spatial perspectives.

Unpacking Management Work: Interpersonal Process Matters

The study of privacy, or online boundary management, is one of the most popular approaches to content sharing on social media. Social media platforms such as Facebook have been intensively researched to understand privacy and impression management (e.g. [29,63,147]). These two issues are interrelated matters, as they both concern the issue of boundary control of self-disclosure, and both emphasize a sense of autonomy. On one hand, social networking sites afford the opportunity for rich identity expression; on the other, people need to draw boundaries between the self and others in order to make sure they don't disclose unwanted personal content in public [21].

There is an abundance of research on how individuals cope with boundary regulations on social media, and how system features help individuals manage their privacy preferences (e.g. [3,70]). Managing content sharing on social media is far more complicated than just managing the line between public versus private, and individual users are faced with many difficult tasks. For example, one great challenge people face is “context collapse” [91] (similar to what Goffman referred to as “front region control”), which means people need to manage appropriate disclosure to different audience groups simultaneously ([138,156]). Work around “context collapse” is consistent with this notion in that it shows how people need to balance disclosure needs on social media to satisfy different audience groups.

To help individuals manage their different social groups, Facebook friend lists and Google plus circles are designed under the assumption that individuals could have better control over selective disclosure when communicating with different groups [165]. Another challenge individuals face is to accurately understand system features and privacy settings [146]. The recent “privacy checkup” feature offered by Facebook is meant to help users develop a better understanding of who can see their content, and how to interact with their privacy settings to ensure the best privacy protection.

Granting individuals more control over and awareness of their disclosure is important; yet, some recent studies in HCI start to highlight situations where boundary regulation goes beyond individuals' control. For example, Ahern et al. [4] and Besmer et al. [11] both studied photo tagging, and emphasized the importance of use design for supporting negotiation and collaboration with other people in photo sharing; Allen et al.'s work [164] on workplace surveillance highlights the role of organizations in protecting individual employees' privacy; Stutzman and Kramer-Duffield [146] found that the complexity of interpersonal boundary regulation has led many to have friends-only profiles in order to protect others' privacy. Because of ease of retrieving identity data online [26,110] and the co-owned nature of some social media data, there is an increasing need to understand interdependence in managing privacy.

Extending previous literature on individual coping strategies for privacy (e.g. [2,3]), more recent studies have shown that boundary regulation on social media usually goes beyond individual decision-making, and requires negotiation and collaboration with other people (e.g. [4,11,49]). For example, in the context of Facebook, people can upload or tag photos of others, or choose to disclose information about others by leaving messages or comments. However, the current interface provides very limited control over how and what others choose to disclose about the self. Even though the current "hide" feature on Facebook Timeline allows users to "hide" tagged photos from their profile pages, such photos still show up in other places on the site, such as newsfeed and graph search results. Similar to most other social media platforms, Facebook does not yet support a groups users in collectively negotiating the appropriateness of a post before releasing it [69].

Schneier [127] has nicely classified social media data about oneself to highlight this complexity. He defines "disclosed data" as what users post about themselves; "entrusted data" as what users post on others' pages, including comments and photos, and "incidental data" as data others post about the user. This research highlighted the challenges for individual users in monitoring information about themselves from multiple sources. A recent survey of 150 Facebook users [80] revealed that a variety of other-

generated content causes great privacy concerns amongst Facebook users. People worry about how others' posts about them might reveal their norm-violating behaviors, or be detrimental to their ideal self-presentation. Being seen with others in either Facebook posts or photos was also one of the common concerns reported by their participants. Other recent studies on the "See Friendship" page on Facebook highlighted people's worry about aggregated interaction data, and the lack of support for capturing and supporting interpersonal privacy concerns [135]. In one qualitative study, Wang et al [162] found that people do actively communicate with and confront each other in order to take down unwanted content uploaded by others. Therefore, successful boundary regulation on social media requires more than successful interaction between individual users and their privacy settings. Sometimes boundary regulation happens in an interpersonal context, and relies on either explicit or implicit collaborative strategies. A recent qualitative study with 27 college students by Lampinen et al. [69] reveals a range of collaborative management strategies people engage with. Their research found that people involved in group co-presence on Facebook usually developed rules (e.g. talking about how they should handle photo uploads) in advance to manage different expectations and to avoid unwanted content being posted for any individual members. Lampinen et al. also nicely classifies collaborative strategies into mental strategies - creating more in-group cohesiveness and trust; behavioral strategies - separating different platforms for different information disclosure among the group; preventative strategies - actions to prevent unwanted privacy outcomes; and corrective strategies - actions taken to correct or reduce the impact of negative outcomes resulting from the disclosure of co-owned data.

Some of these collaborative coping strategies, such as creating more in-group trust and cohesiveness, imply that the negotiation of privacy might be affected by interpersonal relationships, or might have relational outcomes. For example, someone's decision to take down a Facebook post by her ex-boyfriend might be motivated by her intention to protect her relationship with her current romantic partner. The decision could result from

a conversation between her and her partner as a corrective strategy, or as a preventative strategy after carefully considering her partner's needs.

Therefore, in order to provide more space for both individual autonomy and interpersonal negotiation on social media, there is an increasing need to understand how the negotiation of privacy is coupled with relational goals and relational outcomes.

In research I conducted in 2012 [180], I studied romantic partners and how they negotiated their content sharing on Facebook. That study provides evidence for the interpersonal aspect of identity management work: we found that decisions regarding co-owned content, such as "relationship status," photos, and status updates are complicated because they are often bundled with people's relational goals and needs. One example of what we call "identity management" effort is that people often need to go back and take down photos (one example of identity management effort) due to concerns relating to their romantic partners. Content sharing in this case is no longer only relevant to individuals' privacy concerns, but also has significant relational meanings for couples. Sometimes this negotiation even goes beyond co-owned content, but could affect whom one becomes friends with, and how one interacts with his or her own network members. We also found that all users' actions and communication on Facebook serve as triggers for "relationship talk," or contexts for romantic partners to interpret and understand the state of their relationships. This published piece can be retrieved from *Proceedings of CHI'12* and is available upon request.

Unpacking Management Work: Temporality Matters

Goffman's performance metaphor is an appealing metaphor in the social media context - behaviors in social media are socially embedded and observed, thus activating concerns about the online social context at the moment. However, with more theoretical and empirical work shifting attention from "nowness" to the "long-term" relationship between users and their personal data, the application of Goffman's approach to social media needs to be revisited.

Even though social media sites encourage sharing “in the moment” and promote users’ focus on the present by implementing designs such as newsfeed and real-time notifications, interaction histories do not need to be buried. Most social media sites now afford archiving user-generated content and allow re-visitation by the self and others. In fact, more and more social media now provide explicit support for such re-visitation, such as the recent released feature of “One This Day” on Facebook,³ which periodically pushes memories from past years (e.g. photos with others, status updates, friend lists) to users as they log onto Facebook.

The fact that past data is accessible complicates the task of identity management and challenges the Goffman metaphor in the context of social media. If we conceptualize content sharing in social media as a “performance” that pertains to a particular social context, but that content persists over time, how is the shared content subject to the ever-changing time and contexts?

Contesting the use of Goffman’s metaphor in social media, Hogan [47] proposes an alternative metaphor to describe the relationship between users and their social media content. Hogan’s approach calls attention to data persistence on these sites. He argues that social media data is better conceptualized as an online asynchronous “exhibition” rather than a synchronous “performance.” Hogan refers to Goffman’s “performance” as “what gets performed in the real time for an audience that monitors the actor.” In comparison, he proposes the concept of “artifact,” which is “the result of a past performance and lives on for others to view on their own time.” He argues that “performance” is closely associated with synchronous “situations” and a specific “time-space region,” while when past performance becomes “artifacts,” they gets displayed to the public in the form of an asynchronous “exhibition.” Therefore, “performance” is ephemeral and closely associated with a specific “time–space-identity-locus,” while “exhibition” is subject to different times and contexts.

³ Facebook releases “On this Day”: <http://newsroom.fb.com/news/2015/03/introducing-on-this-day-a-new-way-to-look-back-at-photos-and-memories-on-facebook/>

Hogan’s exhibition approach highlights the potential tension involved in managing one’s online identity due to data persistence, but he mostly emphasizes the role of system in managing user-generated content. He further conceptualizes social media as a “storehouse” where users could submit their personal content. Once the content is shared and stored in the system, the system acts as an “invisible curator” who manages, redistributes, and selectively brings content out to show to other audiences who have access to user data.

However, users also actively manage their own data after the sharing action. Recent work around deletion on social network sites has provided evidence for Hogan’s approach in highlighting how people take incremental steps to manage their content sharing [125,138]. Another study [162] found a wide range of regretful behaviors on Facebook. Their descriptive taxonomy towards Facebook regret behaviors begs for a deeper discussion of what causes people to regret, and what leads to explicit management behavior such as deleting, de-tagging, and un-friending on their social media profiles.

Despite work on how social media usage patterns change over time (e.g. [38,68]), there is a lack of research that specifically explores how individuals manage their own data in order to deal with tensions that arise from temporality, and their corresponding coping strategies. A better understanding of users’ current practices of identity management is needed in order to balance and support these practices in future designs.

This leads to the first research question that I explored (Study 1) in this thesis:

- **RQ1: How do people manage their shared content on social media over time?**

Unpacking Management Work: Spatiality Matters

Besides interpersonal tensions and temporal tensions, another important aspect of identity management work comes from the fact that people need to manage content sharing across multiple platforms. According to a recent report from the Pew Research Center [85], there was a significant increase in the number of online adults who use two

or more social media sites from 2013 – 2014. And as of the time of that national survey, more than half of Internet users (52%) were simultaneously using multiple social media.

At the first glimpse, the issue of managing content sharing across platforms is similar to that of “media choice,” which has been widely studied in early interpersonal communication research as a strategic action to achieve interpersonal goals [67,170]. Media choice research usually takes a goal-oriented perspective on communication acts and focuses on communication strategies enacted by individuals (see a review by [54]). Along with this goal-oriented view, the technical affordances of different Computer-Mediated Communication tools are usually a focus of study, and are usually unbundled in order to evaluate how well they serve communication goals. CMC tools are considered to carry less socio-emotional content (e.g. [86]), or to actually have the potential to create pro-social effects (e.g. [160]). Social information processing theory [158] posits that CMC users are able to form impressions of others online, and achieve the same level of relationship development as in face-to-face communication. But research also shows that CMC tools differ in their affordances, such as the frequency of sending and receiving messages [158], response time [157], and editing time involved in the exchange of information [159], which shape the social experience differently.

Communication scholar Walther [54] describes communication on social media sites as “multi-model,” and recent studies have considered this question of how to appropriately bundle and unbundle features of social media in order to situate them in a broad ecology of communication technologies. For instance, Smock et al. [139] unbundle Facebook features and show that different components of the site serve different user gratifications. Similarly, Burke and Kraut [18], in their study of how Facebook interactions affect tie strength, differentiate between passive consumption of content and more active, directed communication (for example, likes and comments and private messages), and find that while both forms of communication contribute to tie strength, they differ in signaling relational meanings.

However, treating social media as a bundle of specific technological affordances (similar to how we used to approach traditional CMC tools) could be problematic. De Ridder [121] points out that social media has complicated structures that are built around “*material, social and cultural processes*” (p260), so that it should be understood as a practice, not just as a passive tool that transmits information. Some communication scholars (e.g. [99]) also point out this blurry boundary between personal communication and production of cultural artifacts (e.g. personal photos, videos) and argue that different “participatory cultures” on social media might affect personal communication experiences. For example, even though both Facebook and Twitter enable users to interact with certain members of their social network, the unique “cultures” on these two platforms might affect and shape what gets talked about, and how people actually interact via these sites.

I argue that content sharing across multiple social media encompasses a much more complicated decision-making process, which adds to the identity management work that I am interested in.

First, it is difficult for people to navigate online social contexts that partly differ and partly overlap between different social media sites. Compared to the offline context, audience in online social media is much harder to conceptualize [81], and research has provided evidence that people are not good at all at estimating who their audience is or how big it is [10].

Second, content sharing on multiple social media needs to be constrained in the context of specific site norms. Norms are defined as “*customs, traditions, standards, rules, values, fashions and all other criteria of conduct which are standardized as a consequence of the contact of individuals*” ([134], p3). Research shows that norms matter in the social media context – even though users might approach the same site with different motivations or needs, they are affected by how others behave and their perceptions of expected site norms [17,29]. Perceived norms pose constraints on what to share and how to share, and

anti-norm behaviors are considered inappropriate [96]. This potentially poses another challenge and generates more identity management work.

Third, the social media environment is constantly changing. We've learnt from Hogan that content shared on social media is likely to persist over time unless purposefully managed. This management task becomes even more challenging when people are leaving traces on multiple platforms. Besides challenges caused by changes in self-presentation needs, individuals also need to deal with challenges brought by the emergence of new social media platforms and potentially changing site norms [96].

Any single social media tool is likely to be limited by its audience, norms, and capabilities. Therefore, despite all the challenges, the availability of multiple platforms also provides new opportunities and spaces for people to manage their diverse needs and goals.

Recent studies found that using multiple sites helps people maintain their social networks: participants in Lindley's study valued the fact different social media provide easy portals to access different parts of their social networks [79]; Vitak et al. [155] found that people switch communication channels when they want to reach different social groups. Research also shows that people attempt to resolve "context collapse" by using multiple social media, either by compartmentalizing their social media use [171], or intentionally making their other account information hard to find for some of their contacts (a strategy called "practical obscurity" [145]).

The diversity of site norms also provides new opportunities for people to manage different types of interactions, or curate different identities. For example, recent studies show that Facebook is more valued for major life events and one's highly curated identity compared to other sites [79,178]; Snapchat is valued as sharing small moments and mundane parts of everyday life compared to sites that afford more data persistence [8,174]. People now go to different sites in order to share different content [5,48]. With more platforms available and people approaching their use of platforms differently, it is

less likely that one’s communicative needs could be met on any single platform. Therefore, we are motivated to investigate how individuals deal with the challenge of managing multiple platforms, while also leveraging these platforms to fulfill their own communication needs.

Existing work has explored the general usage patterns of multiple social media sites for some particular contexts (e.g. organizational context as in [175]; college students as in Wang et al. [163] and different demographics [85]. Although they provide evidence that people do leverage multiple social media to fulfill their communication goals, there is a lack of focus on individuals and how they make decisions about what and where to share across platforms. In order to further unpack this identity management work and answer the call from some recent work [171] to explore “*how sites are compared and contrasted in each individual’s everyday use,*” I propose the second research question (Study 2) for this thesis:

RQ2: How do people manage content sharing across multiple social media platforms?

2.2 EMPIRICAL WORK

Study 1: The Many Faces of Facebook

This section is partly based on the published paper in the proceeding of CHI 2013 (Full paper attached as Appendix A).

BACKGROUND

In order to better understand users’ management behavior with respect to social media data and how their practices align with different theoretical frameworks such as Goffman [37] and Hogan [47] , we conducted a study of 13 active, long-term Facebook users about their day-to-day experience of creating and managing Facebook data. Their responses indicate a complex, dynamic relationship between users and their social media data, in

which the combination of concerns and goals that people have and the tools the platform provides fall into three broad “regions” that roughly align with the perspectives described above: a performance region, an exhibition region, and a personal region. By “region” here, we mean a set of goals, concerns, contexts, and corresponding system features.

METHOD

On December 22, 2011, Facebook launched Timeline. This new interface, which was optional at the time, arranges a person’s Facebook data following a temporal format and makes accessing past data easier for both the user and members of the user’s social network, highlighting a number of the issues we are interested around both temporality and the tension between public and personal goals.

Adoption of Timeline has been slow, allowing us to sample a set of users as they began to use the interface and see how people grappled with these issues. We conducted the study in May and June of 2012, around six months after the new interface was launched.

To try to improve the diversity of our sample, we used Facebook advertising to recruit participants. The ad was targeted at Facebook users living in our local community (a small city in the northeastern United States), because as the final part of the study, we asked participants to come to our lab for an interview. We also targeted participants who had used Facebook for several years and had generated a significant amount of social media content to reflect upon during the interview. Participants were compensated with \$15 in cash.

A total of 13 people (9 female, 4 male; 8 White/Caucasian, 2 Asian, 2 Hispanic/Latino, 1 American Indian/Alaskan Native; aged 18 to 43, $M = 22$), with an average of 4.3 years of Facebook activity, completed the study. Participants first completed a pre-survey with questions about their Facebook use and demographics. Seven of our participants had already installed Timeline at the time of the study, while the others were instructed to adopt it after completing the pre-survey to capture their initial reaction to the interface.

Participants then completed an online diary about their daily use of Facebook for two weeks. The diary asked about several aspects of Facebook use related to creation, curation, and sensemaking around digital traces, questions derived from the theoretical perspectives above. We asked participants to record whether they had updated or changed their profile pages by adding a new post, changing privacy settings, and so on; whether they had accessed or reviewed their own or others' past content; and whether they had managed past content of any sort. The daily diary allowed us to record actions and reactions close to when they happened and provided us with rich examples to reference during our interview. We reminded participants about the diary daily via e-mail.

After two weeks, participants came to our lab for a 60-minute interview. We asked them to log in to their Facebook account and to review their profiles during the interview, both to reflect on their experience and to enrich their responses. We asked general questions about their overall Facebook usage and privacy attitude in order to encourage people to reflect on the kind of management behaviors they engage in. We specifically asked about their Facebook activity from a temporal perspective, such as how they felt about their past content and how they valued it, in order to understand what Facebook data means to them, as well as if, when, and why they take explicit action to manage it. Other questions included how and why they view others' past content and their attitude toward Timeline after having used it. We also encouraged them to talk about offline archiving experiences such as journaling and their experience with other social tools (such as Flickr and Twitter) and to compare these experiences with their use of Facebook.

MAIN FINDINGS

The Regions of Performance, Exhibition, and Personal Archive

Our data provide strong evidence that people experience Facebook from different analytical perspectives — both around the performance and exhibition regions (“public regions”) and the personal region.

Consistent with Goffman, the performance region is where users of Facebook make decisions about creating and managing content for current self-presentation needs. The content is usually targeted to, or associated with contexts and audiences relevant to the moment. The fact that both the old Facebook profile page and the new Timeline interface prioritize content based on recency ensures that context-relevant performance is positioned for maximum exposure, both in the flow of updates on one's profile page and in others' news feeds. In general, the performance region is closely associated with a time-space locus that focuses on current activity and current goals.

I changed my timeline cover, because the soccer game Barcelona vs Chelsea is coming up soon and I want to show my support to Barcelona. (P2)

However, due to the persistence of social media data, content initially bounded by a specific time-space locus gradually goes into the exhibition region, modeled after Hogan (2010). For the most part, this region focuses on past data and longer-term needs around constructing identity. Participants were not always concerned about the past, but when they were, they encountered decision-making challenges regarding the changing contexts and the appropriateness of the content on their profiles.

These needs resulted in a series of management behaviors. It was common for people to express concerns about or decide to delete content previously posted on their profiles that was emotional, hard to interpret, inappropriate for their self image, or irrelevant to self or others. These management behaviors include managing emotional content, managing one's overall image or long-term identity, managing relevance, and managing friends.

I would delete it, yes, like after the event happens it's like really useless. It doesn't add onto my life or my timeline. I try to keep it clean. (P2)

Our data also suggests important personal value people associated with their Facebook content. Almost all participants noted that Facebook has significant personal value, serving as a "personal locker" on the Internet that archives their personal and social memories.

The fact that Facebook is designed primarily to support social and public activity raises tensions between the public and personal regions. People do struggle to balance what is desirable for public display and what they want to keep for personal archival, sometimes facing the “*ongoing tug of war*” (P5) to sacrifice one or the other. Photos are seen as being especially valuable in the personal region.

Because I don't keep everything on email or on my computer or written down someplace. So a lot of times Facebook is the way that I remember stuff... And I like to go back and see how..my silly friends and I were, back in the day. (P12)

One way that people deal with this tension in ways that minimize regret is by using Facebook Timeline features that provide more control over the exhibition region. Some common strategies “hiding” content from Timeline, or leaving tagged pictures “awaiting approval” without exhibiting them.

The personal region seems to be more tolerant than public regions, in that most people prefer to have a record of all that’s happening on Facebook; negative, positive or informative, versus the need to be vigilantly selective about content visible to the public. However, this raises important questions around how Facebook might better support the personal region since content normally must first pass through the public performance region unless people take special care to use the non-default privacy controls.

Temporal Transitions between Regions

Our second major theme highlights the important role temporality plays in mediating among these regions. As content moves from performance to exhibition regions, people are faced with the need to re-evaluate and re-select content. As we discovered, temporal relevance serves not only as one important factor that people consider when managing their Facebook profiles, but also serves as an important boundary for separating performance and exhibition regions. Participants tended to perceive their “recent” content (compared to “former” content) to provide a more accurate representation of self, in the sense that their recent content reflects who they are right now and what they’re up to. As

specific performances “expire” in time, needs for managing content, such as deleting, might arise.

Temporality also plays an important role in mediating between the public and personal regions. We found that as social media data “expires” from the public’s attention, it also gradually transitions into a personal space where it is mostly seen as an archive of meaningful memories.

Part of this idea of content “expiration” comes from a perceived norm that public attention only focuses on recent content. Participants predominantly felt that if they are not viewing the past content of others, then no one else is viewing their past content, either: *“most people don't have the time or patience or desire to go back further”* (P5). When personal content exceeds its “shelf-life,” it crosses over into an awkward state that users perceive as “implicitly private.” People expressed discomfort when others accessed their old data, and they also felt that they were invading others’ privacy when accessing “old” data.

Because it means that you're like digging through their profile and sometimes that's..I don't know, I mean, because it's like referred to as creeping on someone—in a nice way—but if I go through old photos I usually wouldn't comment on them. (P7)

Timeline Both Creates and Alleviates Temporal Tensions

Timeline also provides a nice case in point about how interfaces can interact with these temporal tensions. The interface provides a certain kind of data segmentation by temporality. Content generated around years and months are gathered and arranged within one section of one’s Timeline, and explicit access points are provided on the front page.

This design both creates and alleviates tensions among different functional regions. On one hand, the easy access to old data led many participants to engage in significant management of their Facebook content because the sudden availability of older content

blurred the lines between performance and exhibition: “*When I first got Timeline, it was showing me like all the stuff from the past. I hid things that I was like, people don’t need to know about that*” (P5). However, other participants felt that attaching timestamps to data helped to resolve the “temporal context collapse” between performance and exhibition regions.

Timeline does kind of embrace your history..maybe it’s the ambiguity (of old profile) that makes me want to just delete it just to have the current and relevant stuff..But I guess with Timeline it’s like—oh, okay— you see these pictures, but they are from 2008. (P10)

DISCUSSION

These tensions highlight the uneasy coexistence of these multiple regions in a single platform. In particular, Facebook supports some goals (mostly social) and some curation strategies (personal), but its support for user content curation are not strong and often run afoul of users’ needs. Here, we discuss the sometimes uneasy relationship between the system and users curating together, and the need for better designs and more effective metaphors for supporting dynamic needs and multiple regions emerging from the same “overloaded” platform.

Hogan’s discussion of past data emphasizes the role of the system as content curator. Our study points to a more complex story, including the user’s role in curation, and the various strategies the system and its users engage in, alone and collaboratively, to manage performance, exhibition, and personal needs. Some decisions, such as the format of Timeline or the algorithms used to filter content, are executed by the system, unilaterally. Users also have some unilateral choices, particularly around the initial decision of whether or not to post content in the first place.

After the creation of content, users’ ability to curate their data and exert control over how they will be exhibited is both empowered and limited by system features, such as the

ability to delete content, to create sharing and privacy policies, to manage friend lists, and so on. In observing users' active role in curating their content, we found some features provided by the system that effectively supported their curation needs. For example, hiding content and approval of tags were both used to accomplish high-level goals around controlling the exhibition of data.

At other times, however, the tools don't align with people's needs or mental models. Lack of visibility of how the system curator works can confuse people, resulting in their not trusting the system's mechanisms and engaging in defensive behaviors. One example of users trying, but failing, to embrace system curation tools is in the use of privacy settings. All participants in our study used Facebook's privacy settings, such as only allowing friends to view their profiles. However, there is confusion about how effective these controls actually are, resulting in people relying on, but not always fully trusting, the system:

We were young enough when it (Facebook) went public that we saw kind of a year or two before us getting really scrutinized heavily by future employers and I know there's all sorts of workarounds on Facebook that they can use to hack in and see your stuff so I don't really trust Facebook's privacy settings. (P1)

Another problem arises when curation is too costly. Audience segmentation is seen as being useful for managing information inflow, but is too hard to use to control one's own sharing:

If I could wave a wand and just say only my writer friends, then that would be...I might do that, but it's just such a it would be such a pain to sort everybody and to think about that every time. (P9)

Finally, curation goals around personal data feel awkward in the social context of Facebook. In principle, Facebook supports self-archiving through its privacy settings, but self-focused content management feels unnatural in the current platform:

I notice when I created my most recent album that it was...only visible to me and I was like, well, if it was only visible to me, why would I put it on Facebook because I would just keep it on my computer. (P7)

These aspects of models, cost, and norms around curation highlight the need to think about how system curation decisions and tools affect users' behavior and norms. When we step back and think about Facebook as a system curator, the most salient policy is temporality. Facebook, along with most other social media platforms, arranges user content around the point in time associated with the creation of the content, resulting in "recent content" being prioritized as content created at earlier times "flows" backwards into one's online identity exhibition. On that note, even though no participants explicitly commented about it, we wonder to what extent the taken-for-granted system curating policy has shaped or affected users' perceptions, such as when they perceive the Facebook norm as "going forward," and their behaviors, such as how they focus on managing temporally adjacent content in Timeline. This possibility raises interesting issues about the role of personal data on a public platform, and has important design implications for future interfaces.

Our findings about different functional regions of social media, and the corresponding metaphors—performance, exhibition, and personal locker—led us to revisit how we should design social media as an identity platform for both context-specific performance and long-term exhibition, for both others and self.

As a single platform that serves multiple functions, one can argue that Facebook actually serves performance well through the newsfeed and exhibition fairly well through Timeline, and it also provides some functionalities for personal spaces, such as the privacy option "visible for me". However, users still experience confusion about how exactly their data will appear to others, and frustrations that needs are sometimes conflicting and the system does not always fully support these functions.

For example, although Facebook provides privacy settings that support personal use, it provides no obvious personal spaces for private reflection and meaning making around this personal content:

I notice I have a few things that are private only to me but like they're not separate in any way. They're not like special, "oh, these are only for me...". (P10)

Likewise, although one-third of participants actively used the ability to “hide” Timeline content to manage tensions between public and personal regions, a similar number didn’t understand how this mechanism might support their use of this hidden data. These problems arise because Facebook’s norms and metaphors are a poor match for these personal needs:

So, in terms of hiding things (from Timeline), like, for me, if I hid it, it's gone because... I don't know... I don't even know how I would get that back... So hiding and deleting is kinda the same thing. (P6)

Thus, one way to improve social media platforms’ ability to support multiple regions is to think about how system curation could become “smarter” or “more considerate” when managing one’s digital traces. The way temporality mediates content between public and personal regions raises the possibility of designing a “two-sided” system, where content that falls out of the public attention will be automatically moved into a private space designed for personal archival. Instead of being implicitly private, these data would become explicitly personal. There is much value in systems that forget after a while, and even in systems that help us in our own forgetting. However, our users’ revisitation of old content and regret around decisions to delete it suggest that actual deletion of data is not to be taken lightly.

Another suggestion is to focus on which aspects of a system’s metaphors support which regions, and look for missing elements. For example, the former *Google Buzz* had a similar interface to the Facebook newsfeed, showing an ever-flowing stream of recent content (like Goffman’s “theater”) that prioritized timely updates shared between people but provided few tools for historical exhibition. On the other public-facing extreme, the Intel “*Museum of Me*”, in aggregating Facebook users’ publicly available data and creating a virtual exhibition of the self to encourage reflections and story-telling, resonates well with the exhibition region, but has no aspect of performance.

Missing from all of these systems, including Facebook, is user-driven curation and explicit support for the personal region in social media. There are arguments to be made for the use of separate platforms for separate purposes and for not trying to be “all things to all people.” But, in practice, people do use social media, particularly Facebook, for all three regions we discussed, and designs should respect that. Inviting people to upload their personal historical past to Timeline may align with Mark Zuckerberg’s beliefs in the value of “radical transparency”. But the Timeline metaphor and its affordances that favor public exhibition are a bad match for most people’s goals in archiving personal data.

Inspired by work from Miller et al. on the relationship between people’s identity and personally owned artifacts [98] we wonder if a metaphor based on how people display their physical artifacts around their houses might be a useful tool for thinking about social media design. If we conceptualize one’s Facebook data as a collection of artifacts displayed in one’s house, physical places where people traditionally display artifacts could have strong connotations for supporting the multiple regions. Pictures on the wall might function to display one’s long-term identity exhibition, not unlike the way that one’s basic information on Facebook is always explicitly displayed and easy to access. Grouped pictures in frames might serve to organize specific facets of people’s identity or highlight meaningful groups of friends or family. Stickers or drawings on the refrigerator might represent items that are temporarily important but are replaced or augmented with new content over time, not unlike how one’s profile photos and cover photos are currently used. Pictures put on the bedroom table might have significant personal meanings that only trusted others can access, such as “implicitly private” Facebook content has. A diary locked in a drawer might be strictly personal and private, such as the personal archival space that some of our participants expressed interest in having as a part of the platform. Then, the system might provide tools that help people move, arrange, and tell stories about data between these display spaces.

Note that we are not arguing that Facebook should be, literally, a house or a neighborhood or some other physical space, although systems like Second Life and

LambdaMOO have had some success using these metaphors literally. We are, however, proposing that metaphors that call attention to the multiplicity of regions, transitions, and curation needs of social media users might have real value above and beyond the relatively simple time-based metaphors that are commonly used in social media systems.

CONCLUSION

Study 1 applied both Goffman's theatrical and Hogan's exhibition metaphor for examining the actions users take to manage social media data over time. The need for creating digital content for performance purposes might contradict one's intended long-term image as time goes by, as both goals and audiences change.

As an extension to Hogan's exhibition approach, we also found that as social media data expires from the public attention, they not only move to an exhibition region, which affords presenting one's long-term image, but also gradually become part of a personal region, where social media data functions as a personal archive and repository for meaningful memories. Past interaction data has been commonly described as "implicitly private," where people feel strange accessing others' past data and don't expect an audience for their own past data.

We also discovered an implicit negotiation between users and the system in terms of how personal data on social media platform should be "exhibited". Emphasizing users' role in curating their digital traces both extends the concept of curation in Hogan's theoretical model, as well as allows us to rethink appropriate design metaphors for social media that nicely support and acknowledge users' needs and expectations.

Study 2: The Social Media Ecology

This section is partly based on the paper published in the proceeding of CHI'16 (full paper attached as Appendix B).

BACKGROUND

People don't use any given social media site in a vacuum; its use exists in an ecology of other social media sites and communication tools. Another aspect of identity management work, comes from fact people need to manage sharing of personal content across different platforms.

In order to better understand how people make sharing decisions across multiple sites, we asked our participants (N=29) to categorize all modes of communication they used, with the goal of surfacing their mental models about managing sharing across platforms. Our interview data suggest that people simultaneously consider "audience" and "content" when they share and these needs sometimes compete with one another; that they have the strong desire to both maintain boundaries between platforms as well as allowing content and audience to permeate across these boundaries; and that they strive to stabilize their own communication ecosystem yet need to respond to changes necessitated by the emergence of new tools, practices, and contacts.

METHOD

We recruited participants living in and around Ann Arbor. We disseminated the recruitment advertisements on Craigslist, a local newspaper, and posters at local restaurants, libraries, and supermarkets. Participants were first directed to an online pre-survey to screen for desired characteristics and were asked demographic questions (age, gender, race, etc.) as well as items about the social media tools they frequently and actively use and how often they access these tools. Information from the pre-survey was used to screen participants. We understand that media experience could vary to a great

extent in different age groups, so we aimed to recruit people from a broad age range while balancing gender and race/ethnicity composition in our sample.

Participants were then invited to our research lab for a 60-minute in-depth, face-to-face interview. The interview involved questions about participants' daily communication practices with a focus on their use of different social media and their perceptions of how the communication experience was similar or different across different communication platforms. In the first part of the interview, participants were asked to perform a card-sorting task, where they created their own set of cards to list all the “modes of communication” they use (one card per channel) and then organized their cards into piles and described the relationship between these communication platforms. This activity was designed as a way to encourage participants to react to and reflect upon their communication practices and media use. We intentionally used the wording “modes of communication” in prompting the card-sorting activity, because we did not want to prime people to think of some as communication platforms but not others. In the second part of the interview, we prompted participants to reflect on their experience of using different communication platforms for specific communication scenarios, as well as for specific relationships. Participants were also asked to visit any archives of communication or traces of online activity either on desktop computers or on their own mobile phones, to help them draw examples to talk about in responding to our questions. All card-sorting results were photographed, and all interviews were audio recorded and then transcribed.

29 participants participated in the study (18 Female, 11 male; age range from 22-53). The frequently used social media sites by our participants include Facebook, Twitter, Instagram, LinkedIn, and Snapchat. Participants were given \$35 for their participation. Table 2 shows age, gender, and frequently used social media platform by each participant.

MAIN FINDINGS

We find people simultaneously consider their desired audience and norms around content when deciding how to share specific content. In some cases, audience, norms, and user needs align well. However, when we look at cases in which the boundaries are blurred, a more complicated story arises. We find that participants sometimes struggle to reconcile a strong desire to maintain boundaries between platforms and networks but also a need to allow content and audience to permeate through these boundaries at times. We also find that participants struggle to stabilize their own platform ecosystem yet feel the need to respond to the emergence of new tools and new relationships.

P#	Age	F/M	Social media	P#	Age	F/M	Social media
P1	46	F	1,6,7	P15	34	M	1, 2, 3, 6, 9, 18
P2	53	M	1, 2, 3, 9	P16	29	M	1, 2, 8, 9, 11
P3	50	F	1, 5, 6, 7, 9 16, 17	P17	34	M	1, 6, 9
P4	33	F	1, 2, 3, 6, 10, 12, 13	P18	29	F	1, 2, 3, 5, 9, 8, 9, 10
P5	48	F	1, 4, 5, 6, 9	P19	24	F	1, 2, 3, 8
P6	26	F	1, 3, 5, 7	P20	32	F	1, 2, 3, 9, 14
P7	24	M	1, 2, 3, 8	P21	27	F	1, 5, 6, 7, 9
P8	25	F	1, 2, 8, 9, 15	P22	24	F	1, 2, 3, 5, 6, 8
P9	51	F	1, 2, 3, 5, 6, 7, 8, 9	P23	33	F	1, 5, 6, 9
P10	22	F	1, 2, 3, 5	P24	39	F	1, 2, 3, 5
P11	27	F	1, 2, 3, 4, 5, 6, 7, 8	P25	25	F	1, 2, 3, 4, 5, 9
P12	51	M	1, 6, 7	P26	49	F	1, 5, 7, 9
P13	40	M	1, 2, 3, 5	P27	26	F	1, 5, 9, 11
P14	32	F	1, 2, 5, 6, 9	P28	41	F	1, 3, 5

				P29	20	F	1, 3, 5, 6
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Table 2: Participants and Their Frequently Used Social Media

1=Facebook, 2=Twitter, 3=Instagram, 4=Snapchat, 5=Pinterest, 6=Linkedin, 7=Google+, 8=Tumblr, 9=Youtube, 10=Foursquare, 11=Reddit, 12=Path, 13=Flipboard, 14=MocoSpace, 15=Fetlife, 16=DateHookUp, 17=AtlasQuest, 18=LiveLeak

Sharing Strategies: Considering Audience and Content

Our data echo previous work in highlighting the role of expected audience and norms around content sharing on different sites, but our findings also explicate how these two factors intersect, affecting platform choices.

Consistent with the strategy of “segmenting by sites” described by Stutzman and Hartzog [145], the conceptual link between platform and audience was highlighted when participants described how they consciously curated different audience groups on different platforms.

In addition to managing issues around context collapse, participants described the need to carve out separate spaces for more targeted kinds of content sharing. Having one platform dedicated to a particular kind of audience or content helped to ease the pain of “*deciding where to post*” (P24) for users.

Aligning specific kinds of content (such as sports or children) with specific channels helped to ensure messages were delivered in intended ways and could receive sufficient attention from other parties. Many participants remarked that particular social media platforms such as Facebook and Twitter, which contain a variety of content from a diverse group of people, could end up making it difficult to find valuable and meaningful content due to the messy and diverse nature of the audiences and the filtering algorithms used to display content.

Another need that drives platform choice is whether the content to be shared is normative, or perceived as “appropriate,” for a particular platform. In many cases, the concern for sharing the right kind of content took precedent over concerns around audience. For example, Facebook was perceived to be strictly “personal” for many participants. Even if the audience for that site is constructed from a specific domain (work), the personal-ness of the platform still is what dictates how people communicate on Facebook: *“while I am Friends with some folks that I work with, whatever interactions we have on Facebook have nothing to do with work.”* (P22).

The characteristics of the content often dictated which platform participants used to share it. Three themes emerged with regard to these patterns. First, our participants differentiated lightweight content versus more meaningful, high-quality content. Second, participants described the expected interactivity of the content as driving platform choice. Participants differentiated content mainly shared for self-expression or self-archiving purposes versus content shared with expectations of audience feedback. Finally, content was segregated by topic and theme, with different platforms being used for different topics. Participants described constraining content centered on a common theme to a particular platform, and tried to avoid alienating or spamming other irrelevant platforms.

When the content and desired audience aligned perfectly, participants’ decision-making strategies were clear. However, in many cases participants experienced competing desires. These tensions were along two dimensions: Separation-Permeation, and Stability-Change. Our finding on tensions regarding how people manage platform boundaries does not imply simple contradictions or the need for dichotomous choices: Instead, we can think about “complementary dialectics” as a framing: the notion that tensions are positive to work through and the goal should be to incorporate both poles in an enabling manner [34].

Managing Content Across Platforms: Separation vs. Permeation

Our data suggest that participants experienced opposing desires to guard platform boundaries in order to maintain separate spaces, as well as to relax platform boundaries to allow “audience” and “content” associated with any particular platform to permeate to others.

On one hand, participants mentioned a variety of strategies to keep different platforms separate. The most commonly mentioned strategies include disguising their Facebook account names from people they know from real life (P30), making fake accounts (P2), intentionally avoiding disclosure of their social media profiles (P1), making sure their social media profiles are “search-proof” (P19), and separating their use of different social media accounts to avoid the mix of audience from their professional and personal life (P8).

Although many participants described efforts to keep platforms separate, permeation between platforms did occur. Since a single platform was not likely to have the perfect match of “contacts” and “content”, participants reached their desired audience by sharing the same content over multiple platforms. However, cross-sharing situations are usually managed with extreme caution because they may entail losing control of platform boundaries around audience. For example, many social media sites allow users to use login information from one platform to access another or the ability to link accounts across platforms; when this happens account information is made visible to other users. For example, many mentioned instances where they “*found people's Twitter names through Facebook*” (P22) when others were cross-sharing on both platforms.

Despite the strong desire for separation between platforms, participants also desired platform permeation at times and intentionally made explicit links between platforms in order to increase permeability between platforms. For instance, links between platforms

enabled some participants to port contacts from one platform to another, in order to increase numbers or strategically manage audiences. For instance:

“I absolutely control it to the extent that I can. My Instagram has my online name and a link to my blog. My blog has links to connect back to Instagram or Twitter, and my Facebook has links to my blog, not Twitter or Instagram because Facebook doesn't currently have that interface like, there's no place on a personal profile where you can say, find me on Instagram and you just click a link” (P11)

In other cases, participants were very selective about disclosing account information for one platform on another. For example, this participant talked about having her LinkedIn profile listed on her emails for the purpose of job-hunting, although she purposefully severed the connection for other contexts such as Craigslist postings:

“When I returned from working in Thailand and I did not have this job yet, I definitely beefed up my LinkedIn... My e-mail signature, my personal e-mail signature, has my LinkedIn link... But there are times depending on who I'm messaging, I might delete that signature. If it's a Craigslist response for something like "I'm looking for housing", I'm just going to delete that part...” (P4)

Similarly, participants might selectively post content for the express purpose of encouraging interactions on other channels. These conversational triggers were not necessarily shared on multiple platforms but were rather purposefully placed to initiate interactions via another channel or in anticipation of other kinds of interactions. For example, this participant intentionally updated her Facebook photo albums before the high school reunion:

“When we had a class reunion a couple of years ago, I posted some things on Facebook like pictures of myself 'cause well, I'm in great shape for my age... before the reunion definitely, and kind of to be like, "Heh, heh, I stayed in good shape and you might not be."” Because in high school I was very studious and a little bit of a nerd, so it was kind of like retribution.” (P8)

The Separation-Permeation tension is often especially salient in the case of platform adoption decisions. For example, many social media platforms provide options to import

contact lists from other applications. On one hand, this is a convenient way to build one's contacts quickly and easily. For instance, one participant noted that using the suggested contact lists when one signs into Pinterest through Facebook "*gives you more things to search from*" (P22) from the very beginning. However, this kind of mass transfer of contacts from one platform to another shapes the type of experience they have on the new site and limits the ability to carefully craft a set of contacts tailored to that particular platform. "*Well first, when you sign up (on Snapchat), they have to be in your phone... If I'm not in your phone, you have to know the username*" (P25)

However, this kind of mass transfer of contacts from one platform to another shapes the type of experience they have on the new site and limits the ability to carefully craft a set of contacts tailored to that particular platform. For example, this participant was aware of cutting down the list when Instagram presented the opportunity to easily connect to all applicable Facebook friends:

"... Because I just don't wanna have an overflow of stuff. My sister was complaining to me one time about how she follows like 400 people on Instagram, and how she doesn't get to see all of the photos and stuff that people post, and she just follows them to follow them. And I'm like, "I don't have time for that." ... If I'm gonna follow you, I kinda wanna be interested in what you're doing." (P22)

Depending on a host of factors, participants carefully calibrated the permeability of platform boundaries in ways that reinforced segmentation or blending between tools. For many this represented an ongoing effort to establish an effective communication ecosystem where they could make adjustments based on evolving social needs and norms – and the dynamic ecosystem of platform choices, as described in the next section.

Managing Data Across Platforms: Stability vs. Change

The second tension, stability vs. change, refers to the competing desire for people to establish a stable system of how each communication platform was used and the need for change when faced with new platforms and emerging practices.

Adopting a new platform, and integrating the new platform into one's communication routine, appears to be a non-trivial decision and the integration usually takes some time to really stabilize. We discovered how individuals view their existing communication ecosystem plays an essential role when making adoption decisions for new platforms. Our participants seem to perform an evaluation of their current ecology of communication platforms when faced with decisions about whether to start using a newly available social media platform. One common reason for non-adoption is that they consider their current "ecology" as complete, manageable, and satisfying.

Second, over time the expected use or perceived norms of particular social media could change, affecting participants' own practices and experiences. In other words, even if individuals do not react to the emergence of new platforms, their use of existing ecosystem could be affected by how others are reacting to such changes.

With the increasingly proliferating communication platforms, it might be evitable that the use of each platform is getting more "specialized." Similarly, with the availability of multiple sharing platforms, our participants reported becoming more conscious about where and how to share certain content. For example, interactions or content that used to belong to Facebook may have diverged to other platforms over time:

"So, I feel like the status... When Facebook first came out in social media or whatever, it was like the major one, right? So, everyone was putting up everything that they're doing on Facebook or whatever... but now... I don't know. I feel like everything that people used to do on Facebook has been branched into these two forms (Instagram and Twitter) and I think they've made it better. "(P7)

The change in site norms and in interface design can also lead to people rethinking and enforcing changes in managing their social media ecology. For example, this participant talked about how he had to switch to another social media for photo-sharing with families after Picasa changed their interface. *"It's just all the links that I had been sharing with my family stopped working... now I couldn't share a link that says, "Here is all the folders that I have, essentially... (because) my parents aren't gonna get a GooglePlus*

account.” (P17)

DISCUSSION

Our study explores how individuals manage their platform choices when faced with an ecology of communication and information tools. Our findings suggest that both audience and content are key considerations for participants as they make decisions about what to share. People experience challenges when their content and audience needs are not met by the same platform or require the use of multiple platforms. These challenges are amplified by the fact that users experience multiple (and sometimes conflicting) desires, which are captured in the two tensions we see in our dataset: Separation-Permeation and Stability-Change. We found people experience the desire to both reinforce and dismantle boundaries between platforms. This fluid calibration of boundaries is an ongoing process in which participants attempted to stabilize their use while contending with shifting norms and the influx of new platforms and people.

The affordance perspective describes how users perceive different social media site features as “affording” different types of activities [30,139]. For example, on Facebook a person might see a status update as affording the ability to broadcast to a large audience of known contacts. The affordances people associate with a platform stems from multiple sources; the design characteristics of the platform, observation of how others use platform, and previous personal experience may all play a role in defining what affordances people perceive.

The affordance perspective of social media platforms has been most commonly applied to use of a single social media site, given that the numerous features available in individual platforms already create a complex set of affordances[139]. However, our findings regarding cross-platform practices suggest that people think about affordances within the context of their overall assessment of all available platforms. Rather than focusing on whether a particular platform “allows” people to do one thing, users consider the affordances of that social media platform in the context of all of the communication tools

available to meet a communication or information need. In other words, we suggest that people are cognizant of the sum total of affordances of their own social media ecology, not just those associated with discrete platforms or channels.

While existing privacy management research is mostly focused on individual platforms, the availability of multiple information and communication services brings new opportunity to manage nuanced social needs. Previous boundary management work in HCI (as in [20,32]) explores how people consciously integrate their use of multiple devices or applications (e.g., cellphones vs. desktop computers, work email vs. personal email) into their daily routine to manage their social role transitions (mainly between home and work). Our findings on how people consciously calibrate platform boundaries has extended this work and provided evidence that people are remixing their use of multiple platforms as a strategy to overcome the inherent social-technical gap, as suggested by the Separation-Permeation and Stability-Change tensions in our data. Our participants pointed to friction between their social communication desires and the ability of individual platforms to meet those communicative goals. Even though individual platforms pose social friction because of the social-technical gap, participants reported breaking platform boundaries, as well as restructuring and reintegrating them, based on considerations like audience, permeation, content, norms and changes in the available set of tools. This ecological view of the social-technical gap changes the calculus of user-interaction from system-centric to goal-centric.

Our data suggest we should consider system affordances not within the context of any single tool or service, but rather within the framework of an ecosystem of communication channels people use in an organic and fluid fashion. Furthermore, our findings suggest one's personal media ecology is re-evaluated constantly in the context of shifting norms and other available and emerging platforms. These findings have important implications for system designers, researchers, and practitioners.

First, system designers now face the challenge of balancing how to design for use of one discrete platform versus designing for the broader ecosystem of platforms and channels. On one hand, when approaching the design of new social systems, it is useful to think about how to deliver a unique value proposition that extends a user's existing ecology of systems; for example, novel ways to aggregate contacts or a new type of content generation (e.g. using location information to suggest new contacts or encourage location-specific content exchange). On the other, the ecological approach suggests new types of "cross-platform affordances" that could act as design guidelines. For example, designers may wish to provide tools for users that acknowledge the fact that people are using multiple platforms and which support their ability to calibrate levels of permeation and segmentation across platforms. Many social media platforms visibly display users' other social media accounts or employ permeability calibration functions that allow for cross-sharing content and contacts. In order to create robust content streams, new systems now often provide options to build contact lists from other existing applications. System designers should be cognizant that these design decisions could have significant impact on sharing the norm of particular sites. For example, in cross-sharing situations, the possibility of sharing contacts across platforms creates a tension between convenience and the ability to partition contacts as well as content. Furthermore, designers should consider how to supporting how people communicate within their ecology of technology use. Two users who wish to communicate must consider one another's constraints, preferences, and skills as they negotiate the choice of platform. User decisions about platform choice are not unilateral decisions, although they are often treated this way, but rather are negotiated with others either explicitly or implicitly.

Second, our finding suggests new ways to approach social media scholarship. Research often focuses on use of one particular platform, as in [28]. As users increasingly mix and remix use of different communication platforms, focusing on only one channel may conceal important insights. Our findings highlight the need to consider the more holistic context of social media use across platforms, as affordances are perceptual and are

shaped by a broad range of factors including the other channels being used at that time. This suggests an increasing need to evaluate the usability of a discrete social system iteratively within context of other available technologies and systems.

Third, our findings suggest new directions for social media literacy training, emphasizing a focus not on the features of discrete platforms, but rather on the affordances of the suite of possible communication tools. Social media literacy deals with helping people understand the implications of social media use, at the personal and interpersonal scale, and an affordance view that emphasis media ecosystems may help users create a menu of available channels that can be matched to specific communication goals at that moment.

CONCLUSION

Study 2 explores the “spatial” dimension of identity management work by investigating how individuals manage content sharing in the context of an increasingly large and complex set of communication channels, each with its own set of norms and networks. We used a data collection method that reflected participants’ lived experiences using different platforms and communication channels as opposed to artificially restricting them to one platform, in order to better explicate how they worked together.

Our data suggest that both audience and content are key considerations for participants as they make decisions about what content to share on which platform to what audience, but they experience challenges when their content and audience needs are not met by the same platform or require the use of multiple platforms. These challenges result in a series of management strategies, such as cross-sharing, segmentation, and intentional permeation, and bring friction as people are confronted with new platforms and new practices.

This work has two broader implications. First, these findings show that people use multiple communication tools to bridge the “sociotechnical gap” [1]. Second, the use of the affordances perspective to describe how people interact with an individual platform

needs to be broadened to include consideration of specific platform characteristics (norms and networks) that people consider when evaluating their communication and information needs.

CHAPTER 3:

IDENTITY REFLECTION

In the previous chapter, I reviewed related work and showcased two studies that reveal a set of tensions and strategies related to how people manage content sharing on social media, across platforms, over time. Results from Study 1 [179] and Study 2 show that people engage with continuous, strategic management behaviors towards social media, which we referred as “identity management” work. This management work encompasses negotiating with other individuals in the space (e.g. [180]), negotiating with ever-changing self-presentation needs on a single social media platform over time (Study 1), and negotiating different audiences and practices across multiple social media platforms (study 2).

In Chapter 2 I was particularly interested in how people sustain a long-term relationship with their own personal data for outward-facing purposes. For Chapter 3, I will focus on the second goal of my dissertation, which is to explore the potential for individuals to keep engaging with their personal data on social media after “sharing” for inward-facing, self-reflective purposes.

The outward-facing, public perspective nicely frames how people approach social media, in that social connections and interpersonal communication are major driving forces for people using these sites. However, studies from Chapter 2 show evidence that people are increasingly revisiting past shared data for their own personal use: Study 1 shows that people struggle to decide whether to keep or delete personally meaningful data on social media and that they are in need of explicit support for the “personal” use of this content; consistent with what Study 1 found about the emerging personal region in social media,

Study 2 shows that people are motivated to carve out separate social media platforms where they intentionally limit the number of audiences and mainly use certain ones for the purposes of life logging and memory keeping.

The emerging practice of using social media for personal archiving means the “self” has become an important audience of the platform. Goffman [37] actually argues that self-presentation goes beyond performances for others, but is also a process of developing a sense of the self. Researchers have long argued that digital representations of physical objects, such as pictures, help people tell stories about their memories [144], and more recently, the role of social media in archiving and curating digital content has been highlighted (e.g. [88,105,107]). Commercial applications have also been developed to support self-reflection via user-generated content on social media, such as MemoLane, Everyday.me and Timehop, which all gather one’s social media traces and feed them back to users for triggering self-reflection.

In line with this body of work, I argue that even though personal content on social media could be considered “interaction” traces (similar to archived chat histories or email archives), the fact that it is more self-focused (rather than relationship-focused) and is created and shared with conscious identity goals in mind makes it a unique “social mirror” for identity reflection.

My work in Chapter 3 is driven partly by the intention to understand the existing practices of people using social media as a container for their important personal memories (as suggested by Studies 1 and 2), and partly by the intention to explore how we can purposefully trigger people to look back on the content they have generated. Building on Chapter 2, my goal is to unpack and explore the reflective value of social media content from both temporal and spatial dimensions:

- To explore the reflective value of social media as a curated collection of content over time (temporal);

- To explore the reflective value of social media as a curated collection across multiple communication platforms (spatial).

In this chapter, I will first examine the topic of supporting self-reflection from both the perspective of psychology and the perspective of HCI, and then offer an argument as to why the nature of social media content makes it particularly relevant and interesting for triggering reflection. I then build on related work and describe two projects that address the temporal and spatial dimensions, respectively.

3.1 RELATED WORK

Triggering Reflection: The Psychological Approach

In cognitive psychology terms, memory is present because effective interaction with the world requires taking into account past interactions so we can be better prepared for the future. The incorporation of past individual experiences with an orientation toward the future is the main function of memory systems [16,35]. In this “large collective pool of experiences,” there is a distinction between representations of events that humans themselves experienced (autobiographical memory) and events without personal experience associated (historical memory) [41]. Autobiographical memories are specific, long-lasting, personal events [104]. They are not necessarily about information or events that are shocking, interesting or entertaining, but they are meaningful to each individual.

Self-reflection refers to the process of synthesizing one’s behaviors, feelings, and other relevant information, in order to make sense of both the self and the outside environment [78]. Reflection is more appropriate for describing access to autobiographical memories – past experiences having to do with the self, one’s interactions with others, or one’s feelings and emotions. Reflection on one’s past is not just about remembering the content or the facts, but about re-attending, interpreting, and evaluating the past experience.

One important driving force for self-reflection is to gain self-awareness, or knowledge

about the self – one’s own emotions, motives, and desires [39]. The importance of self-consciousness lies in the fact that it helps people create and maintain their self-identities [52], and make sense of the past in order to plan for the future [166,167].

One important characteristic of self-reflection is that it is strongly future-oriented, meaning that the activity involves a considerable amount of future thinking and planning. Therefore, self-reflection is often associated with purposeful mental activities, such as self-regulating and self-monitoring towards specific goals [126].

Even though self-reflection helps people to gain self-knowledge and regulate their behaviors, there is actually a great amount of inconsistency regarding whether more reflection leads to physical and mental well-being. Some argue that a high level of self-consciousness leads to more accurate self-knowledge and ultimately results in greater happiness [57,103], while others argue that thinking too much about the self is linked with distortions of self-image, more negative emotions, and low emotional stability. One example is rumination, which means individuals keep focusing on analyzing their own behaviors and moods with doubt, blame, and negativity [120].

Therefore, how to more effectively shape people’s reflection experience in ways that contribute to gaining useful self-knowledge has always been an important topic in psychology. For example, one particularly useful framework is “psychological distancing,” which aims to diminish one’s direct egocentric experience of one particular experience [75]. Psychological distancing can be achieved by temporal distancing (near vs. far future), spatial distancing (close vs. far distances), or social distancing (self vs. others), which all lead people to focus on the big picture in life in making meaning out of their experiences [65]. In order to trigger psychological distancing from the social perspective, Kross et al. [66] prompted people to use their own names instead of “I” or “me” in self-reflection tasks as an effective technique to allow people see oneself as “other.” Their work demonstrates that by altering perspective, individuals are more likely to engage in positive “adaptive self-reflection” instead of “rumination.” This approach to

seeing the self as “other” while still having access to one’s inner thoughts and feelings [76] is close to the theoretical idea of the “looking glass self” [23], which argues that people form their self-perceptions based on imagining how others might perceive them.

Triggering Reflection: The HCI Approach

How to effectively support memory and reflection is an emerging topic in HCI [7,42]. The topic of reflection has been explored by a number of communities in HCI, such as personal information management, personal informatics, information visualizations, digital possessions, and life logging. Each of these communities approach reflection in very different ways, in terms of both the specific memory or reflective activities they support as well as the type of data used to support reflection. However, these approaches are rarely compared and contrasted. Here I attempt to organize these different approaches and perspectives, mainly for the purpose of better situating my own work in the space, rather than providing a comprehensive review of each of them.

One way to make sense of work in this space is to categorize it based on the specific reflective activity the technology supports. In their well-known review article, Sellen and Whittaker [133] critique the “total capture” approach of life-logging technology and outline five “R”s - five different types of memory activities that should be supported by technology: retrieval, recollection, remembering intentions, reminiscing, and reflection.

Retrieval aids a person’s memory in re-finding relevant information, and the key is to enhance the ability for storage and organization. This particular activity is supported by work from personal information management (PIM), where the main task is to support the organization and management of one’s personal information in the long run, or “information curation,” as it has been termed by Whittaker [169]. Distinct from the prevailing view of information foraging, Whittaker’s information curation model considers the processing of information that is “filtered in” and involves a set of practices and strategies associated with the collection, storage, and organization of personal information such as emails and photographs.

While retrieval is more about knowledge and information, recollection is more about reliving a moment and the recall of experience. Life-logging technologies, such as the early wearable device, SenseCam [46,132], or the newer commercial products such as Narrative Clips, are all examples of technology that captures video or audio snippets from a user's everyday life in order to support recollection. Besides capturing real-life scenes and experiences directly, other designs trigger recollection in different ways – for example, Reflexive Printer [152] prints out distorted photos to purposefully trigger people to reconstruct their own experience with the past scene.

Remembering intentions is about storing cues that trigger future behaviors. This activity is also supported by work from PIM – setting to-do lists or calendar items are examples that augment the ability to remember intentions. This activity is usually very goal-oriented, and is usually an important element for personal informatics systems, too [71,74].

The last two memory activities, reminiscing and reflecting, often go together but could suggest slightly different practices. Reminiscing and reflecting are both about processing one's past experience in a more abstract way, but reminiscing focuses more on the emotional or sentimental aspect while not containing in-depth evaluation or synthesis of the experience. Reminiscing and reflecting are both primary focuses for work on digital possessions, in that they aim to explore how people develop a sense of sentimental value for digital artifacts similar to how they develop attachments to physical possessions [106,108]. Some studies have found that digital content might not be experienced or valued in the way that material things are - digital music has been shown to be quite difficult for people to display as part of their identity expression [15]; digitized artifacts such as photos, cards, and maps can have diminished sentimental value [118].

Reflection is also the primary focus for personal informatics systems [71,72]. The purpose of personal informatics systems is to use behavioral information, such as number of steps taken and blood glucose level measured by devices, to help people track and

reflect on their pre-set goals.

Even though we differentiate these memory practices here, they are in fact not mutually exclusive. For example, a recollection of a past event will be accompanied with some emotional response like reminiscing; and active reflection on behavioral patterns might trigger people to remember their intentions for future behaviors. Similarly, it is not likely that one particular system or design only focuses on one of these practices while not including others: For example, tracking one's location and steps taken is mostly used for triggering reflection on one's health behaviors, but the same set of data could also trigger reminiscing, and remembering intentions.

Therefore, even though I refer to the second part of my work as being about “identity reflection,” the term “reflection” is used loosely here to describe the experience of re-visiting and re-experiencing personal data in general.

HCI approaches to reflection also differ in terms of whether the digital data was generated for the purpose of reflection, and where the digital data comes from (system vs. users). For example, in personal informatics systems, the system and users usually collaboratively determine the specific metrics or the type of behavioral data to track and measure [58,71]; “Mindful technology”, such as “three good things” doesn't assume any pre-set goals, but purposefully asks people to reflect on their behaviors or attitudes to increase their psychological wellbeing [101]; Work on digital possessions draws on consumer research (e.g. [9]) and sociological research (e.g. [98]) on personal possessions and argues digital things are extensions of the self, and therefore supporting revisiting of digital traces (even when they are not generated for reflection purposes) is important [105–107].

My work on repurposing social media data for triggering reflection is a good fit in this last category. This particular type of data was generated by users with a goal (social), but in most cases not with a reflective goal (personal). Similarly, creating an information

visualization of one's email archive is also about repurposing content for reflection, but this is a case where the reflection goals are preset by the system and users do not have much control over how they explore the material and approach the reflection. For example, the design could choose to focus on the temporal pattern of how individuals send emails, which is indicative of the individual's work pattern. Tools such as PostHistory visualize one's email history to provide insights into how a dyadic relationship evolves [154], and the visualization is also used for supporting storytelling, like photographs. Such designs usually directly present the visualized pattern to users, while giving little freedom to users to explore the dimensions of their personal data that interest them.

My particular interest in Chapter 3 is to repurpose personal content on social media for triggering reflection. This was driven by both a theoretical interest in this particular set of data, as well as an interest in advancing the design agenda for supporting reflection practices.

3.2 EMPIRICAL WORK

In Chapter 2 I approached identity management in social media from three different aspects: Individuals need to negotiate content sharing with others (interpersonal), manage content sharing in response to temporal change (temporal), and manage content shared across different platforms (spatial). Building on Chapter 2 and the set of tensions we discovered arising from interpersonal, temporal and spatial dimensions, I argue these tensions people face in managing outward-facing presentation online actually make social media content a valuable and meaningful source for reflection. Corresponding to the three dimensions explored above, the reflective value also encompasses the interpersonal, temporal and spatial dimensions.

In exploring the interpersonal dimension, I co-led a study with my colleague [128] to explore how individual reflection might take shape in mutually reflective activities. In order to explore whether people collectively reflect on social media content, how data

both supports and limits the ways people think about and interact with each other, and how the data lets them think about the quality of and behaviors in their own friendships, we conducted a qualitative study of 28 people. We asked them to reflect on their relationship with a close friend – either with the friend, or alone, or with the support from social media content. This study provides evidence that reflecting with other people on social media content increases relationship closeness and brings positivity to the relationship. This study also generates design implications for supporting conversations and recreation of experience by triggering relational partners to collectively revisit and reflect their social media content.

In Chapter 2, my work suggests that the negotiation of content sharing often happens as an interpersonal process, which could create tensions between individual users and adds onto the identity management work [180]. However, Sosik, Zhao and Cosley [128] found that the fact people are negotiating their online presence with others also makes the content co-owned, suggesting a unique opportunity for social reminiscing and reflection. This study is not part of the thesis, but could be retrieved in the *Proceedings of CSCW'12* or is available upon request.

For the rest of this Chapter, I will focus on exploring the reflective value of social media from the temporal and spatial perspective.

Study 3: Curation Through Use

This section is partly based on the published paper in the proceeding of CHI'14 (full paper attached as Appendix C).

BACKGROUND

From a temporal perspective, personal content gains reflective value over time. The “self” function of reflection suggests one benefit of looking back, which is to make sense of one’s past with a temporal distance and thus being able to understand the development of the self in the continuity (e.g., [12]). On social media, sharing personal content is primarily about experiencing the present, but it nonetheless leaves a record of the

particular moment, or “artifact” in Hogan’s term, that persists in time. This suggests the increasing personal archival value of social media.

Recent work points to the idea that the web might be considered a form of archive, and furthermore, one that works with offline content. Lindley et al. [178] suggest that online repositories such as Flickr, together with social media sites, blog posts and webmail accounts, work in concert to form a space that users can easily navigate when looking for their virtual possessions. Social media is, in theory, part of that space. However, it is rarely studied as a personal archive.

We know from traditional personal archiving work that people already struggle with the task of managing their digital content. In HCI, researchers have pointed out that digital archiving is subject to many difficulties: For example, special content is mixed in with the mundane, digital content in general is sorted, organized and encountered only infrequently [118] and users find it surprisingly difficult to locate even their favorite photos [168] or other cherished digital mementos [116]. Social media as an emerging personal archive differ from traditional digital archive in many ways. For example, Harper et al. [43] points out that social media cannot support traditional “saving” actions (e.g. saving a status update), and it is difficult to capture metadata with digital content when people try to copy data from social media. Social media is also shared, stored in the cloud, where possession is felt to be compromised [105] and access to accounts can be lost [87].

The above suggests that social media could have archival value for the self, but also highlights the complexity here; it has been described as both meaningful and trivial, being generated for the maintenance of a social network but also potentially accruing personal value over time.

In this paper, I undertook a qualitative study in which 14 participants created digital keepsakes using their social media content. The findings highlight a quite nuanced view toward social media sites as personal archives, and how some social media sites are considered more likely to host ‘keepable’ content than others. We found social media

hold a valuable collection of personal content as users carefully select and curate content for their social media profiles, although the curation practice differs across sites; Social media also has its uniqueness in supporting re-visiting past content and offering more opportunities for reminiscing.

The third research question of this thesis is:

RQ3: How do people value social media as a meaningful personal archive over time?

STUDY DESIGN

In this study, we aim to probe more deeply into the concept of social media as an archive, by situating social media in relation to other more private digital archives, stored on personal devices or in the cloud. We aim to explore where the long-term archival value may lie in social media, and what the complexities are, given that some accounts position it as trivial [79] while in others it accrues personal value over time (Study 1). We do this through an activity designed to encourage participants to reflect more closely on the value of the content hosted on social network sites, by making a ‘keepsake’ out of social media.

14 participants completed the study. They were 9 women and 5 men, with an age range of 20-53 years ($M=29$, $SD=8.83$). Most were in their 20s, however, we deliberately included two people in their forties and fifties and two people in their teens, as we expected they might show different attitudes towards and practices in using social media. All participants were living in and around a city in the south-east of England, although eight nationalities were represented. The social media tools participants frequently used include Facebook, Twitter, Instagram, Snapchat, Pinterest, Vine and LinkedIn. Participants were compensated £30 for their participation.

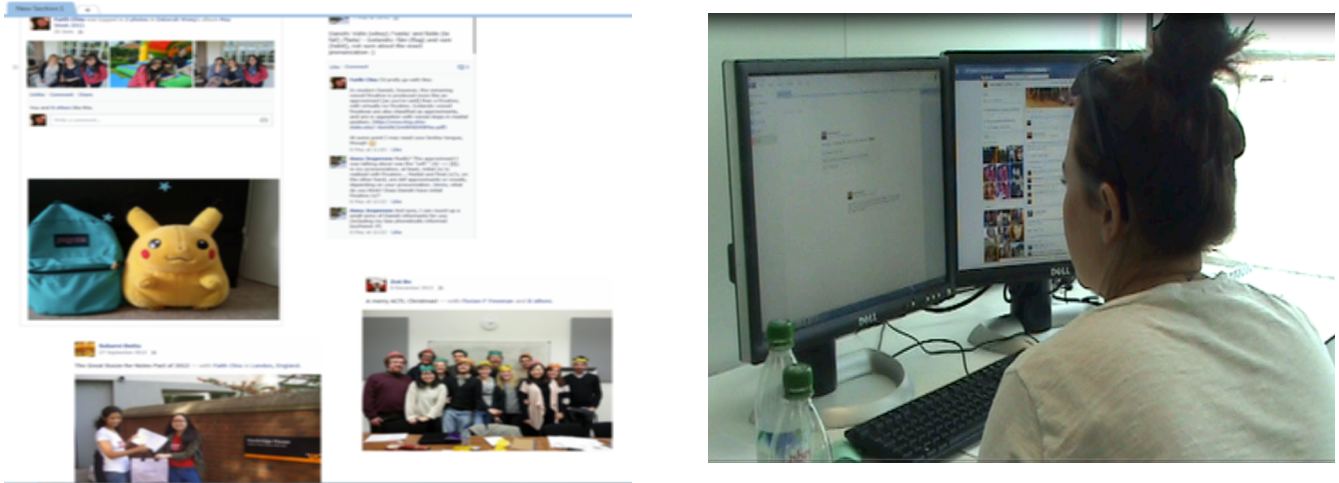


Figure 1. Anonymized example of a digital ‘keepsake’ produced by a participant (left); participant making her digital keepsake during the study (right)

Participants were invited to our research lab for a 60-minute in-depth interview about their experiences with different social media tools, and how they perceive the social media that is produced through these platforms. The first part of the interview focused on use of different social media tools and reasons for doing so, the nature of social media that persists on these platforms, and how social media archives are different or similar to personal archives stored either online or on personal devices. The second part was an activity in which participants were asked to browse content from their various social media profiles and make a digital ‘keepsake’. This was inspired by Petrelli et al.’s study [117], in which participants captured ‘future memories’ by making time capsules. Using a similar approach, we asked participants to capture content on the screen (for example, pictures, status updates, comments, etc.) that they wanted to keep, and organize it in a way that was meaningful to them using OneNote 2013, a free-form screen clipping and note taking tool (see Figure 1 for an example). This activity was designed as a way of encouraging participants to react to and reflect upon their social media archives, with a particular focus on the value of the social media that persists there. The activity grounded the remainder of the interview.

MAIN FINDINGS

Consistent with much prior work on social media and identity management, participants described the primary purpose of social media as to support interactions with others at the moment of posting. Sites like Facebook were seen as a tool to support communication in the moment, rather than a place for storing data. However, social network sites were used in ways that could be considered as similar to archives. They were curated repositories of *meaningful* content, and were noted as *reliable* data stores (sometimes more so than personal devices). Furthermore, they were said to be *encountered* more frequently, and to provide a better narrative of the past, than archives held on personal devices. Thus, our findings comprise quite nuanced views with regards to how our participants viewed the long-term value of social media. In the following, we look to these five factors.

Social media is beyond curation / social media is curated

The first theme explores the notion of curation. Social media sites were not generally seen as curated repositories of content. Indeed, some participants commented that sites like Facebook were simply “*beyond curation*”; they contained content generated by too many people, they contained too much trivial content, and they went too far back in time to be manageable.

However, participants did also recognize that simply through using the sites, they were undertaking a form of curation. Facebook was a site with a surprisingly high bar for posting content, and participants who used Instagram highlighted that use of the site also resulted in a collection of images that had been carefully selected and edited. These sites comprised a collection that offered an alternative archive to that stored on computers and phones.

Thus, participants spent time when presenting photos online, selecting a subset of “the best” photos to upload to Facebook, creating albums (something that was often not done with photos stored on laptops and phones), “*adding interesting captions*” (P13), and on

Instagram, “*adding filters to make it prettier*” (P6). This was done with a view to presenting content that others would appreciate, whilst also avoiding overloading them with content: “*There’s obviously a lot of stuff that isn’t on there from that age, but it must’ve been my favorite bits from when I was at that age.*” (P12)

Therefore, although social media is posted in line with a particular expectation of what an audience would be interested with, with its initial value being social, the curated collection in results has personal value. As P5 summarizes, “*I’m curating for the public, but I am also curating for the self*”.

Social media is trivial / social media is worth keeping

The second theme deals with where participants perceived value in their social media. This was complex; some social media had evident personal value, some was seen as obviously trivial, but even trivial content could be reinterpreted as meaningful after a period of time.

Nevertheless, most of our participants agreed that the value of social media was often compromised by the fact that it encompasses a breadth of content, ranging from favorite photos and records of important events, to comments and URLs of little relevance, to content that not only had been forgotten about, but that triggered no memories when encountered. This aggregation of large amounts of content made it difficult to find that which is meaningful and of interest, and this was confounded further by the presence of other people’s content, mixed in with one’s own.

Participants generally felt that the “*things that are important to me is pictures, photography, just pictures*” (P9). Comments were generally seen as “*of secondary importance to the photo*” (P5) and conversations on the wall, despite being unique to the site, were often deemed trivial, perhaps because they are closest to the ‘tool-like’ and ephemeral aspects of social media use: “*I guess most of the conversations with people (on the site) could be lost*” (P6).

In summary, social media comprises a record of key events that are of personal value, which is compromised by the presence of trivial exchanges and other people's poorly curated content. However, even small communications can become valuable over time.

Social media is a duplicate/ social media is the go-to place

The third theme relates to how personal content is encountered. Participants often compared the archival value of social media in relation to other archives, especially those on laptops and mobile phones. Most participants believed that the content most important to them comprised photos that were also held elsewhere, for example on the phones or cameras they had used to take the photos. Thus social media sites were seen as comprising lower resolution duplicates of content held in other archives: *"I've never taken a picture directly from the Facebook (app). No. It's just because Facebook is the base for my communication, so it is ALSO there."* (P9)

Because of this, social media sites did not host as much content as these other repositories and were not considered as "complete" (P9) archives. However, some participants did think that sites like Facebook gave a fair representation of occasions they would like to remember: *"It's definitely not a biography, maybe not 100%, but it could be, why not? In the end I have all important events there, when my friends come and visit me, when I was doing something somewhere, when I visited China... they are all very important to me and they are all here since 2008."* (P12)

The fact that social media sites contained less content was even beneficial in some sense. As already noted, sites like Facebook were seen as a "curated exhibition" (P14), and were consequently more selective than other, private, archives. This had the result that Facebook was for some their "go-to album" used over and above other repositories. However, despite this view of social media producing a more encountered archive, participants were resistant to the idea of disposing of the complete offline collection, preferring to keep everything, even if this produces difficulties in managing and revisiting content: *"It's probably gonna be enough with only the information on*

Facebook... and I'm not gonna look at 5000 pictures in my computer ever again – but you feel if I lose all the pictures it would be really horrible.” (P12)

This resonates with previous work on digital archiving [168], but it raises an important point that we shall return in the discussion: as increasing amounts of social media are generated, how can we help users navigate these spaces, as well as their personal digital archives, if they are uncomfortable with the notion of deletion [40,94].

Social media is insecure / social media is safe

The fourth theme relates to the reliability associated with social media sites. This highlights another set of contradictions, in that participants perceived sites like Facebook as both more insecure and more powerful and safe than offline archives. On the one hand, social media sites were seen as transitory, unlikely to withstand the face of technological innovation. Furthermore, and in line with prior research [108], content on social media sites was associated with a weak sense of control.

Yet this attitude was transformed in the circumstance of data loss, and for some participants (the younger ones especially) this seemed to be developing into a more general shift. Some participants deleted content from their phones once posting them to Facebook as a means of freeing up memory on their own devices, and others stored hidden files on their timeline, reinterpreting the site as a place for reliable cloud storage. And of course, social media also offers a means of building shared albums, functionality seen as supporting file-sharing. Most surprisingly though, some participants expressed the view that Facebook was more reliable than personal devices such as laptops and phones.

Social media tells a story / an inauthentic history

The final theme relates to narrative, and how social media supports the creation of stories but also can inhibit this through content that is inauthentic to the past. Sites like Facebook offered compelling ways of revisiting past content. Some features, such as See

Friendship, provide a way of pulling together disjointed social media when revisiting it, creating a narrative from a number of smaller pieces.

However, participants noted that some features of social media sites produced a version of the past that was not authentic. Lists of friends and profile pages were both highlighted as types of content that could not really be revisited as they had been at a particular moment in time, and changes to profile pictures which were propagated through the site also had the result that content was not preserved accurately.

This final theme highlights how additional sense-making around significant relationships, major life events or even ‘expired’ content plus its metadata can alter perceptions of social media from the seemingly trivial to meaningful stories. This type of behavior was also evident when making the keepsake, where content that is relevant to a story becomes valued through its aggregation.

DISCUSSION

Our findings demonstrate that the organization and management of personal content is integrated with its generation for different sites and audiences: in this sense, *curation is inherent to use*. Selective uploading, the formation of photo albums, and the addition of annotation and filters was often simply part of using a social network site.

This way of thinking about the archiving of digital content resonates with Kirk and Sellen’s [60] analysis of home archiving. Their focus on cherished objects leads them to highlight three types of storage in the home: objects on display; objects stored for functional use; and objects placed in deep storage. These different types of storage support different values, for example, objects on display support ready reminiscence; objects in functional storage enable the honoring of others through their use; and objects in deep storage support ‘forgetting’, in that one may wish to avoid encountering something, but feel uncomfortable getting rid of it. If we consider a photo album uploaded to Facebook to be on display, and photos on an external hard drive to be in deep

storage, we can begin to unpack how these different digital spaces support different values in the same way that different places in the home do.

Like physical objects, photos on display in an online space seem to support ready reminiscence, or at least readier reminiscence than those stored on computers. Our findings suggest that Facebook and Instagram photos were more frequently encountered than those saved offline, and this is in line with research that suggests photos archives are rarely revisited.

A finding that was somewhat unexpected, however, was that users would view social media sites to be reliable repositories. This obviously raises challenges, notwithstanding what would happen in the face of data loss or accounts being shut down. Returning to Kirk and Sellen's storage types, social media cannot be put into deep storage, and this is sometimes necessary if an archival space is to be multi-faceted and persist over time. We saw clear examples of this limitation in our data, whereby deletion of online content would be done for a range of reasons, from hiding from an audience to hiding from oneself, or 'forgetting', as Kirk and Sellen describe it. If one wishes to forget, there is only one option on a social media site, and that is to delete. The feature 'to hide' on Facebook means hiding from others, not hiding from oneself. Yet it is quite possible that the participant who had broken up with his girlfriend would have preferred some other option to the rather blunt 'delete' in this case. If social media sites represent 'objects on display', being able to take objects 'off' display and selectively download them or make them invisible to oneself, whilst supporting safekeeping, seems desirable.

Our findings highlight a design space around bridging online and offline spaces. For example, if users find it difficult to curate their digital photo collections, but undertake a form of curation when they choose which photos to upload to the internet, it may be worth reflecting this in the offline collections as well. Perhaps users could filter their offline collections by where those photos have been uploaded to, allowing them to browse higher-resolution versions of those photos offline. Conversely, for users that

upload content to social media sites before deleting it from their own devices, a means of getting this content back, perhaps with associated social metadata, comments, etc., and without having to download one's entire profile, may be useful.

This could be taken further if better support for curation was offered through social media sites, enabling users to marshal out important and meaningful things in the increasing volume of online content. The changing value of social media over time makes it difficult to delete with confidence; people like to keep content, just in case. Yet the abundance of content meant that participants also encountered difficulties when looking back and making sense of the social media that was stored. As our findings also made clear, social media comprises much content that works against the notion of an archive. Supporting users in filtering out this content, or transforming it into a more compelling narrative, is the final point we wish to explore in this discussion.

Even though personal content gains meaning over time, sense-making is still important for actually getting value out of this social media archive. It was notable that support for sense-making was largely lacking on social network sites. See Friendship was the exception here, but features such as the Facebook Timeline, which are intended to produce 'the story of your life', tended to comprise too much trivial and mixed content to live up to this claim. Amalgamating content by time is simply not sufficient, and indeed others have argued that time is 'configured' rather than simply reproduced in the formation of narratives about the past. Life stories are not simply ordered by time, rather people draw on the past selectively when telling stories and even when building timelines about their lives.

We suggest that social media sites could offer a greater range of actions that could be used in the formation of these narratives. One possibility would be to give users the option to privately 'favorite' photos; actions such as download or print that indicate preference might also be capitalized upon here. These favorites could be used as anchors to other related content, supporting sense-making and the creation of a framework for

browsing when revisiting past content. Finally, and returning to the observation that users seem more motivated to ‘curate’ their content if reaching out to an audience than if keeping it simply for themselves, we suggest the possibility of supporting the formation of new narratives through interaction and sharing with others. For example, this could be accomplished by shifting the ‘unit’ in social media sites from a single piece of content to content plus metadata, or even to a collage of multiple pieces of content. This could encourage users to draw social media together in meaningful ways, and to potentially resurface it ‘out of time’, without breaking social norms, as one of our participants did through the use of screengrabs. If social media sites could capitalize on connections between old and new conversations about the same content, this could facilitate the browsing and formation of new narratives.

CONCLUSION

Findings from our qualitative study suggest that, while social media sites are not explicitly viewed as archives, they nevertheless form a repository that could complement personal file stores. Social media is curated through use, and thus comprises a collection that is selective, organized, and annotated. It is more encountered than content in private archives, and so supports ready reminiscing. And it can be more reliable than private archives; for those who have had the experience of losing their own devices or have had them fail, social media can become the back-up.

However, the concept of social media sites as archival is limited by the presence of data considered trivial and tensions over ownership and authenticity. We conclude by highlighting the possibilities for bridging social media and personal archives as a potential way forward. Personal archives could benefit from being imbued with some of the curation that is inherent to social media use; reflecting which content has been uploaded, and to where, could offer a novel way of filtering the higher-resolution photos stored on a personal computer. Conversely, social media sites could benefit from a richer grammar of action [43], allowing users to place content in deep storage or otherwise

‘keep’ it. Identifying meaningful social media through such actions, for example by picking up on what has been printed or downloaded, could offer a more natural way of structuring reflective sense-making on social network sites. In conclusion, unpacking the personal value of social media may mean pulling online and offline archives together, so that actions in one are echoed across the other.

So far we are able to tie back to the story we told: the process of identity management and how this outward-facing process is shaped in returns affect how people reflect on themselves – By reflecting on the past data on social media, they are able to re-attend major life events and meaningful conversations, they are more likely to encounter these memories, they see patterns of the development of the self and their relationships.

Study 4: Know Thyself from Communication Traces

Study 3 explores the potential of social media for constituting a personally meaningful archive that people value in the long run. Most studies about reflection in the HCI community focus on the effect of “temporal distancing,” and aim to help people understand behavioral patterns using an aggregated history of personal data over time. However, the process of how one synthesizes one’s communication activities and technology use across platforms (a qualitative “put-together”) is rarely explored.

In Study 4 I will focus on the spatial dimension of reflective value - the goal is to explore whether holistic reflection on one’s personal content spread over multiple communication platforms (including multiple social media) brings more mindfulness regarding individuals’ goals, communication patterns, and social relationships.

In Study 3 we mostly focused on how people value social media when reminiscing, without triggering them to do any deeper reflection based on the lookback. For Study 4, I will focus more on “reflection” than “reminiscing,” as differentiated at the beginning of this Chapter. I hope that by explicitly asking people to engage with more synthesis of their own digital traces, we can unpack more psychological value of reflection in this

particular set of personal data, which could go beyond an emotional experience.

Study 4 is motivated by:

- 1) A theoretical interest in exploring how people interact with communication traces (especially in social media) for reflection;
- 2) An exploratory inquiry into how different digital traces are valued in context of others;
- 3) A methodological interest in combining design prompts and other mixed methods to shape the reflection experience and potentially generate important design insights.

I argue that a lookback on one's aggregated social media content allows people to gain important self-knowledge. We know that shared personal data that exists in the cloud constitutes part of our crafted performance [37] and content that exists in different places represents different aspects of our identity [31]. This social, outward-facing nature of social media makes it an appropriate context in which to "see the self as others do" [76]. In addition to the outward-facing nature of social media, the possibility it offers to reorganize personal information by searching, filtering, and re-appropriating (such as aggregating one's check-in information on a map) provides opportunities for alternative views, or creates "metaspaces" that might reveal the self in new ways [50].

As Study 2 found, the choice of communication platforms is entangled with a complicated set of goals and motivations involved in maintaining relationships and curating online identities. Building on these findings, I hypothesize that reflecting on one's social media content in relation to other communication traces offers a new way for people to contemplate their various personal and social goals, and gain important self-knowledge for planning their future behavior.

Study 2 also calls for answers to this challenging question. Study 2 provides evidence that individuals now face challenges in managing their content sharing across multiple

platforms: People’s sharing behaviors apparently differ in different online spaces, and factors that go into their decision-making regarding how to navigate different spaces are entangled with their dynamic informational and relational goals. It becomes a question of how people value some sites more than others for personal use, or, whether we need to unpack the “personal region” even more, if we want to map different sites spatially to the performance, exhibition, and personal regions suggested by Study 1.

Since I want to focus on the “spatial” dimension in the last part of this thesis, I propose the following research questions that focus on understanding how people reflect on the “recent past” across platforms. This focus on the recent past offers opportunities to explore whether such reflection motivates the way people plan for future behaviors, thus generating more psychological benefits, as some psychological work suggests [35].

BACKGROUND

Our autobiographical memory is not just a record of our past experience – it is actually a functional process that can guide our future behaviors [22]. In psychology, both reminiscing and reflection are well-studied self-enhancement strategies that help us filter and process memories. However, they have some fundamental differences: Reminiscing focuses on remembering and reliving past experience, while reflection emphasizes the sense-making, evaluation and synthesis of one’s past experience [143].

Both reminiscing and reflection can be used to shape our memory in a positive way [22]. Reminiscing can increase one’s psychological wellbeing by having individuals selectively focus on positive memories; reflection, on the other hand, can help transform emotionally negative experiences into more positive perceptions and evaluations [95]. Reflection is about re-attending to, interpreting, and evaluating past experience; therefore, the primary focus is not concerned with memory capacity (or how well people remember things), but memory utility (or how people synthesize memories for fulfilling specific functions).

Reminiscing has been shown to generate many psychological benefits by enhancing awareness of positive memory. For example, “three good things” triggers reminiscing on positive events and has been proven to increase happiness in the clinical setting [100]. However, research shows that reminiscing over negative events could lead to rumination [111], mainly because reminiscing does not really help people to process and evaluate a situation in a positive way [19]. Quite interestingly, reflection works in the opposite way: It works well with negative past experience and has been proven effective in transforming negative experiences [95]. In the psychology literature reflection is often used as a self-enhancing strategy to reduce rumination (see a review by [62]). However, clinical evidence shows that reflecting on positive experiences could bring about an unexpected decrease in psychological wellbeing, since reflection might reveal negative aspects unseen before [83].

Reflection can be guided by therapists, or done in the form of private writing, or “expressive writing,” as first introduced by Pennebaker and Beall in 1986 [115]. Expressive writing is a method that offers a structured way for people to write about their negative experiences. Even though empirical evidence shows that expressive writing is effective in eliciting positive psychological benefits [140], questions still remain with regard to the method – for example, when we should introduce emotional writing to the process; who would benefit the most from emotional writing; and what exactly it is about emotional writing that actually causes the health benefit (e.g. the change of perspective, or the repeated exposure to the negative event)? And as a matter of fact, how to more effectively shape people’s reflection experience in ways that contribute to gaining psychological wellbeing and useful self-knowledge has always been an important topic in psychology [62]. Now with new technology, we not only have the opportunity to further study the issue, but also opportunities to capture more sources of personal data and ways to acquire more useful self-knowledge, or actually reshape our memories in positive ways.

In the field of HCI, design for reflection is an emerging theme [71,72]. The existing work largely aligns with what psychologists have identified as the “three functional approaches” to autobiographical memory: *directive*, *psychodynamic*, and *communicative*.

Pillemer [119] further unpacks different aspects of self-consciousness: directive, self, and communicative. The *directive* function means people take advantage of memory to plan for the present and to direct their behaviors for the future. For example, literature on goal-setting [82] and self-regulation [173] reveal the importance of making sense of one’s past for motivating people to achieve their idealized future states. Gilbert and Wilson [36] shows that people gain a better ability to simulate future outcomes based on previous autobiographical knowledge about the self. The *psychodynamic* function is the use of memory to gain emotional and psychological insight into the self, and to express that emotional self. The *communicative* function means autobiographical memory could be shared in the process of reflection as a way to develop and maintain social relationships.

The *directive approach* is seen in design for personal informatics systems. Personal informatics is a group of systems that help individual users gather relevant personal information to improve self-knowledge and help them to achieve goals [58,71]. This type of system usually has a clearly defined goal set either by users or by the system. The purpose is to use behavioral information, such as number of steps taken and blood glucose level measured by devices, to help people track and reflect on their pre-set goals. Li, Dey and Forlizzi [71] reported four categories that are most relevant for personal informatics systems: exercise, general health, finance, and journaling. Li et al. [71] identified six kinds of questions that people want to gather personal informatics data to answer: status, history, goals, discrepancies, context, and factors. This data could come from system-tracked data such as blood glucose level measured by diabetes devices, or from user-generated data such as logged meals. The system and users will collaboratively determine the specific metrics or the type of behavioral data to track and measure, and the system will analyze and extract information on individuals’ past behaviors and provide that information back to individuals. Communication visualizations also fulfill the

directive function. Communication visualization design covers a variety of media, including real-time (such as group chat or instant messaging) or asynchronous communication systems (such as one's email archive, with the goal of providing feedback for users to improve their communication with others [149,154]).

The challenge with this type of system is that it always assumes pre-set goals (of behavioral change), and the data or feedback it provides might be hard or confusing for people to actually understand. In reality, goals change constantly, and without a deeper engagement with an actual event (or content), people might not be able to truly internalize the feedback and drive their behavioral change. Even though "reflection" is one key part of their studies, this work does not fully address what "reflection" in such systems actually means; for example, reflection is simply referred to as "*looking at lists of collected personal information or exploring or interacting with information visualizations*" [73], but a question remains in terms of how to get people to reflect, how people get benefits from the reflection, and what systems should structure or shape the reflection.

The *psychodynamic* approach aligns well with reflection systems that focus on improving one's emotional and psychological wellbeing. The design of "mindful technology" [102] speaks to the importance of self-consciousness from the psychology perspective, and argues that reflecting in a particular way brings emotional and psychological benefits. One example is a system deployed in a social media platform that builds on positive psychology and asks people reflect on "three good things" on a daily basis – the system purposefully asks people to reflect on this specific set of behaviors or attitudes "*whether or not people have goals and whether or not the system is aware of those goals*" [101]. The iPhone application Live Happy [113] asks users to curate a "happy album" and triggers people to look back at these positive memories; Similarly, Isaacs et al. [51] developed Echo, a mobile application that prompts people to log events and emotions, and asks them to repeatedly reflect on their own logs. Their research discovered that people benefit the most from repeated reflecting, in that they gain more analytical

perspective over time, even for less emotional events. Pensieve [114] provided with people random snippets from their social media posts as a way to remind people with positive memories.

The *psychodynamic* approach in HCI is limited in that systems usually focus on reminiscing or the emotional experience, without providing enough opportunities for individuals to process, evaluate, and analyze their experiences. It also focuses on specific “events” (e.g. major life events highlighted on social media, or positive memories), without paying enough attention to mundane and neutral experiences.

Finally, the *communicative* approach is about sharing memories with others to maintain social relationships. It is tricky to think about how to focus on the communication function in existing technological systems, as practically all sharing behaviors that take place via instant messaging, social media, and email could be considered use of technologies that support this *communicative* approach. However, we don’t usually think of all communication technologies as “reflection systems.” Exceptions are popular memory applications such as TimeHop or some particular features on social media site such as the Facebook “See Friendship” page and “On This Day”. They clearly mark past sharing as “memories”, and encourage people to re-share again with others.

To summarize, the main interest of HCI is to use technology to support useful reflection for both behavioral change and improving one’s mental wellbeing (directive and psychodynamic functions). However, there has been a lack of users’ active role in exploring, analyzing, and evaluating their own digital content. We are in general lacking an understanding of people’s day-to-day reflection experiences and the role of their current use of technology. Such studies will allow a deeper understanding of how reflection and reminiscing practices could be better integrated with the use of technology, as well as informing us in a fundamental way about what digital content matters to people and how we can shape reflection in a more positive way through future designs.

Knowing that reflection has been regarded as a quite “fuzzy” term, Baumer [7] recently developed a conceptual approach to what he calls “*reflective informatics*,” to provide more theoretical grounding for reflection in HCI and start outlining unexplored potentials of technology to support reflection. He emphasizes the importance of examining “reflection” as a process, not as an end goal (e.g. getting people to reflect more). His framework contains three important dimensions of designing for reflection: breakdown, inquiry, and transformation. The first dimension, “breakdown,” refers to identifying moments of perplexity or creating such moments that could trigger reflection (e.g. demonstrating the difference between an intended goal and a user’s current behavioral data [35]); the second dimension, “inquiry,” refers to conscious inquiry about one’s own state, and the third dimension, “transformation” refers to a fundamental change to one’s mental state or conceptualization of a situation, and it is usually the hardest dimension for reflective systems to provide support for.

To answer Baumer’s calls [7] for research that “*seek(s) to understand how different interventions alter the nature of reflective thought*,” and to seek more understanding of how users discover, explore, and analyze their own digital traces/content, I designed a qualitative study of 18 participants to understand both how they interact with communication traces in their existing reflection practices, as well as how they *might* benefit from reflection. I designed a two-week reflection task, which involves an IOS application (“*DAYS7*”) that automatically aggregates one’s social media activity and other personal digital content (such as calendar data and photos) into a daily journal format, diary surveys sent to participants via email, and three prompts to guide their reflections.

Although the current study is intended to examine how users might interact with or leverage a wide range of digital content in facilitating their self-reflection, a narrower scope, focusing on communication traces (especially social media), is required. For one, communication traces are the most accessible, pervasive and easy-to-understand personal data, compared to health data or financial data, which might be hard to capture or

understand. In addition, my previous work around social media calls for this research, and a better understanding of the role of social media (in the context of other communication traces) in supporting reflection is within the scope of this dissertation.

Study 4 is motivated by the following research questions:

RQ1: What is the role of technology in people’s current reflection practice? How and why do they reflect on communication traces?

RQ2: How do people reflect on communication traces towards *directive* and *psychodynamic* functions?

STUDY DESIGN

This work was completed using a mixed method comprising surveys, diaries and interviews. Similar to how I conducted Study 3, I will use design prompts – in this case, a commercial application called DAYS7, to help participants fulfill their reflection tasks.

DAYS7⁴ is an iPhone application (as shown in Figure 2) that syncs with users’ selected social media profiles (e.g. Facebook, Twitter, Swarm, Instagram, Flickr), digital calendars, camera rolls, location information, digital music record, and merges them all into one place. DAYS7’s journal is automatically updated when users choose to sync all the services, and all entries are organized in a private time-based journal format (daily/weekly/monthly views), unless users choose to share their journals. Since our primary goal is to explore how people react to and engage with reflection triggered by cross-platform data, but not to build a new technical system, DAYS7 provides a nice semi-functional prototype that allows people to work with its functionalities as well as its constraints, which will hopefully generate insights into how future design could better support their practices. I do not intend to formally evaluate this application as a reflective

⁴ <https://www.days7.jp/en/>

technology; rather, I want to use this functioning prototype to deepen our understanding for reflection itself.

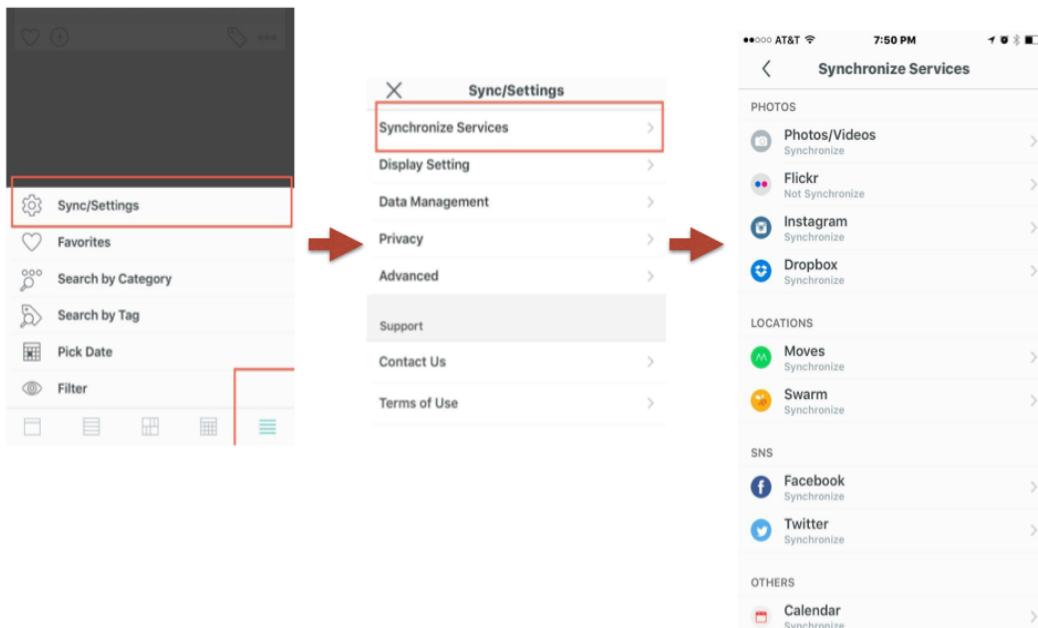
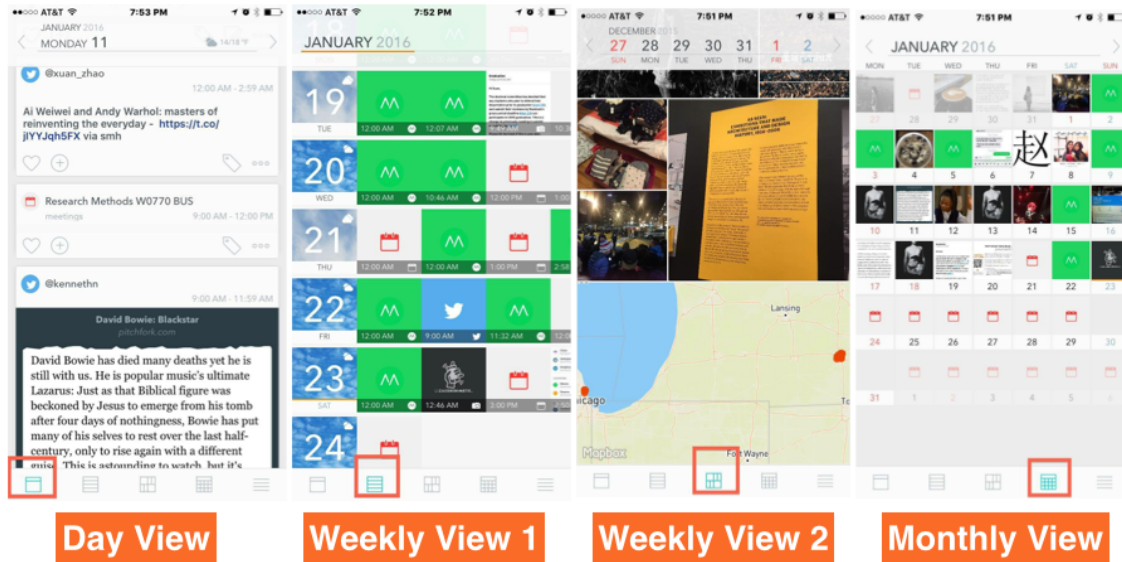


Figure 2: DAYS7 is a mobile application that pulls users' communication traces together and provides easy (but selective) access to users' recent past data in a diary format.

Both online flyers disseminated through social media (such as Facebook and Twitter) and in-person recruiting at new students' residence halls at UM were used to recruit participants. Interested participants were direct to visit the screening survey online which asked about their demographic information and use of social media and other communication technologies including texting, IM, emails, personal calendars, cameral rolls, etc.

After the pre-survey, participants were contacted about installing the DAYS7 application on their IOS devices, and were invited to follow emailed instructions to sync all available services. Participants were then contacted via phone for a conversation in which I made sure the application was installed and that participants understood it, and I explained the procedure for the two-week long reflection experiment.

- 1) During the experimental period, participants received an email prompting them to reflect and add diary entries three times a week. The choice of “three times a week” was based on feedback from the pilot study. Three pilot participants reported that a daily reflection task was too demanding. Another reason was to have a more condensed schedule for the experiment, which could reduce the dropout rate, based on my previous experience. The reflection experiment lasted for two weeks for each participant, resulting in 6 diary entries each.
- 2) Every time participants received the prompt, they were instructed to spend the first 10 minutes looking back at the “Day View” of DAYS7 to explore their communication traces for the past few days, and then check other messaging or social media applications not covered by DAYS7. In the current study, I do not discriminate between events or traces – even though I have a particular interest in exploring the role of social media in supporting reflection, the whole spectrum of communication traces will be covered in designing for the reflection intervention (similar to [51,114]).
- 3) Therefore, as the first step in the reflection exercise, the survey reads: “Please spend 10 minutes looking back...”
 - 4) ... at your DAYS7 application, and browse your activity for the past few days.

- 5) ... at your email sentbox, and browse emails you sent out for the past few days.
- 6) ... at your most frequently used IM application (chosen at the pre-interview), and browse your recent conversations with others for the past few days.
- 7) ... at any other social media platforms (not captured by DAYS7, such as Snapchat, Tumblr, etc.), and browse your activities for the past few days.

After the lookback activity, each participant was asked to write about reactions or stories the content elicited. We provided some specific prompts to guide their writing, based on *directive* and *psychodynamic* functional aspects of memory: “What made you think about your goals and motivations” (*directive* function), and “What made you think about your struggles and difficulties” (*psychodynamic* function).

After the two-week reflection activity, participants were invited to the lab for an in-depth, in-person interview. Participants were asked to complete the post-survey on social connectedness and self-consciousness again, and then asked to read all their diary entries (including the personal narratives they wrote before the experiment) prior to the interview.

Interview questions centered around their existing reflection practices (we intentionally kept the use of the term vague to explore a wide range of practices as interpreted by our participants), their use of different communication platforms, and how their reflection and lookback practices overlapped with the use of these systems. We also asked about their experience with DAYS7 and their experience with the structured reflection experiment – what they liked, what they didn’t like, and whether they perceived any value in doing the reflection. We also followed up with their diary entries and discussed specific cases and examples.

In total, participants generated 98 diary entries, and these diary entries contained 298 mentions of a variety of personal digital content (e.g. from messengers, email, social

media, etc.), which they either briefly or extensively reflected on in response to our prompts.

I coded the diary data for types of communication platforms that people reflected on in responding to each prompt: goals and motivations, struggles and difficulties. This was to get a general sense of what people choose to reflect on, and see if there are patterns we can observe. Note that I did not count all the platforms they mentioned because I am only interested in what specific traces trigger people's reflection and how, on a particular day. For example, "Facebook" was not counted if they just described opinions on how they use the platform in general, but instances like "*recently I fell into the trap of a minor Facebook debate... what I thought was a discussion turned into people arguing over who was right. I have learnt over the years to not share my opinion with groups unless I know...*" (P5- diary – 2/3/2016) were counted. I then did open coding to look for themes in the diary data, using TAMSAalyzer and concept charting, in a way that was similar to how I coded the interview data.

All interviews were fully transcribed. I used open coding to analyze both the diary and the interview data. I focused on participants' responses in the interviews, as well as the written diary entries directly, since writing is only a small part of the larger reflection practice that I am interested in. I used open coding to develop major categories to easily review and handle related data. I then coded the data into these major categories using TAMSAalyzer. In the second phase of the coding, major categories were then iterated and the relationships between them were explored.

PARTICIPANTS

Two important sampling strategies were used for this study. One was that I targeted active social media users who used at least three social media platforms to make sure they have enough reflection materials when interacting with DAYS7. This criterion was made clear in the recruitment poster and on the screening survey, and was double checked with a few survey questions asking about their active level on all the social

media platforms supported by DAYS7 (Facebook, Instagram, Twitter, and Swarm). Second, I sampled a life period when people were going through a “breakdown” experience so I could observe how people reflect and how they benefit from doing so. Inspired by some existing work on life transitions from both psychology and HCI (e.g. [6]) I decided to focus on newcomers to Ann Arbor.

This decision was based on some key considerations. First, life transitions make all three important elements for designing for reflective systems identified by Baumer [7] salient – breakdown, inquiry, and transformation. The literature shows that people experience a breakdown of social and life routines when they go through important life transitions, and technology now plays a key role in the “shift towards a new normal” [92]. Second, reflection plays a key role in transforming negative experiences and has been shown by clinical studies to reduce rumination and depression [148]. A great amount of empirical work has suggested that key changes to people’s routines, such as a change in social networks, is a great contributing factor to depression [56]. This issue has also been highlighted in the college mental health literature, which suggests that the transition to college is a major life event which could cause academic stress, breakdown of important and well-established relationships[27,33], which negatively impact students’ mental health. This literature also emphasizes the role of social support, and shows that social connectedness can significantly improve how college students adjust to life transitions and perform better academically [44]. Therefore, targeting this population can also help us explore how future design can promote mental health through designing for reflection. Third, we primarily focused on graduate students, as we are aware of the age effect in reflection, and how reflective judgment develops more as college graduates move to graduate education [59].

In total, thirty-nine people responded to the screening survey and were contacted for the diary task. Out of thirty-nine individuals, eighteen participants completed the study (both diary and post-interview). The sample was predominately female (5 males, 13 females),

mostly in the age range of 20-25 (M=24). They were predominantly graduate students pursuing their Master’s degree.

Participant	Frequently Used Communication Applications	Gender	Ethnicity	Age	Participant	Frequently Used Communication Applications	Gender	Ethnicity	Age
P4	SMS, Facebook, Whatsapp, Phone call, skype	M	Asian	27	P13	Facebook, Facebook messenger, imessage, email, googlevoice, WhatsApp, instagram, Snapchat	F	Asian	24
P5	Text, Facebook, Facebook Messenger, Skype, Twitter, Instagram, Google Calendar	F	Black or African-American	23	P14	Messages, Instagram, Twitter, Facebook Messenger, Outlook Email and Calendar, Google Keep, Feedly, Mint, Slack, Snapchat	M	Asian	25
P6	Facebook, Whatsapp, Google Hangouts, Slack, Gmail, Instagram, Calendar, Snapchat	M	Asian	25	P15	Facebook, Instagram, twitter, whatsapp, groupie, calendar, email, texting	F	Asian	26
P7	Message, Facebook, Facebook Messenger, Instagram, Twitter, Wechat, GroupMe, Gmail	F	Asian	23	P17	Calendar, Whatsapp, Line, GroupMe, Instagram, Twitter Path, Email, texting (SMS), Skype	F	Asian	31
P8	Facebook, Twitter, Snapchat, Whatsapp, Slack, Splitwise, To-do notes, default Calender, personal and umich email, Runtastic	F	Asian	24	P18	Mail (built in iOS & in my mac), Facebook, Facebook Messenger, Instagram, Coffee Meets Bagel, texting,	F	White/Caucasian	22
P9	Facebook, Instagram, text, email, google calendar,	F	Asian	23	P19	iPhone Messaging app, Facebook messenger, Twitter, Snapchat, Gmail, iPhone Calling app, iPhone Calendar app (synced to my personal Google Calendar), Wunderlist	F	Black or African-American	23
P10	Facebook, Instagram, Whatsapp, email, google calendar, twitter, texting	F	White/Caucasian	22	P20	Facebook, Instagram, iMessage, Snapchat, YikYak	F	Asian	19
P11	Instagram, text messages, email, calendar, Facebook, Twitter, Todoist (to-do list app)	F	White/Caucasian	29	P21	Mobile app reminders, facebook, texting, email, phone calls, instagram	M	Asian	18
P12	messages, gmail, google calendar, facebook, twitter, instagram, snapchat, tumblr	F	White/Caucasian	23	P22	Whatsapp / Facebook / Messenger / Calendar / Outlook Mail / Slack / Safari / Twitch	M	Asian	23

Table 3: Participants and Their Frequently Used Communication Applications

* P number starts from P4 since P1-P3 were from pilot studies. P16 dropped out from the study prior to the diary task.

FINDINGS

To answer RQ1, we first go over findings on people’s existing reflection practice, before taking a close look at how the reflection experiment shaped participants’ reflection practice in the two-week period.

RQ1: What is the role of technology in people’s current reflection practice? How and why do they reflect on communication traces?

Day-to-day Reflection Practices

During the interview, we kept the use of term “reflection” loose because we wanted to capture how participants interpreted the term to fully explore the role of technology in their daily practices. Our participants interpreted the term as a hybrid of reminiscing (simply remembering and reliving past experience), and reflection (evaluating and analyzing past experience). We identified two important roles of technology in people’s daily reflection practices: Technology provides the materials for reflection, or triggers the reflection; people use the technology to reflect or reminisce.

Technology as Material for Reflection

Many participants have described the experience of “stumbling upon” digital content that ultimately leads to reflection. Opportunistic reflections usually happen because of opportunistic encounters with some material, for example, one’s photo galleries, or they are caused by unique events or experiences. From what participants described, this type of reflection is usually a hybrid of reminiscing and reflection, and usually involves interactions with some digital or physical traces.

A most commonly mentioned case is when attention is needed to manage one’s phone storage (P11), or “*something pops up and you start going through all the photos*” (P4).

Unique experiences or events could also trigger people to reflect, sometimes as a one-time activity, and sometimes as an activity that lasted for a while. During the unique experience, such as “study abroad,” or “travel,” or “Peace Corps,” people wanted to “document” everything and were constantly stimulated to reflect:

“No. I’ve never been good at doing Diary. I think the only time I’ve done one was on a ‘Study Abroad’ trip, where I was like, ‘I’m gonna capture everything,’ but it’s not like...03:01 S1: What was that about? 03:02 S2: That was a month-long trip to Spain with my university. So I used a blog for that then, but I haven’t really used it consistently since. And that was about trying to get pictures and capture like, with the pictures, what was going on around it that day. But no, I’m not a huge reflector. I do a little bit of religious reflection in the morning but that’s

reading, not writing about my day, and then... I've always told people that I kind of prefer to talk. Like, if I call my parents and talk to them about what's going on for the day, like that's enough reflection for me.” (P18)

For example, participants mentioned that right after travelling they used to “browse photos they just took” just to “savor the moment” (P17). But this is mostly a novelty effect:

“... main reason is just to see if there are photos worth keeping if they're good quality photos. But then, the next reason I guess, so the second day after and I'm still looking at my photos, it's just... I would basically say it's nostalgia and it's, 'That was so much fun' or 'That was so interesting.' Like, 'Remember when this happened'” And you just go through it. But then the novelty wears off after you've relived that experience so many times... So that's why the novelty wears off and I stop after the second or third day and then just leave my photos alone until the next big thing happens.” (P21)

Technology as the Place for Reflection

Some technologies, either communication technology or PIM (Personal Information Management) technology, are designated places for reflection. This also means that people create content via the technology with future retrieval purposes in mind.

Our participants considered reflection an integral part of their daily planning – many used digital planners or calendars to track important to-dos, financial items, and deadlines (e.g. P8, P13, P22), and they periodically looked back while planning their future activities. Although part of this note-taking practice was intended for task management, a few mentioned taking notes for meaningful “self-talk” and reflection, in times of stress. For example, this participant often wrote self-encouraging notes for herself to read:

“In fact, sometimes there are some things that I explicitly want myself to remember, and I write notes about it, and I set up alarms on specific days, 'Read your note,' just to kind of remind. It could be a motivating note, or it could be maybe some incident that or some emotion that I keep going through recurringly, and so that there's a note that I keep that whenever you have these kind of feelings, go read this note. And that note kind of reorients me to a more positive channel or a more positive thought...” (P8)

She even set timers on her calendar to direct herself to read the notes, especially around times when she could anticipate negative emotions, such as during job interviews:

“The very recent one was around jobs and interviews. I kind of get really depressed when I think that I did not do well at a particular interview or if I get rejected by one of the companies, and that a lot of times if I’m not in the right state of mind, it kind of spirals downwards and I start thinking about or questioning my capabilities. So, that is a time when I go back to the note that I wrote, and in the note I kind of... The first things I write is that, ‘You are good at A, B, C, D, E.’ So that kind of reminds me that, ‘You know what, maybe what they wanted was not with me or maybe one of these needs more improvement, but that is no reason for me to think that I’m not good at anything,’ and that kind of helps me relax a bit and kind of try to remember what things are good about me... if I have very specific interviews lined up or very specific events after which I anticipate that I might be in a mood...(I set up an alarm).” (P8)

Even though some reflection does not necessarily leave traces (for example, it can function as a mental exercise), our participants also engaged with more structured reflection practices, in ways similar to how we set up the reflection experiment. Most of our participants mentioned that they used to own paper diaries when they were young, but no longer kept the habit of writing. However, two out of eighteen participants do still regularly write in their dairies: Both of them use *Day One* – the digital journaling application that runs on desktop and mobile.

P22 is an international student who moved to the US from India for his Master’s degree. We looked through P22’s digital diary, and noticed that he took quite a liberal approach to his diary writing – his diary entries were a combination of random notes, photos he added from camera roll, and longer paragraphs of self-reflection. The frequency of his journal writing had reduced significantly since he moved to the US for grad school in Aug 2015, but he still maintained at least a few entries every month, and set a timer to remind himself to write everyday at 11pm: *“I tried hard... but it's hard to maintain things.”* When asked about the motivation for writing regularly, he said,

“It helps you reflect and just going through the day to know if you're staying on your goals and motivation. It helps that way a lot. Like knowing if I'm doing

something in the day that goes towards my end goal and I'm like, 'Oh, yeah.' So, I can at least after three months down the line be like looking at what I've done. I'm not working towards my goal at all. I'm doing things that are not related to my goal but have I found something new? So, it's basically like self-analysis. I do that a lot. Which is good and bad, I don't know." (P22)

Another participant (P14) also emphasized how important it was to “reflect” in the moment, and that it was important to have Day One in his hands whenever he wanted to write.

“I think you should do [write about] it as soon as you think that you should. I think it depends. If I had a regular schedule, then yes, because I told myself that I wanna do this reflection. But if I just say I wanna capture a memory, then it's not nearly as important; I can just take a picture of the memory or just maybe write a tweet about it. But if it's like something I told myself I'm gonna write regularly and keep a blog of, then yeah, I think so, it's very important to have it (Day One) in your hands.” (P14)

Another very prevalent case of “*technology as the place for reflection*” is with social media. Along with previous work [77,178], we find that people “carve out” some social media specifically for the purpose of life-logging and writing reflective thoughts. Some platforms are more intended for blogging purposes, such as Tumblr (e.g. P5, P12, P18, P19), and participants mostly described Tumblr as a relatively private space for writing long posts (P12). The limitation of using social media for journaling is obvious and resonates with previous work: Because of the concern for audiences, most of the reflections recorded there are positive, and both mundane and negative life experiences are less likely to be captured.

Other commonly mentioned platforms people associate with “reflection” are Instagram and Path. For Instagram, hashtags are creatively used for documenting memories of specific themes. These hashtags usually are not intended for others, but for the self to retrieve in the future. For example, P11 created “#sky” to remind herself to take photos every day to capture the change of the sky (a project she started after her relocation); P9 started using Instagram after her relocation, and she has been posting photos with specific dates and personalized hashtags “username+AnnArbor” to document her life since she

moved to the US; P15 called her Instagram “personal picture diaries,” and mentioned adding locations as hashtags when she traveled, so that later she could retrieve not only her own photos but photos others took at the same location, as a way of reminiscing.

The reason Instagram has replaced paper or digital diaries, for many, is the ease of maintaining it *“I think it's... Just after I came to US that I think it's a new life and it's a good idea for me to record my new life... but the diary might be too old style, so I choose to upload the photos as a picture diary... and it's a more easier way for me to do it on Instagram. I think it will be a reminder for me that (if) I am not doing something interesting during the whole week, I would try to find something interesting (to do).” (P7)*

Another example is P17, who during the interview, vividly recalled that her Path had “1500 moments” recorded, suggesting that this was a platform she frequently used and revisited. She gave the following example to demonstrate how she consciously maintained Path as a unique place for her “diary” and “reflection,” with an example of the same photos updated to Path and Instagram (screenshots attached as Figure 3, with permission) – one with a rich narrative and reflection on the experience, the other with a succinct description of the photo:

“...because my Instagram is really public so people can see that. Most of the time I wrote in English because I know that a lot of my American friends are on Instagram, and I think they want to understand what I am talking. But in Path, I can be myself. When I put this house in Instagram, I just put like, ‘I visited this, and I would have admired this house since I was an architecture student.’ But here (on Path) I put the journey to reach that house, ...Yeah, so I put that the house is in rural southwestern Pennsylvania, and it's really far. And because it's rural Google Maps showed me the roads through the mountain, to the farms, and even there is no cell reception, and I said, ‘But it's all worth it.’”(P17)

When asked why Path has become the place for reflection, she mentioned two reasons: a limited audience with close ties, and a place already curated and filtered for important memories.

“Because now it's really easy to take photos and then my phone has very big memory, very large memory, sometimes it's really annoying to scroll all of your photos to search for a specific one, so I decided I put the important events or important things... Not important, it's just like when I travel or when there's something happening in school and then I put it in Instagram or in iPad, so I can just scroll that instead of my photos. And then I also got the description about the photos, so it will be easier for me to memorize.” (P17)

There are important lessons we can learn from people’s existing reflection practice. First, people do interact with digital materials in their reflection – sometimes that material was intended for re-visitation and reflection, or it could be “stumbled upon” – therefore, both structured and randomly triggered reflection might have its place. There are important salient moments appropriate for reflection – for example, when one expects negative emotions and stress, or right after a memorable experience such as travel. Second, people who have developed their routines of reflection do find value in this activity – in fact, participants’ existing journaling experience is pretty close to what we set up for the experiment, but without “pre-filled data” (P22), in this case, a variety of communication traces. Lastly, reflection is not strictly personal, based on participants’ experience, and people do enjoy communicating with a limited audience about their inner thoughts and feelings in certain situations.

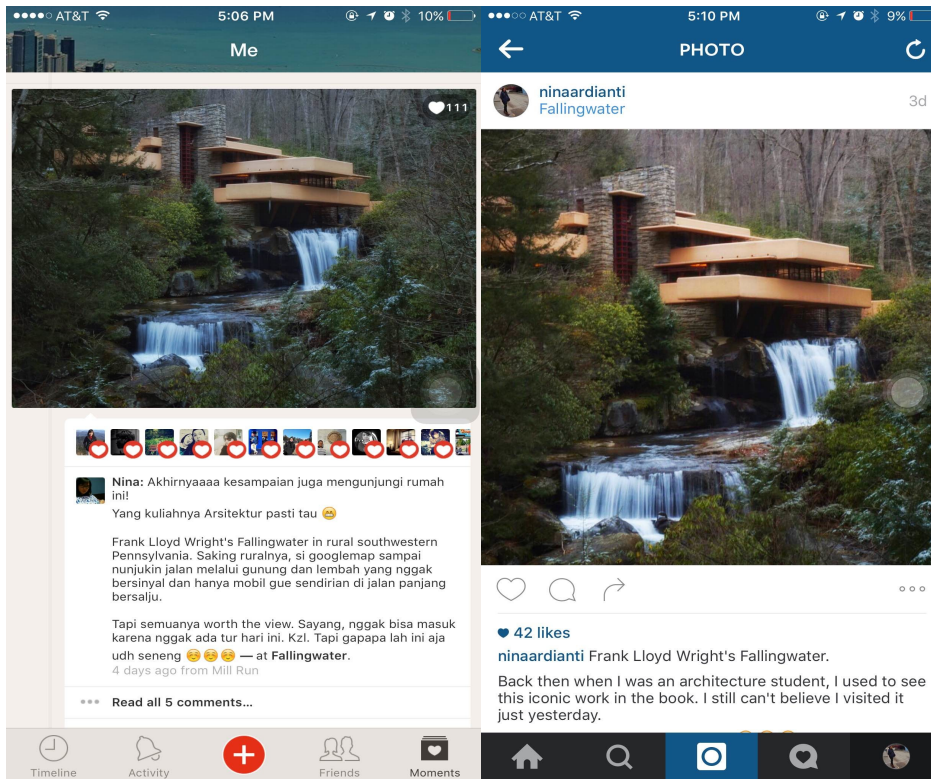


Figure 3: Screenshots from P17, to demonstrate how she is consciously using Path as a place for writing longer reflections (Path photo on the left, Instagram photo on the right).

Reflection on Social Media Traces for Communication Goals

As part of their existing reflection practice, people do reflect on social media traces a lot – and they mainly reflect on them to achieve their desired communication goals (the *directive* function). A very salient theme from our interviews was that people go through a “*Goal - Reflect - Adjust*” cycle in the context of evaluating social media use. Here “*reflection*” involves looking back, evaluating, and analyzing ways one uses different communication platforms. The fact that our participants were experiencing important life transitions allowed us to more easily observe this reflection cycle in action, as life transitions cause both social and technical reconfiguration [93]. This dynamic reflection cycle applies to micro-level goals such as managing individual communications or specific interactions, as well as to more macro-level goals such as managing one’s overall

engagement on different platforms or one's desired image online. We focus here on reporting results on their practices of looking back, evaluating, and making sense of their use of these systems during their day-to-day lives, not just during the interview.

Reflection on Communication Goals: On the Micro-Level

On a micro-level, our interviews showed that participants often reflected on social feedback they received on individual communications - for example, likes, comments, or number of views, and made subsequent adjustments in their future sharing behaviors. In fact, participants often commented on how they often stayed mindful about what they shared after the sharing action (e.g. "for a couple of days", P6) in anticipating and evaluating the feedback they received.

"... because I have to achieve some goal in order to communicate with others through those applications (social media). And if they didn't respond in half a day or several hours, I will considering was I saying something wrong? Or maybe they are busy and they can't respond to me or something like that? " (P7)

Sometimes you think like, "What made people not like this? Is it because I posted it at 2:00 AM and no one was awake, or is it because no one cares about this issue? So you kind of always wonder. (P19)

And gradually through the feedback cycle, people learn about patterns of "successful sharing", and adjust their behaviors accordingly: *"I think it's a pattern for people to comment more on when the person is showed in person in that picture. And if there is only a link, people will not tend to comment... so when posting, I will include some photos that have me in it"* (P7).

For sites like Facebook, likes and comments offer direct feedback that people can access. The site affords this feedback for each individual post, and it is relatively easy to understand. For some content, participants were mostly mindful about getting feedback from specific people, such as expecting "likes" from professional colleagues if posting professional content (P18), but in general participants were more mindful of getting desired feedback from Facebook than from other others sites they mentioned because the

norm of social validation is more prevalent on Facebook. For different social media, the feedback participants cared about differed. With Twitter, participants were mainly concerned with “Twitter Analytics” - the site analytics that provide a series of measures including tweet impressions, new followers, profile visits, and tips for users if they want to drive more engagement and generate more responses from the online audience.

*“So, I'll live tweet and even after the show is over... And then, after that, I go to bed or eat dinner or whatever and so I'm kind of done thinking about it. **Although I'll think about it later.** If I come back to Twitter the next day and I see... 'Cause that's the last thing I tweeted, so it shows up at the top. And Twitter does that thing where they show you your engagement. So it's like, "How many people have seen your tweet? How many people liked your tweet?". And those will usually get more, like if you include a hashtag it gets more views and things like that. So it's kind of interesting to look and see like, "Oh, how many people did my tweet reach? What was my impact?" (P19)*

Similarly, the feedback people received on Twitter affected their sharing strategy later. For example, this participant talked about how he constantly reflected on Twitter Analytics and adjusted the ways he used Twitter to increase the pure reach of his tweets or account, or the professional visibility that helped him in the job search process. He was particularly mindful about how the way he tweeted affected numbers of visits on his twitter profile and other social media profiles.

*“Twitter Analytics, I use it way too much... In a week, (I check) at least 15-20 times, easily, in a week... So yeah, you can see I've been tweeting a lot recently. So I can actually find trends of how to get tweets which will get better views and highlights. So if you want a tweet that gets more than 5000 impressions, tweet to one of these guys. **So if any of the celebrities from these things post, I tweet back to them 'cause that improves my visibility, which increases my profile visits, which increases my LinkedIn views, which increases my chance of getting a job, which actually happened. I got my job from Twitter. I tweeted about FarmLogs and they found that and then they gave me a job.**”*

Twitter also introduced the “heart” as one feedback mechanism to replace “like” in late 2015, but since the norm associated with Twitter for the most is more about broader reach rather than deep engagement, analytics such as “tweet impressions” and “profile visits” seem to have been valued more by our participants. Even though Twitter Analytics gives

more fine-grained feedback to help people understand and achieve their communication goals, there is still a gap between the direct feedback afforded by the site and the types of communication effects that participants were trying to make sense of:

“People have been following me (on Twitter) more for my intended profession. The lines of being professional and being personal on social media is really blurred for me. I have trouble right now seeing what I should do with my Twitter account and how to approach it... Another thought is that although I don't want to be like a superstar in the field of user experience, I wonder what my online presence would do to affect my potential career in the future. Like I said in my previous reflection diaries, I want to use social media to have a presence, but I wonder what type of effect that presence is actually going to have on my career.” (P14-diary-2/6/2016)

“Because I use Twitter the most out of the public social media formats, I think about if the content I post is appropriate for information professionals. I think (about) this because I'm still not entirely sure if I can continue to always post and talk about anything... For now, it's more for fun and occasional information, but because I want it to be a professional outlet, I'm not sure if I should stop posting about nonprofessional things and possibly make two accounts to post about different topics.” (P14-diary-2/7/2016)

Reflection on Communication Goals: On the Macro-Level

On a macro-level, we also found evidence that people reflect on their overall impression management goals on different social media. It is quite common for people to periodically check content they have shared (sometimes as a daily routine) to monitor the overall presence and outlook of their social media profiles. For example, this participant often reviewed his recent posts on Facebook to make sure his profile had enough content to appear “social” and “outgoing.”

“I would say I check my recent post just to monitor what I'm putting out there. And just making sure that I have or at least it appears that I'm active. I tend to be pretty busy and I tend to have a lot of things going on so I like to have my social interactions, like platform represent that well... I think it's just that expectation from society to be social and outgoing. 'Cause social networking is very important nowadays and people see your life through that.” (P20)

A few participants also mentioned that they consciously reflected on their overall engagement of different applications by tracking “time spent.” Some set out timers for using particular sites (P15) on their browser, and some checked the battery usage data (P14) to make sense of how they spent their time on different applications. For example, this participant tried multiple strategies such as deleting the application from his smartphone or deactivating his Facebook account to cut down his use.

“... I saw on my battery usage what apps I use the most... So that's why I actually first deleted Facebook, but I realized also that I used it very often because it was 60%. It's funny, I don't use my phone... I think it was 48% was Facebook, and then these are all the other things I use very often... I felt like this was also a good indicator of what apps I use very frequently. I have a lot of apps on my phone. There's only a list of... In the last 24 hours, I've used six of them. You can look up to a week. So Chrome, I use the most, Instagram, Snapchat, Twitter, the game I just downloaded, I guess I've been playing that a lot.” (P14)

Here social feedback also played an important role in triggering people to think about their engagement with these sites, and motivated them to change behaviors. For example, one Instagram user mentioned:

“...I didn't realize that I had cut off from people until I reflected back to the things that I used to post a lot more and people used to connect with me a lot more. I just thought reduced activities are not making any difference, but that people actually care about it and the fact that social media... And when you reflect on social media it helps you go back and see that "Yeah, people used to comment, the people used to like the stuff. And they wanted more of it and they helped connect better and have a conversation over it. (P22).

Reflect on Communication Goals in a Time of Change

Through the “Goal - Reflect - Adjust” cycle, participants were able to fine-tune their behavior to achieve their pre-set goal of using different social media tools. However, these goals also changed in response to changes from the platform, network, or external environment. Since our participants were a group of people experiencing the life transition of relocation, our interview data was able to reveal how people reacted to

external changes to fine-tune their goals of using different systems. In general, participants noted a more salient role of reflection in helping them with the adjustment.

Participants identified a few common challenges that caused them to reflect more on their technology use: *adapting to new social routines, new online etiquette/norm, and new self-presentational needs*. Each of them represents a different kind of “breakdown” that Baumer identified in his framework [7], which suggests that they are “moments of perplexity” that call for the need for reflection.

Adapting to new social/relational routines: After moving to a new place, participants first experienced difficulty in establishing their new networks. They were in general more intentional in terms of establishing new connections, knowing who they wanted to connect with, and figuring out social ambiguities associated with new groups.

“It's like I haven't known these people for that long. I've known them all for like less than a year. Whereas my friends back home, I've known for more than 10 years. So I'll talk to my friends at home about anything whereas here, sometimes I'll see something and I'll think about telling it to one of my friends here but then I think about it again like, "Should I send it to them? Will they think it's funny? Is it worth it? Maybe I just shouldn't send it to them", and then I won't send whatever I was thinking message to them or whatever. So, I think I just don't feel as close to them as I do to...”

This struggle with social ambiguity is more prevalent in an intercultural context, when it's also related to language and cultural barriers. Participants who moved from overseas encountered this challenge in both face-to-face interactions as well as online interactions, even causing some of them to become compulsive about checking emails they had sent out to make sure they used correct words or addressed others appropriately (e.g. P10, P9).

“ They were sitting next to me and then we started talking and I actually started looking on the laptop what they are doing, and they pushed me back, that, "You should not look at my laptop, these are my personal stuff." That was like pretty awkward for me, because it never happened with my Indian friends... But American friends is like something different.(P4)

The biggest challenge, I think it is the cultural differences. Because you are in US, you need to try to make friends with the Americans, and sometimes I don't really understand what would make them laugh, or what would make them angry. So if that problem remains, I cannot comfortably talk to them. I might be very careful and talk, and I think that it's not me. And they cannot see the real me, because I try to speak more carefully. (P9)

Adapting to new online etiquette and norms: In relation to their struggle to establish new social connections, participants in our study also faced the need to adapt to new communication technologies, or to new online etiquette and norms, which were more prevalent in the new social or cultural context. Among many, the change of norms for using social media was particularly interesting. Here people mainly used observation and social comparison to learn the norms and then adjust their own behaviors on the site:

Facebook is not the main ways that I communicate with others. I can live without Facebook. But right now... I will browse in Facebook, even though I didn't post on it. And when browsing Facebook, I just want to see what others are posting ... Browsing others' post, I found one function that is more useful than others, and that is the activity or events nearby. And my friends will post that they are interested or they will go to that event, and I start to use that function. I am interested in that event, and I will probably go there, and post like that... Facebook, Facebook... I think Facebook is interesting because everybody is using Facebook, and I don't... I'm not that much, I'm not so into it. So I feel that I have to use it, but I don't know what I can post to it. ” (P7)

Many participants who moved internationally mentioned intentionally using Facebook, texting or emails more after moving to the US since these are popular methods to keep in contact with people here. One international MBA student mentioned that she had to re-activate her Facebook account after the move despite not using Facebook for four years, “just to maintain the relationship with my American friend because Facebook is so big here and that I will be really clueless if I am not on Facebook”. (P17)

Adapting to new self-presentational needs: Our participants were not only experiencing a simple relocation - many experienced a significant role transition associated with the move. The majority of the participants in our study moved to a new place to pursue a new degree or new career. This “role shift” caused people to rethink their online presence in

general. In part, this process of technological reconfiguration was related to how people needed to re-configure how to present themselves in interpersonal situations in general - for example, “*now I’m in their culture, I think a lot, to what extent should I follow their way of living their life?*” (P17), or related to a new identity they needed to adapt to, or wanted to establish in the new phase of their lives.

According to this participant, who came to pursue her Master’s degree, the move completely changed how she used and approached Facebook. She was no longer active on Facebook, because she was no longer “people-focused,” but “career-focused.”

“ So back in Shanghai, I was using Facebook a lot 'cause I have a lot of friends here and I was posting a lot of things... So coming to the US, I'm more career driven. When you have a stable job ... I hang out with my friends a lot. I go to different social networking events, I was dating. So you really focus on people to people experiences, that was a really good time but right now, I think I also... 'Cause I don't really have families here 'cause you have to be responsible for the decisions you make. Okay, these two years, I'm good at this, so I think with this pressure I'm... All the other things doesn't really matter to me anymore. 'Cause by the end of the day, you have to be a stronger individual to take control of everything.” (P5)

Twitter was the most interesting case, as almost one third of our participants mentioned that their Twitter usage and the image they wanted to portray on Twitter was going through some dramatic change, which reflected the role transition. For example, this participant, who used to keep Twitter private before beginning her graduate program, now needed to be more active in advocating the self in a professional way:

“ I went to a very big church, it was like 10,000 people, and so a lot of people will see the content you post online and the pictures you're taking.... Ever since then, I kept it (Twitter) private, ... now, even when I see it, when I have to put in my resume (on Twitter) and all that, it does feel like I'm a new person. I have to... I don't wanna say take on, but that's what it almost feels like; I have to take on this identity of becoming this type of person... and I have to kind of think more actively about the actual usage of my social media and how I talk to people. (P14)

Because of “role transitions,” people felt the need to adjust their goals and re-configure the “expected” ways of using different platforms. Or sometimes, they needed to

strategically use communication platforms to establish a new identity. Here is a powerful quote from a participant who came to pursue her graduate degree describing how she now needed to portray a “prospective” identity on Twitter because of this transition:

“So, I don't know how to articulate it exactly, but yeah, you want people... You're basically faking it. Like your portfolio says, [name], User Experience Designer. I'm presenting a version of myself that almost exists, but doesn't quite. And I want it to. I want very badly for that to be true. But I'm not there yet because I'm not an expert. And I don't know that I ever will be, but it's still a hesitant thing when people are like, "What do you do?" I would say I'm a student before I would say I'm a User Experience Designer. But if I can convey that through my social media, if I can convey through Twitter that I have a voice and an opinion and a point of view about my work, that reinforcement from others helps me feel like I'm doing it right. You know?” (P11)

Because of the role transition and all the occurring changes, it is reasonable to expect people to need to be more reflective (e.g. doing self-monitoring or engaging with more evaluation of social feedback, etc.) on their use of these platforms. Even though the effect of the transition is hard to measure with our qualitative data, we do have some evidence from the diary data that people monitored their level of success in increasing network connections when using particular communication applications:

“I did a good job staying connected to people near and far through social media this weekend. My Snapchat audience is increasing more and more to people from Ann Arbor. I appreciate FaceTime to be used to stay in touch with old friends and enjoy using Facebook and Twitter to stay connected to new friends here when we are not in class. “(P12 – dairy – 2/8/2016)

During the interviews, we discovered that participants had already developed a wide range of reflection practices for the “directed” function – they had desired goals for different communication platforms, and they often analyzed, evaluated and reflected on their own activities in order to achieve their communication goals. This type of reflection (reflection on “use”) mostly took place in the context of a specific online environment and served the end goal of achieving desirable communication or successful use of the platform.

RQ2: How do people reflect on communication traces towards *directive*, and *psychodynamic* functions?

We then discuss, in the following section, how people interacted with and reacted to our reflection experiment via the DAYS7 application for two weeks, and implications for designing for reflection. We framed the reflection task in specific ways. 1) I prompted them to look back at their mixed and aggregated digital traces from a wide range of communication platforms; 2) I asked participants to look back at their communication traces from the recent past; 3) I prompted them to reflect towards *directive*, and *psychodynamic* functions. We were interested in how people reacted to such a reflection task, how they created narratives and found meanings by exploring their everyday communication traces.

This part of our findings centered on how everyday communication traces triggered reflection towards 1) achieving goals (*directive* function); 2) emotional and psychological wellbeing (*psychodynamic* function). In each of the sections, we explored how people reflected on, or valued different types of communication traces (with a specific focus on understanding the role of social media).

***Directive* function: Reflection task unveils diverse, broader goals**

When asked “What made you think about your goals and motivations” (*directive* function), email was most frequently mentioned (27% of the *directive* function), followed by Twitter (17%) and digital calendar (12%). Here communication goals, which people frequently reflect on in their day-to-day life according to our interviews, are not prevalent. Instead, frequently identified goals were relationship goals such as maintaining relationship with friends and family back home and establishing new friendship in the new city (mostly associated with Snapchat and Facebook), career goals such as finding jobs or internships (mostly associated with Twitter, email and calendars), academic goals such as doing well in exams or projects (mostly associated with emails and group

messaging tools – Slack or Groupme); and fitness goals (mostly associated with personal photos).

Even though participants did express the concern that looking back on specific traces (such as email, calendars, Slack and Twitter, as mentioned above) caused them stress, they do think reflecting on them was “useful”. For example, people reread their internship application emails from their inboxes; this was not enjoyable to look back on, but usually motivated people to initiate actions, change strategies or make sense of their current progress (P9).

As mentioned, our interviews revealed a wide range of practices that people are already engaged with in their daily life to reflect on communication traces (especially social media) for achieving better, more successful use of different platforms. However, the two-week reflection allows our participants to discover and act on broader goals, which as some of them mentioned, were even not salient to themselves prior to the experiment.

Relationship goals: The reflection task has made participants more mindful about their relationship goals. The reflection task helped participants to observe their own communication styles (with different audiences), both in terms of how they communicated in specific interactions, as well as their overall communication “ideal” that they wanted to achieve (e.g. in terms of frequency and quality of communication). For example, this participant was able to reflect on how she communicated in group situations, which motivated her to change her behaviors in all professional communications later on:

“This helped me look back on how I would interact via text with people and Slack, too... So that showed me how I work with them in a professional way, and that will help me when it comes time for job interviews and when it comes time for I'm gonna go to Gamzee's research conference. That helps show me how I need to present myself and how I need to change the way I find myself... And sometimes I need to talk more. So, I talk too much in specific groups, and I'll get nervous, and I'll talk a lot. But then sometimes with info-gamers, Jim and Jeff know a lot more than me, so I'll be intimidated and I don't know what to say. So in different

context, I need to talk less and give more quality to employers as well as the way I word things. Sometimes, I'm too friendly immediately and I need to realize that sure, recruiters might wanna get to know you, but primarily they're there to do their job. And with EA, I've been trying to get the courage to, okay, like I'll prepare like, "This is what we've done through the week. This is the useful opinions that I have on the project." so I'll have more confidence to bring that up, 'cause I'm afraid of just looking stupid. Yeah. (P5)

In another example, the diary writing made this participant realize how “bad” she was at communicating with her group members, and she actually changed her behavior afterwards (by “*trying to adopt their usage of words*”, P7) based on her reflection during the experiment:

Because after writing those notes (diaries), I find more problems about my current life. I tend to not to solve the conflict between my friends and teammates in English because I lack the confidence that I can convince them of what I think... This one is for the SI622 course, and we are using Facebook Messenger to communicate with others. And this time, I think one of my teammates just brought up the problem in our group, and since others don't response, so I didn't respond... So this kind of notes help me to find this problem, and I'm trying to solve this problem after I taking the notes. (P7)

The reflection experiment allowed people to synthesize their communication traces around different relationship contexts, and reflect on their communication patterns (e.g. frequency) in specific relationships:

“I think that we're a little bit self-segregating and we all silo, where we're like, "Oh, I'm in this by myself and it sucks and ... " I think that there needs to be more... If it makes me realize anything about myself, it's that I haven't been doing a good enough job of reaching out to my classmates because if I'm not the only one, then I have to express that.” (P11)

Broader, long-term goals: In addition to communication goals, participants were also able to look through the lens of communication traces and connect them with bigger, long-term life goals: “*One thing about me is I think a lot about my immediate future. This made me think about long term. Like long-term goals, I don't think about them so much. There also I was thinking about very immediate goals, 'cause probably I was working with my team and that's what I was doing... Thanks to this survey, I went back to even*

further older stuff and I was looking at stuff... " So the fact that you're reflecting every day, it helps you account for the bigger picture. It's more like, "Okay, I did this in the last two days, I did last two days, I did this in the last two days." So have I clear idea of what I did in the last week. Is that going towards my big goal? .. Or what am I doing here?.. So these small, small parts kind of add up to be like, "Oh, I'm not doing anything that matters right now." (P22)

For example, this participant mentioned how looking back at his recent Reddit activity for the two-week period of time helped him to be mindful of his initial motivation to use the platform – a big passion for being involved in the gaming community.

"I reflected back to it and I was like, "Why am I on Reddit in the first place." So, I'm on Reddit in the first place to play game... Because I'm engaging with the gaming community. Why am I gaming again? Because I like gaming and the whole big picture theme kind of pops up, which is what helped me... On the last two days yes, I'm using it way too much... I used to play games because games gave me more new ideas and new concepts and it's team building at the same time. And that's one thing I want to learn all the time so which is why I play games even right now. Because games in itself help you understand design better. They help you understand team work better. It's more like an activity for me which engages me better things than these. I mean better things than like well I'm learning in college right now, it's not so much fun and there's nothing new that I'm learning. It's more repetitive. But for games it's different. And that's the reason I want to always stick to playing games. That's actually a goal that I have. Even when I get 60 I want to be playing games. Because it keeps my mind fresh. "

And he continued to explain why this reflection was helpful: The day-to-day use of different tools and platforms could easily cause people to lose perspective on what they want to get out of them, but being able to step back and critically evaluate the experience reinforced the value:

"Because it became a habit. So once it becomes an habit I feel I lose it... The fact that I'm tweeting everyday about things that I see. I'm not anymore excited about it but initially as I used to be excited about it... Which is why I've lost it but then I reflect like, "Oh, I tweeted this because I was actually excited about looking at the thing" but I just tweeted that thing. It's second nature right now to just click a photo of something beautiful and post it. And then we like, "Oh, I did this because

I was feeling good." and I was like, "Oh, it make sense". My Instagram posts, I usually... I just find something fancy and I click and I post it. I didn't think of meaning behind it of why I'm posting it. But then when I reflected I'm like, "Oh, this is the reason I was probably thinking about this and that's why I was tweeting about it."

What's particularly interesting is that mindfulness about bigger, long-term goals helped people to cope with their stress during the transition: *"I think looking back on things, like, calendars, emails... you can see how it has a bigger meaning. So you can look back and see all those busy things, but then go, "Okay, this is why I'm doing them." So I think that's helpful... I think about how sometimes when I call home and I'm having a hard time. My mom will say, "But think about it, you could be living at home right now. Why aren't you in grad school right now?" So it's sort of like being able to look back and say, "Okay, yes, I'm stressed, but this is why I'm doing it." It's helpful."*

However, participants were not sure which part of the reflection task led to this intention to make changes: *"I'm not really happy in this situation." And I was motivated. I was like, "Can it be better? I don't know." But like, "Can it be better?" I was thinking that way. I don't know what this drive... I'm not really sure. I don't know whether it is driven by actually I'm writing it; then I reflect on my behavior, I'm not really sure."* (P15)

Increased mindfulness about goals is not enough, though. Some participants talked about the importance of initiating action. Admittedly, our experiment only lasted for two weeks, and that amount of time might be too short for participants to actually adjust their behavior following the reflection.

" When I change my profile picture on Facebook people from back home, high school friends, old friends will like the photo but it's not for me... Seeing one of my old friends like my photo, I'm not going to immediately chat them and be like, "Hey, you liked my photo what's up?"[laughter]0:47:31 S2: No. A comment on my Instagram photos and something like that, you might reply to their comment in the comments and be like, "Oh nice photo." You're like, "Thanks. Yeah, I look good," or something like that. Even though you do have a little bit of contact like right then, like I said it's up to you if you want to extend that into something more personal or if you just want to keep that at face value and be like. "That's

happening. That happened. That's cool. That's it. I'm just gonna leave it at that." So if you want to extend it, I feel like you would still have to go to send them a snap or open up a chat box. So, even that little bit interaction, liking the photo or commenting isn't enough, in my opinion.0:48:18 S1: For establishing new tie or maintaining? 0:48:21 S2: Maintaining (P21).

Psychodynamic function: Positive communication traces help with coping

When asked “What made you think about your struggles and difficulties”(psychodynamic function), email again became the most frequently mentioned (17%), followed by IM applications (14%), and interestingly, Snapchat (10%). Some commonly mentioned difficulties were academic stress (mostly triggered by emails and camera photos) and networking challenges (mostly triggered by Snapchat and Facebook). In the psychodynamic category, people were actually talking not only about difficulties but also their coping strategies and the social support they received in response to their difficulties. For example, Snapchat was frequently mentioned as a source of stress, mostly because participants got to “participate” in the lives of their far-away friends and family, but it was also mentioned as a source of social support (along with texting and IM) that helped with the difficulty.

“The hardest part about social media while being away from home is that I can see what all my friends are doing. I miss the community of friends that I had. And even though I have a great group of friends in Ann Arbor who are supportive of me, I can't help but to think that I'm missing out back home. I don't feel homesick often because I feel too busy. But if I wasn't busy, I think I'd be homesick much more often. Snapchat seems to be the thing that makes me homesick the most because it's such an immersive experience compared to all the other mediums. The other thing too is that Instagram and Twitter are almost idealized and characterized versions of real life. I don't feel like I get a good sense of home when I'm looking at them. With Snapchat, I see firsthand what it is like back home.” (P14- diary-1/30/2016)

The mix of both “mundane” parts of day-to-day communication and more “crafted” interactions on social media triggered participants to reflect on this great divide between “front-stage” and “back-stage” self, which was mostly observed from the diary data. For

example, *“I think others see this post as something awesome, but when I look at them, all I can think about are endless school projects.”*

This made people feel “superficial” in a way:

“social media is very much crafted... A lot of the photos people take online, especially in the beginning of the year, it's just like getting people together to look like everyone's very close together... I guess, not really pretending to be friends, but just very superficial surface-level relationships... You only post what you want others to view you as, or to think how your life is actually is. But often times very not parallel to what it really is in life.”

“ Last Saturday the U of M American Pharmacist Association Club at the College of Pharmacy threw an event called "PharmBash" aka Pharmacy School prom. The event consisted of dinner, awards for professors and students, as well as dancing and a photobooth. On my Facebook, i have photos of my printed photobooth strips... The photos look great. Everyone is dressed beautifully and looking gorgeous and silly. But what stands out to me is that when looking at them, i dont really feel close to any of them.... perhaps within in the next upcoming years, my relationships will develop further. (P13 – diary- 1/27/2016)

This suggest, being mindful about certain social media content could introduce negative reflection experiences, since people are often reminded of the divide between the “real me” and “crafted me”.

On the other hand, positive social feedback can really act as social support that helps people to deal with personal struggles associated with a transition. For example, this participant mentioned that she valued unexpected positive social feedback from Instagram:

“Well, yeah. 'Cause the comments I get on those are like, "Good for you," and like, "Things are so great." Like, "Wow, you're at Michigan. You must be so great."... So, pictures of whiteboards are like, I'll take a picture of my homework. It's like a picture... I can show it to you, but it's like a picture... I thought the colors were cool where I was wearing a green sweater and my nail polish was orange, and I had an orange cup. And people were like, "Wow, how great!" But when I look at it, I see my homework. And I think, it's kinda funny, it's sort of like tongue-in-cheek... So, when I look at it, it's sad, but I'm glad that... I'm glad that other people think it's great. But that's why it's funny, 'cause there's this total

disconnect where when I look at this stuff as a whole, I see it and I'm like, "Ooh." 'Cause all I can see is the stress, but when other people see it, they're like, "Wow, you're so..." I get emails, people are like, "You're so inspiring." Like, "I wanna work so hard and go to school."... And I'm like, "That's great." But it's interesting when you're trying to convey reality and the reality that you're conveying is still something that other people are not jealous of, but they're like that, "Wow," and you're like, "Oh." And so, it's a nice reminder that you are doing good things, but it's like.. "(P11)

Looking back at positive feedback from families and friends on social media was a primary way to get social support. *"Sometimes, you feel lonely. But then if there are some posts, which I have posted after coming to the US with friends or with family, I look back at that and I feel good about it, that even in this place, I have had people around me and I've not always been lonely. So it's just one day and this, too, shall pass and that sort of thing that will make me happy."* (P10)

One participant who identified "lack of close friends" as one personal struggle in the pre-survey commented that the two-week reflection helped her to be more aware of connections she had already made:

"I'm used to having a very close group of girls that I'm very good friends with, and I didn't seem to find that here. So I was struggling to figure out what my close group of... Or my niche of friends would be. But I think just looking back at this past couple of weeks and what I've been writing about difficulties and friends, I think I've realized I do have a group of friends here but it's just not what I initially expected out of it. I just have a group of guys that I always hung out with and I've become one of the bros but it's not what I'm used to but like that's not the end of the day. Like wanna be good friends. 0:22:33 S2: I've discovered it based off the frequency of always speaking like them on social media." (P13)

"Yeah from the study, when I was thinking about my interactions with people on social media from my undergrad compared to being here, it kinda makes me feel good to know that I am starting to connect with people here on social media, where as last semester not so much. So, I didn't realize maybe how much that is starting to... It's kind of another level, like I had middle school, high school, college, and now grad school, and that's actually starting to permeate my social media... Yeah, it makes me feel like I'm connected to the people here more." (P12)

“I think the realization that was most helpful out of this was to realize that I really have formed a couple close friendships here. That's one of the hard things about moving is that it takes awhile to make a good solid friendships. And to realize how much I'm communicating with two of my friends here. And that it's about a wide variety of topics, that was kind of affirming. And I like seeing that.” (P18)

And being reminded of personal achievements ultimately helps people to achieve more goals [82]:

“Yeah, so I think it was in the first email that I got an internship and I had an interview call for another internship before I had accepted the offer so I was really excited that I had... So when I came here, one of the main goals at least for these two semester was to get an internship. And there were certain companies that I wanted to go into and the fact that I actually got into one of very good companies that I would have loved to go. But the fact that it was all happening, I'd never thought that how important it was for me, probably eight months back and now that I've achieved it I did not feel... So all I'm saying is the fact that for example, I got into Amazon. And I would've just dreamt of getting into Amazon probably when I came here. And the fact that it happened over time and never got back to think about how important it was for me and how good that was for my career. I never got a chance to think about that I've come a long way. And probably boost my... Like, "Thumbs up, you did a good job." (P6)

The “recent past” brings new perspective

Since the current study aims to unveil how reflection interact with day-to-day communication traces, participants were prompted to look back at their content from “the past few days”. Participants compared and contrasted this reflection experience with similar applications which surface social media content from long time back (e.g. Facebook’s On This Day or TimeHop), and commented on the tension between reflecting in the moment and reflecting at a distance.

On one hand, certain content needs to be appreciated over time, and it is hard to form an opinion about it when it is too recent: *“So aside from being reflective to begin with, I'm also very nostalgic and I like to think about the past a lot, especially if they were good memories. So if it's more recent, it's hard to form an opinion about it, except my immediate reaction to my more recent posts. Maybe I don't care nearly as much about*

now because now is so busy and hectic, and when I look at the older pictures and content, then it's more relaxed and peaceful.”

Time also helps to reveal patterns, especially for digital traces that are more telling about certain aspect of one’s life, in this case, music playlists:

“There's so many different aspects to your life and so many different things that you're doing. You can't really I guess establish a pattern in what you do because and maybe you do listen to calm, peaceful music at the gym, but even then I doubt a person would listen to that one type of music all the time. It's just different cases, different instances throughout the day, throughout your life that just require different things. So I feel the Day Seven app or just reflecting, having something that takes notes for you, shows what you do. It doesn't really open your eyes to something new. You might say, "Oh, I listen to this music more," or, "Oh, I took pictures of this today." But is it something you can use to find something new about yourself? I wouldn't really say so.” (P21)

On the other hand, understanding long-term patterns, especially regarding one’s social interactions, might be difficult, or quickly become irrelevant. As one participant said, *“I mean the six-month-old (lookback) does makes sense if you look at the patterns and stuff, but how are you gonna use those patterns is my question. I never figured that out. (P22).* When reflecting in the moment, everything is still relevant and actionable. Participants in general reacted to this type of reflection positively. Some compared this experiment to something similar to their daily routine of looking back (P4), and thought this could be easily integrated into their current life – *“and those things I could still mold it in my way and they could help me achieve my current goal.”* Some mentioned that synthesizing one’s communication traces every few days helped to “break down” longer term goals and made it easy to track one’s progress at things such as applying for jobs (P20).

“(I enjoy looking back)... probably something that happened recently, there is still chance to improve on that or change something that you did and you didn't want to do or something like that. But something that happened very early, very back in the past, you wouldn't be able to change it. You can just look at it and reflect that, "Okay, I wouldn't do this next time" or something like that, or "I will do this next time because this was a good thing that happened." But if it's in the recent past, then you can think of changing things or improving things.” (P15)

Participants also frequently compared their experience with DAYS7 with their experience with Facebook's On This Day feature (which resurfaces old Facebook content to users at years distance). People thought the Facebook feature often resurfaced moments or relationships that were no longer relevant or that were even “awkward” (P18).

Although most participants found reflecting on recent communication traces useful, some expressed concern about finding the right “temporal distance” between each prompted lookback. One participant mentioned that reflecting on a group conflict occurring via Facebook Messenger immediately didn't help her to gain perspective, and suggested that a week's distance would be better (P8). Other participants suggested similar weekly (P11) or monthly (P4) reflection intervals.

“Again, the fact that these small pieces help you look at the bigger goal, that... I mean the six-month-old does makes sense if you look at the patterns and stuff, but how are you gonna use those patterns is my question. I never figured that out. I'm like, "Okay, I did these things before, I know I might do these things before." But it doesn't matter as long as I'm reaching towards my goal. So I like these 'cause these chunk-sized bits help me look at the bigger picture”. (P14)

DISCUSSION

This study explores people's current reflection practices, and alternative ways to shape reflection by introducing a design prompt for two weeks. Our findings unveil insights into how people reflectively use different communication platforms to achieve their communication goals, as well as how content or digital traces associated with these platforms act as reflection materials to help people reflect on their goals, and react to negative events. In the following section, I will discuss implications of both reflection for goal achievement and reflection for psychological wellbeing. I will then discuss important dimensions of designing for reflection around communication traces as suggested by this work.

Reflection for Goal Achievement

In examining how digital traces across communication platforms interact with people's self-reflection purposes, we found that "the reflective use" of different communication technologies, especially social media, is a big part of people's reflection practices (for "directive" functions). This "reflective use" is essentially about how people evaluate social media as an effective communication tool with a wide variety of audiences. Our qualitative data shows that people do reflect on the effect of their sharing behaviors and evaluate them against intended goals. This reflection applies to both micro-level reflections, such as whether an individual post receives enough attention, or gathers certain number of views/likes/comments, as well as to more macro-level reflections, such as whether one's overall appearance on the platform and one's overall engagement with the platform align with one's intended goals.

Our findings point out one important aspect of designing for communication in social media, which is to think about how to more effectively engage users in evaluating their communication and sharing behaviors, as well as how to get them the right feedback to improve their success on the platform. Very recently, there have been studies that explore the "perception" aspect of this interaction; for example, we know that people overestimate the number of audiences for individual posts on Facebook [10], and according to known egocentric biases, people might overestimate the amount of positive feedback they receive from their audiences, too. A recent study by Wang et al. [161] shows that Facebook posters themselves usually evaluate their posts as more successful in promoting their self-image than outsiders judge them to be. Their study also shows that posters generally overestimate the success of their self-presentation when posts are associated with mundane topics such as clothing and sleep.

We've known that social media users take advantage of different site analytics and social feedback in managing their sharing strategies [131], but the key point here is to start supporting the design of feedback mechanisms to help people track and reflect on their

communication goals, in ways that are similar to how we support tracking and reflecting on diet or exercise goals. Consistent with recent research showing that people care more about who “likes” their content on Facebook than the number of likes [131], our results show that people tend to evaluate feedback with regard to specific relationship contexts. On the more macro level, feedback means quite different things – for example, similar to Twitter Analytics, the platform could highlight posts that get the most exposure or important meta-data that might have contributed to a “successful” post, such as “time” and “topic.”

Designing for feedback could greatly impact how people engage with the platform or interact with others. One great example is the new Facebook feature “Reaction,” which introduces a wider range of possibilities for giving feedback in addition to “like,” and which is supposed to encourage deeper content engagement. The possibility of providing more ways to give and evaluate social feedback also makes people more conscious about the feedback they give and receive. For example, one participant mentioned that he became extremely mindful about giving as well as receiving feedback using “Reactions”:
“... but there are some people on my list I will never ‘love’ it cause they will just get offended... I mean they post something sarcastic and I put an angry emoticon, the person will not like it. Even though he knows I am acting funny, they might not get it... So (I am) very conscious, very conscious of how to use these things now” (P22).

Another important implication of this work is that people were able to re-discover broader social and life goals when we prompted them to interact with a wide range of communication traces. The reflection experiment allowed people to synthesize their communication traces around different relationship contexts, and reflect on their communication patterns (e.g. frequency) in specific relationships. People were also able to reflect on the “bigger” goals associated with the use of certain social media (e.g. the case with the Reddit user and his passion for the game industry). This suggests that in addition to being a source of positive memory, social media could also serve as a trigger to help people analyze and evaluate their relationships with others around them, and even

life transitions they are going through. Similar to providing feedback for users in terms of how they achieve their health or diet goals, this suggests the possibility to design for reflection around “communication” and “social goals,” especially at critical, opportune moments (a point of discussion later).

Reflection for Psychological Wellbeing

Previous work that focuses on repurposing social media content for personal use mainly emphasizes the possibility to engage people with more positive memories (reminiscing) because of the positive nature of social media content [141,150]. As an extension of this previous work, the current study shows the complexity of using curated social media content as triggers for reflection – even though its content has a positive focus, it might not always work the best for reflection purposes (e.g. analyzing, evaluating rather than simply remembering). Some of our participants were drawn to analyze their social media content (in comparison with other personal content) in a negative way. This is actually consistent with some psychological work that suggests reflecting on positive memories, or on an overwhelming amount of information, can lead to rumination [83]. However, quite interestingly, even though social media content shared publicly could bring negativity to personal reflection, social feedback (such as likes and comments) are what really bring positive enhancement for people when they experience negative emotions.

This suggests that reflecting on publicly shared content itself does not always help people cope with difficult situations; instead, the social feedback or conversations that result from this sharing are more important to reflect on. Likes and comments, as a form of communication, provide social support people need in coping with negative emotions. Our study also suggests the importance to incorporate mundane and everyday communication traces. For example, Snapchat was considered as one important component of people’s reflection during the two-week period and people perceived it to be extremely personal. One-on-one communication (such as IM and texting) was

considered as an important source of positivity in the time of transition among our participants.

Implications for Design

Our findings also suggest a few important implications for designing for reflection in general: In order to positively shape people's reflection practices, we should introduce reflection at opportune moments, experiment with different ways of structuring the reflection experience, and cultivate appropriate involvement and effort from individuals.

First, design for reflection should think carefully about engaging people at opportune moments. The fact that our participants were experiencing important life transitions allowed us to more easily observe how people reflect or could benefit from it in action, as life transitions cause people to experience "breakdown" (of social, life, and cultural routines), according to Baumer's framework [7]. Because of the role transition and all the changes they were experiencing, it is reasonable to expect that our participants might have been more reflective (e.g. doing self-monitoring or engaging with more evaluation of social feedback, etc.) in their use of these platforms. Even though the effect of transition is hard to measure with our qualitative data, we do have some evidence from the diary data that this opportune moment caused people to be more mindful of particular parts of their social media use; for example, participants mentioned monitoring the proportion of their new Snapchat friends as a measure of their networking success during the transition.

This suggests that opportune moments exist to introduce more structured reflection. In fact, in learning about people's existing reflection practice, we've already seen evidence for such moments. For example, opportune moments are times when one expects negative emotion and stress (e.g. one participant reminds herself to read self-encouraging notes right after job interviews), or right after a memorable experience such as travel.

This study also raises the question of the appropriate “temporal distancing” in reflection. Wilson and Ross [172] found that the temporal distance is needed for people to feel superior to their past self, and thus feel more optimistic about their future. They also pointed out that this evaluation of one’s past self depends more on subjective time, not objective time. However, when individuals reflect on their past behaviors from a great temporal distance (e.g. communication traces from distant past), they encounter difficulties in understanding these long-term behavioral patterns, especially regarding their social interactions, and these traces may quickly become irrelevant to people’s current life (based on participants’ reaction to applications such as TimeHop or Facebook On This Day).

In our study, participants in general think of “reflecting on the recent past” in a positive way. Some compared our study with their daily routine of looking back in the morning or night, and think this practice could be easily integrated into their current daily routine; some mentioned that synthesizing one’s communication traces every few days helps to “break down” longer term goals and makes it easy to track progress. Most importantly, being able to focus on the “present,” not the “distant past,” might have made the reflection more relevant to their future. Our participants’ diary writing shows a strong future-focused orientation, which is different from what Pensieve has demonstrated – Pensieve is one example that repurposes social media posts to trigger reflection [114]. It sends people random posts and tries to integrate reminiscing into their everyday practices. LIWC shows that people mainly use Pensieve to make sense of the past and understand the current self, without much emphasis on planning future actions. One possible explanation for the difference in our results (a strong future orientation) is that we specifically asked participants to reflect on the recent past which is still relevant to people’s planning behaviors, while Pensieve randomly selects social media posts from a wide range of time frames.

One useful implication is to start thinking about how systems and users could work together on the “when” in future design of reflection systems. Here “when” is about

identifying opportune moments. One possible application is to resurface memories to people when they experience moments such as negative stress and emotions, major life events, or memorable experiences like travel, based on personal content shared on social media (e.g. check-ins, profile updates, etc). This is different from most existing applications (e.g. Timehop) that focus on resurfacing memories based on temporal distance measured in years.

Our findings here also emphasize the benefit of recency in reflection. Instead of prompting people to look back at the distant past (e.g. content or updates from years back), future designs could focus on getting people to be reflective and mindful about recent conversations or social media actions in order to help them analyze and plan their behaviors while the actions are still relevant. Such applications of resurfacing memories to people do not need to be integrated into existing social media platforms (such as Facebook On This Day) - the important consideration here is to know when people might want to look back or get value out of looking back. In fact, a smart offline photo archive on one's mobile device which intelligently surfaces photos based on updates from one's social media profiles might fit the purpose of reflection even better.

To take this one step further, future work could leverage existing communication traces and target the appropriate timing for positive psychological interventions. For example, by detecting one's language use in his or her online profile or one's activity level in participating in different communication channels, we would be able to reach out to people experiencing emotional difficulty to offer positive psychological interventions by resurfacing positive memories from their personal content.

Second, design should experiment with different ways to structure personal data for triggering reflection. As mentioned, one of the limitations of many reflective technologies is that they provide system-extracted user data. This could be challenging for people to comprehend and relate to, and might be limiting when it comes to helping people explore and discover goals. Throughout the study, we saw a strong desire to try to

“communicate” with one’s own data. Our study suggests the possibility of engaging users to interact with “original” communication data, and of combining both “extracted” and “original” data.

A well-known challenge for existing positive psychology interventions is to promote sustained engagement of individuals. For example, existing interventions usually feature a fixed set of prompts that guide people to reflect on their past experience in a particular way. Our findings suggest the potential to supplementing intervention prompts with one’s communication traces to add variety. The current study aggregated all communication traces and asked participants to review them all together – which might have provided more contexts and opportunities for people to “explore” their data, and raised more “inquiries” that triggered reflection [7].

Future research should keep experimenting with alternative ways to structure reflection materials to engage individual users. Our study provided one way for people to discover and explore their own communication data and their goals themselves, instead of having the system decide for them. The tradeoff here, though, is the “sense-making” effort required from individuals. Therefore, future designs should leverage what we’ve already known about useful reflection and help individuals in their exploration or sense making. For example, in line with prior work [141], we found people’s reflection usually centers on people. This suggests the opportunity to re-grouping one’s communication traces according to different relationship contexts to help shape more useful reflections.

The current study aims to explore how people interact with a variety of their communication traces for reflection purposes. It did not intend to conclude on the benefits of doing so or measure the effect of looking back on one’s social media or communication traces. Future research could take inspirations from this study to build reflection technologies, either focusing on helping people to more reflectively use social media to achieve their communication goals, or helping people to achieve more happiness and positivity. Furthermore, the current study sample was mostly graduate

students, and the reflection exercise only lasted for two weeks. Future studies should address these limitations and more accurately measure how interacting with one's social media content (or other communication traces) has direct effects on psychological well-being outcomes.

Conclusion

Study 4 aims to study both how people reflectively use different communication platforms to achieve their communication goals, as well as how content or digital traces associated with these platforms act as reflection materials to help people reflect on their goals, and respond to negative emotions. Study 4 found that “the reflective use” of different communication technologies, especially social media, is a big part of people's reflection practice, and that design should explicitly support feedback to help with the reflective use of such platforms. Study 4 also showed the complexity of using curated social media content as triggers for reflection, and suggests the importance of incorporating both social metadata (such as likes and comments) as well as one-on-one communication traces to shape self-reflection in a positive way during life transitions. In summary, study 4 suggests design opportunities to invite individuals to explore and re-interpret one's own personal data. Future research should further experiment and explore how reflection could be better supported at opportune moments (e.g. in the presence of life transitions and negative events), when to introduce reflection (e.g. recent past or distant past), what types of personal data to include (e.g. social media posts or IM conversations or tracked steps), and the appropriate level of involvement and effort required from individuals for making meaning out of their personal data.

CHAPTER 4: CONCLUSION

This concluding chapter has the following parts: In Part I, Identity Management, I will first synthesize findings from Study 1 and Study 2, and then discuss their broader implications for managing “personal data in public.” In Part II, Identity Reflection, I will synthesize findings from Study 3 and Study 4, and then discuss implications from these studies for supporting “personal use of personal data.” Finally, I will highlight the overall contribution of this work, discuss limitations, and suggest future directions for research.

4.1. Identity Management: “Personal Data in Public”

The goal for Chapter 2 is to unpack users’ identity management work over time and across sites. My work unveils a series of practices, struggles and specific strategies that provide an appropriate context for revisiting the socio-technical gap, and suggest important design implications.

Study 1 and Study 2 both revealed tensions involved in managing one’s sharing on social media – In Study 1 I studied one single platform and highlighted the tensions people need to manage in order to deal with the coexistence of multiple concerns and needs that arises from temporal change, while Study 2 highlighted how people leverage multiple social media platforms for different audiences and different types of content they care about, but showed that tension arises when people need to carefully calibrate the permeability between platforms to maintain appropriate boundaries in response to changes in audience, content, identity, or the technical context of the platforms.

Socio-Technical Gap Revisited

My work on identity management provides a productive context for revisiting the notion of the socio-technical gap [1] in the social media era. The socio-technical gap is defined as “the divide between what we know we must support socially and what we can support technically” (P179). Ackerman argues that it is challenging for technical systems to accommodate fluid and nuanced social needs because technologies have rigid and discrete boundaries.

This sociotechnical gap is very much experienced as people manage their content on any individual social media platform. Online social dynamics change all the time, but it is challenging to code all the subtle and fluid ways people manage social boundaries and self-presentation work over time into technical systems. In fact, attempts have often been too cost-heavy on the part of users of those systems [84]. Therefore, as Study 1 shows, continuous curation effort is still needed for purposes such as editing and deleting.

The sociotechnical gap is also evident in Study 2. In some ways, using multiple social media is one strategy people choose to deal with the temporal tensions they encounter on any single platform. Because of the opportunity to leverage multiple platforms, single platforms do not have to become “all things to all people.” However, the sociotechnical gap still persists in cross-platform use: People desire to communicate specific messages to specific people, yet these audiences are spread across multiple platforms and community norms constrain what can be shared where. Although individuals may have an envisioned ideal audience for a particular piece of content, it is rare that this audience perfectly aligns with one existing platform. Due to the “batched” nature of social media messages (e.g., a status update that can be seen by one’s entire network) and the lack of traditional signals around who actually attended to the message, individuals may “satisfice” when it comes to platform choice.

Even though people create boundaries around and within online tools to allow them to serve as convenient portals for communication, these technology boundaries are rigid, and need to be broken and reintegrated in response to dynamic social needs. Therefore,

people engage in workaround behaviors that seek to circumvent constraints in the technology, such as including a LinkedIn link in an email signature to allow contacts to permeate in between.

The nuanced, fluid social practices that Ackerman describes echo Goffman's dramaturgical approach as described at the beginning of this thesis. When individuals try to achieve conflicting self-presentational goals such as performing for multiple audiences simultaneously, they can leverage a diverse set of practices available in the offline setting, such as lowering the voice and only talking to some audiences but not others. However, online settings provide much fewer socially sophisticated options for resolving these tensions, especially within the limit of one particular platform; as a response to this, our participants often used multiple platforms in order to calibrate access and audience across platforms. Therefore, my work has provided more empirical evidence of individuals actively closing the social technical gap.

Curating Personal Data in Public: Systems and Users

Social media platforms are usually seen as powerful "curators." Here we use the term "curation," as it involves a set of decisions and practices that are evolving over time. Although the term "curation" has often been criticized because it carries so many definitions [16], it still captures dimensions important to understanding the long-term relationship between users and the social media platforms they use. Hogan applied the metaphor of the "storehouse" to describe the system, which uses its unique algorithms, such as filtering, searching, and ordering of content, to bring artifacts out of the storehouse (database) to show to audiences (e.g. one's Facebook friends) in specific ways. For example, Facebook gets to "exhibit" personal content that users choose to upload to the site in specific ways - it can be retrieved in profiles, newsfeed, and through searches, and can be brought to the "front stage" when others interact with it (e.g. liking or commenting).

In unpacking “identity management work,” my work has emphasized the active role of users in curating their online spaces.

In the Facebook deletion study (Study 1), my work provided strong evidence for user-side “curation”: Users of social media sites actively take control to monitor, revisit, and manage how their own content on Facebook is “exhibited.” Just as some decisions are executed by the system unilaterally (e.g. the format of Facebook Timeline or the algorithms used to filter content), users also have some unilateral choices, particularly around the initial decision of whether or not to post content in the first place.

We can think of the three functional regions we identified on a single social media platform – performance, exhibition, and personal archive – as separate “spaces” where people develop different sharing strategies. Different social dynamics are nurtured in these functional regions. For example, people believe “old” personal content will be less accessed by their Facebook audiences, or do not interact with others’ “old” content in the same way as they would for “newer” content. These differences cause users to look back, re-evaluate, and sometimes manage content on their profiles.

With this in mind, it is easier to understand the curation effort needed to manage content sharing across an increasingly complex set of communication platforms, each of which has its associated networks and norms [5,177]. The social media ecology study (Study 2) unpacked this “curation” work: Individuals need to constantly revisit and calibrate the “sharing boundaries” they set between different online spaces in response to shifting norms and other emerging platforms. Therefore, what matters is not just what affordances any individual platform provides or how individual users want to leverage them, but how users perceive the affordances in the context of all of the communication tools available to the person trying to meet a communication or information need. This is a regular and iterative process: Individuals are constantly considering various intersections (audience and content) for each communicative instance and matching those to the tools available to them.

Understanding users' desires and active role in curating in online space highlights an intricate relationship between systems and users in identity management work - if users and systems are both "curators," how can this collaborative relationship best be supported?

For any single platform, users' control over their data is usually empowered by features of the specific system, such as the ability to delete content, or hide a post on Facebook. Knowing this, we should think hard about how to support these curation needs, or develop intelligent systems to reduce curation effort. For example, enhancing within-site search, private views of profiles, and alerts about potentially controversial sharing are all examples offered by our participants from Study 1.

However, we should also be careful not to overload users with too many choices or too much control. For example, in reacting to system curating policies such as fine-grained privacy options, users don't always embrace them [84] – in fact, users might significantly reduce the amount of content they share if a privacy setting is overloaded with too many options and becomes hard to comprehend, or they might develop alternative privacy management strategies of their own (such as leaving content tagged but not approved), or become resistant to the platform overall when faced with major changes to the system (such as the case of Facebook Timeline).

Therefore, overloading a single platform with a complex set of features and expecting it to be "all things to all people" might not be the right model. Our findings in the ecology study regarding cross-platform practices suggest that the affordance perspective needs to be supplemented with greater attention to platform decisions – decisions in which users often combine multiple tools in order to meet their needs. The fact that people need to manage an ecosystem of communication platforms does not necessarily add to users' curation needs – it might actually bring opportunities to reduce curation effort on any single platform.

For cross-platform design, we also need to be mindful about systems' roles in such curation and how to balance that with users' active role. For example, many social media platforms now have designed permeability functions to allow for cross-sharing of content and contacts. In order to create a content stream, new systems now often provide options to build contact lists from other existing applications (such as logging in via Facebook or Twitter or building contact lists based on an existing phone book or email list). Some systems maintain internal consistency in forming contact lists among all associated platforms (e.g., users could aggregate their Gchat contact lists or choose to connect with people on Google Plus based on their Gmail activity). System designers should be aware that how users aggregate contacts from other applications could shape the type of experience they have on the new site. Specifically, in cross-sharing situations, the possibility of sharing contacts across platforms creates a tension between convenience and the ability to partition contacts as well as content.

4.2. Identity Reflection: “Personal Use of Personal Data”

By unpacking identity management work – the continuous, strategic effort one puts into managing one's overall content sharing strategy – my work highlights users' role and the collaborative relationship between individuals and systems. Through their curation people evaluate and analyze their own content. The notion of “curation through use,” at a time when personal digital traces/content are abundant and frequently cited as becoming unmanageable and hard to approach, is a value that should not be underestimated.

I approach “personal use of personal data” in a way that is similar to how sociologists study memory practice (i.e. “creating a memory box,” Study 3), and how psychologists study reflection practice (i. e. “emotional writing,” Study 4). Study 3 shows how social media could become “keepable,” even though they are not seen as archives in the usual sense of the word. We show how this perception is bound up with five contradictions, which center on social media as curated, as a reliable repository of meaningful content, as readily encountered and as having the potential to present content as a compelling

narrative. We conclude by highlighting opportunities for design relating to curation through use and what this implies for personal digital archives, which are known to present difficulties in terms of curation and re-finding.

In Study 4, instead of focusing on how social media traces gain meaning over time, I examined how social media traces (situated within a wide range of communication traces) interact with people's self-reflection purposes. By engaging participants with a mobile application that aggregates one's social media updates in a journal format and asking them to complete a two-week diary writing task, I further unpacked the reflection value of social media: People reflect on social media activities for achieving expected ways to use different platforms. Besides being a source of positive memory, social media could also serve as a trigger to help people analyze and evaluate various social, relational and life goals, and could highlight the positive role of "social connection" in time of negativity or stress.

Making Sense of Personal Data: Systems and User

Our findings contribute to a better understanding of how different digital traces are valued. One of the biggest challenges in digital archiving nowadays is to model how users value different types of personal digital content. Marshall et al. [89] talk about the dramatic change to personal archiving, from a situation in which everyone has a manageable number of files they value to one in which everyone has an overwhelming amount of self-generated content, either online or offline. They highlight the issue of a "profound sense of digital benign neglect," which means people keep generating content while not knowing how to value it and re-access it. Other work points to the issue of ownership and control and how to navigate in the online space [88,90] when we are also dealing with more devices, more communication platforms, and more types of data to manage [105].

Study 3 highlights a quite nuanced view of social media sites as personal archives, and how some social media sites are considered more likely to host “keepable” content than others. They are easy to assess and encounter and more likely to contain important personal memories, and people strongly value the narratives they provide. We also found interesting similarities and differences between offline archives (e.g. pictures on your computer) and online social media archives (e.g. pictures on Facebook), and suggested bridging personal, offline archives with online network sites to offer a novel way to approach the long-standing problems in personal information management.

However, Study 3 also suggests that people are still struggling with this already “filtered” space and that they still face the challenge of how to discover value through social media data as well. Even though social media already represented a “curated” collection of personal content, the abundance of content meant that participants also encountered difficulties when looking back and making sense of the social media that was stored. The changing value of social media over time makes it difficult to delete with confidence; people like to keep content, just in case. As our findings in Study 3 also made clear, social media comprises much content that works against the notion of an archive. How to support users in further filtering out this content, or engaging it for meaningful reminiscing and reflection, is still a challenging topic.

We then provided more types of traces (including other communication traces) and guided people to look back for different purposes (not just reminiscing, but reflection; not just reflection on goal achievement, but also for coping with negative emotions). Study 4 depicts a more complex picture: To repurpose social media content (and other communication traces) for reflection, the specific purpose of the reflection must be carefully considered. Design should also balance timing, content, the level of extraction of the content, as well as the appropriate involvement from users.

As mentioned, one of the limitations for many reflective technologies is that they provide system-extracted user data and a pre-set goal for reflection. However, goals could

change, the extracted data might be hard for people to comprehend, and the content could quickly become irrelevant over time. However, even though my work (both Study 3 and Study 4) provided evidence for the benefit of inviting users to engage with memory-making and meaning-making activities, questions still remain in terms of whether and how much technology should shape such activities, and how much user involvement is needed.

Given how bad people usually are at putting memories together in a constructive manner [137], there is a space for technology to make an impact. In the era of big data, systems are smart at figuring out our location, relationships, and even our personality or mental state based on our social media profiles [112,129,130]. However, as my work suggests, involving users in directly interacting with their data and extracting meanings by themselves seems important, too. If “self” is more of a “mental process” rather than a “concept” [176], the effort to understand one’s existence is indispensable. After all, meanings do not just emerge, and “transformation” [7] does not just occur.

Therefore, evaluating reflection technologies is particularly difficult, too – whether the reflection actually brings benefits, what these benefits are and how to measure them very much depend on the individual context. My studies did not intend to target specific psychological benefits or measurable behavioral change (as in [51,141]), but there are some fundamental challenges to this process. Just as Hallnas and Redstrom said in their piece on “Slow Technology” [42], “*One cannot explain what a symphony by Beethoven is [...] by empirical studies of a collection of concert visitors.*”

4.4. Limitations and Future Work

My work firstly approached identity management in social media from three different perspectives: Individuals need to negotiate content sharing with others (interpersonal), manage content sharing in response to temporal change (temporal), and manage content shared across different platforms (spatial). Building on the set of tensions I discovered

arising from interpersonal, temporal and spatial dimensions, I argue that these tensions people face when managing outward-facing presentations actually make social media content a valuable and meaningful source for reminiscing and reflection.

As with any study, there are limitations of my approach to the research questions. In order to recruit people who have rich experience with social media and investigate their mental models, I mostly recruited active social media users (in all four studies included here). Most of my studies were limited by the university sample. The experiences of our participants were limited by their cultural and geographic context, and these experiences might differ in other contexts. Our findings should be approached in other contexts and through different data collection means to triangulate the transferability of these observations and claims.

My thesis mainly took a qualitative approach – an approach that is usually described as “naturalistic,” “ethnographic,” and “participatory,” as it often involves close interactions with participants [61]. This approach was appropriate for addressing my research questions, as I sought to provide a rich context for understanding people’s mental models or potential ways to interact with their own personal data. I am interested in intricate details of the situation and the use, not consistency of results. For example, if my goal was to understand people’s current practices for sharing *#tbt* photos on Facebook, or understanding the prevalence of looking back on previous tweets, my approaches would differ.

However, I often encountered the question of “generalizability” in conducting qualitative work. While quantitative research might exert a variety of controls on the research process to increase generalizability of the findings, qualitative research does not seek to extrapolate statistically significant findings from a specified sample to the wider population. Instead it concerns what could happen and might be happening; therefore, the experimental concern to obtain a large randomized sample to be representative of whole population might miss the point [64].

That being said, it is important to explore my findings in other technological or cultural contexts in future work. Even in qualitative research, it is the researcher's responsibility to explain sources of possible variability. In the field of HCI, technological advancement often quickly makes studies of some particular systems or practices obsolete. Therefore, studying "what might happen" in the next technological or cultural context could extend this work.

Also, future work should further explore research questions in this area using alternative approaches. With the popularity of big data analysis and *Quantified Self*, computer algorithms could analyze individuals' online activities (e.g. activeness in participating on different platforms or language used in their shared content) to construct individual psychological profiles, or profiles for an entire community or society. Such understanding could also be leveraged to design useful systems for people – for example, by detecting one's language use in his or her online profile, we might be able to reach out at the "opportune moment" for positive psychological interventions. My work could hopefully contribute to some initial understanding of how people interact with, and find meanings from their own digital traces themselves.

Lastly, future research should explore the role of temporality in the online space. The fact that social media persists by default (there is no option to "keep" social media – it is simply there) poses challenges to maintaining a collection that is meaningful and that can be held in what is, after all, a public-facing space. My work is based on the premise that people still leave traces as they interact online, and thus, we need to be able to understand the tensions arising from the need to manage them, as well as the potential to resurface them for future personal use. However, as some recent work on supporting "forgetting" [81] and ephemerality in design [147] suggests, the future of online interactions might be shifting to a place where the "ephemeral" is the default (such as Snapchat), which will bring a whole new set of questions about maintaining online social profiles, archiving and memory keeping.

In conclusion, my dissertation reveals a complex relationship between systems and users in archiving, curating and exhibiting personal digital data, and has highlighted the importance of understanding the ecology of different communication platforms and the meaningful data they hold. My work will hopefully contribute to the field's understanding of how people value and manage their online presence successfully both as part of identity presentations, and as part of their meaningful personal memories.

Appendix A: The Many Faces of Facebook: Experiencing Social Media as Performance, Exhibition, and Personal Archive

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ABSTRACT

The growing use of social media means that an increasing amount of people's lives are visible online. We draw from Goffman's theatrical metaphor and Hogan's exhibition approach to explore how people manage their personal collection of social media data over time. We conducted a qualitative study of 13 participants to reveal their day-to-day decision-making about producing and curating digital traces on Facebook. Their goals and strategies showed that people experience the Facebook platform as consisting of three different functional regions: a *performance region* for managing recent data and impression management, an *exhibition region* for longer term presentation of self-image, and a *personal region* for archiving meaningful facets of life. Further, users' need for presenting and archiving data in these three regions is mediated by temporality. These findings trigger a discussion of how to design social media that support these dynamic and sometimes conflicting needs.

Author Keywords

Reminiscing; personal archives; curation; identity; exhibition

ACM Classification Keywords

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

INTRODUCTION

Hundreds of millions of users are generating digital traces of their daily lives in social media. Social media serve many purposes, the most salient of which relate to their original functions of communication and social connectedness. Research around these platforms has focused on issues that arise in the context of social interaction, such as how these systems support identity presentation [5, 16] and how they help people build social capital [6]. These studies generally conceptualize social media as a platform for context-specific, selective "performance," following Goffman's theatrical "front stage/back stage" metaphor for impression management and the enactment of social roles [7].

A more recent metaphor extends Goffman, arguing that social media's reviewability and searchability lend social media the feeling of an art exhibition in a museum [11]. In this metaphor, performances leave behind digital traces that act as digital artifacts of the performance, and the accumulation and collection of these artifacts causes these spaces to take on the character of a long-term identity "exhibition," rather than that of an ephemeral performance.

The value of these exhibitions is not limited to others. Much of the content that people create in social media has personal meaning [4], and the emerging personal value of content in these media has been explored in recent studies [15, 25, 29]. Thus, despite these systems' focus on social purposes, it is fair to say that "*today there is an increasing desire to use online social media as a way for archiving life experiences and reflecting on identities*" [9, p15].

These shifts and emerging goals triggered us to rethink the nature of social platforms, the curation of data that they afford, and the ways that individual users conceptualize and experience social media and the data they create in them.

Both the archive and the exhibition metaphors point to the importance of the past in social media. However, except for recent work around reminiscing [29], reflection [33], and digital possessions [27], there has been little study of how people make decisions about their past content. Likewise, little is known about how the performance, exhibition, and archiving perspectives coexist. As we move into a world where one's digital traces express more of who we are, it is important to learn and design around not only how and why people produce digital traces, but also how and why they take care of this data, and how the relationship between users and their data might change over time.

To address these questions, we conducted a study of 13 active, long-term Facebook users about their day-to-day experience of creating and managing Facebook data. Their responses indicate a complex, dynamic relationship between people and their data, in which the combination of concerns and goals that people have and the tools the platform provides fall into three broad "regions" that roughly align with the perspectives described above: a *performance region*, an *exhibition region*, and a *personal region*. By "region" here, we mean a set of goals, concerns, contexts, and corresponding system features.

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As we shall argue, these three regions have both spatial and temporal aspects, with both elements of the interface and elements that depend on the recency of content and duration of goals helping to define them. We identify the implications of these regions in social media systems, particularly in the tensions and opposing needs people experience as they manage their Facebook data. Finally, we discuss how thinking about these regions and the ways current platforms support them suggest metaphors that might drive designs that better support all three regions together.

RELATED WORK

*“The Moving Finger writes; and, having writ,
Moves on: nor all thy Piety nor Wit
Shall lure it back to cancel half a Line,
Nor all thy Tears wash out a Word of it.”*

—Omar Khayyam

translated by Edward Fitzgerald

We explore the complexity of social media from two perspectives: as a space that extends in time and as a space that serves both public and personal purposes.

An Identity Platform that Extends in Time

Goffman’s notion of selective self-presentation [7] is widely used in studies that examine how people interact with each other in online spaces, for example, work that focuses on impression management [1, 3] and privacy management [32, 34]. In his dramaturgical approach, Goffman conceptualizes the “front stage” as where a performance is given in presence of an audience. People often need to selectively present themselves in order to meet social expectations and cultural values. In comparison, the “back stage” is a place where only the performer exists, without the audience and where other aspects of personal identity might be revealed.

This metaphor maps well onto salient elements of social media. It matches well with the fact that behaviors in social media are socially embedded and observed, activating concerns about others’ expectations. The metaphor also emphasizes present action: *“The Moving Finger writes; and having writ, moves on.”* Most social media systems emphasize the present, featuring recent content and burying the past both to support goals such as awareness of friends [13] and to draw repeat visitors with fresh content [26].

The past, however, does not have to be buried, as illustrated by Facebook’s own Timeline interface (Figure 1). Timeline explicitly organizes a person’s content around a linear timeline that supports browsing far into the past, including links directly to activity that happened years ago. This makes the past much more salient than in pre-Timeline versions of the interface, where past status updates and wall posts were available, but required tedious paging through a list; and past photos were available, but organized in albums rather than as a temporal stream.

Hogan’s exhibition metaphor calls attention to these past data [11]. He conceptualizes social media as a storehouse, where users submit their personal data, and the system acts

as an invisible curator who manages, redistributes, and selectively displays content for audiences who have access to the user’s data. Systems provide users with limited control:



Figure 1: Facebook’s Timeline interface and the time links (see inset) that provide rapid access to past content.

“nor all thy Piety nor Wit shall lure it back to cancel half a Line” resonates with the feeling that many people have when trying to manage privacy settings. Hogan emphasizes that “performance” is closely associated with a specific “time-space-identity-locus”, but that once the data associated with a performance are recorded, they become artifacts that others will view at different times and contexts. Therefore, social media data are used more for asynchronous exhibitions than synchronous performances.

Most current research either studies users’ activity and motivations for using social media as a snapshot in time [13, 22] or their collective usage patterns over time [8, 17]. Hogan’s approach emphasizes the need to think about the relationship between *individuals* and their data over time. Given the persistence of social media data, it becomes interesting to consider how notions of performance and exhibition manifest on the same platform. In particular, there is an uneasy relationship between people and their past data when the data becomes detached from their original context. For example, Wang et al.’s descriptive taxonomy towards Facebook regret behaviors [35] begs a deeper discussion of *why* people regret, and take explicit management efforts such as deleting, detagging, and unfriending.

An Identity Platform for the Self

Both the performance and exhibition perspectives frame social media behavior from an outward-facing, public perspective. This framing is natural given the social nature of these media, but the emerging practice of using social media for personal archiving [9] leads us to consider whether the self has also become an important audience. One conceptualization of these data is the notion of “digital possessions” that carry and display meaningful events, places, and people for both the self and others to view [21, 27].

A second line of work explores how social media data traces can mediate and support reflection processes. These traces appear in many media: e-mail [10], text chat [36], and social media including Flickr, Picasa, last.fm, twitter, Blogger, and Facebook [29]. On balance, this work has focused on individual sensemaking and use, although there has been some attention to supporting relationships and family using both digital traces and physical possessions [30, 31] and studying how people use digital content to think about and enact their friendships [33] and romantic relationships [37]. Information generated and owned by others can play an important role in this meaning-making process [33], although issues around third-party ownership can make the management and curation of these data difficult [27].

This research suggests that digital traces left in social media contain great potential for stimulating and supporting self-reflection and reminiscing activities. Both the intentional use of social media as a “life logging” tool and the potential usefulness of digital traces for memory and reflection highlight the importance of understanding how people balance the public functions and personal value of social media. For instance, the unwritten rule limiting public displays of affection in Facebook might prevent people from recording as much about relationships as they would like, while changes in a relationship might cause content previously important for public affirmation to become instead a source of pain [37]: “*Nor all thy Tears wash out a Word of it.*”

STUDY DESIGN

Our study aims to explore how practices of online presentation, exhibition, and archiving are intertwined; how needs for different activities contrast or align with each other; and how designs might help to balance, support, and enrich these practices. We approach this problem by investigating how and why people manage their Facebook data. We seek to provide a deep understanding of how aforementioned theories manifest in the interaction between users and their own data, to identify how these perspectives are relevant to social media systems, and to discuss implications for designing systems that support these practices.

Research Context and Data Collection

On December 22, 2011, Facebook launched Timeline. As described earlier, this user interface makes past data more salient for both the user and members of their social network, highlighting a number of the issues in which we are interested related both to temporality and the tension between public and personal goals. Now a standard part of the interface, Timeline was originally opt-in and adoption was slow, allowing us to sample a set of users as they began to use the interface and grapple with these issues.

We conducted our study in May and June of 2012, around six months after the new interface was launched. To try to improve the diversity of our sample, we used Facebook advertising to recruit participants. The ad was targeted at Facebook users living in our local community (a small city in the northeastern United States) to facilitate bringing par-

ticipants to our lab for an interview. We also targeted people who had used Facebook for several years and had generated a significant amount of social media content. Participants were compensated with \$15 in cash.

A total of 13 people (9 female, 4 male; 8 White/Caucasian, 2 Asian, 2 Hispanic/Latino, 1 American Indian/Alaskan Native; aged 18 to 43, $M = 22$) with an average of 4.3 years of Facebook activity completed the study. Participants first completed a pre-survey with questions about their Facebook use and demographics. Seven of our participants had already installed Timeline at the time of the study, while the others were instructed to adopt it after completing the pre-survey to capture their initial reactions to the interface.

Each participant then completed a daily online diary for two weeks about aspects of Facebook use related to data creation, curation, and sensemaking around digital traces—questions derived from the theoretical perspectives above. We asked them to record whether they had updated or changed their profiles by adding a new post, changing privacy settings, and so on; whether they had reviewed their own or others’ past content; and whether they had managed past content of any sort. The daily diary allowed us to record actions and reactions close to when they happened and provided us with examples to reference during interviews. We reminded participants about the diary via daily e-mails.

After two weeks, participants came to our lab for a one-hour interview. We asked them to log in to their Facebook account and to review their profiles during the interview, both to reflect on their experience and to enrich their responses. We asked general questions about their overall Facebook usage and privacy attitudes, in order to encourage them to reflect on the kind of management behaviors in which they engage. We specifically asked about their Facebook activity from a temporal perspective, such as how they felt about their past content and how they valued it, in order to understand what Facebook data means to them, as well as if, when, and why they take explicit action to manage it. Other questions included how and why they view others’ past content and their attitude toward Timeline after having used it. We also encouraged them to talk about offline archiving experiences such as journaling and their experience with other social tools (such as Flickr and Twitter) and to compare these experiences with their use of Facebook.

Data Analysis

To develop a holistic understanding of participants’ use of Facebook, we included data from both diary entries and interviews in our analysis. We conducted a collaborative, inductive analysis process.

In the first analytic phase, four researchers met together face-to-face and used open coding to develop a set of primary categories and, subsequently, subcategories to help organize our initial insights. Our primary categories included themes such as real-time decision-making of Facebook activities (resonant with Goffman [7]), management behav-

iors (resonant with Hogan [11]), browsing behaviors, and general use of Facebook. Through continued, iterative analysis, we identified subcategories of these themes, for example, within “management behaviors” we identified descriptions of behaviors, motivations for managing, and strategies for managing. By the end of this first phase of analysis, we had established a high-level agreement upon and common ground for organizing, discussing, and interpreting the data. In phase two, we used TAMS Analyzer to map all interviewees’ statements onto our categories and subcategories. Each of the four researchers independently reviewed half of the transcripts, such that all data were examined by two researchers¹. The goal of this categorization phase was to sort the data so that we could easily review related data together in the third phase of our analysis. In the third analytic phase, we conducted a series of face-to-face meetings in which we used concept charting [19] to expand on and refine our understanding of the interrelationships among the themes that we had previously identified. In this phase of the analysis, we further unpacked our data to arrive at two main themes. The first is the idea that although Facebook is a single platform, it provides multiple regions of activity including performance, exhibition and personal regions. The second is the key role of temporality in how transitions between and tensions among these regions occur.

Below, we present these themes using representative quotes from participants and discuss how future designs might better account for the multiple regions of Facebook by providing appropriate curation tools and metaphors.

ONE PLATFORM, MULTIPLE REGIONS

Our data provide strong evidence that people do, in fact, experience Facebook from the analytical perspectives identified earlier, around the performance and exhibition regions (“public regions”) and the personal region. In this section, we explore the shape of these regions, as well as the tensions and opposing needs people experience as they manage their Facebook profiles across multiple regions.

Performance Region: Creating Content

Consistent with Goffman [7], the *performance region* is where users make decisions about creating and managing content for current self-presentation needs. The content is usually targeted to, or associated with contexts and audiences relevant to the moment.

(There is) a video posted by my girlfriend that was related to a phone conversation we were having. (P2)

I updated my status to show team support for a big meet. (P18)

Decisions made in the performance region also include who people decide to be friends with, with context influencing their behaviors as well, making “friending” another sort of performance act.

[I friended him] because he was at camp with me so after camp I guess I just got friend requests from people there or friended people who were there ... (P16)

¹[I friended them] just to be friendly. Like, it’s just kind of rude [not responding] if someone is friending you ... If I really dislike somebody, I won’t accept it. But if they’re a nice person and maybe have something interesting to say, I’ll—I’ll accept it. (P9)

Constraints in the performance region change over time, and participants leverage features such as profile pictures to customize their self-presentation for specific situations:

I changed my timeline cover, because the soccer game Barcelona vs. Chelsea is coming up soon and I want to show my support to Barcelona. (P2)

The fact that both the old Facebook profile page and the new Timeline interface prioritize content based on recency ensures that context-relevant performance is positioned for maximum exposure, both in the flow of updates on one’s profile page and in others’ news feeds. In general, the performance region is closely associated with a time-space locus that focuses on current activity and current goals:

Yeah. I mean overall I’d say I am [conscious about how my page appeared to other people]. But I think it more so applies to like my current content. (P6)

Exhibition Region: Managing Content

Due to the persistence of social media data, content initially bounded by a specific time-space locus gradually goes into the *exhibition region*, modeled after Hogan [11]. For the most part, this region focuses on past data and longer-term needs around constructing identity. However, while Hogan’s discussion of exhibition focuses on the system’s role in data curation [11], our results show that users, too, wish to play an active role in curating data in this region.

Participants were not always concerned about the past, but when they were, they encountered decision-making challenges regarding the changing contexts and the appropriateness of the content on their profiles. These challenges sometime resulted in an explicit competition between the performance and the exhibition region that drove management behaviors. We define management here as a conscious behavior for evaluating personal profiles or tweaking one’s public presentation in social media over time.

The concept of management hints at a conscious effort, consistent with how previous literature defines personal information management as a practice that involves maintaining, organizing, retrieving, and redistributing personal information for task-related purposes [14]. It was common

¹ We do not report inter-coder reliability; as argued by Armstrong et al. [1], reliability measures are most useful when the coding breakdown is the primary output of analysis. When the codes are a first step toward further interpretation, measures like kappa give little information about the quality of the analysis.

for people to express concerns about past data that was emotional, hard to interpret, inappropriate for their self image, or irrelevant to themselves or others.

Managing emotional content. Emotional or self-expressive content was frequently mentioned as the content needing the most attention. At the time of performance, this content might have been quite useful: “I was so frustrated at the time, posting a status about it was a slight relief from the situation” (P6), but it became undesirable, or subject to misinterpretation, out of context: “Because I thought my status may have come off as a bit whiney or condescending...” (P6). This finding is consistent with prior work that looks at tactics for self-presentation in face-to-face situations [18] and experiences of regret in social media [35].

One aspect of context that came up often as a trigger for managing emotional content was how others might interpret a given post:

I was in a certain mood right then and I posted something ... I went back and read it I realized that people probably wouldn't take it sarcastically. That's so hard about communicating online, is people can't tell ... your emotion behind stuff. (P12)

Managing overall self-image. When people take a critical eye towards their Facebook profiles, they are usually concerned about whether the content still promotes or adds to their overall self-image. Over half of participants mentioned that they have deleted content that is related to a specific event or a specific conversation but does not have value for long-term exhibition of the self:

I would delete it, yes, like after the event happens it's like really useless. It doesn't add onto my life or my timeline. I try to keep it clean. (P2)

These concerns would also trigger based on participants' desire to control how much they revealed about themselves:

I'm an organized person and like things to be more concise and ... I want to limit how much I'm showing people about my life at a time. (P10)

About one-third of participants also mentioned their concern towards old content, which seemed to be appropriate, “cool,” or “funny” at the moment but became undesirable as people's values changed over time:

I had an [photo] album in ... 2007 ... I thought it was cool...and two years later I was looking at it and it embarrassed me so much that I deleted some of the pictures. (P3)

Managing relevance. For most participants, it was important to keep data on their profile relevant, both in the sense of content and temporal relevance. More than half of the participants actively manage recent content “...just to kind of keep it relevant” (P7) to their current life. People would delete bits of information about having read articles,

or listening to music, even if “it's not hurting anything. It's just kinda cluttering what's there” (P12).

Most participants also recognized that recent content was most likely to get attention from others, leading management activities to focus on recent content:

[I manage] just the most recent stuff because I assume that most people don't have the time or patience or desire to go back further than that. (P5)

Managing friends. Besides content that expires in time, people also treat the relationship of being a Facebook friend as a dynamic concept. They frequently adjust their friend list to make sure that people who have access to their profiles are appropriate audiences for their long-term exhibition. In particular, they were sometimes motivated to control others' access to their information:

Sometimes I would friend people for like a specific purpose like I'm working with them on a project ... but like afterwards do I need to have them see all my information all the time. (P6)

The other major reason for removing friendships was relationship change:

After a really horrible suite/living situation with now ex-friends, I did end up deleting, blocking, and changing the privacy settings on my Facebook because I felt that they could find out things about my day, my schedule, my emotions, by reading my Facebook if we remained friends and I wanted nothing to do with them anymore. (P11)

Friend list management corresponds closely with Hogan's observation that once a performance becomes recorded, the content submitter (user) may have little control over how their content will be consumed by others who have access to the exhibition. The ability to delete friends seems to be one common strategy that people use for transitioning content into the exhibition region.

Personal Region: Curating Content for the Long-Term

When participants responded to our questions about how and why they manage their profiles, exhibiting their image to the public was not the only concern. Almost all participants noted that Facebook has significant *personal* value, serving as a “personal locker” on the Internet that archives their personal and social memories.

We define the *personal region* as the place where users perceive or manage their Facebook data around a perceived personal value such as reminiscing and reflecting, as opposed to traditionally rendered public values such as self-presentation to others. This region is also focused on the past, and on features that promote archival storage:

Because I don't keep everything on e-mail or on my computer or written down someplace. So a lot of times Facebook is the way that I remember stuff ... And I

like to go back and see how ... my silly friends and I were, back in the day. (P12)

Whether or not they frequently use Facebook as a reminiscing tool, participants found this archival space to be reassuring: “I mean I actually like having the past stuff, not that I frequently look at it but if I ever do want to reminisce something ... it’s cool that it’s there” (P3).

On balance, most participants preferred to have a record of “everything” happening on Facebook, negative or positive, even in the case of difficult relationship endings:

I’m not friends with a lot of people that I was friends with years ago. And sometimes it ended really badly ... but sometimes I get nostalgic, I go back and I smile and I remember and it makes me feel really warm sort of like comforting to know that stuff happened and reflect upon it. (P5)

Decisions about whether to archive or access specific content, however, might change over time:

So like at least for me, I’m now best friends with my previous boyfriend, so there would be no reason to delete these pictures. I think though I remember at the time untagging myself in pictures and then ended up retagging myself ... I was angry when we broke up ... but then I went back and retagged some of them because I liked the picture. (P6)

Tensions Between Public and Personal Regions

The fact that Facebook is designed primarily to support social and public activity raises tensions between the public and personal regions. People do struggle to balance what is desirable for public display and what they want to keep for personal archival, sometimes facing the “ongoing tug of war” (P5) to sacrifice one or the other:

I look weird in that picture ... Oh my goodness. I don’t like it at all but I don’t know if I would delete it because I like having that memory. (P6)

Photos are seen as being especially valuable in the personal region. However, photos also have a significant public component as well, since people are often tagged in one another’s photos. People who value this collection or are used to claiming the ownership of photos in this way face more of a psychological burden when they don’t think that the photo is publicly desirable:

I’ve had people post photos of me and be like wow this is a bad photo. But I mean ... if I untagged all the photos that were bad I would have no photos at all. (P7)

However, untagging yourself from a photo removes your access to it, and, as with deleting content, can lead to regret:

I tend to delete, untag myself off of a lot of pictures, and sometimes I think it’s a mistake because then afterwards when I want to look back I’m not going to have that much to look back on ... But, anyway, I still

like to just keep the things I think are relevant (on Facebook) even though it’s probably a mistake. (P2)

One way that people deal with this tension in ways that minimize regret is by using Timeline features that provide more control over the exhibition region. The most frequently used such feature is “hiding” content, which prevents it from appearing on the Timeline but leaves it accessible from elsewhere, such as albums:

I rarely un-tag photos that I don’t like of myself but I’ll hide it from my timeline, it’s like I don’t need that to be like the first thing anyone sees when they’re on my page. But I do like to keep them just because like most of them are nice memories. (P6)

Leaving tagged pictures “awaiting approval” of the tag is another way to keep photos without exhibiting them:

I leave it in the approval section, like where you have to click yes or no ... I don’t delete it because it’s kind of nice to remember the stupid, funny nights ... (P4)

The personal region seems to be more tolerant than public regions, in that most people prefer to have a record of all that’s happening on Facebook—negative, positive or informative—versus the need to be vigilantly selective about content visible to the public. However, this raises important questions around how Facebook might better support the personal region, since content normally must first pass through the public performance region unless people take special care to use non-default privacy controls.

TEMPORAL TRANSITIONS BETWEEN REGIONS

This brings us to our second major theme, which highlights the important role that temporality plays in mediating among these regions, one reason that we define regions as having both a spatial and temporal component.

Between Performance and Exhibition Regions

As content moves from performance to exhibition regions, people are faced with the need to re-evaluate and re-select content. Temporal relevance serves not only as one important factor that people consider when managing their profiles, but also as an important boundary for separating performance and exhibition regions. Participants tended to perceive their “recent” content (in contrast to their “former” content) as providing a more accurate representation of self, reflecting who they are right now and what they’re up to. As specific performances “expire” in time, needs for managing content, such as deleting, might arise.

Participants commonly talked of content that was *relevant*, *recent*, *current*, and *past*, highlighting the importance of temporality. In general, they tied the notion of recent content to the front page of their profiles; however, they had widely varying perceptions of what counted as “recent.” Some participants perceived recent content as being comprised of a day’s worth of content, while others felt it might include up to a month or a year. The closest commonality we found was that there was broad agreement that recent

content would help people catch up on one's life, and tended to represent current aspects of the self well:

I think when I look at my page it's like ... Like wow, this is what Katherine's been up to lately, like okay like that's what she looks like, pretty background ... she got into [university name]. (P10)

The notion that current Facebook content represents the self well is closely tied to the notion that the "big events" in their lives are documented on Facebook, such that an audience can easily catch up with a person's present state:

I mean, obviously, there's more to my life than just what you see on the Facebook, but as far as like big events happening, like getting into [university] and like running that race and ... Those are just some big things that have been happening ... (P10)

Big events also served to make the transitions between performance and exhibition regions salient, when people faced meaningful life events or turning points. For example, relationship changes, "applying for a job" (P2), and graduation were all commonly mentioned as triggers:

Then we got into a really bad spat and then, like, it was just getting, like, kind of nasty about it. So, like, I just took them [friends] off Facebook. (P4)

It usually depends on sort of what jobs I'm looking for or what internships and it's whether that's like changing the profile picture to be more professional or just having it be like slightly more casual. (P1)

Other than that, Facebook content management tasks were a more sporadic activity that people undertook when they "have a lot of time to kill" (P5).

Between Public and Personal Regions

Temporality also plays an important role in mediating between the public and personal regions. We found that as social media data "expires" from the public's attention, it also gradually transitions into a personal space where it is mostly seen as an archive of meaningful memories.

Part of this idea of content expiration comes from a perceived norm that public attention only focuses on recent content. Participants predominantly felt that if they are not viewing the past content of others, then no one else is viewing their past content, either: "most people don't have the time or patience or desire to go back further" (P5). When personal content exceeds its "shelf life," it crosses over into an awkward state that users perceive as "implicitly private." People expressed discomfort when others accessed their old data: "I think it's weird when people comment on my old stuff because you can sort of tell that they're digging" (P1). Participants also felt that they were invading others' privacy when accessing old data, even for short definitions of "old":

It would be weird, like if I came down and I like ... even like to a week ago it would be weird if I like now commented. (P6)

Because it means that you're like digging through their profile and sometimes that's ... I don't know, I mean, because it's like referred to as creeping on someone—in a nice way—but if I go through old photos I usually wouldn't comment on them. (P7)

Although the archive is not necessarily seen as appropriate for others, it has value to the self:

I think it's good to have [an archive], if not for someone else, for myself. Because I don't keep everything on e-mail or on my computer or written down someplace. So a lot of times, Facebook is the way that I remember stuff ... I want to be able to go back ... I do like that. (P12)

Timeline Creates and Alleviates Temporal Tensions

Timeline also provides a nice case in point about how interfaces can interact with these temporal tensions. As shown in Figure 1, the interface provides a kind of temporal data segmentation. Content generated around years and months are gathered and arranged within sections of one's Timeline, and access points are provided on the front page.

This design both creates and alleviates tensions among different functional regions. On one hand, the easy access to old data led many participants to engage in significant management of their Facebook content because the sudden availability of older content blurred the lines between performance and exhibition: "When I first got Timeline, it was showing me like all the stuff from the past. I hid things that I was like, people don't need to know about that" (P5). However, other participants felt that attaching timestamps to data helped to resolve the "temporal context collapse" between performance and exhibition regions:

Timeline does kind of embrace your history ... maybe it's the ambiguity [of the old profile] that makes me want to just delete it just to have the current and relevant stuff ... But I guess with Timeline it's like—oh, okay—you see these pictures, but they are from 2008. (P10)

DESIGNING FOR THE MANY FACES OF FACEBOOK

These tensions highlight the uneasy coexistence of these multiple regions in a single platform. Facebook supports some goals (mostly social) and some curation strategies well, but its support for user curation and the personal region are not strong and often run afoul of users' needs.

Here, we discuss the sometimes-uneasy relationship between the system and users curating together, along with the need for better designs and more effective metaphors for supporting dynamic needs and multiple regions emerging from the same "overloaded" platform.

Who Curates, and How?

Hogan's discussion of past data emphasizes the role of the system as content curator [11]. Our study points to a more complex story, including the user's role in curation and the various strategies that the system and its users engage in,

alone and collaboratively, to manage performance, exhibition, and personal archiving. Some decisions, such as the format of Timeline or the algorithms used to filter content, are executed by the system unilaterally. Users also have some unilateral choices, particularly around the decision about whether or not to post content in the first place.

After the creation of content, users' ability to curate their data and exert control over how they will be exhibited is both empowered and limited by system features, such as the ability to delete content, to create sharing and privacy policies, to manage friend lists, and so on. In observing users' active role in curating their content, we found that some system features effectively supported their curation needs. For example, hiding content and delaying approval of tags were both used to accomplish high-level goals around controlling the exhibition of data.

At other times, however, the tools don't align with people's needs or mental models. For example, although Facebook provides privacy settings that support personal use, it provides no obvious personal spaces for private reflection and meaning making around this personal content:

I notice I have a few things that are private only to me but like they're not separate in any way. They're not like special, "oh, these are only for me ...". (P10)

Lack of visibility about how the system curator works can also confuse people [12], resulting in distrust and defensive behaviors. One example of users trying, but failing, to embrace system curation tools is in the use of privacy settings. All participants in our study used Facebook's privacy settings, such as only allowing friends to view their profiles. However, there is confusion about how effective these controls actually are, resulting in people relying on—but not always fully trusting—the system:

We were young enough when it (Facebook) went public that we saw kind of a year or two before us getting really scrutinized heavily by future employers and I know there's all sorts of workarounds on Facebook that they can use to hack in and see your stuff so I don't really trust Facebook's privacy settings. (P1)

Likewise, although one-third of participants actively used the ability to hide Timeline content to manage tensions between public and personal regions, a similar number didn't understand how this mechanism might support their use of this hidden data because the interface didn't make clear what would happen or how to access it:

So, in terms of hiding things (from Timeline), like, for me, if I hid it, it's gone because ... I don't know ... I don't even know how I would get that back ... So hiding and deleting is kinda the same thing. (P6)

Another problem arises when curation is too costly. Consistent with previous work [20], audience segmentation is seen as being useful for managing information inflow, but is too hard to use to control one's own sharing:

If I could wave a wand and just say only my writer friends, then that would be ... I might do that, but it's just such a ... it would be such a pain to sort everybody and to think about that every time. (P9)

Finally, goals for curating personal data feel awkward in the social context of Facebook. Though in principle it supports self-archiving through its privacy settings, this feels unnatural in the current platform:

I notice when I created my most recent album that it was ... only visible to me and I was like, well, if it was only visible to me, why would I put it on Facebook because I would just keep it on my computer. (P7)

These aspects of features, models, cost, and norms around curation highlight the need to think about how system curation decisions and tools affect users' behavior and norms. When we step back and think about Facebook's curation policies, the most salient is based on temporality. Facebook, like most other social media platforms, arranges content around the time that it is created, resulting in recent content being prioritized while earlier content flows backwards into one's online identity exhibition. On that note, even though no participants explicitly commented about it, we wonder to what extent this taken-for-granted system curation policy has shaped users' perceptions, such as perceiving the Facebook norm as "going forward," and their behaviors, such as how they tend to manage temporally adjacent content in Timeline. This possibility raises interesting issues about the role of personal data on a public platform, and has important design implications for future interfaces.

Metaphors Matter

Our findings about different functional regions of social media, and the corresponding metaphors of performance, exhibition, and personal locker, lead us to revisit how we should design social media as an identity platform for both context-specific performance and long-term exhibition, for both others and self.

One can argue that Facebook actually does well compared to many other social media. It serves performance well through the newsfeed and exhibition fairly well through Timeline, and also provides some features for personal spaces, such as the privacy option "visible for me". Many other interfaces focus only on one region: Twitter and Google Buzz, for instance, provide functionality mainly supporting performance; Pinterest is largely about exhibition; and Flickr and Path are largely tools for archiving. All of these could, in principle, serve multiple goals: in Flickr, people can perform for those who follow their photo stream, and exhibit to at least some extent through the album mechanism. Likewise, Pinterest could, in principle, support collections of past data for both personal sensemaking and exhibition to others, although its normal use as an exhibit of one's tastes and desires is so strong that it may be hard for these other uses to gain footing.

There are arguments to be made for the use of separate platforms for separate purposes and for not trying to be “all things to all people.” But, in practice, people do use social media for multiple purposes, and designs should respect that. Inviting people to upload their personal histories to Timeline may align with Mark Zuckerberg’s beliefs in the value of “radical transparency.” But the Timeline metaphor and its affordances that favor public exhibition are a bad match for most people’s goals in archiving personal data. Careful attention to how people might wish to use the data that social media increasingly capture will lead to designs that better serve people’s needs and respect their wishes.

One way to mitigate these tensions and improve social media platforms’ ability to support multiple regions is to think about how system curation could become “smarter” or “more considerate” when managing one’s digital traces. The way temporality mediates content between public and personal regions raises the possibility of designing a “two-sided” system, where content that falls out of the public attention will be automatically moved into a private space designed for personal archival. Instead of being implicitly private, these data would become explicitly personal. There is much value in systems that forget after a while, and even in systems that help us in our own forgetting [23]. However, our users’ re-visitation of old content and regret around decisions to delete it suggest that actual deletion of data is not to be taken lightly.

Another, more extended metaphor, is inspired by work from Miller et al. on the relationship between people’s identity and personally owned artifacts [24]. We wonder if drawing on people’s practices for displaying physical artifacts around their houses might be a useful tool for thinking about social media design, somewhat like Odom et al.’s exploration of how people manage virtual processions relative to the ways that they arrange physical space [28].

If we conceptualize one’s Facebook data as a collection of artifacts displayed in one’s house, physical places where people traditionally display artifacts could have strong connotations for supporting the multiple regions. Pictures on the wall might function to display one’s long-term identity exhibition, not unlike the way that one’s basic information on Facebook is always explicitly displayed and easy to access. Grouped pictures in frames might serve to organize specific facets of people’s identity or highlight meaningful groups of friends or family. Stickers or drawings on the refrigerator might represent items that are temporarily important but are replaced or augmented with new content over time, not unlike how one’s profile photos and cover photos are currently used. Pictures put on the bedroom table might have significant personal meanings that only trusted others can access, somewhat like “implicitly private” Facebook content. A diary locked in a drawer might be strictly personal and private, such as the personal archival space that some of our participants expressed interest in having as a part of the platform. Then, the system might provide tools

that help people move, arrange, and tell stories about data among these display spaces.

Note that we are not arguing that Facebook should be, literally, a house or a neighborhood or some other physical space, although systems like Second Life and LambdaMOO have had some success using these metaphors literally. We are, however, proposing that metaphors that call attention to the multiplicity of regions, transitions, and curation needs of social media users might have real value above and beyond the relatively simple, time-based metaphors that are commonly used in social media systems.

CONCLUSION

Our study applied both Goffman’s [7] theatrical and Hogan’s [11] exhibition metaphor for examining the actions that users take for managing social media data over time. Our analysis highlighted spatial and temporal tensions brought on by the persistence of data, extending previous literature on self-presentation, which mainly focuses on the decision-making process in the moment. The need for creating digital content for performance purposes might contradict one’s intended long-term image as time goes by, as both goals and audiences change. It is also important to note the sense of expiration for digital content on social media, that is, that recent content plays a role as the focus of attention for purposeful self-presentation, and digital content created in the past becomes “invisible” as new content accumulates.

As an extension to Hogan’s exhibition approach, we also found that as social media data expire from public attention, they not only move to an exhibition region that affords presenting one’s long-term image, but also gradually become part of a personal region, where social media data functions as a personal archive and repository for meaningful memories. Past interaction data has been commonly described as “implicitly private,” where people feel strange accessing others’ pasts and don’t expect an audience for their own.

We also discovered an implicit negotiation between users and the system in terms of how personal data on social media platform should be “exhibited”. Emphasizing users’ role in curating their digital traces both extends the concept of curation in Hogan’s theoretical model and allows us to re-think appropriate design metaphors for social media that nicely support users’ needs and expectations.

Popular social media systems, such as Facebook, naturally afford the accumulation of user data over time. We hope that our findings about social media being a combination of different functional regions and our proposals of alternative metaphors for conceptualizing social media might inspire future designs to better accommodate the many functions, values, and faces of people using social media.

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Appendix B: The Social Media Ecology: User Perceptions, Strategies and Challenges

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ABSTRACT

Many existing studies of social media focus on only one platform, but the reality of users' lived experiences is that most users incorporate multiple platforms into their communication practices in order to access the people and networks they desire to influence. In order to better understand how people make sharing decisions across multiple sites, we asked our participants (N=29) to categorize all modes of communication they used, with the goal of surfacing their mental models about managing sharing across platforms. Our interview data suggest that people simultaneously consider "audience" and "content" when sharing and these needs sometimes compete with one another; that they have the strong desire to both maintain boundaries between platforms as well as allowing content and audience to permeate across these boundaries; and that they strive to stabilize their own communication ecosystem yet need to respond to changes necessitated by the emergence of new tools, practices, and contacts. We unpack the implications of these tensions and suggest future design possibilities.

Author Keywords

Social media; media ecology; content sharing; boundary management

ACM Classification Keywords

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

INTRODUCTION

Over the past 10 years, the social media ecology has changed radically in both the types of people who have access to social media sites and the range of social media tools available to them. As recently as 2005, only 8% of the Internet using adult population in the United States used social network sites (SNSs) [7], whereas more recently

more than 70% of people in a nationwide survey reported using Facebook [10]. As more people have access to the technology and skills that make up SNS use, their needs and goals for communication also become more diverse [22, 25, 38]. This diversity is compounded by the rapidly changing social media ecology. While long-standing sites like Facebook and Twitter have been integrated with communication tools like phones, new tools emerge that users need to consider in the context of their existing communication technology use. The changes in both the heterogeneity of the online population and the tools they have access to may drive new considerations for how people manage multiple social media sites.

The changing ecology of social media sites can also affect the decisions people make about how to meet their communication needs. According to recent work [10], 52% of adult Internet users in the United States use two or more social media applications, an increase from 42% just a year earlier [10]. Zhang, Choudhury, and Grudin [53] studied workers in a technology company over a five-year period and found among other things that "churn," or the rate of abandonment for new social media sites, was high among users, who would consistently return to Facebook. Forte et al. [20] studied how teens in two high schools used social media for information gathering, and found that teens used a variety of social media sites, often simultaneously. Researchers have previously found that people use multiple communication tools to engage their communication needs. In Haythornthwaite's [26] media multiplexity theory, the number of different communication tools that a person used to communicate with someone else was related to the closeness of that relationship.

Through interviews with 29 social media users, we address issues of how people perceive and manage the range of social media tools available to them, in a context where tools like email and telephone are also available. We find that, similar to previous work on managing social media relationships, people balance a variety of dimensions in considering which tools they will use to meet their communication needs. On top of the need to balance audience and content, we find that people consider how different sites enable permeation of content to multiple audiences and document how they react to the emergence of new social media tools that may threaten the stability of the communication ecosystem they have constructed.

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RELATED WORK

Negotiating Individual Differences

Over the past several years, there has been a rapid shift in both the number of people who use social media sites and the availability of sites to them. In 2005, only 8% of Internet using adults in the United States used social media sites [7]. By 2013, that number had grown to 73% of people. Social media use is even more ubiquitous when considered internationally, where on average 77% of Internet users are social media users [51]. The increased access to computer networks and the increased sophistication and decreased cost of mobile devices are just two factors that have led to widespread adoption of social media sites, many of which serve as a common platform for people to meet their communication and information needs.

As more people adopt social media applications, demographic and psychosocial factors become important for understanding how people experience social media differently. In early studies of SNS use, Hargittai [25] found that race and parental education (a common proxy for economic status) predicted differential adoption of early SNSs, which she warned could be a sign that inequality was being replicated online. Others have looked at urban/rural differences in MySpace adoption [22], personality differences in Facebook adoption [38], and cultural differences in “commitment” to adopt Facebook [49].

Not only does diversity of individual characteristics shape who adopts different social media tools, but it also affects their motivations and behaviors within those systems. As Smock et al. [42] point out, “SNS use has been traditionally treated as homogeneous, implicitly operating under the assumption that users are employing the same set of features in the same manner” (p. 2323). However, numerous studies have shown that use within social media sites is very diverse. Joinson [30] conducted exploratory work on early Facebook users and found that motivations to connect to others on the site could come from a desire to connect to old friends, having shared identities, or wanting to share pictures. Similarly Ellison and colleagues [15] found that people had different, distinct “connection strategies” on Facebook, like initiating new relationships vs. seeking social information about the people around them. Papacharissi and Mendelson [37] used the Uses and Gratifications perspective to show Facebook users valued very different potential benefits of the site, such as entertainment or social support.

Adding to this complexity, the heterogeneity in individual characteristics and motivations need to be negotiated in the context of specific site norms. Norms are “*customs, traditions, standards, rules, values, fashions and all other criteria of conduct which are standardized as a consequence of the contact of individuals*” [36]. Research shows norms matter in the context of social media use – even though users might approach the same site with different motivations or needs, they are affected by how

others behave and their perceptions of what other users expect [14, 8]. Perceived norms pose another constraint on people in terms of what to share and how to share, as some behaviors are considered inappropriate in particular contexts [35].

Negotiating Diverse Communication Needs

As in offline settings, people have diverse communicative needs to fulfill when they communicate online. Goffman [23] argues that people have nuanced needs for sharing information and that they must consider specific social contexts and the effects of their self-disclosures. Compared to the offline context, communicating in online social contexts poses many challenges. In fact, people need to “imagine” their audiences when sharing on social media [33], and they are not good at conceptualizing who their audience is or how big it is [6]. Given the difficulty of imagining one’s audience in a social media site, and that most social media sites collapse all connections into one common stream, friction about what to share to whom, or “context collapse” [34, 50], has become endemic.

Other factors further complicate users’ decisions around social media use. Although interactions among users can happen in short bursts of almost synchronous activity, Hogan [27] applied the exhibition approach to highlight the role of data persistence, arguing that social media is an enduring “exhibition” of one’s online identity. Following his approach, recent work around deletion behaviors provide evidence that people do need to re-evaluate how they use social media and that they take incremental efforts to manage their content sharing [39,44,55]. In addition, people’s social relationships and social circles change over time as do site norms [35]. Together, these changes suggest that understanding user practices around multiple site use is a worthy scholarly endeavor.

Multiple Platforms Provide Opportunities

Even though any single social media tool might be limited by its audience, norms of use, and features, the availability of multiple platforms provide new opportunities for people to negotiate their diverse needs and differences. The fact that people might adopt different sites means that we are less likely to find everyone we want to connect with in one “place.” Recent studies found that using multiple sites help to resolve this access issue: participants in Lindley’s study valued the fact that different social media provide easy access to different social networks [32] and Vitak et al. [50] found people switch communication channels when they want to reach different social groups. Research also shows people attempt to resolve “context collapse” by using multiple social media and compartmentalizing their social media use [48]; people would intentionally make their other account information hard to find for some of their contacts (a strategy called “practical obscurity” [43]).

The diversity of site norms actually provides new opportunities for people to manage different types of interactions or curate different identities. For example,

recent studies show that Facebook was more valued for sharing major life events and one’s highly curated identity compared to other sites [32, 54] whereas Snapchat is valued for sharing small moments and mundane aspects of everyday life compared to sites that afford more data persistence [4, 52]. It is now common for people to go to different sites in order to share different content [2, 28].

With more platforms available and people approaching their use of platforms differently, it is less likely that one’s communicative needs could be met on any single platform. Therefore, we are motivated to investigate how individuals leverage multiple social media platforms to fulfill their own communication needs, negotiating diverse needs in the presence of others and different site norms.

Existing work has explored the general pattern of multiple social media use for particular contexts (e.g., organizational context as in [53]; college students as in [45]) and different demographic segments [10]). Although this literature provides evidence that people do leverage multiple social media sites to fulfill their communication goals, our focus is on individuals and how their perceptions and practices are supported and negotiated when leveraging different social media: If people’s usage pattern of social media is overlapping yet different [29], where exactly do people draw boundaries between different platforms? If it is hard to have any single platform fulfill one’s communicative needs, how do people experience the constraints and opportunities represented by different platforms and channels? If people often need to decide to adopt new social media sites or to migrate from one to another, what drives their decisions and how does this affect their overall strategy of social media use?

To answer the call from some recent work [e.g., 48] to explore “how sites are compared and contrasted in each individual’s everyday use,” we designed a qualitative study to explore the following research questions:

RQ1: How do participants make decisions about which platform to use?

RQ2: How do people manage communication across multiple social media platforms?

**THE STUDY
Procedure**

We recruited participants living in and around a Mid-western city in the US. We disseminated the recruitment advertisements on Craigslist, a local newspaper, and posters at local restaurants, libraries, and supermarkets. Participants were first directed to an online survey to screen for desired characteristics and were asked demographic questions (age, gender, race, etc.) as well as items about the social media tools they frequently and actively used and how often they accessed these tools. Information from the screening survey was used to screen participants. We understand that media experience could vary to a great extent in different age groups, so we aimed to recruit people from a broad age

range while balancing gender and race/ethnicity composition in our sample.

Participants were then invited to our research lab for a 60-minute in-depth, face-to-face interview. The interview involved questions about participants’ daily communication practices with a focus on their use of different social media and their perceptions of how the communication experience was similar or different across different communication platforms. In the first part of the interview, participants were asked to perform a card-sorting task, where they created their own set of cards to list all the “modes of communication” they use (one card per channel) and then organized their cards into piles and described the relationship between these communication platforms. This activity was designed as a way to encourage participants to react to and reflect upon their communication practices and media use. We intentionally used the wording “modes of communication” in prompting the card-sorting activity, because we did not want to prime people to think of some as communication platforms but not others. In the second

P#	age	F/M	social media	P#	age	F/M	social media
P1	46	F	1,6,7	P15	34	M	1, 2, 3, 6, 9, 18
P2	53	M	1, 2, 3, 9	P16	29	M	1, 2, 8, 9, 11
P3	50	F	1, 5, 6, 7, 9 16, 17	P17	34	M	1, 6, 9
P4	33	F	1, 2, 3, 6, 10, 12, 13	P18	29	F	1, 2, 3, 5, 9, 8, 9, 10
P5	48	F	1, 4, 5, 6, 9	P19	24	F	1, 2, 3, 8
P6	26	F	1, 3, 5, 7	P20	32	F	1, 2, 3, 9, 14
P7	24	M	1, 2, 3, 8	P21	27	F	1, 5, 6, 7, 9
P8	25	F	1, 2, 8, 9, 15	P22	24	F	1, 2, 3, 5, 6, 8
P9	51	F	1, 2, 3, 5, 6, 7, 8, 9	P23	33	F	1, 5, 6, 9
P10	22	F	1, 2, 3, 5	P24	39	F	1, 2, 3, 5
P11	27	F	1, 2, 3, 4, 5, 6, 7, 8	P25	25	F	1, 2, 3, 4, 5, 9
P12	51	M	1, 6, 7	P26	49	F	1, 5, 7, 9
P13	40	M	1, 2, 3, 5	P27	26	F	1, 5, 9, 11
P14	32	F	1, 2, 5, 6, 9	P28	41	F	1, 3, 5
				P29	20	F	1, 3, 5, 6

Table 1: Participants and Their Frequently Used Social Media

1=Facebook, 2=Twitter, 3=Instagram, 4=Snapchat, 5=Pinterest, 6=LinkedIn, 7=Google+, 8=Tumblr, 9=Youtube, 10=Foursquare, 11=Reddit, 12=Path, 13=Flipboard, 14=MocoSpace, 15=Fetlife, 16=DateHookUp, 17=AtlasQuest, 18=LiveLeak

part of the interview, we prompted participants to reflect on their experience of using different communication platforms for specific communication scenarios, as well as for specific relationships. Participants were also asked to visit any archives of communication or traces of online activity either on desktop computers or on their own mobile phones, to help them draw examples to talk about in responding to our questions. All card-sorting results were photographed, and all interviews were audio recorded and then transcribed.

Participants

29 participants participated in the study (18 Female, 11 male; age range from 22-53). The frequently used social media sites by our participants include Facebook, Twitter, Instagram, LinkedIn, and Snapchat. Participants were given \$35 for their participation. Table 1 shows age, gender, and frequently used social media platform for each participant.

Analysis

The card-sorting activities were intended to serve as prompts for eliciting concrete communication cases to be discussed in the interview; since participants were asked to elaborate on their card-sorting results in the interview, and they talked about their use of communication platforms throughout the whole process, photographs from card-sorting sessions were analyzed together with the interview data and we do not differentiate between the two sources of data in our analysis. We used iterative coding to analyze all the interview data. There were three stages of our iterative coding process: inductive coding and codebook development, recoding of the interviews based on this codebook, and association of quotes with different themes. All co-authors met in a series of face-to-face meetings to discuss all the codes and emerging themes.

FINDINGS

We find people simultaneously consider their desired audience and norms around content when deciding how to share specific content. In some cases, audience, norms, and user needs align well. Our first set of findings describes the ways in which participants consider the primary factors of content and audience.

However, when we look at cases in which the boundaries are blurred, a more complicated story arises. In response to our second research question, we find that participants sometimes struggle to reconcile a strong desire to maintain boundaries between platforms and networks but also a need to allow content and audience to permeate through these boundaries at times. We also find that participants struggle to stabilize their own platform ecosystem yet feel the need to respond to the emergence of new tools and new relationships.

Sharing Strategies: Considering Audience and Content

Our first RQ explores how people experience the constraints and opportunities represented by different platforms and channels and how this affects their decision-

making practices around content sharing. Our data echo previous work in highlighting the role of expected audience and norms around content sharing on different sites, but our findings also explicate how these two factors intersect, affecting platform choices.

Participants experienced tension when their social needs did not align with a particular technical solution (i.e., sharing to one particular social media platform). Social needs include the desire to reach a particular audience and to share a particular kind of message or content. With regard to social media, we found “audience” and “content” are two primary considerations that simultaneously drive platform choices – but often these needs could not be met by the same channel. Participants described their need to reach specific audiences and to share specific content while noting the inherent tension at play when these needs could not be met in the same channel.

Audiences differ across platforms

As has been noted in other work, in some cases our participants selected platforms based on intended audience. For instance, this participant attributed her decision-making on *where* to post a photo to a decision about audience: *‘Oh, I just want my friends to see this,’ or ‘I just want my younger cousins,’ or ‘I want everyone to see this.’* (P25).

This strategy of “segmenting audiences by sites” is consistent with what Stutzman and Hartzog described in their work [43]. We find people are creating conceptual links between platform and audience as they consciously curate different audience groups on different platforms. For example, when mapping out relationships between communication platforms during the card-sorting activity, over half of participants categorized their platforms based on audience, such as close friends versus family versus business contacts.

Consistent with research on “context collapse” [34], this desire to separate audience groups often stemmed from privacy concerns, such as the need to keep multiple dimensions of one’s identity (and the audiences for each) separate from one another. One example is this Reddit poster explaining why he does not link to his Reddit page from his Facebook account:

“I try to keep the story page separate from everything else, is because, like, I’m writing primarily, like, horror stories. So, they’re gonna be kind of gross, and creepy, and upsetting... I kind of don’t want my boss or somebody finding out about all these horrible, gross, gory things that I wrote on the Internet.” (P16)

In addition to managing issues around context collapse, participants described the need to carve out separate spaces for more targeted kinds of content-sharing. Having one platform dedicated to a particular kind of audience or content helped to ease the pain of “*deciding where to post*” (P24) for users:

“My main mode of social media is Facebook and to me having to decide where to post it is more of a pain in the butt than that, so most of my friends and family are on Facebook... [whereas with] Instagram if I know it's something for the girls and softball-related, the picture goes there.” (P24)

Aligning specific kinds of content (such as sports or children) with specific channels helped to ensure messages were delivered in intended ways and could receive sufficient attention from other parties. Many participants remarked that particular social media platforms such as Facebook and Twitter, which contain a variety of content from a diverse group of people, could end up making it difficult to find valuable and meaningful content due to the messy and diverse nature of the audiences and the filtering algorithms used to display content. In talking about this issue, one participant described how she intentionally maintains a subset of contacts on Instagram that are different from Facebook:

“There’s so many other things on Facebook... I know I use it more so for stories and videos of random things that had nothing to do with my close friends. I’m thinking that other people use it as that, too. So [if I post to Facebook] they might scroll down and miss the picture that I want them to see, whereas on Instagram it’s like you can’t really miss it.” (P25)

Norms differ across platforms

Another need that drives platform choice is whether the content to be shared is normative, or perceived as “appropriate,” for a particular platform. In many cases, the concern for sharing the right kind of content took precedent over concerns around audience.

For example, Facebook was perceived to be strictly “personal” for many participants. Even if the audience for that site represents connections from a specific domain (such as work), the personal nature of the platform still is what dictates how people communicate on Facebook: *“while I am Friends with some folks that I work with, whatever interactions we have on Facebook have nothing to do with work.” (P22).*

The characteristics of the content often dictated which platform participants used to share it. Three themes emerged with regard to these patterns. First, our participants differentiated lightweight content from more meaningful, high-quality content. For example, consistent with previous work [e.g., 54] we found some platforms, like Facebook, were seen as appropriate for highly curated content. Participants described selecting the best subset of photos (as opposed to uploading the whole camera roll) when they used Facebook, in order to meet audience expectations and avoid overwhelming their readers. Other platforms, such as Instagram, did not require this kind of selection process:

“If it’s an exceptionally cute photo of my rabbit, I send it to Facebook. If it’s just – ‘this is another pet picture’ I just keep it to Instagram... I don’t want to have [my bunny] overtake my Facebook page.” (P22)

Second, participants described the expected interactivity of the content as driving platform choice. Participants differentiated between content mainly shared for self-expression or self-archiving purposes versus content shared with expectations of audience feedback. Participants saw some social media platforms as vehicles for self-expression, as opposed to extended interactions with specific people. For example, Twitter was described as “a venting tool” (P3); another participant described the value of sharing there as purely “getting it out” (P5). Another participant described Twitter as *“more [of] an informational tool versus a communications tool” (P15).*

Similarly, social media platforms varied with regard to the expected level of feedback. For example,

“...Facebook, I get a lot more comments on things. But Instagram is more of just, ‘I just wanna share this because I want you to see it,’ not so much comment on this. I just wanna share it with people. That’s all.” (P28)

Finally, content was segregated by topic and theme, with different platforms being used for different topics. Participants described constraining content centered on a common theme to a particular platform, and tried to avoid alienating or spamming other platforms with irrelevant content. For example, one participant reported that all discussions regarding *“politics and religion”* only took place on Facebook and Twitter (P2); another participant mentioned Instagram was reserved for content that was *“visual”* and highlighted *“my artistic taste” (P11).*

Audience and content are intersecting parameters

In the section above we describe content and audience as distinct dimensions, in which considerations of expected audience and appropriate content were engaged to manage social boundaries and site norms, respectively. In reality, content and audience were often intertwined. Site norms around content are actually partly shaped by the ways in which different social media aggregate audiences, and different audiences expect different kinds of content. For example, Facebook networks typically reflect a more comprehensive group of “contacts,” and normative “content” shared on Facebook was expected to be more curated than other platforms (also noted in [54]), perhaps due to this wider audience.

In some cases, schisms existed between platform audience and expected content. For example, this participant talked about why he has to communicate with some of his family members via Facebook, even though he does not consider Facebook as the preferred place for this kind of interaction:

“... for them it’s like the most convenient way to get in contact with me, and I guess they figure I’m going to see it,

so they go on there. They don't care (about the content) ... So I have to go on there to contact them because that may be the only way... I may not have their phone number." (P15)

In conclusion our data highlight the importance of content and audience factors when making decisions about platform choice. When the content and desired audience aligned perfectly, participants' decision-making strategies were clear. However, in many cases participants experienced competing desires. These tensions were along two dimensions: Separation-Permeation, and Stability-Change. Similar to the way in which tensions have been explored in interpersonal [3] and organizational contexts [21], our finding about tensions regarding how people manage platform boundaries does not imply simple contradictions or the need for dichotomous choices. Rather, echoing Gibbs [21], we can think about "complementary dialectics" as a framing: the notion that tensions are positive to work through and the goal should be to incorporate both poles in an enabling manner.

Managing Across Platforms: Separation vs. Permeation

Our second RQ asked about the tensions that arose when people attempted to manage content across multiple platforms. Our data suggest that participants experienced opposing desires to guard platform boundaries in order to maintain separate spaces but also felt the need to relax platform boundaries to allow "audience" and "content" associated with any particular platform to permeate others.

On one hand, participants mentioned a variety of strategies for keeping different platforms separate. The most commonly mentioned strategies include disguising their Facebook account names to avoid recognition by offline contacts (P30), making fake accounts (P2), intentionally avoiding disclosure of their social media profiles (P1), making sure their social media profiles were "search-proof" (P19), and separating different social media accounts to avoid mixing professional and personal audiences (P8).

In this following case, the participant purposefully chose other traditional communication channels (such as email) to avoid directing others' attention to her Facebook profile, which is associated with more recent personal information:

"[When communicating in professional settings] I don't want that to come with everything that's attached to my Facebook, 'cause I don't want that to come with the ability to look back. I don't want [people to say] 'Oh. Let me go stalk all her pictures now' because I want that to come from me as a professional individual, and Facebook is not that professional setting. (P15)

Although many participants described efforts to keep platforms separate, permeation between platforms did occur. Since a single platform was not likely to have the perfect match of "contacts" and "content," participants reached their desired audience by sharing the same content over multiple platforms. More than half of our participants

mentioned this cross-sharing strategy, which means sharing the same content across different platforms to reach a bigger audience. For instance, participants used multiple channels (e.g., Facebook, emails, calls) to announce big life events, as we saw with two of our participants (P2, P8) who announced engagements on multiple platforms.

Another participant, who is active in an online letterboxing [an outdoor orienteering game] community, mentioned she often shares letterboxing-related content to Facebook in order to access those who weren't in this community:

"Because it's interesting to get comments back from non-letterbox-ers. Brandon isn't a letter-boxer, he doesn't have a letterbox-ing profile or whatever. But if I said, 'Where's a good box place to plant in Washington County?'... they don't need to be a letterbox-er to have insight into where's the cool places to hide little boxes." (P3)

When people share across platforms, they do strategically "tailor" content to specific channels. For instance, one participant would post photos to Instagram "when preparing for exams" but post a status for "passing the exam" on Facebook later so "everyone could see" (P25). Alternatively, the same content might be modified to be consistent with different platform norms, as with this participant who shared a textual quote on Facebook but the quote and an image on Instagram:

"... (on the picture) it'll say, 'Love is...', and then you copy and paste it and you'll put it on Facebook and then you'll use the actual picture for Instagram... Instagram should be pictures and Facebook should be words." (P18)

This "cross-sharing" is one type of boundary permeation described by our participants. We found that cross-sharing situations were usually managed with extreme caution because they may entail losing control of platform boundaries around audience. For example, many social media sites allow users to use login information from one platform to access another or the ability to link accounts across platforms; when this happens account information is made visible to other (perhaps unanticipated) users. Many of our participants mentioned instances where they "found people's Twitter names through Facebook" (P22) when others were cross-sharing on both platforms.

This participant, for example, explains why she always posts from Instagram to Twitter, not another way around, because this does not reveal her Instagram account information to her Twitter followers:

"Because I like to keep my Twitter private. If I post something from Instagram to Twitter, then the people that follow me on Instagram still don't know I have a Twitter... But if I was going to tweet, post pictures of something I tweeted, then everybody on Instagram would know I have a Twitter [account] and they could follow me. It's like I keep it private, kind of. I'm weird with it." (P19)

In addition to linking accounts, which can be seen as a permanent form of enabling permeability across platforms, participants sometimes did this sporadically in order to, say, attract a bigger audience at the moment while still maintaining the boundaries between platform audiences:

"I try to keep [the Facebook Fan page and personal account] a little bit of separate. When I first made [the fan page], I kind of made an announcement, like I invited people to like it. And then after that I just kind of like keep my personal account personal and keep the Facebook page the Facebook page." (P16)

Despite the strong desire for separation between platforms, participants also desired platform permeation at times and intentionally made explicit links between platforms in order to increase permeability between platforms. For instance, links between platforms enabled some participants to port contacts from one platform to another, in order to increase numbers or strategically manage audiences. For instance:

"I absolutely control it to the extent that I can. My Instagram has my online name and a link to my blog. My blog has links to connect back to Instagram or Twitter, and my Facebook has links to my blog, not Twitter or Instagram because Facebook doesn't currently have that interface like, there's no place on a personal profile where you can say, find me on Instagram and you just click a link" (P11)

In other cases, participants were very selective about disclosing account information for one platform on another. For example, this participant talked about having her LinkedIn profile included on her emails for the purpose of job-hunting, although she purposefully severed the connection for other contexts such as Craigslist postings:

"When I returned from working in Thailand and I did not have this job yet, I definitely beefed up my LinkedIn... My e-mail signature, my personal e-mail signature, has my LinkedIn link... But there are times depending on who I'm messaging, I might delete that signature. If it's a Craigslist response for something like 'I'm looking for housing,' I'm just going to delete that part..." (P4)

Similarly, participants might selectively post content for the purpose of encouraging interactions on other channels. These conversational triggers were not necessarily shared on multiple platforms but were rather purposefully placed to initiate interactions via another channel or in anticipation of other kinds of interactions. For example, this participant intentionally updated her Facebook photo albums before the high school reunion:

"When we had a class reunion a couple of years ago, I posted some things on Facebook like pictures of myself 'cause well, I'm in great shape for my age... before the reunion definitely, and kind of to be like, "Heh, heh, I stayed in good shape and you might not be." Because in high school I was very studious and a little bit of a nerd, so it was kind of like retribution." (P9)

For others, porting Facebook content into other channels, such as face-to-face communication, were desirable because they allowed her to signal attention to specific ties:

"I have to remember to talk to them about [their Facebook posts]... like 'I saw this weekend that you're camping and I saw pictures of it that you had fun,' that type of thing. So, it's a gateway for communicating with the person the next time you see them... I think it helps to cultivate the relationship because it's showing that you're paying attention to what they have on there, and you pay attention enough to actually have a conversation about it too." (P24)

The Separation-Permeation tension is often especially salient in the case of platform adoption decisions. For example, many social media platforms provide options to import contact lists from other applications. On one hand, this is a convenient way to build one's contacts quickly and easily. For instance, one participant noted that using the suggested contact lists when one signs into Pinterest through Facebook "gives you more things to search from" (P22) from the very beginning. Similarly, being able to mine one's phone contacts made it easier to locate others on new platforms; P25 described how hard it was to find people on Snapchat because people "have to be in your phone" or one has to know others' snapchat username.

However, this kind of mass transfer of contacts from one platform to another shapes the type of experience users have on the new site and limits the ability to carefully craft a set of contacts tailored to that particular platform. For example, this participant was aware of cutting down the list when Instagram presented the opportunity to easily connect to all applicable Facebook friends:

"... Because I just don't want to have an overflow of stuff. My sister was complaining to me one time about how she follows like 400 people on Instagram, and how she doesn't get to see all of the photos and stuff that people post, and she just follows them to follow them. And I'm like, 'I don't have time for that.' ... If I'm going to follow you, I kind of want to be interested in what you're doing." (P22)

Depending on a host of factors, participants carefully calibrated the permeability of platform boundaries in ways that reinforced segmentation or blending between tools. For many this represented an ongoing effort to establish an effective communication eco-system where they could make adjustments based on evolving social needs and norms – and the dynamic ecosystem of platform choices, as described in the next section.

Managing Across Platforms: Stability vs. Change

The second tension, stability vs. change, refers to the competing desire to establish a stable system of how each communication platform was used and the need for change when faced with new platforms and emerging practices. Adopting a new platform, and integrating the new platform into one's communication routine, appears to be a non-trivial decision and the integration usually took time to

stabilize. About half of our participants mentioned the experience of “trying out” a new tool hoping to get more benefits, often not successfully.

We discovered that how individuals view their existing communication ecosystem plays an essential role when making adoption decisions for new platforms. Our participants seem to perform an evaluation of their current ecology of communication platforms when faced with decisions about whether to start using a newly available social media platform. One common reason for non-adoption is that they consider their current “ecology” as complete, manageable, and satisfying. For example, this participant thinks Facebook is a more powerful tool due to its broad user base and everything else is merely a subset of what Facebook can help him accomplish:

“I’ve checked out Instagram before.... They weren’t really things that like stuck for me, especially because you already have something that kind of like overpowers those.... Not everybody has like a Instagram or not everybody has the Foursquare, but most people are going to have a Facebook” (P6)

Another important factor that determines whether people want to adopt a new platform is a person’s perception of their own “literacy”:

“... It’s partly a laziness decision. Like, I kinda don’t like... I barely understand Tumblr like first off... I go there and I don’t get it. They’re just like all these pictures and GIFs, and I don’t know what’s going on... This all looks chaotic and random to me,... And Twitter just seems silly to me. I’ve never really gotten into that.” (P16)

This concern for new “literacy” is particularly common among older participants (over age 45):

“I signed up for a Twitter account. I tried logging in, and it was mostly to see what my daughter was doing on Twitter... What I saw the pattern... And this is gonna show my age, I couldn’t even understand what the fascination was with it. ‘Cause it was incomplete sentences and thoughts and re-tweeting, and trying to understand what all that meant... So I went back to the old people’s Facebook.” (P1)

Second, over time the expected use or perceived norms of particular social media could change, affecting participants’ own practices and experiences. In other words, even if individuals do not react to the emergence of new platforms, their use of existing ecosystem could be affected by how others are reacting to such changes. For example, more than half of our participants commented on how they changed their sharing and other practices on Facebook since their initial use of the platform. Many expressed the belief that overall use of Facebook was becoming more curated, and that some uses of the site had migrated to other channels.

“... but my friends now... we are no longer like, ‘Oh look, I really enjoyed driving past my old high school today.’

We’ve reached the point now where we all use Facebook to browse for each other, but when it comes to the everyday necessities of life, we all just text each other.” (P22)

Often platform usage practices were determined by broader shifts in use as opposed to individual decisions; these shifts in norms around platform choice drive users to other platforms for the type of “content” or communication experiences that they care about [35]. This participant described how she replaced Instagram with Snapchat:

“...when Instagram first opened, it was just for iPhone people and, not like that mattered, but most of my friends have iPhones, so it was just me and my friends... So now, Instagram is weird... Because people post weird stuff on there or there will be spam and I don’t know. It’s just not the same anymore... Everyone’s worrying about how many followers they can get, opposed to being just the people you actually know... So on Snapchat, it’s just people I actually know and people can’t just randomly follow me and find my thing and get on there and send me random things.” (P25)

With the increasingly proliferating communication platforms, it might be evitable that the use of each platform is getting more “specialized.” For example, this participant commented on how he was more cautious about adding new “contacts” on Instagram:

“So when I first got my Facebook back in high school, like eight years ago – I was friending literally everyone that I ever knew. And now, because I’m still friends with a lot of those people, I have people, where I can’t even remember why I’m friends with them, posting stuff. And I’m just like ‘I don’t really care to see your stuff on my Facebook anymore’... So now when it comes to things like Instagram... I’m more strict about it.” (P22)

Similarly, with the availability of multiple sharing platforms, our participants reported becoming more conscious about where and how to share certain content. For example, interactions or content that used to belong to Facebook may have diverged to other platforms over time:

“So, I feel like the status... When Facebook first came out in social media or whatever, it was like the major one, right? So, everyone was putting up everything that they’re doing on Facebook or whatever... but now... I don’t know. I feel like everything that people used to do on Facebook has been branched into these two forms [Instagram and Twitter] and I think they’ve made it better.” (P7)

Changing norms on particular platforms also affected participants’ platform choices. For example, this participant describes the difference between phone calls and Facebook:

“... It’s very similar, I would say, in a lot of ways [Facebook has] really replaced [phone calls]. Definitely. If I were to get a phone call from one of my old friends, I would think that somebody just died. That would be... It would be like, not like, “How dare you call me,” but I would

be very thrown off as to why they're calling me. Whereas ... 20 years ago or something like that, that would've been the totally normal thing to do.” (P27)

The change in interface design can also lead to people rethinking and enforcing changes in managing their social media ecology. For example, this participant talked about how he had to switch to another social media for photo-sharing with families after Picasa changed their interface.

P17: “It’s just all the links that I had been sharing with my family stopped working... now I couldn’t share a link that says, “Here is all the folders that I have, essentially. (Interviewer: Can you give people access to your GooglePlus page instead?) Right, but my parents aren’t going to get a GooglePlus account.”

DISCUSSION

Our study explores how individuals manage their platform choices when faced with an ecology of communication and information tools. Our findings suggest that both audience and content are key considerations for participants as they make decisions about what to share. People experience challenges when their content and audience needs are not met by the same platform or require the use of multiple platforms. These challenges are amplified by the fact that users experience multiple (and sometimes conflicting) desires, which are captured in the two tensions we see in our dataset: Separation-Permeation and Stability-Change. We found people experience the desire to both reinforce and dismantle boundaries between platforms. This fluid calibration of boundaries is an ongoing process in which participants attempted to stabilize their use while contending with shifting norms and the influx of new platforms and people.

The affordance perspective describes how users perceive different social media site features as “affording” different types of activities [16, 42]. For example, on Facebook a person might see a status update as affording the ability to broadcast to a large audience of known contacts. The affordances people associate with a platform stems from multiple sources; the design characteristics of the platform, observation of how others use platform, and previous personal experience may all play a role in defining what affordances people perceive.

The affordance perspective of social media platforms has been most commonly applied to use of a single social media site, given that the numerous features available in individual platforms already create a complex set of affordances [42]. However, our findings regarding cross-platform practices suggest that people think about affordances within the context of their *overall assessment of all available platforms*. Rather than focusing on whether a particular platform “allows” people to do one thing, users consider the affordances of that social media platform in the context of *all of the communication tools* available to meet a communication or information need. In other words, we

suggest that people are cognizant of the sum total of affordances of their own social media ecology, not just those associated with discrete platforms or channels.

Using the Social Media Ecology to Bridge the Social-technical Gap

Our findings provide a productive context for revisiting the notion of the social-technical gap with respect to the social media ecology. The social-technical gap is defined by Ackerman [1] as “the divide between what we know we must support socially and what we can support technically” (p. 179). Ackerman argues that the difficulty in designing for technical systems lies in the fact that social activities and needs are fluid and nuanced, while technologies have rigid and discrete boundaries. In other words, human social processes are analog, but when we enable them through computer networks we have to represent them digitally. As with any conversion of analog to digital, there will be gaps in translation.

This social-technical gap is still salient in the design and research of social-technical systems. For instance, scholarship on privacy and boundary management highlights the discrepancy between social needs and technical capabilities. As Goffman’s work on self presentation [23] demonstrates, our practices around sharing information with others are shaped by audiences, physical contexts, time, and other factors. Individuals may struggle to achieve conflicting self-presentational goals when performing to multiple audiences simultaneously. Research on context collapse and privacy management [e.g.34, 50] has highlighted the difficulty of managing social pressures around self-presentation in social media platforms, suggesting the continued salience of the social-technical gap. The subtle and fluid way that social boundaries and self presentation work in face-to-face contexts is hard to code into technical systems, and attempts have often been too cost-heavy on the part of users of those systems [50].

While existing privacy management research is mostly focused on individual platforms, the availability of multiple information and communication services brings new opportunity to manage nuanced social needs. Previous boundary management work in HCI (as in [11, 18]) explores how people consciously integrate their use of multiple devices or applications (e.g., cellphones vs. desktop computers, work email vs. personal email) into their daily routine to manage their social role transitions (mainly between home and work). Our findings on how people consciously calibrate platform boundaries has extended this work and provided evidence that people are remixing their use of multiple platforms as a strategy to overcome the inherent social-technical gap, as suggested by the Separation-Permeation and Stability-Change tensions in our data. Our participants pointed to friction between their social communication desires and the ability of individual platforms to meet those communicative goals. Even though

individual platforms pose social friction because of the social-technical gap, participants reported breaking platform boundaries, as well as restructuring and reintegrating them, based on considerations like audience, permeation, content, norms and changes in the available set of tools. This ecological view of the social-technical gap changes the calculus of user-interaction from system-centric to goal-centric.

Implications for Practice

Our data suggest we should consider system affordances not within the context of any single tool or service, but rather within the framework of an ecosystem of communication channels people use in an organic and fluid fashion. Furthermore, our findings suggest one's personal media ecology is re-evaluated constantly in the context of shifting norms and other available and emerging platforms. These findings have important implications for system designers, researchers, and practitioners.

First, system designers now face the challenge of balancing how to design for use of one discrete platform versus designing for the broader ecosystem of platforms and channels. On one hand, when approaching the design of new social systems, it is useful to think about how to deliver a unique value proposition that extends a user's existing ecology of systems; for example, novel ways to aggregate contacts or a new type of content generation (e.g. using location information to suggest new contacts or encourage location-specific content exchange). On the other, the ecological approach suggests new types of "cross-platform affordances" that could act as design guidelines. For example, designers may wish to provide tools for users that acknowledge the fact that people are using multiple platforms and which support their ability to calibrate levels of permeation and segmentation across platforms. Many social media platforms visibly display users' other social media accounts or employ permeability calibration functions that allow for cross-sharing content and contacts. In order to create robust content streams, new systems now often provide options to build contact lists from other existing applications. System designers should be cognizant that these design decisions could have significant impact on sharing the norm of particular sites. For example, in cross-sharing situations, the possibility of sharing contacts across platforms creates a tension between convenience and the ability to partition contacts as well as content. Furthermore, designers should consider how to supporting how people communicate within their ecology of technology use. Two users who wish to communicate must consider one another's constraints, preferences, and skills as they negotiate the choice of platform. User decisions about platform choice are not unilateral decisions, although they are often treated this way, but rather are negotiated with others either explicitly or implicitly.

Second, our finding suggests new ways to approach social media scholarship. Research often focuses on use of one

particular platform, as in [15]. As users increasingly mix and remix use of different communication platforms, focusing on only one channel may conceal important insights. Our findings highlight the need to consider the more holistic context of social media use across platforms, as affordances are perceptual and are shaped by a broad range of factors including the other channels being used at that time. This suggests an increasing need to evaluate the usability of a discrete social system iteratively within context of other available technologies and systems.

Third, our findings suggest new directions for social media literacy training, emphasizing a focus not on the features of discrete platforms, but rather on the affordances of the suite of possible communication tools. Social media literacy deals with helping people understand the implications of social media use, at the personal and interpersonal scale, and an affordance view that emphasis media ecosystems may help users create a menu of available channels that can be matched to specific communication goals at that moment.

As with any study, there are limitations of this work. The experiences of our participants are shaped by their cultural and geographic context, and thus research in other contexts may uncover other insights. Our two main contributions of this work – that people intuitively attempt to bridge the social-technical gap through use of multiple tools and the benefits of considering affordances at the environmental level – should be confirmed in other contexts and methods.

CONCLUSION

Our study disentangles how and why people approach their use of different communication platforms. In this piece we used a data collection method that reflected participant's lived experiences using different communication channels as opposed to artificially restricting them to one platform, in order to better explicate how users made choices within a media ecosystem. Our work suggests that people make decisions based on their consideration of multiple parameters across social media platforms, including audience and norms. We found that users experience the desire to both reinforce and dismantle boundaries between platforms, and they are engaged with an ongoing effort to calibrate boundaries to adjust to new platforms, people, and practices. This has two broad implications. First, these findings suggest that people use multiple communication tools to bridge the "social-technical gap." Second, the use of the affordances perspective to describe how people interact with an individual platform should be broadened to include consideration of specific platform characteristics (norms and networks) that people think about when trying to meet their communication and information needs.

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Appendix C: Curation through Use: Understanding the Personal Value of Social Media

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ABSTRACT

Content generation on social network sites has been considered mainly from the perspective of individuals interacting with social network contacts. Yet research has also pointed to the potential for social media to become a meaningful personal archive over time. The aim of this paper is to consider how social media, over time and across sites, forms part of the wider digital archiving space for individuals. Our findings, from a qualitative study of 14 social media users, highlight how although some sites are more associated with ‘keepable’ social media than others, even those are not seen as archives in the usual sense of the word. We show how this perception is bound up with five contradictions, which center on social media as *curated*, as a *reliable* repository of *meaningful* content, as readily *encountered* and as having the potential to present content as a compelling *narrative*. We conclude by highlighting opportunities for design relating to curation through use and what this implies for personal digital archives, which are known to present difficulties in terms of curation and re-finding.

Author Keywords

Personal information management; archive; exhibition.

ACM Classification Keywords

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

INTRODUCTION

Content generation on social network sites has been considered mainly from the perspective of networking, with researchers emphasizing interaction via social media as a performance of identity and a means of maintaining relationships. Site features such as newsfeeds and notifications, along with emerging social conventions that emphasize ‘nowness’ [11] result in an environment in which users focus on the ‘present’ [23] and avoid posting old content, which will surface ‘out of time’ [11]. Yet this content does,

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of course, persist, and because of this social network sites accumulate content including status updates, pictures and videos. Thus, social network sites have also been positioned as hosting ‘virtual possessions’ [22], which become more personally meaningful over time [32], and which form part of a wider space in which online content in itself can be considered an archive [17].

However, the fact that social media persists by default (there is no option to ‘keep’ social media – it is simply *there*) poses challenges to maintaining a collection that is meaningful and that can be held in what is, after all, a public space. Hogan [12] positions social media as an enduring ‘exhibition’ of personal data, and recent work around deletion [e.g. 28, 29] highlights the problem of keeping social media on display. Content that does not fit the way one wishes to present oneself must be removed. This concern with audience and self-presentation contrasts with the curation work that underpins more personal archives. For example, material possessions can be hidden away in ‘deep storage’ [15], and virtual possessions become buried in nested folders on laptops and hard drives [26]. These possessions are rarely encountered by their owners, let alone by others, and so the curation work that underpins them can entail a focus on what one wants to keep rather than what one wishes to share.

In this paper, we explore whether social media has archival value, given that it is curated as an exhibition rather than as something to be kept in the long-term. We consider whether new opportunities for design open up if social network sites are positioned as comprising an archive of sorts, rather than content that is ephemeral [11] and trivial [17]. As pointed out by Good, research is needed to identify “social media users’ self-archiving habits, desires, abilities and awareness online” [8, p. 570].

To explore this further, we undertook a qualitative study in which 14 participants were asked to create digital keepsakes using their social media content. While participants did not typically view social media sites as repositories in the usual sense of word, their practices nevertheless resonate with certain aspects of personal information management. Social media generated for particular audiences results in a landscape of content across social media sites, with some (especially Facebook) hosting content viewed as personally meaningful. Our findings indicate that social media is *curated* and is considered a *reliable* place to store *meaningful*

content. Furthermore, it is easily *encountered* and has the potential to present content as a compelling *narrative*. We draw implications for design relating to the notion of curation through use, and the bridging of online and offline archival spaces. We build on this to consider what opportunities lie in drawing together social media and personal digital archives.

RELATED WORK

Before describing the study in more depth, we provide an overview of related research. We focus on prior work in which social media is positioned firstly, as a means of connecting with others, and secondly, as a virtual possession.

Research on why people use social network sites, and what they get out of them, often highlights values such as social connection and social surveillance [13, 3, 14]. In this network-centric view, social media is conceptualized as a tool to facilitate tailored and purposeful identity performance [e.g. 5, 16], in which user activities are shaped by different audiences present in online [1, 18] and faceted [6] networks.

This concern for audience, however, is dynamic. Recognizing that social media sites do not only facilitate interaction in the moment, but also present an aggregated history of interactions (e.g. via the Facebook Timeline), recent research suggests that identity performance in social media should no longer be considered simply as a snapshot in time, but something to be revisited, re-evaluated, and that is subject to changes in audience and relationships that unfold in the long-term. For example, Hogan [12] points out that social media, once generated, become an exhibit that is encountered by different audiences and in different contexts. Performance of self is not an ephemeral act, but an enduring act. He emphasizes the system's role as 'curator' of this exhibition; algorithms mediate the audience's experience of social media. However, it is clear that users also play a role in curating these exhibitions. For example, recent research on deletion of social media highlights users' on-going curation work, work that is triggered especially due to changing circumstances, such as relationship breakdowns, and which can occur long after the moment of upload [28, 29, 32].

This conceptualization of social media as enduring exhibition highlights a form of curation work that is quite different to that underpinning personal archives, but this is not to say that social media does not have personal archival value. Research has shown that social network sites are host to meaningful content that might be considered a form of 'virtual possession' [22], which can support reminiscing [24] and reflection [30, 33]. In line with this view, recent work by Zhao *et al.* [32] shows that as social media content becomes older, its value to the user shifts from supporting the performance of identity to something that is more personal. Their participants were less concerned with whether content would be viewed by others after a certain point, focusing instead on whether the content would have personal value. Lindley *et al.* [17] have also suggested that online repositories

such as Flickr, together with social media sites, blogs and webmail accounts, work in concert to form an online archive of sorts, although in this account the potential for social media to comprise a good deal of trivial content is also highlighted.

The above suggests that social media could have archival value for the self, but also highlights the complexity here. Social media has been described as both meaningful and trivial, being generated for the maintenance of a social network, but also potentially accruing personal value over time. Furthermore, it is well known that people already struggle with the task of managing their digital content. Digital archiving is subject to many difficulties: special content is mixed in with the mundane; digital content in general is sorted, organised and encountered only infrequently [26]; and users find it surprisingly difficult to locate even their favourite photos [31] or other cherished digital mementos [27]. It is possible that positioning social media as another form of personal digital archive may only add to this melee. In this paper, we begin to explore opportunities for design in this space. Can social media, which is principally curated as an exhibition and means of sharing, be reconsidered as a meaningful personal archive? And if social media, and the web more generally, can be considered an online archive of sorts [17], what does this suggest for archives that are located more privately, but that may suffer from problems of organization, curation and a lack of revisitation?

RESEARCH AIMS

The aim of this study is to consider more carefully whether social media has value as an archive, both in itself, within and across sites, and as part of a wider array of virtual possessions. We do this through an activity designed to encourage participants to reflect more closely on the value of content hosted on various social network sites, by making a 'keepsake' out of social media. This positions social media as something that one might wish to keep rather than share. We interpret our findings in the context of digital archiving.

METHOD

Participants

14 participants completed the study. They were 9 women and 5 men, with an age range of 20-53 years ($M=29$, $SD=8.83$). Most were in their 20s, however, we deliberately included two people in their forties and fifties as we expected they might show different attitudes towards and practices in using social media. All participants were living in and around a city in the south-east of England, although eight nationalities were represented. The social media tools participants frequently used include Facebook, Twitter, Instagram, Snapchat, Pinterest, Vine and LinkedIn. Participants were given a £30 gift voucher to thank them for their participation.

We recruited social media users through university email lists and Facebook posts. Participants were screened via a survey, through which we collected demographic infor-

mation and details of frequently used social media tools. In order to have a diverse sample of people who use different social media platforms, but also share some common experiences, we sought to recruit Facebook users who were also active users of other social media sites.

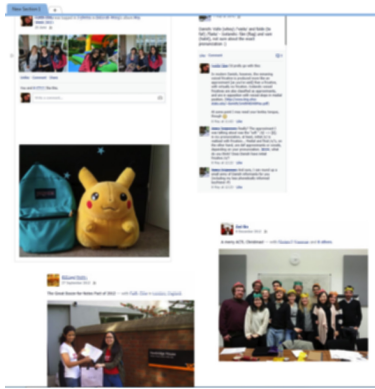


Figure 1. Anonymized example of a digital ‘keepsake’ produced by a participant.

Interviews and Activity

Participants were invited to our research lab for a 60-minute in-depth interview about their experiences with different social media tools, and how they perceive the social media that is produced through these platforms. The first 15 minutes of the interview focused on reasons for using different social media tools, the nature of social media that persists on these platforms, and how social media archives are perceived as different or similar to personal archives stored either online or on personal devices. Following this, participants were asked to browse content from their various social media profiles and make a digital ‘keepsake’, by capturing online content (for example, pictures, status updates, comments, etc.) that they would like to keep. They organized this content in a way that was meaningful to them using OneNote 2013, a free-form screen clipping and note taking tool (see Figure 1 for an example). The activity was designed as a way of encouraging participants to react to and reflect upon their social media archives, with a particular focus on the value of the social media that persists there, and was inspired by a study by Petrelli *et al.* [25], in which participants captured ‘future memories’ by making time capsules. Participants spent 15 minutes alone to focus on making their keepsakes before continuing the activity with the researcher present. The keepsakes as well as the social network sites that were used in their making grounded the remainder of the interview.

Analysis

The interviews were audio- and video-recorded, and screen-grabs were taken of the keepsakes produced by the participants. Our analysis focuses on the interviews rather than the keepsakes, as these were primarily intended to serve as prompts for discussion. Interviews were fully transcribed and analyzed for emergent themes using grounded theory techniques [7]. In initial data analyses, open codes were developed and assigned; these were then iterated and the

relationships between them explored through axial coding. Axial codes include: management strategies for different social media tools; the nature of social media; and sentiment around losing content. Five high-level themes were then identified; these are curation, meaningfulness, encounterability, reliability, and narrative. The first author developed the coding scheme. Both authors read all transcripts and discussed and reached consensus with regard to coding at each iteration of the analysis.

FINDINGS

We introduce our findings by describing firstly, how participants responded to the activity of making a keepsake, and secondly, how they viewed the value of social media across different sites. We then present the five overarching themes that emerged in the analysis.

Making a Digital Keepsake

The process of making a digital keepsake out of social media led participants to reflect on both the experience of making and the value of the social media they came across. We focus on the latter in more depth in the following section, as it is nuanced, but reactions to the activity in general were positive. The process was described as similar to “*a story you are writing*” (P2) or to the curation of an old photo album, and was engaged in as a meaningful activity:

“It’s brilliant. I definitely haven’t been down this bit of my Facebook for a long time. There were loads of comments and stuff that I didn’t know were on there as well, which is good... it just makes me laugh.” (P10)

Participants tended to organize their keepsakes either around major life events (e.g. having a baby, getting engaged, moving to a new location, getting a new job) or around significant relationships (e.g. family, close friends, romantic relationships), and selected content accordingly:

“I think it would still be centered largely on big events... Other than that, I guess, more mundane parts of life, I probably wouldn’t [include them].” (P1)

“My idea is to create my multiple identities, academic life, me as a friend, my life as a wife probably, and my life as a daughter.” (P14)

Photos formed a substantial part of the keepsakes, in line with more traditional ideas of photo albums, collages and scrapbooks. They were described as “*the best thing you can do to try to recall a memory*” (P1). Yet other content was also included, such as status updates, conversations, and even URLs that had been posted. The social metadata (e.g. comments and likes) that accompanied such content online was also typically included in the snipped version; indeed, some participants described that the value of such content was to be found in the conversations that augmented it:

“Because I really liked this link, I liked the conversation that I had with my friends, I liked what I’ve said and I don’t often do this, you see I don’t often share links but... I like

the story that was relevant to the link that was one of my memories about something.” (P5)

Even though Facebook was only one amongst a range of social media sites used by our participants, and we encouraged them to reflect on content spread across different platforms when building their keepsakes, Facebook was in most cases the go-to site during the activity. Next, we consider why this was so.

The Value of Social Media across Sites

Facebook was often the first port of call when building a keepsake, despite it being only one of many social media sites used by the participants. The predominance of photos used by participants may partly account for this, as most had photos hosted on Facebook. However, participants also described the existence of a ‘higher bar’ for posting content to Facebook, which made it more probable that social media worth keeping would be found there. This seemed bound up with two properties of social media: its expected audience and its expiry rate. These are not mutually exclusive, but together influence expectations around the value of social media and how this is maintained over time.

Expected audience

Consistent with work that explores social media as a means of maintaining relationships, we found different social network sites were associated with different audiences. For example, for our participants, Twitter was mostly associated with peers and people with shared interests but who are not real-life contacts, whereas tools like Snapchat were mainly used with small and specific groups of friends. Facebook tended to be associated with the most diverse audiences, mainly family and friends, but also contacts from different spheres of life. This broad audience encompasses parents, extended family and ex-boyfriends, and was often described as having built up over time as the Facebook network had expanded. The diversification of network composition, from an initial group of “college friends”, meant that participants perceived a need to be more careful in posting content on Facebook:

“On Twitter it’s about a TV show or it’s about where I am going, whereas on Facebook I don’t like to update it so often but [only for] something I want a lot of people to know about...like graduation.” (P3)

In addition to writing fewer silly and mundane updates, the nature of interactions via Facebook had also changed. Wall conversations were noted as having declined, with the emphasis now being on the sharing of personal content:

“When I got Facebook originally like when it was still for university only... you had a much smaller number of friends, you know, it was more of a personal thing, like you could just write on somebody’s wall...It’s funny as time progressed I found it became less of a ‘I’m going to write on this person’s wall’ or whatever, and it became more of

this push-out model, like publishing your own content.” (P4)

However, this is not to say that such interactions no longer exist. Instead, they had shifted to sites like Twitter and Snapchat:

“I have become more selective of what I post (on Facebook) as I get older, and that might be because of the introduction of Twitter. All the stuff that I used to post on Facebook when I was younger, like going out tonight duh duh duh, I do that on Twitter now.” (P3)

Content expiry rate

As noted in prior research [11, 32], content on social network sites falls out of currency fairly rapidly, after which commenting on or otherwise interacting with it becomes unexpected and goes against social conventions. Participants in this study noted how this rate of expiry differs across sites:

“It expires. I mean you tweet and like 20 minutes later it’s not on your feed, anyone’s feed anymore... Whereas on Facebook, it’s like one week or so... It kind of sticks on your profile on Facebook...” (P6)

This ‘stickiness’ is sociotechnical. The “deluge of information” (P4) on Twitter meant that tweets were perceived as expiring more quickly, and of course this is self-reinforcing. “Less meaningful discussions or ... more meaningless things” (P4) could be posted to Twitter, whereas the higher bar for posting to Facebook meant that less content was there, and so it expired more slowly. Tools like Snapchat, whereby expiry is built in, inevitably facilitated the generation of playful content.

Bound up with this are the ways in which different social media sites offer ways of encountering content that is due to, or has already, expired. Facebook especially was felt to offer more scope for looking back at content, through the Timeline on the profile page but also via photo albums and features such as ‘See Friendship’, which filter content by relationship. Nevertheless, it was not considered typical to look back at the Facebook Timeline, unless in the context of making a new Facebook ‘friend’.

As shown, the combination of a diverse audience and a relatively slow expiry rate (when compared with other social media) led participants to perceive a higher threshold for posting content to Facebook in particular. Indeed, some participants selectively synched content to the site from other social networks, such as Instagram and Twitter. For these participants, Facebook became a kind of “hub” (P1), representing the “best” and “most selective” of their social media content. However, Facebook was not necessarily interpreted as a repository of meaningful content, nor as something to be kept in the long-term. In the following sec-

tion, we consider why this was so, through five contradictions in our participants' attitudes to social media.

Social Network Sites as Personal Archives?

Consistent with much prior work on social media and identity management, participants described the primary purpose of social media as to support interactions with others at the moment of posting. Social network sites were seen as a tool to support communication in the moment, rather than a place for storing data. Of course, this emphasis on content being for consumption by others meant that participants self-censored and avoided topics that might be considered controversial by their network:

"I don't know, I quite often try and put myself into other people's shoes and think okay if I was them and I saw that I had posted this on Facebook what would I think?" (P8)

This audience-centered perception of social media contrasts with a typical understand of archives, which are usually thought to be places to *"put stuff there just for me"* (P10).

"[I post the photo] just to share it with my friends... if I just want to keep it I can just keep it on my phone then people wouldn't see it..." (P3)

However, social network sites were used in ways that could be considered as similar to archives. They were *curated* repositories of *meaningful* content, and were noted as *reliable* data stores (sometimes more so than personal devices). Furthermore, they were said to be *encountered* more frequently, and to provide a better *narrative* of the past, than archives held on personal devices. Thus, our findings comprise quite nuanced views with regards to how our participants viewed the long-term value of social media. In the following, we look to these five factors.

Social media is beyond curation / social media is curated

The first theme explores the notion of curation. Social media sites were not generally seen as curated repositories of content. Indeed, some participants commented that social network sites were simply *"beyond curation"*; they contained content generated by too many people, they contained too much trivial content, and they went too far back in time to be manageable.

However, participants did also recognize that simply through using the sites, they were undertaking a form of curation. As noted above, Facebook was a site with a surprisingly high bar for posting content, and participants who used Instagram highlighted that it too resulted in a collection of images that had been carefully selected and edited. These sites comprised a collection that offered an alternative archive to that stored on computers and phones. Indeed, offline archives did not receive the same level of attention as their online counterparts, the motivation to curate being highlighted as social:

"Why do you put photos in a [printed] photo album, because that takes time and effort doesn't it? And that [sharing on Facebook] is for sharing with an audience." (P3)

Thus, participants spent time when presenting photos online, selecting a subset of *"the best"* photos to upload to Facebook, creating albums (something that was often not done with photos stored on laptops and phones), *"adding interesting captions"* (P13), and on Instagram, *"adding filters to make it prettier"* (P6). This was done with a view to presenting content that others would appreciate, whilst also avoiding overloading them with content:

"There's obviously a lot of stuff that isn't on there from that age, but it must've been my favorite bits from when I was at that age." (P12)

Furthermore, these sites used in combination were interpreted as offering different ways of looking at content, each with unique advantages. P5 describes how Instagram provided a nicer view of her year than Facebook, where holidays were over-represented because photo albums were made to represent them. On Instagram, a quick overview of her year, featuring few duplicates, could be found:

"Because [on Instagram] they are single pictures and it's like a single picture that represents a moment or a single picture from a certain week or a holiday, rather than a whole album, like visually you can see a kind of mosaic, a collage of time of just one photo, you don't have to go into each album." (P5)

She goes on to describe how these different social media collections work together, demonstrating how sites work in concert with offline archives in enabling her to manage and revisit her photo collection:

"There is the collection of absolutely everything which is on my computer, there is the collection of everything which is the best of everything on Facebook, and then there is an even smaller one [on Instagram], which is this nice grid view."

For a minority, social media sites were explicitly curated after posting, as a means of changing the view of the past presented. For example, one participant curated the Facebook Timeline following the breakdown of a relationship, saying that he didn't wish to come across content associated with it in the future, and another edited what was shown on the Timeline when it was first introduced, as it made visible too much content she did not wish to be so easily accessible on her profile page. This part of our findings corresponds well with previous deletion studies that highlight the tension between present and past self-presentation needs [cf. 29, 32]. However, for others, curation was a systematic and ongoing pursuit, aimed at removing content deemed to be no longer 'current' or 'relevant', such as links, conversations or status updates that had expired. This activity was bound up with self-presentation and personal branding:

“Because it was just something I wanted to share with my friends... after a time period I decided to delete it because it is not the actual thing, it is not a current thing (any more).” (P2)

Therefore, although social media is posted in line with a particular expectation of what an audience would be interested in, with its initial value being *social*, the curated collection has *personal* value. As P5 summarizes, *“I’m curating for the public, but I am also curating for the self”*.

Social media is trivial / social media is worth keeping

The second theme deals with where participants perceived value in their social media. This was complex; some social media had evident personal value, some was seen as obviously trivial, but even trivial content could be reinterpreted as meaningful after a period of time.

Nevertheless, most of our participants agreed that the value of social media was often compromised by the fact that it encompasses a breadth of content, ranging from favorite photos and records of important events, to comments and URLs of little relevance, to content that not only had been forgotten about, but that triggered no memories when encountered. This aggregation of large amounts of content made it difficult to find that which is meaningful and of interest, and this was confounded further by the presence of other people’s content, mixed in with one’s own:

“I think the thing is that Facebook is full of a lot of crap as well... so you look at it and say if somebody’s not very good at curating their Facebook they’ll post like a million photos of you and some of them are rubbish.” (P5)

Yet, amongst the trivia lies content about key events. For some participants social media was seen as part of their history; for example P8 had been using the site since she was 14 years old, and P2 noted how the main events in her life were detailed on the site:

“All the big parts (of my life), you know, something I want to share with all my family and friends are on Facebook. Something that’s huge for me, like I don’t know, my degree or something like that. Not every day life really.” (P2)

Often these key events would be represented by a photo (*“If it was really important, I would have a picture [on Facebook]”* – P5), although other types of content, such as comments, were also noted as having value by some:

“I haven’t got a very close family... a lot of them I don’t have their phone numbers but I have them on Facebook. When I got my degree and stuff like that they had congratulations on there, and I would be quite upset if I lost that...” (P6)

However, photos were highlighted as the media type most likely to be of value. Participants generally felt that the

“things that are important to me is pictures, photography, just pictures” (P9). Comments were generally seen as *“of secondary importance to the photo”* (P5) and conversations on the wall, despite being unique to the site, were often deemed trivial, perhaps because they are closest to the ‘tool-like’ and ephemeral aspects of social media use: *“I guess most of the conversations with people [on the site] could be lost”* (P6).

On the other hand, even trivial social media could become valued later: *“... Something will happen to me, like you meet somebody whether it’s whatever a significant other or like just a good friend or something, you’re not going to know whether that first meeting, like the first picture that you had with them was like actually going to mean something to you in a while or not.”* (P4)

In summary, social media comprises a record of key events that are of personal value, which is compromised by the presence of trivial exchanges and other people’s poorly curated content. However, even small communications can become valuable over time.

Social media is a duplicate/ social media is the go-to place

The third theme relates to how personal content is encountered. Participants often compared the archival value of social media in relation to other archives, especially those on laptops and mobile phones. Most participants believed that the content most important to them comprised photos that were also held elsewhere, for example on the phones or cameras they had used to take the photos (see also [17]). Thus, social media sites were seen as comprising lower resolution duplicates of content held in other archives:

“I’ve never taken a picture directly from the Facebook [app]. No. It’s just because Facebook is the base for my communication, so it is ALSO there.” (P9)

Because of this, social media sites did not host as much content as these other repositories and were not considered as *“complete”* (P9) archives. However, some participants did think that Facebook in particular gave a fair representation of occasions they would like to remember:

“It’s definitely not a biography, maybe not 100%, but it could be, why not? In the end I have all important events there, when my friends come and visit me, when I was doing something somewhere, when I visited China... they are all very important to me and they are all here since 2008.” (P12)

The fact that social media sites contained less content was even beneficial in some sense. As already noted, Facebook was seen as a *“curated exhibition”* (P14), and consequently as more selective than other, private, archives. This had the result that the site was, for some, a *“go-to album”* used over and above other repositories:

“When you take photos, there are too many photos and we just select the best to put on Facebook... I don’t even look back my computer, for photos, but just look at the albums on Facebook.” (P13)

“Because it’s ordered, it’s been selected, and it’s been updated in a way that it has meanings and you may want to go back again and look at it. It has more opportunities to be looked at again.” (P14)

However, despite the finding that social media produced an archive that was more frequently encountered, participants were resistant to the idea of disposing of the complete offline collection. They preferred to keep everything, even if this would produce difficulties in managing and revisiting content:

“It’s probably gonna be enough with only the information on Facebook... and I’m not gonna look at 5000 pictures in my computer ever again – but you feel if I lose all the pictures it would be really horrible.” (P12)

This resonates with previous work on digital archiving [31], but it raises an important question that we shall return to in the discussion: as increasing amounts of social media are generated, how can we help users navigate these spaces, as well as their personal digital archives, if they are uncomfortable with the notion of deletion [9, 19]?

Social media is insecure / social media is safe

The fourth theme relates to the perceived reliability of social media sites. This highlights another set of contradictions, in that participants perceived social media sites as both more insecure and more powerful and safe than offline archives. On the one hand, social media sites were seen as transitory, unlikely to withstand the face of technological innovation:

“I see Facebook as very ephemeral. I don’t see it as a repository... It’s just a tool. I mean have you ever seen the old floppy disks?” (P7)

Furthermore, and in line with prior research [21], content on social media sites was associated with a weak sense of control:

“I think the [offline] digital content allows you to hold on to the idea that you own this stuff and it’s yours and you have control over it [...] this gives you a sense of ownership that Facebook doesn’t give.” (P14)

Yet this attitude was transformed in the circumstance of data loss, and for some participants (the younger ones especially) this seemed to be developing into a more general shift. Some participants deleted content from their phones after posting it to Facebook, as a means of freeing up memory on their own devices, and others stored hidden files on their timeline, re-appropriating the site as a means of reliable cloud storage. And of course, social media also offers a way to build shared albums, functionality seen as

supporting file-sharing. Most surprisingly though, some participants expressed the view that Facebook was more reliable than personal devices such as laptops and phones. Again, this opinion was expressed by the younger participants in the study, who had experienced sufficient problems with losing devices or having them fail to see social media as comparatively safe:

“...Because I cannot store a lot of photos on my phone and my laptop is pretty dead, so to be able to like store them and then look back at them [on Facebook]... they are always going to be there.” (P3)

Social media tells a story / an inauthentic history

The final theme relates to narrative, and how social media supports the creation of stories but also can inhibit this through content that is inauthentic to the past. Facebook in particular offered compelling ways of revisiting past content:

“I guess it’s the way it’s presented, you know? Like when you graduate, it’s like a big banner and she’s graduated. She’s got a new job.” (P6)

Some features, such as See Friendship, provide a way of pulling together disjointed social media when revisiting it, creating a narrative from a number of smaller pieces.

“At some point I looked at the friendship between my husband and I, it was very cool because I was able to see pictures and comments and status we have shared since 2009, that’s why I look at it in a story-telling way... not only I can see our pictures at the honeymoon or our wedding, but I can read the comments he used to put up on my wall when we were dating.” (P14)

However, participants noted that some features of social media sites produced a version of the past that was not authentic. Lists of friends and profile pages were both highlighted as comprising content that could not really be revisited as they had been at a particular moment in time, and changes to profile pictures which were propagated through the site also had the result that content was not preserved accurately:

“Well it’s not... because the profile picture has changed. That has changed. So it’s not what exactly as I put it up... and how I put it up [when I look back]. I mean that’s probably why I wouldn’t see it as a repository.” (P7)

A final observation here relates to how participants attempted to preserve aspects of the past when revisiting it, rather than altering old content through new interactions. As noted, prior work points to social norms that deem it inappropriate to surface social media ‘out of time’ [11]. Here we see that doing so may be permitted so long as the content is reinterpreted in relation to the present, while the original artifact is preserved. P12 described how she and

her friends capture screengrabs of old content to discuss on Facebook. This allows them to shift the discussion from the original photo to the photo plus its metadata. Furthermore, the redefinition of the artifact under discussion means that the original object is kept intact, and social norms are maintained:

“[Taking a screenshot of a Facebook content] is like separating it from the original, so taking a picture of what we were before and attach a whole new message to it would make it – so like when you are in a museum kind of thing like you have old documents and stuff that you keep, so it would just make it like a different joke if you see what I mean?” (P12)

This final theme highlights how additional sense-making around significant relationships, major life events or even ‘expired’ content plus its metadata can alter perceptions of social media from the seemingly trivial to meaningful stories. This type of behavior was also evident when making the keepsake, where content that is relevant to a story becomes valued through its aggregation.

DISCUSSION

Our aims for this study were to explore whether social media has value as an archive, given that it is principally understood as an exhibition [12], and to consider whether it can support personal archiving more generally, given the complexities of managing digital content. Our findings suggest that, while social media sites are not really viewed as repositories of valued content, they nevertheless form an archive of sorts, one that is different to but could complement more traditional notions of file stores such as folders of photos and the camera rolls on mobile phones. The content found online is not the ‘complete’ collection that is found on one’s computer, but it does represent a medley that is more selective, easier to browse, and encountered more often.

In this discussion, we develop these ideas further. We first consider what the use of social media in concert with other file stores suggests for the design of digital archives, and whether the curation work done in exhibiting social media to an audience can be translated to a personal, offline, archive. We then consider what implications our findings have for the creation of narratives on social network sites themselves.

Design for Digital Archives

Curation through use

In line with previous work [17], participants in this study used different social media sites for different purposes, and so understood them to host different types of content, some about friendship and family, some about the user’s professional life, some about beautiful photography, and so on. These sites, alongside personal archives stored on their own devices, form a complex repository that suggests different

implications for the design of archiving tools to prior work. Our findings demonstrate that the organization and management of personal content is integrated with its generation for different sites and audiences: in this sense, *curation is inherent to use*. Selective uploading, the formation of photo albums, and the addition of annotation and filters is often simply part of the process of using a social network site.

These findings emphasize that users as well as systems [cf. 12] are curators of social media, as conceptualized as an enduring exhibition. But they also resonate with Kirk and Sellen’s [15] analysis of home archiving. Kirk and Sellen’s focus on cherished objects leads them to highlight three types of storage in the home: objects on display; objects stored for functional use; and objects placed in deep storage. These different types of storage support different values, for example, objects on display support ready reminiscence; objects in functional storage enable the honoring of others through their use; and objects in deep storage support ‘forgetting’, in that one may wish to avoid encountering something, but feel uncomfortable getting rid of it. If we consider a photo album uploaded to Facebook to be on display, and photos on an external hard drive to be in deep storage, we can begin to unpack how these different digital spaces support different values in the same way that different places in the home do.

Like physical objects, photos on display, or that have been exhibited in an online space, seem to support ready reminiscence. Our findings suggest that Facebook and Instagram photos in particular were more frequently encountered than those saved offline, and this is in line with research that suggests photos archives are rarely revisited [31]. Furthermore, the fact that these sites are associated with different audiences, and with different thresholds for posting, means that users have a sense of where to look to re-find meaningful content. Again, this is something that users are known to struggle with when dealing with digital archives [26]. The notion of curation through use, at a time when digital photos are abundant and frequently cited as becoming unmanageable, is a value that should not be underestimated.

Safekeeping and forgetting

A finding that was somewhat unexpected, however, was that users would view social media sites to be reliable repositories. Of course this was not the case for all of our participants, and issues relating to a lack of sense of ownership arose here as they have done in prior work [21]. However, some of our participants were beginning to see social media sites as the locale where their content was most likely to persist, and this was especially the case for younger users. This obviously raises challenges, notwithstanding what would happen in the face of data loss or accounts being shut down. Returning to Kirk and Sellen’s [15] storage

types, social media cannot be put into deep storage, an action that is necessary if an archival space is to be multifaceted and persist over time. We saw clear examples of this limitation in our data, whereby deletion of online content would be done for a range of reasons, from hiding from an audience to hiding from oneself, or ‘forgetting’, as Kirk and Sellen describe it. If one wishes to forget, there is only one option on a social media site, and that is to delete. The feature ‘to hide’ on Facebook means hiding from others, not hiding from oneself. Yet it is quite possible that the participant who had broken up with his girlfriend would have preferred some other option to the rather blunt ‘delete’ to deal with content relating to her (see also [28]). If social media sites represent ‘objects on display’, being able to take objects ‘off’ display and selectively download them or make them invisible to oneself, whilst supporting safekeeping, seems desirable.

This suggests the value of a design space around bridging online and offline spaces, and being able to translate the curation work done in exhibiting content online to an offline, private space. For example, if users find it difficult to manage their digital photo collections, but undertake a form of curation when they choose which photos to upload to the internet, it may be worth reflecting this in offline collections as well. If an operating system could indicate which photos are on Facebook and the tags associated with it, this could support users in navigating offline, higher resolution, versions of those same photos in an offline (and private) space. Further, it could indicate which photos the user might want to back up elsewhere, and may even support ‘forgetting’. For example, photos that are deleted from Facebook could also be suppressed offline, by being hidden in features such as the random slideshows of photos that run on personal devices.

Of course, it is important to acknowledge that, while there may be benefits in reflecting the curation work done through using social media sites offline, the translation is unlikely to be perfect. Curation for exhibition is different to curation for archiving, and while the former may provide a starting point for the latter, it cannot provide a complete solution. It is worth noting also that both repositories have their limitations. Just as is the case with personal digital archives, users of social media sites can struggle to marshal out important and meaningful things in the increasing volume of content. The abundance of social media meant that participants encountered difficulties when looking back and making sense of it. Supporting users in filtering this content, or transforming it into a more compelling narrative, is the final point we wish to explore in this discussion.

Building Personal Narratives from Social Media

Bamberg and Georgakopoulou [2] argue that ‘small stories’, including tellings of on-going, future, hypothetical, and shared events, are used by people in everyday, mun-

dane situations to create a sense of who they are. While their focus is on synchronous conversation, social media content, as captured through individuals’ day-to-day interactions with their network, can similarly be considered instances of the talked-about that have a role to play in identity work. Page [23] has argued that social network users are adept at creating narratives out of the small stories they post on social network sites, and in this study we see how certain site features, such as See Friendship, as well as the activity of building a keepsake in itself, can be used to produce larger narratives. However, in order to make these narratives compelling, small stories need further selection, filtering, and sense-making.

It was notable that support for this sense-making was largely lacking on social network sites. See Friendship was the exception here, but features such as the Facebook Timeline, which are intended to produce ‘the story of your life’, tended to comprise too much trivial and mixed content to live up to this claim. It has been argued that time is ‘configured’ rather than simply reproduced in the formation of narratives about the past; the past is drawn on selectively when forming life stories [e.g. 4]. We suggest that social media sites could offer a greater range of actions that could be used in the formation of these narratives. One possibility would be to give users the option to privately ‘favorite’ photos; actions such as download or print that indicate preference might also be capitalized upon here. These favorites could be used as anchors to other related content, supporting sense-making and the creation of a framework for browsing when revisiting past content. Finally, and returning to the observation that users seem more motivated to ‘curate’ their content if reaching out to an audience than if simply keeping it for themselves, we suggest the possibility of supporting the formation of new narratives through interaction and sharing with others. For example, this could be accomplished by shifting the ‘unit’ in social media sites from a single piece of content to content plus metadata, or even to a collage of multiple pieces of content. This could encourage users to draw social media together in meaningful ways, and to potentially resurface it ‘out of time’, without breaking social norms, as one of our participants did through the use of screengrabs. If social media sites could capitalize on connections between old and new conversations about the same content, this could also facilitate the browsing and formation of new narratives.

CONCLUSION

Findings from our qualitative study suggest that, while social media sites are not explicitly viewed as archives, they nevertheless form a repository that could complement personal file stores. Social media is curated through use, and thus comprises a collection that is selective, organized, and annotated. It is more encountered than content in private archives, and so supports ready reminiscing. And it can be more reliable than private archives; for those who have had the experience of losing their own devices or have had them fail, social media can become the back-up. However, the

concept of social media sites as archival is limited by the presence of data considered trivial and tensions over ownership and authenticity. We conclude by highlighting the possibilities for bridging social media and personal archives as a potential way forward. Personal archives could benefit from being imbued with some of the curation that is inherent to social media use; reflecting which content has been uploaded, and to where, could offer a novel way of filtering the higher-resolution photos stored on a personal computer. Conversely, social media sites could benefit from a richer grammar of action [cf. 10], allowing users to place content in deep storage or otherwise ‘keep’ it. Identifying meaningful social media through such actions, for example by picking up on what has been printed or downloaded, could offer a more natural way of structuring reflective sense-making on social network sites. In conclusion, unpacking the personal value of social media may mean pulling online and offline archives together, so that actions in one are echoed across the other.

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