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ENTIRE HISTORY OF YOU: RESEARCH AND DESIGN TO MANAGE DIGITAL HOARDING

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

ÇAĞIN BAŞKAN

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ENTIRE HISTORY OF YOU: RESEARCH AND DESIGN TO MANAGE DIGITAL HOARDING

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ABSTRACT

ENTIRE HISTORY OF YOU: RESEARCH AND DESIGN TO MANAGE DIGITAL HOARDING

Başkan, Çağın
Master of Science, Industrial Design
Supervisor: Prof. Dr. Owain Pedgley

September 2021, 224 pages

Digital hoarding is very common, considering the quantity of devices (phones, cameras, laptops, watches) that can create an entire 'history of ourselves.' A digital history is directly connected to our memories, having varied emotional importance, making it hard to archive and prioritize. In turn, this causes the data to grow and become harder to navigate or reduce. The research examines how digital hoarding in terms of visual data (photographs and videos) exists and is managed by users. Interviews are made to understand motives and experiences related to digital hoarding along with the current digital tools used to manage personal visual archives. The findings are used to establish to which degree the user experience of existing digital tools is sufficient for managing hoarded visuals. For the second phase of the work, a 'research through design' approach is taken to offer design features that can help manage and provide access to digital memories in a way that is satisfying and engaging for users. Outcomes of the thesis are presented as insights for future researchers and designers.

Keywords: User Experience, Digital Hoarding, Digital Image Curation, Personal Information Management, User-Product Interaction

ÖZ

SENİN TÜM TARİHİN: DİJİTAL İSTİFLEMEYİ YÖNETMEK İÇİN ARAŞTIRMA VE TASARIM

Başkan, Çağın
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Tez Yöneticisi: Prof. Dr. Owain Pedgley

Eylül 2021, 224 sayfa

"Kendi tarihimizi" yaratmak için kullandığımız cihazların (telefonlar, kameralar, dizüstü bilgisayarlar, saatler) miktarı göz önüne alındığında, dijital istifleme çok yaygın olduğu yadsınamaz. Dijital tarihimiz, anılarımızla doğrudan bağlantılıdır ve çeşitli duygusal öneme sahiptir, bu da arşivlemeyi ve önceliklendirme işini zorlaştırır. Bu durum arşivimizdeki verilerin giderek büyümesine, gerekli elemelerin yapılmasınının ve arşivde gezinmenin zorlaşmasına neden olur. Bu araştırmada görsel veriler (fotoğraflar ve videolar) özelinde dijital istiflemenin nasıl var olduğunu ve kullanıcılar tarafından nasıl yönetildiği incelenmiştir. Kişisel görsel arşivleri yönetmek için kullanılan mevcut dijital araçlarla birlikte dijital istifleme ile ilgili alışkanlıkları ve deneyimleri anlamak için görüşmeler yapılacaktır. Bulgular, mevcut dijital araçların kullanıcı deneyiminin, birikmiş görselleri yönetmek için ne derece yeterli olduğunu belirlemek için kullanılacaktır. Çalışmanın ikinci aşaması için, dijital belleklerin kullanıcılar için tatmin edici ve ilgi çekici bir şekilde yönetilmesine ve bunlara erişim sağlanmasına yardımcı olabilecek tasarım özellikleri sunmak için bir 'tasarım yoluyla araştırma' yaklaşımı benimsenmiştir. Tezin çıktıları, gelecekteki araştırmacılar ve tasarımcılar için yol gösterici fikirler olarak sunulmuştur.

Anahtar Kelimeler: Kullanıcı Deneyimi, Dijital İstifleme, Dijital Görüntü Kürasyonu, Kişisel Bilgi Yönetimi, Kullanıcı-Ürün Etkileşimi

To my dear mum and dad…

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ABBREVIATIONS

UX	User Experience
PIM	Personal Information Management
FM	File Management
HCI	Human Computer Interaction
IoT	Internet of Things

CHAPTER 1

INTRODUCTION

Imagine a world where we have the capability to record and keep accurate records of everything we see for our future reference. “The Entire History of You” episode of the British television series Black Mirror discovers the nature of the memory in a context where people record everything they see and hear with the help of a device called ‘grain’ worn as an eye lens. It also allows them to store all of their memories in one place, giving them access to any memory they want to access and share with others. With a dystopian narrative on technology, this episode of the series critically examines the phenomenon of digital hoarding via visuals and gives us a look at where we might be heading. Even though we are not there yet, digital photography has come a long way from the first-ever digital camera invented by the Kodak engineer Steve Sasson in 1975, changing people’s personal practices with personal collections.

As digital cameras become more accessible and an embodied part of our daily lives as smart phones, the amount of digital memories as visuals produced by an individual has increased. As Van House (2011) stated, “The shift to digital technologies has, if anything, increased the use of and enthusiasm for photography” (p. 125). With storage options as hardware and software become cheaper and accessible too, the size of people's collections has only increased, creating ‘history of ourselves’. Digital images are everyday file types for the general population, providing shared and personal meaning triggering memories, life events, information recall and more. To visualize the growing collections of digital memories, Broekhuijsen (2018), created a visual representing own photo collection (Figure 1.1). Broekhuijsen (2018) expressed the drastic change in graphic due to his first digital camera he acquired on 2008, his first Digital Single Lens Reflex (DSLR) camera and a smartphone with a

good quality camera he acquired both in 2011 which enabled him to shoot more photos of mundane events throughout the years. Van House (2011) states this is a transition more smartphone users notice. In addition to this, people are not only dealing with the images produces by own capturing behavior, but also have to deal with all the media that is created by others, added into their own collections. (Broekhuijsen, 2018)

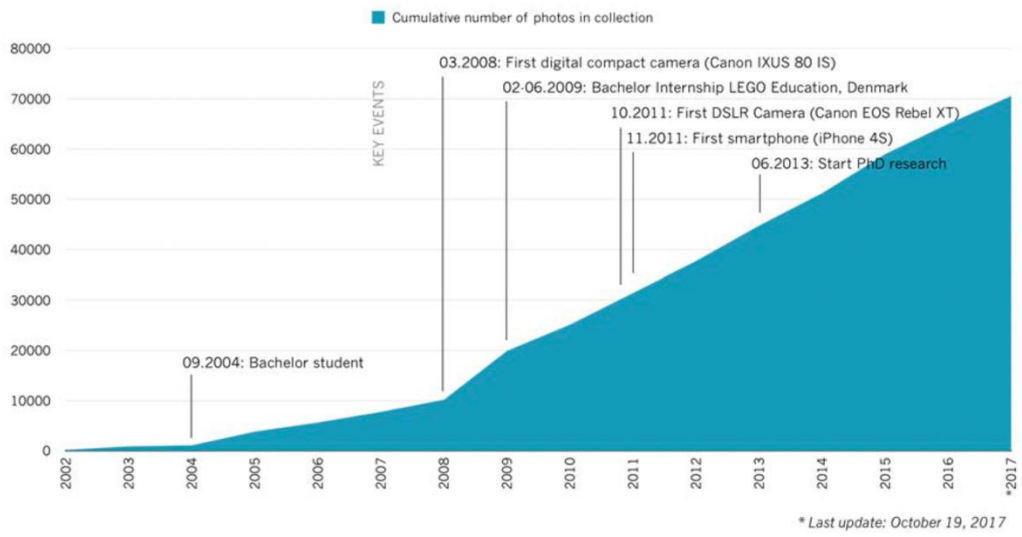

Figure 1.1. Statistics of own personal collection, showing its growth between 2002- 2017 (Broekhuijsen, 2018)

With these technological developments mentioned and people's capturing behaviour developing more and more, massive and diverse collection of digital visual possessions are created, which leads to diminishing value of each one and making it hard to interact with them. As Kaye et al. (2006) stated, "The problem of personal archiving, in a nutshell, is that we collect more documents and objects than we can immediately access.". Acknowledging these issues, this study mainly focus on hoarding related to digital images that creates personal digital archives. When it comes to personal archiving, it is not possible to separate archiving with curation practices. Whittaker (2011) described three stages people experience during curation: keeping, managing and exploiting. These stages may also be equivalated

to storing, organizing, and using. Existing digital tools offer several solutions regarding each step of the curation cycle, yet this study intends to discover to which degree the user experience of these existing tools is sufficient, find out what dimensions of UX are unsatisfactory in the current curation process and how they might be improved to create better experiences for users regarding their digital visual archives. The study takes a UX approach to better understand how the curation process of digital visuals can be improved from a user centered perspective.

1.1 Aim and Objectives of the Study

The main aim of the study is to understand the opportunities to improve user experience of digital tools used to manage and navigate through one's personal digital history of images and videos and to respond to the issue of digital hoarding. In order to understand those opportunities, this study acknowledges that user's motivations, behaviors and strategies on curation of their own personal digital history, their experience with current digital tools should be understood. The objectives for this study can be summarized as follows:

- To analyze underlying motivations of digital hoarding related to visuals and how it affects users' decisions on archiving and prioritizing their digital history.

- To understand users' behaviors and strategies on archiving and prioritizing digital history regarding visuals and assess the change in those habits in accordance with different digital tools.

- To examine how different digital tools contribute to managing digitally hoarded visual content and evaluate their experience.

- To offer insights for designers aiming to build a tool that helps manage personal digital history regarding visuals and provide access to digital memories in a way that is satisfying, engaging and enjoyable for users.

1.2 Research Questions

The main research question is:

- How can the curation experience of digital visuals on our personal electronics be improved?

To help answer the main research question, secondary research questions are determined:

- What are the strategies or tendencies people use while keeping, managing and exploiting their personal digital history related to digital visuals?

- How do existing tools shape personal data management experience in terms of digital visuals?

- In which aspects are existing digital tools incapable of satisfying the needs and expectations of users in terms of personal data management experience regarding digital visual curation?

1.3 Structure of the Thesis

The thesis has been structured into seven chapters:

Chapter 1, *Introduction,* draws attention to the background of the problem and presents the research aim, objectives and research questions.

Chapter 2, *Literature Review,* discovers related literature. The chapter starts with introducing the terms Physical and Digital Hoarding, Personal Information Management. After covering Data Types that Created Digital History, the chapter focuses on Hoarding in Relation to Digital Photos and Videos and literature related to it. Steps of Digital Curation Cycle are examined in detail, followed by Digital Tools used in Curation of Digital Visual Possessions. The chapter ends by discovering related User Experience literature and frameworks.

Chapter 3, *Methodology,* explains the methodological structure of the research and presents an overview of the empirical study. The empirical study, which comprises three parts (Survey, Semi-structured interviews and Focus group), embedded with several design responses, is explained in detail.

Chapter 4, *Empirical Research Part 1: Survey,* presents and discusses the qualitative and quantitative outcomes of the survey.

Chapter 5, *Empirical Research Part 2: Interviews,* presents and discusses the outcomes the semi-structured interviews. Insights from the literature review, survey and interviews are used to generate design solutions in the form of plausible new features to manage digital hoarding to be evaluated during the last part of the empirical research.

Chapter 6, *Empirical Research Part 3: Focus Group,* presents and discusses the outcomes of the focus group and includes an evaluation of the plausible new features to manage digital hoarding, presented in Chapter 5.

Chapter 7, *Conclusion*, provides an overview of the highlights of the research and presents the limitations of the study along with discussions on some opportunities for future studies. The chapter also summarizes answers to the research questions.

CHAPTER 2

LITERATURE REVIEW

2.1 Personal Accumulation

Houses are full of objects that remind us of the times we had, we surround ourselves with items that we find meaningful and relate with some memories. Over the years we continue to accumulate possessions; as we change in time, the form of the possessions we have can change too. Only the desire to accumulate stays the same. As Caldwell et al. (2010) stated, "It is part of being human to store and accumulate things. It relates to our preservation instincts to hunt and to store items" (p.9).

2.1.1 Physical Hoarding

Most people tend to accumulate things that have meaning to them over their lifetimes. As Grisham and Barlow (2005) stated, such behavior might be adaptive by ensuring survival when specific resources become scarce. However, in some cases, these 'normal' hoarding behaviors become pathological and transition to Hoarding Disorder (Frost & Gross, 1993). Frost & Gross (1993) defined *hoarding* as ''the acquisition of, and failure to discard, possessions which appear to be useless or of limited value'' (p. 367). A person with extreme hoarding disorder shows great unwillingness to discard any items, thus leading to extensive clutter in their living spaces, such that daily routines (like cooking, bathing) become almost impossible. This situation leads to significant distress and/or impairment of normal functioning (Frost & Gross, 1993). In literature, the underlying motivations of this tendency and disorder have been discussed over the years. Adler, Csikszentmihalyi & Rochberg-Halton (1983) tried to explain this as "Meaning, not possessions, is the ultimate goal of people's lives, and the fruits of technology [...] cannot alone provide this. People

still need to know [...] that they are remembered and loved, and that their individual self is part of some greater design beyond the fleeting span of mortal years" (p.9).

2.1.2 Digital Hoarding

As we live in an increasingly digital age and our everyday practices and routines change with it, this tendency starts to change and form new terms. As people share more information online, they may form deep attachments to certain digital materials, with such materials becoming more deeply ingrained in our personal and working lives (Gulotta, Odom, Forlizzi, & Faste, 2013). Research has shown that people perceive their 'self' as extending to their digital possessions and become increasingly 'attached' to them (Cushing, 2011). It is thus interesting to speculate to what extent the hoarding of physical possessions has similarities to the accumulation of digital possessions (Sweeten, Sillence & Neave ,2018). The existence of "digital hoarding" has been speculated on various online forums, blogs, and the media. With the increase in unlimited possibilities for digital storage, the predictions show that digital material hoarding may become an increasing problem. The first authors to address and name this situation was Bennekom, Blom, Vulink, Denys (2015). In their article they defined Digital Hoarding as "accumulation of digital files to the point of loss of perspective, which eventually results in stress and disorganization" (p.1) and defined digital hoarding as a new subtype of Hoarding Disorder. They also stated that even though there is no clear impact of digital hoarding on physical living spaces, it is possible that personal and professional life can still be affected by digital hoarding behaviours. The study conducted by Sweeten, Sillence & Neave (2018), proves this situation. In this study, it is reported that having a large quantity of digital materials available and accessible was perceived negatively and often described in terms of 'digital clutter' among the participants of the study. They also reported that digital clutter was seen as distracting, reduced concentration, and efficiency.

As it is mentioned before, hoarding is considered as a mental disorder. However, it is seen that in the literature related to digital data management, the term 'hoarding'

is used as a word to state an extreme in a spectrum. Vitale (2019) expressed two extremes of this spectrum: hoarding and minimalism. In his research, he realized that hoarding had both an emotional and practical role for participants: participants kept most of their data as they were attached to data or wanted to record things. Organizing large quantities of data made some participants face some challenges. Some participants, on the other hand, tended to discard as much data as possible. He labelled this extreme "minimalism", in which participants cleaned up their data on a regular basis or avoided excessive downloading. Some participants shared underlying tendencies to minimize the amount of money or time they spend on technology and data management. He expressed the reason why they framed the tendencies as a spectrum as participants having diverse attitudes toward their data, with a general approach guiding their decisions and some exceptions depending on different data types. As Bennekom, Blom, Vulink & Denys (2015) also mentioned, "digital hoarding is pathological when it crosses the line of interference with other aspects of life" (p.3). In this thesis research, digital hoarding will not be mentioned or considered as a mental disorder, but instead as an extreme form of keeping possessions, as in the spectrum offered by Vitale (2019). As this thesis is mainly focused on "hoarding of digital possessions", the following sections will examine terms and concepts discussed in the literature related to this context.

2.2 Personal Information Management (PIM)

Personal Information Management (PIM) is the storage, organization, and retrieval of information by an individual for their own use (Bergman, Boardman, Gwizdka & Jones, 2004). It is a fundamental aspect of computer-based activity as millions of people manage personal information like files, email, contacts, bookmarks, reminders, etc., every day for the context of work or leisure. Improved PIM means better use of precious resources like time, money, energy, and attention (Bergman, Boardman, Gwizdka & Jones, 2004). Even though several early studies focus on physical information and how to improve users' management practices in the transformation from physical to digital, as most of daily life shifted to digital, studies

are now more focused on emerging types of information such as computer documents, emails, contacts, etc. (Vitale, 2020).

With the enormous shift from physical to digital, users spend remarkable time every day with digital files and folders including creating, downloading, naming, moving, saving, copying, reviewing, navigating, searching for, sharing, and deleting. All of these activities are alternatively known as "File Management" (Dinneen & Julien, 2020). As it is limited with files and folders, File Management has a relatively narrower focus than PIM. Vitale (2020) visualized the relation between the terms Personal Data Management, Personal Information Management, and File Management (see Figure 2.1.) (The size of the circles in this illustration represents how broad the focus of each term is, not their importance.). As it is seen in the Figure 2.1., Personal Data Management is the broadest of all, followed by PIM, which is followed by File Management.

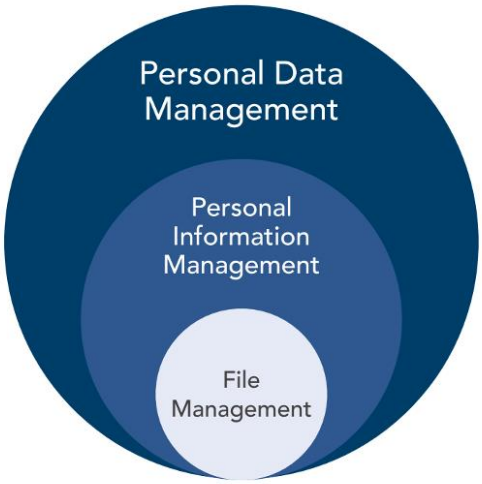

Figure 2.1. Personal Data Management- Personal Information Management- File Management (Vitale, 2020)

Recently, terms like "personal data," "digital data," and "digital or virtual possessions" become more common in HCI studies, replacing "personal information". As Vitale (2020) discussed, this shift is a signal of an expanded focus

which includes emerging types of data such as social network data, location data, lifelogging data, metadata, and so on. He also predicts that with new voice and virtual assistant devices and IoT (Internet of Things) products becoming more prevalent, even more types of data will become part of daily life which feel increasingly personal.

2.3 Data Types and Creating Digital History

Photos, videos, emails, voice notes, and documents: these are all examples of the kinds of data one has located in computers or smart phones, which in combination create a digital history of everyone. People carry their digital history with them on their smart phones and laptops, whilst dividing their history on those devices onto cloud platforms, external hard disks, and sharing glimpses of their history through uploads to social media. Personal data can take many forms, ranging from photos to files and logs, and they live in ecosystems made up of multiple devices and services with online cloud storage are now more prominent than ever (Vertesi et al., 2016).

Figure 2.2. visualizes the various types of data creating our digital history which is created by researcher herself to help visualize the subject. Even though the main aim is to be as extensive as possible, it is not claimed it to be fully extensive and includes some examples.

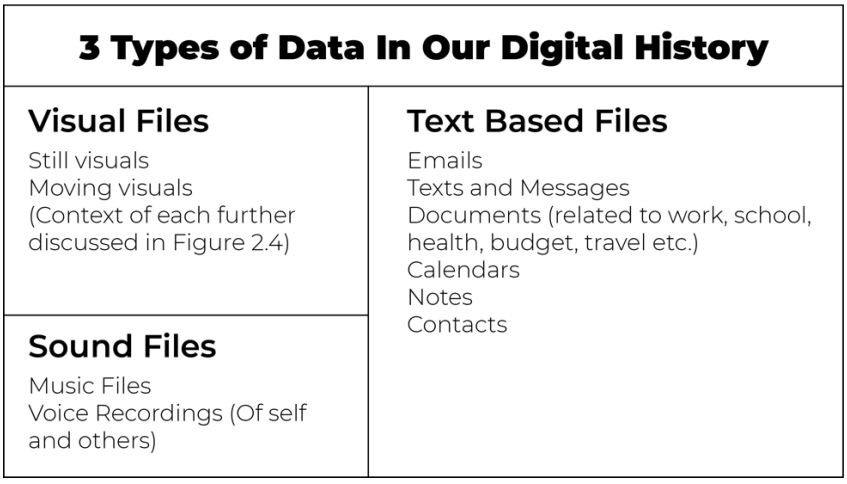

Figure 2.2. Examples of data types in our digital history

Vitale (2020) created a taxonomy of personal data types, derived from the kinds of data that survey participants reported decluttering. He groups different data types into six macro-areas: documents, organization, communication, media, system data, logging data (see Figure 2.3.).

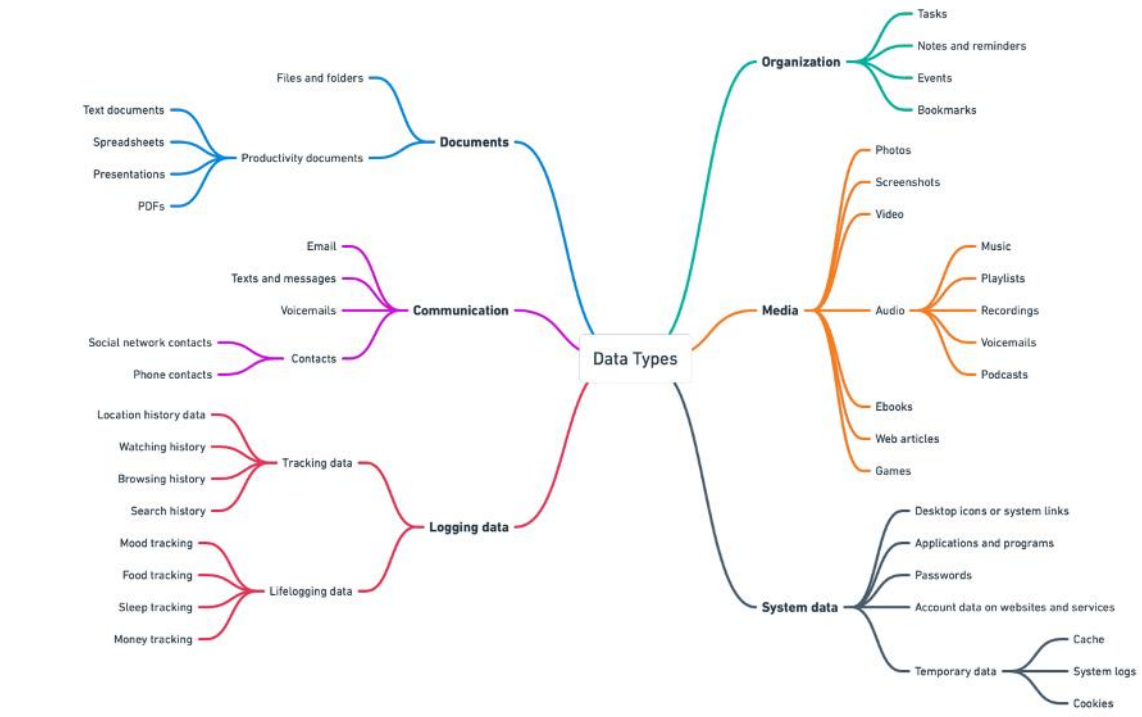

Figure 2.3. A taxonomy of data types (Vitale, 2020)

Previous studies report several reasons why people engage in personal data creation, revealing motivations behind creating digital history. Vitale (2020) listed some of the reasons in his study: to build a legacy (Gulotta et al., 2013), support memory (Jones & Ackerman, 2016), manage and honor relationships (Vertesi et al., 2016), find things later (Kaye et al., 2006), or present their image to others (Odom et al., 2011).

As mentioned before, this current research will examine “hoarding of digital possessions”. According to Vitale (2020), users have a chance of experiencing visual files and folders as different from information that are more integrated into specific

applications, such as contacts or bookmarks. Considering strategies and management methods can change based on different data types, and it is important to set a clear focus in order to reach accurate findings, this research will be purposefully restricted to digital visual possessions such as photos and videos. These are the most common hoarded data type among people and based on file sizes, occupies the most space across devices and systems.

2.4 Hoarding in Relation to Digital Photos and Videos

The accessibility of smartphones and digital cameras to the common society, along with increased data storage capacities, has facilitated the creation of large visual datasets by individuals. With barely no restrictions on the number of images or videos that can be taken, several photos of the same object or scene that are only slightly different or identical can be observed in people's collections (Kang & Shneiderman, 2000). Broekhuijsen, Hoven & Markopoulos (2017) compares to sizes of photo collections of individuals transforming from in the order of hundreds to in the order of tens of thousands after the introduction of digital photography. The existence of tools for creating content, such as communication applications including WhatsApp, and Social Media (Facebook, Instagram etc.) have added to the accumulation. Kirk et al. (2006) also mentioned the freedom to "tinker" with images, such as cropping, editing colors, or Photoshopping practices like eliminating red-eye, as a justification for multiple copies of similar images, as well as technologies that enable users to collage images to produce related yet new versions of images, as reasons for multiple copies of similar images. This ease of replication allows the same image to appear in many places, fulfilling different purposes. These various techniques for adjustment, when taken together, result in more flexibility in our photo practices, but they also demand more complexity in the types of activities users carry out and the organizational systems in which they interact (Kirk et al., 2006).

As Bergman & Whittaker (2016) stated, it is critical to understand that not all the personal data is self-created. Even though the majority of domestic photo collections contains photos related to holidays, birthdays and other personal events, there are other kinds of photos that end up in collections such as saved Web images, screenshots, snapshots of receipts, and boarding passes (Broekhuijsen, Hoven & Markopoulos, 2017). Broekhuijsen, Hoven & Markopoulos (2017), defined two parts of the process of expanding a personal photo collection (alternatively known as accumulating photos): Capturing (taking pictures; on-device quality triage to determine retaking the picture) and Collecting (adding pictures to your collection, which you did not capture yourself).

The figures overleaf illustrate what digital image content includes (see Figure 2.4.) and investigate where all the digital image content comes from and where it might reside (see Figure 2.5.). It is important to note that especially for Figure 2.4., the categories that are defined are highly connected and nested. These figures are created by the thesis researcher: even though they are inspired from reviewed literature, they are mostly based on self and collaborative brainstorming with other researchers and created to further visualize the context of this research.

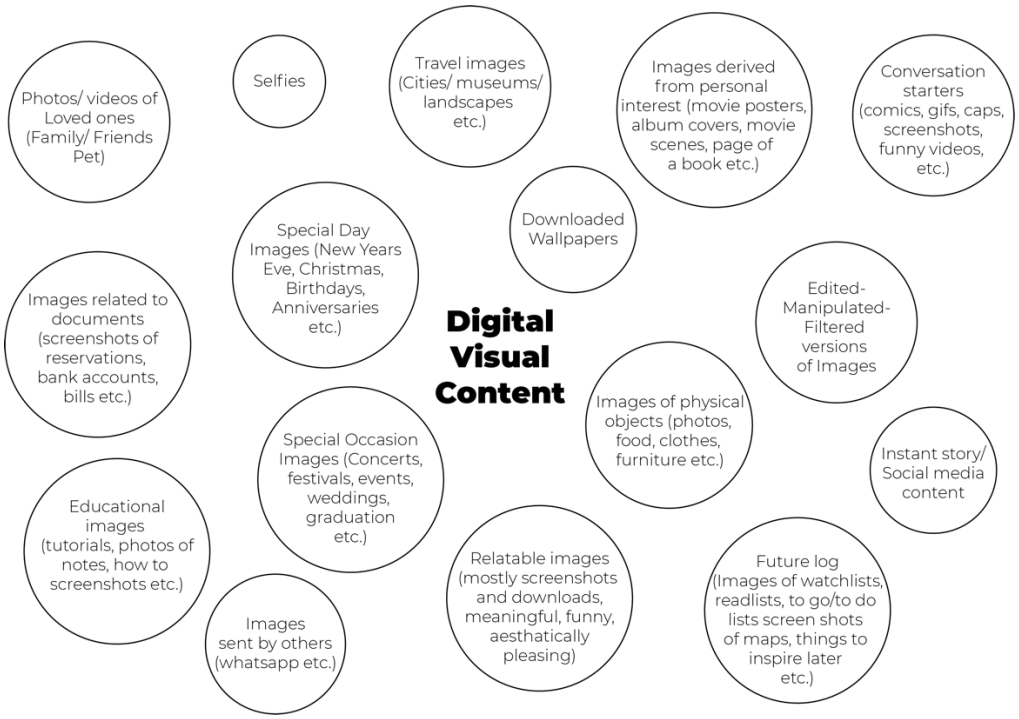

Figure 2.4. Digital Visual Content

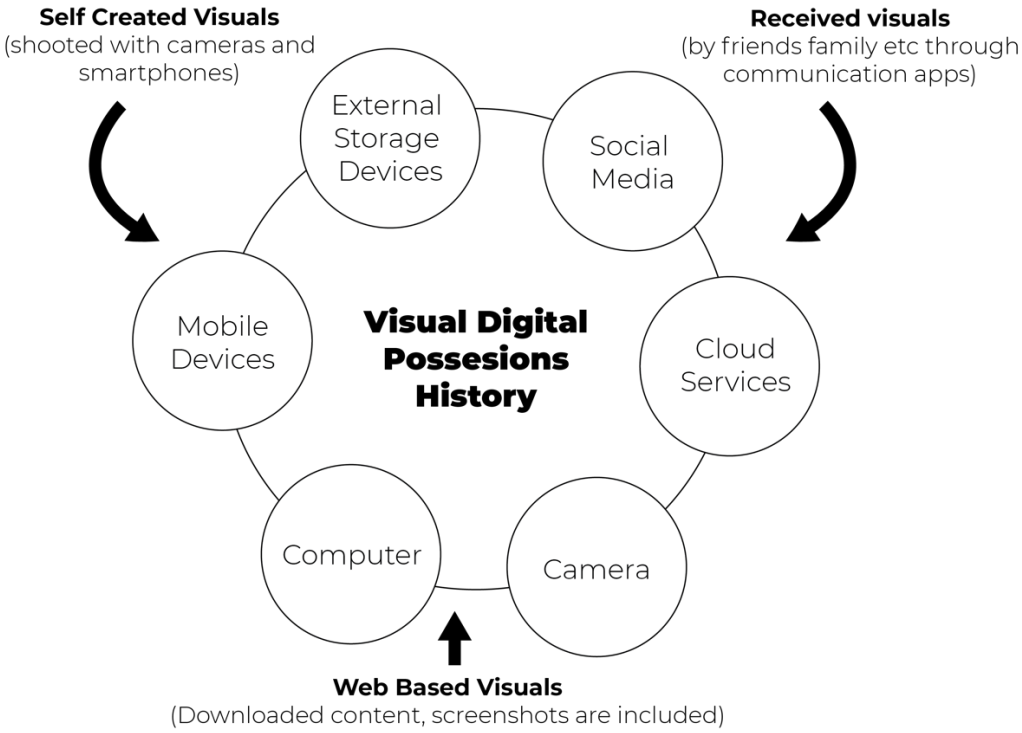

Figure 2.5. Where images come from and where they might reside

Sentimental possessions like photos can serve in the recall of important moments and interactions from one's memory by serving as symbols of significant life events (Kirk et al., 2010). This is also revealed in Vitale's (2020) study, where participants mention how photographs helped them recall things and how difficult it would be to get those photographs (and the associated recollections) back if they lost them, directly quoting from one of his participants: "I can't retake those photos [...] I'm emotionally attached to them [...] Music, I can always download again. It seems like photos are less replaceable". The images we take or gather for our personal collections also take on personal significance as external representations that can cause autobiographical memories (Hoven & Eggen, 2014). As Guenther (1998) stated, memories cannot be saved as a digital or physical record; instead, they must be reconstructed any time they are retrieved. However, external items that can help in memory reconstruction can be stored (Sellen & Whittaker, 2010). This shows that memory curation is an important part of media-assisted autobiographical recalling (Broekhuijsen, Hoven & Markopoulos, 2017) Also it is important to note that the use of photos for communication and identity forming is more common than the use of photos for remembering purposes, particularly among younger generations (van Dijck, 2008). The autobiographical importance of photographs can also help us engage with others, such as while sharing a story about a vacation while watching a slideshow of pre-selected photographs (Broekhuijsen, Hoven & Markopoulos, 2017).

Kirk et al. (2006), introduced PhotoWork, a descriptive flow-chart model that covers the most frequent interactions with digital images during capture and share stages, aiming to be used in the development and assessment process of new digital image management tools. PhotoWork (Figure 2.6.) defines three stages between capturing and sharing of images: Pre-download stage, At-download Stage and Pre-share stage. After capturing an image, the pre-download stage involves choosing and eliminating on the device. When uploading images to the computer, the at-download stage involves eliminating on computer, editing, organizing, storage, and backup. And

lastly, the Pre-share stage includes sorting, choosing a subset, quick editing, copying, printing, and sending. However, Broekhuijsen et al. (2017) commented on this model as the steps outlined tending to be the ones that are required by photo technologies rather than how people choose to do stuff. They also indicated that this model emphasizes user tasks, such as curation, and designing for efficiency, rather than opportunities to design for a better user experience.

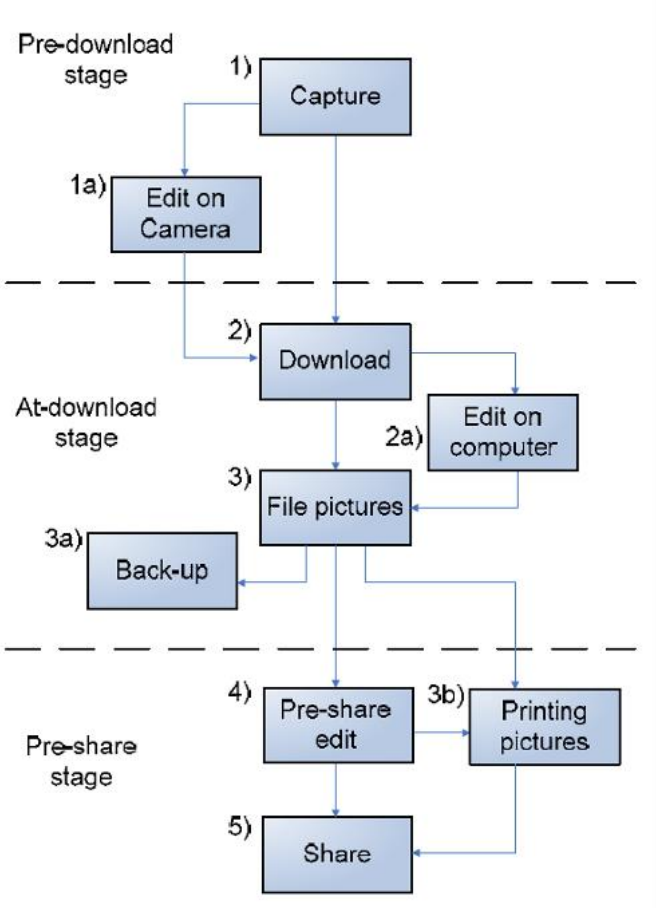

Figure 2.6. Flow diagram of PhotoWork lifecycle (Kirk et al., 2006)

Broekhuijsen et al. (2017) stated that to allow pleasurable and effective editing and access to photo libraries, most apps have used modern interaction methods supported by smartphones or multi-touch surfaces. However, they also stated that this is insufficient to solve the problems of organizing and restoring images in their totality. To gain deeper insights on the subject, they conducted a study revealing why people engage with their photos. They defined three common purposes: individual, social,

or utilitarian. Individual reminiscing and recalling memories, browsing for leisure, and creating collages for decoration are examples of individual purpose. Social purpose includes storytelling and shared viewing & reminiscing. Lastly, searching for specific knowledge as a hobby or technical interest; optimizing the organization involves utilitarian purposes. Combining the photo activities which they defined in the same study with the purposes, they proposed the model PhotoUse (Figure 2.7.). To illustrate their focus on the purposes that motivate the behavior, they placed purposes around the activities. ("The outer circle displays the social, individual, and utilitarian purposes that motivate the photo activities. The middle circle displays the 4 photo activity types; the inner circle displays the 13 photo activity categories.")

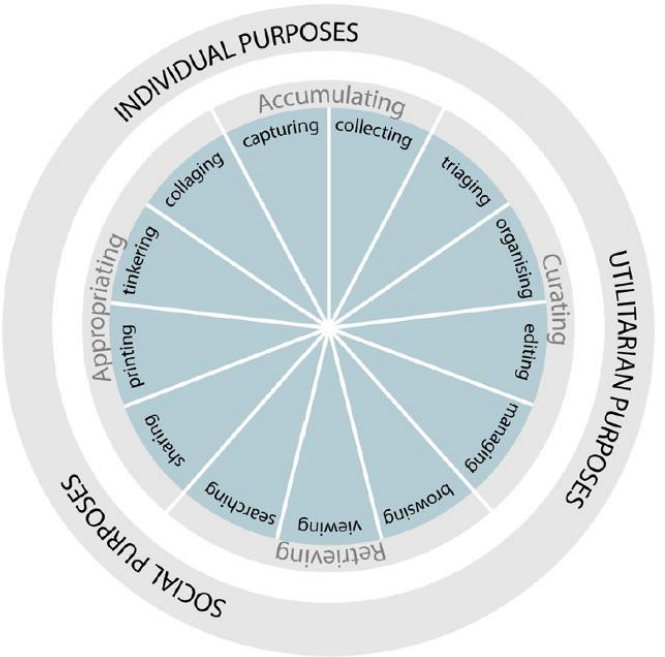

Figure 2.7. Model of PhotoUse (Broekhuijsen et al., 2017)

Even though the PhotoWork model remains inadequate to cover user experience, considering efficiency is a pre-requisite for better user experience as it will be discussed in the next related sections, it remains valuable in the scope of this study alongside the PhotoUse model, which achieves insights on user experience by providing a more detailed framework that includes motivations and visual data related activities based on previous studies. The next section will examine Digital

Data Preservation as a Curation Cycle with a more comprehensive model from the literature.

2.5 Digital Data Preservation as a Curation Cycle: A Closer Look to All Curation Steps

In their digital worlds, people are actively engaged in preservation and curation behaviours. And if we were to, we don't erase the less suitable versions of the ten separate versions of a picture we took on our last vacation. We take great care to keep personal pictures safe over time. There are lots of examples of people preserving and managing personal possessions in order to benefit from them in the future. A study of digital photos made by Whittaker, Bergman, & Clough (2010) found over 4000 personal pictures are stored on people's hard drives. New technologies like digital videos and smartphones, are making it easier to record new forms of digital virtual possessions. Furthermore, this development, along with ongoing price reductions in digital hard and solid-state drives, means that people's drives are now filling up with massive collections of personal images and videos (Whittaker, 2011). Clouds are now making it more difficult for people to reduce their digital possessions too. People not having the time, tools, or patience to manage all the cluttered images prevent them from thoroughly enjoying their collections (Kirk et al., 2006), and the challenge in this situation is how to help people curate their collection of digital visuals better (Broekhuijsen, Hoven & Markopoulos, 2017). In order to achieve this, one should have a better understanding of the curation process.

Amongst the literature that has discussed digital hoarding and its related concepts, so far Whittaker's (2011) curation cycle model is the most used to evaluate findings and arguments. In the data preservation process, according to Whittaker, users experience an information curation cycle. He describes three different stages or broad activities that people engage in during curation: keeping (deciding what to keep or discard), managing (actually organizing what has been kept, using folders or other structures), and exploiting (searching for, finding, and using what has been

kept) (Figure 2.8.). At this point it is important to note that he states, "Curation involves future oriented activities, more specifically the set of practices that select, maintain, and manage information in ways that are intended to promote future consumption of that information."

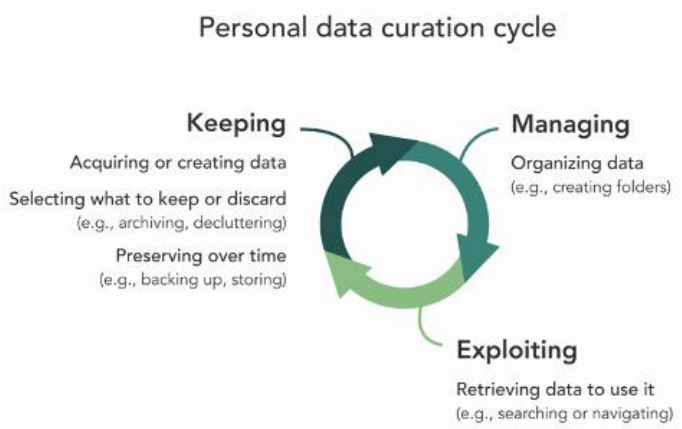

Figure 2.8. An illustrative elaboration of Whittaker's personal data curation cycle, visualized by Vitale (2020)

2.5.1 Keeping

Keeping or discarding digital data is a complex decision that is influenced by several factors including when it is expected to be needed later and the context in which it will be needed. Vitale (2020) in his study, made a list of common decluttering reasons among his participants in media files (photos and videos): duplicates; large size; blurry photos; unflattering photos; emotional content (e.g., post-breakup); irrelevant content; disliked content; not-safe-for-work content; shared or sent by others; containing sensitive information; used in another document (i.e., as attachment); content already consumed; unused. As digital photography enabled the creation of lots of digital visuals, so the emergence of cheap storage technology has brought an ability to preserve those visuals, as well as the visuals that are candidates to be decluttered.

In a study conducted by Whittaker (2011), parents with young families were investigated, revealing an average possession of 4475 digital pictures. During the

shooting and transferring processes, all participants were asked to delete some images. Participants claimed that they removed 17% of the photographs due to low technical content or the absence of an interesting incident in the shot. Nonetheless, the fact that there were so many identical images at the end of the procedure suggests that deleting was a challenging task. Participants' reasons for this overkeeping were that they were spending little cost keeping all these images and they had a strong expectation to rationalize their photo collection on a later date.

Cushing (2011) stated that when people preserve data, they do it, among other reasons, to build an identity. He studied the phenomenon of digital self-extension, in other words the role of possessions in defining personal identity and found that not all the "…stuff [is] created equal.". People determine importance of digital possessions based on personal values such as utility and up-to, emotional commitment, and (ir)replaceability, according to studies (Cushing, 2011).

Vitale, Janzen, and McGrenere (2018) conducted some studies showing hoarding is sometimes a proxy to remember life, which provides emotional support through a large number of images representing a large number of experiences to remember. In their study, one of the participants explained how data helps her build an image of herself: "I think humans are always trying to find things outside of themselves to make them feel they're more than they are. If I like a song, it's part of me, me kind of building up the image of myself. So, I think it's me being like 'Oh yeah, my life, school and this and that.' We don't need things outside ourselves, but we are always looking for things to make us feel complete".

All these technological advancements that make it easier to create and store images have consequences downstream for retrieval that needs to be taken into account when deciding whether to keep them (Whittaker, 2010). Bergman, Beyth-Marom, Nachmias (2003) mentions the term "deletion paradox". Even though the files with no subjective importance distract user's attention and time, reviewing them in order to make sure they are not needed anymore, also takes time and attention which

creates a deletion paradox. Bergman & Whittaker (2016) also states, the habit of keeping as default leads to creation of an accumulation cycle: the more data there is, the more it is to select, organize or find things, which creates bigger problems at the next steps of the curation cycle.

2.5.2 Managing

After having decided what to keep, or just allowing accumulation on storage devices, how can people manage the digital images in ways that will produce future value? In this step, people must choose between spending effort in managing what they have or paying off for the effort they chose not to spend during exploitation. Allowing digital images to become piles is a strategy that reduces the work and time spent organizing possessions but as Whittaker stated (2005) it will make it harder to locate critical information when needed.

Recent studies show that people are mostly using rather rudimentary structures to organize images (Kirk et al., 2006). In a study conducted by Whittaker et al. (2010), organization of family photo archives by parents were investigated. These collections were discovered to have very little hierarchical structure and were organized more like piles than files. Participants tended to rely on a single main storage site, or in the case of those with several devices, a single main storage folder for each unit. Images are typically stored in a single level, flat hierarchy with few subfolders, and they also contain a variety images linked to different events. This can be explained with images being uploaded at the same time and never sorted afterwards. In the same study, it is seen that people do not access the vast majority of their images after uploading. Participants almost universally tend to scan images using a thumbnail view. They are unaware of the poorly structured layout of their collection as they seldom view images. As Whittaker et al. (2010) stated, users may not realize that their photo collection has to be systematically restructured in order to be efficiently retrieved due to infrequent access.

2.5.3 Exploiting

Exploitation is considered as vital in the curation process, since it is pointless to keep and manage data if they cannot be successfully exploited. It is important to note that exploitation is different from information-seeking, since in with information-seeking the target information is seen as being completely new (Belkin, 1980) rather than a recall. Exploitation is different considering retrieval structures: in exploiting, the structures are usually self-generated rather than publicly generated (Landsale, 1988). Furthermore, the exploiter can recall important information about the target item and how it was organized. Exploitation can be described as the reconstruction of privately organized (or partially organized) records and involves familiarity.

There are two main methods of exploitation (Whittaker, 2011): navigation (which exploits structures the user has set up for retrieval and involves incremental manual traversal of these structures) and search (a more indirect way to find information—where the user generates textual labels that refer to the name of an information item, one of its attributes, or its contents). Even though navigation offers the user feedback at each access stage (Barreau & Nardi, 1995), in complex hierarchies it will be laborious. On the other hand, search is more flexible as it allows users to specify multiple properties of the target file (Lansdale, 1988), but the user needs to remember certain properties of the target image to define proper search terms. Whittaker (2011) also refers to two more methods which are orienteering (a hybrid that combines search and navigation, where user may benefit from a search query to locate a specific data and then manually navigate to target) and tagging (which allow users to label data and enables flexible categorization). Kirk et al. (2006) also referred to the term ‘browsing’ and defined it as a way to view large collections of the images in the cases where not a specific goal by the user is defined and referred to the method ‘searching’ as a more goal directed finding of particular images.

Successful exploitation is highly linked to retention and management practices. Successful organization and effort to organize valuable information should make it

easier to re-access the data. But as mentioned before, technology potentially reduces the motivation to organize. With the endless opportunity of storage and preserving, like Vitale, Odom, and Mcgrenere (2019) stated, “The possibility of losing information that turns out to be useful outweighs the possibility of finding data more easily.” (p. 2). One can say that technology also reduces the need to organize too, as emerging technologies used for the searching promise to reduce the effort to navigate them manually.

The problem of personal archiving, in a nutshell, is that we collect more documents and objects than we can immediately access, as Kaye, Vertesi, Avery, Dafoe, David, Onaga, and Pinch (2006) stated. Even though the technology also tries to find solutions for this step of the curation cycle, with Clouds and applications like iCloud, Apple Photos or Google Photos, the potential is not well discovered in the literature. This study will therefore pay particular attention to the ‘exploitation’ step of digital visual possessions and the user experience of this step while also considering curation cycle as a whole.

2.6 Tools on Digital Image Curation

People use various tools to deal with the increasing amount of data they produce every day as well as tools to create them. In the creation of visual collections, Digital Cameras including smartphones and lifelogging devices like GoPro, and Social Media Tools including Instant Messaging Platforms can be listed as main tools (Broekhuijsen, 2018). In the curation process, the storage and management part of the collections mostly involve internal storage (built within computers, laptops and mobile devices) and external storage (SSDs, HDDs or wireless personal devices like Network Attached) as well as cloud platforms and software tools. The mentioned tools include some software offered within the devices, which may be built-in or downloadable, such as gallery apps for Androids, Apple photos for Apple products, and Microsoft gallery. These sit alongside cloud solutions like Google Photos (it also can be used like a gallery app online), Google Drive, Apple Photos, Dropbox,

OneDrive, etc. Some of the mentioned tools can be considered as a hybrid solution, offered by major tech companies that build both hardware and software. These hybrid solution examples offer a cloud-based storage for all types of files, with an online photo platform with the added content analysis (Broekhuijsen, 2018) such as Apple's iCloud with iCloud Photo Library.

Tools such as iCloud and Google Photos offer automated management, with the help of developing computer vision technology, so long as the data (image file) is stored on their servers. Automated management includes smart folders of people, events and trips, video collages made special for users with photos from certain dates or smart folders, and many more automated features based on metadata such as location, time, camera settings (embedded as metadata within image files) and image recognition technology (Broekhuijsen, 2018). Broekhuijsen (2018) mentioned that although features such as searching for places, objects or people within photos are helpful, some features lack the capability of determining personal relevance accurately such as highlights or automatically created videos for user. These tools are easy to use but less transparent in the way they operate, as they offer few options to customize the organization (Broekhuijsen, 2018).

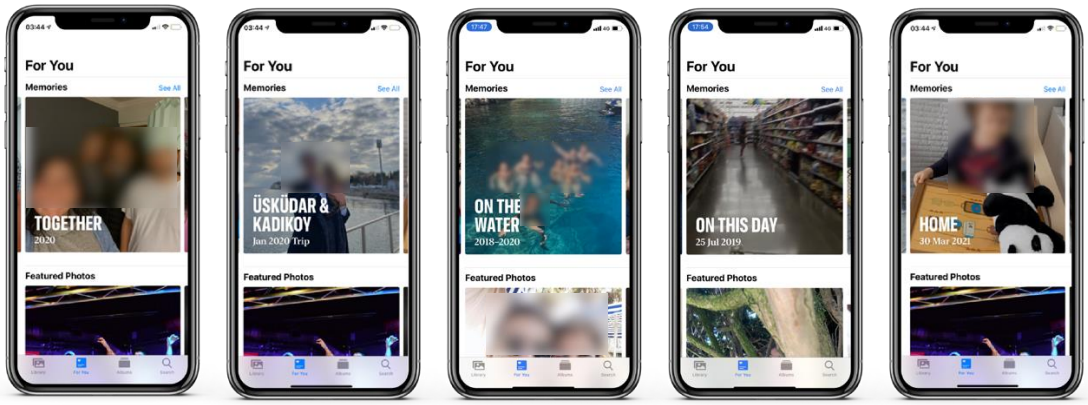

Figure 2.9. Examples of automatic highlight by Apple Photos in the "For You" section

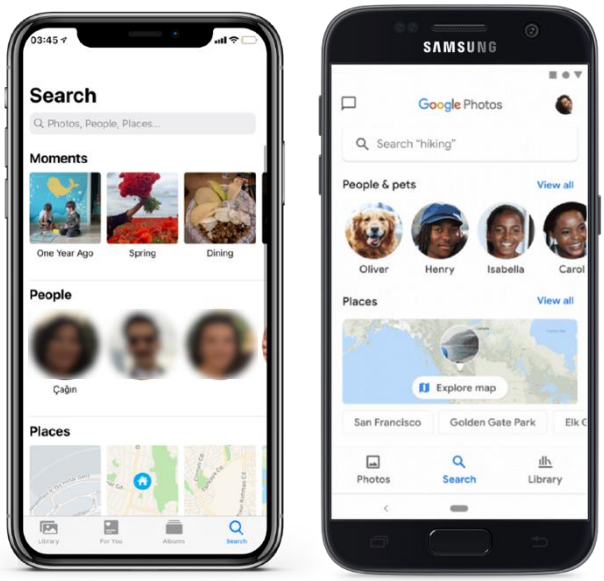

Figure 2.10. Search screens from Apple Photos (left) and Google Photos (right)

Even though cloud services have been in our lives for only a limited time – for example Dropbox launched in 2008, iCloud in 2011, and Google Drive in 2012 – they are increasingly popular among everyday users (Vertesi et al., 2016). In the literature cloud services are often mentioned as raising privacy concerns (Ion et al., 2011). Leading technology firms such as Apple, Dropbox, Google, and Microsoft, all of which offer cloud solutions, have a vested interest in motivating people to accumulate large amounts of data (see Figure 2.11.) and move them into clouds: the more data, the more space users need (Vitale, 2020). With the offering of seemingly unlimited storage and little requirement on user maintenance, these cloud services create the "seductive" digital landscape that Marshall (2008) predicted long ago (Vitale, 2020).

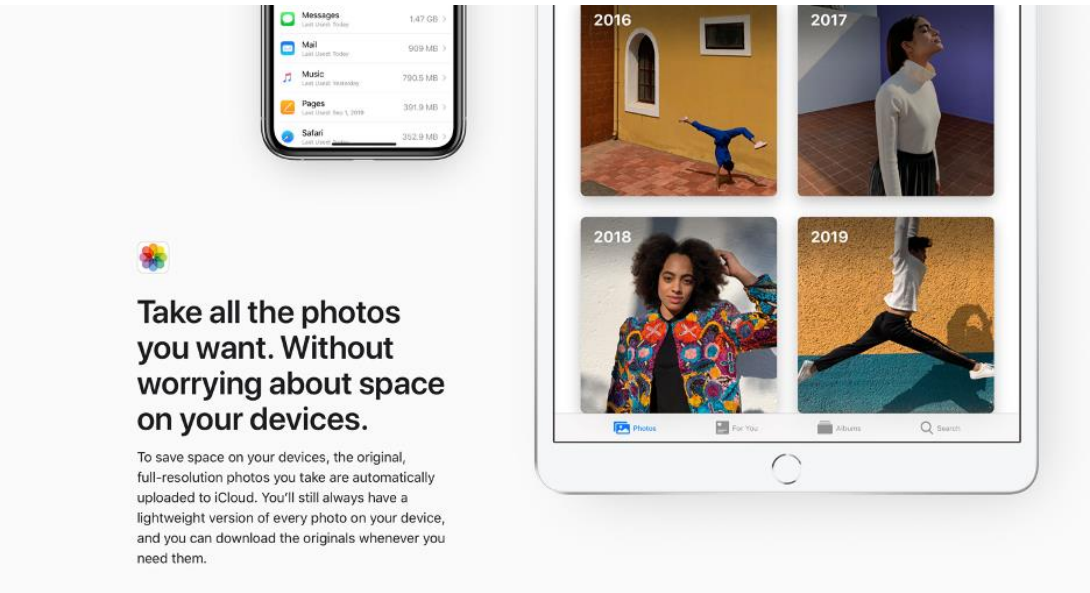

Figure 2.11. Search screens from Apple Photos (left) and Google Photos (right)

Cloud platforms that are not specially focused on photo management (including Dropbox, Google Drive and One Drive), often shares similar features such as accessing data from multiple devices, creating and sharing folders, collaboration tools, file and photo management, and desktop synchronization. The tools more specified for photo and video management such as Google Photos and iCloud, offer more focused features including extended search with metadata, editing the media and creating collages and videos along with sharing, automatic backups, and access from multiple devices, with the promise to manage device storage. They also offer highlights from one's personal history and help the reminiscing process.

Apple Photos describes itself as "A smarter way to find your favorites" and states that it intelligently declutters and curates photos and videos - aiming for the user to easily see their best memories and promoting the firm's cloud solution with the motto "Fill your library, not your device". Some key features they highlighted can be seen in Figure 2.12., where they also highlighting the interrelated features with iCloud. Through this connection editing options are provided, as well as image access always available from all devices, bringing even more life to live photos, built-in filter options, sharing options, automatic backup and turning pictures into projects via

third-party extensions. With the iCloud features it is important to note that Apple highlights a two-factor authentication system, which they describe as an extra layer of security to keep users' data safe. The main competitor of the tool, Google Photos, also highlights similar features and describes itself as "One Home for All Your Photos and Videos". Their main mottos are "Organize Your Photos and Bring Moments to Life in New Ways" and "Easily Share and Save What Matters".

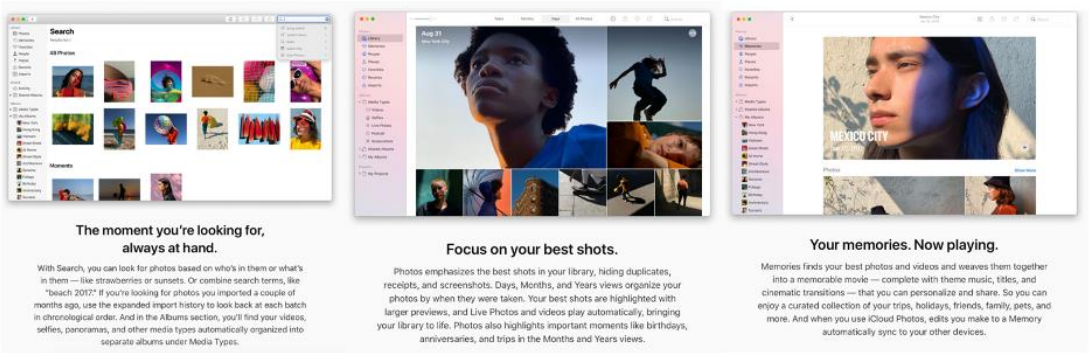

Figure 2.12. Apple Photos features highlighted in the official website

Instead of covering all the tools mentioned with their detailed features, this section covered an overview of the tools that relate to the personal photo curation process and some explanations of the main tools that are relevant to the thesis objectives. The tools mentioned in this section will be inspected in detail, especially from users' perspectives, through the empirical study included in this research. As the main aim of this thesis is to understand the opportunities to improve the user experience of the tools that are previously mentioned, the next chapter will cover literature on the user experience (UX) phenomenon.

2.7 User Experience

In this research, the management of personal visual files is considered as a user experience (UX). UX covers many research fields and disciplines, which in turn offer many different viewpoints on what UX is and how it relates to design. According to Forlizzi and Battarbee (2004), for designers and developers who aim to design

interactive systems, understanding UX is an exceedingly critical issue. By understanding how people interact with products, the resulting emotions and experience that unfold will result in products which will improve users' lives on many different levels.

There are numerous definitions that cover the term user experience. Even though UX includes "experience", both terms differ from each other: unlike experience (on its own), *user* experience requires a product, a system or service to be experienced by people and it requires interaction (Roto, 2007). Figure 2.13. visualizes the conceptual differences between terms and shows user experience in relation to other experiences that can be studied. The following sections will cover an overview of UX, including its definitions, UX models and frameworks from literature, and key elements of UX.

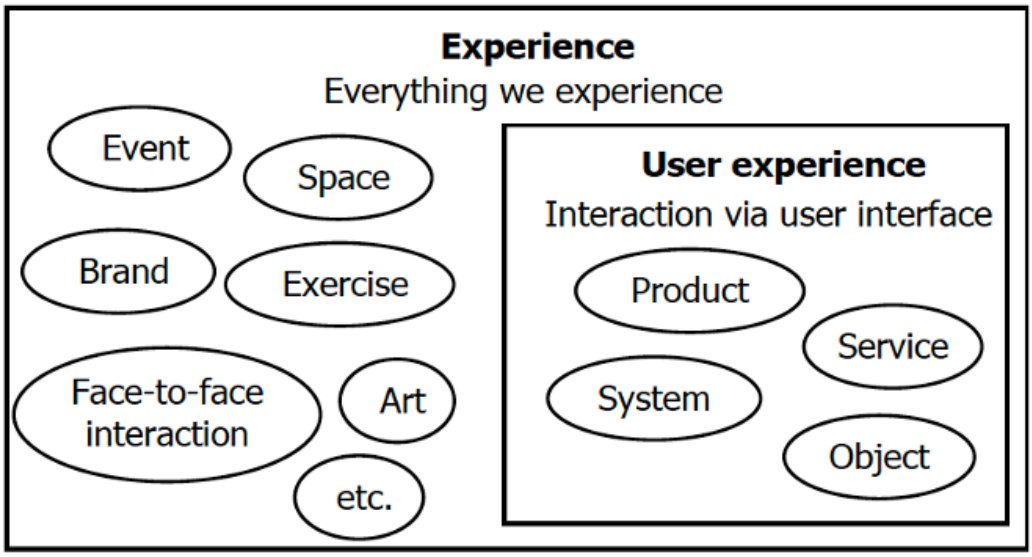

Figure 2.13. UX in relation to other experiences that can be studied - visual by Law, Roto, Hassenzahl and Vermeeren (2009)

2.7.1 An Overview of User Experience: Definitions

As user experience is a subject that is studied by many different disciplines for various concepts at different times, the term has diverse definitions (Law et al.,

2009). ISO (2019) defines user experience as "[a] user's perceptions and responses that result from the use and/or anticipated use of a system, product or service". This definition is the most basic explanation of the term, followed by two notes to entry:

> Note 1 to entry: "Users' perceptions and responses include the users' emotions, beliefs, preferences, perceptions, comfort, behaviours, and accomplishments that occur before, during and after use."
>
> Note 2 to entry: "User experience is a consequence of brand image, presentation, functionality, system performance, interactive behaviour, and assistive capabilities of a system, product or service. It also results from the user's internal and physical state resulting from prior experiences, attitudes, skills, abilities and personality; and from the context of use."

Garrett (2011) explains the term as "the experience the product creates for the people who use it in the real world. When a product is being developed, people pay a great deal of attention to what it does. User experience is the other, often overlooked, side of the equation— how it works—that can often make the difference between a successful product and a failure." (p.6). He also states that when someone asks a person how it's like to use a product, this question is about the user experience. "Is it hard to do simple things? Is it easy to figure out? How does it feel to interact with the product?"

Hassenzahl & Tractinsky (2006) stated that user experience is a consequence of three main things: 1. a user's internal state, which includes predispositions, expectations, needs, motivation, mood, etc.; 2. the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.); and 3. the context (or the environment) within which the interaction occurs (e.g. organizational/social setting, meaningfulness of the activity, voluntariness of use, etc.). This statement supports their additional statement, which is that "UX is about technology that fulfills more

than just instrumental needs in a way that acknowledges its use as a subjective, situated, complex and dynamic encounter" (p. 95).

Kuniavsky (2010) defines user experience as the totality of a user's perceptions as they interact with a product or a service. He states that these perceptions include "effectiveness (how good is the result?), efficiency (how fast or cheap is it?), emotional satisfaction (how good does it feel?), and the quality of the relationship with the entity that created the product or service (what expectations does it create for subsequent interactions?)" (p.14). Kuniavsky states that this definition tries to exceed all metrics that are considered relevant to an experience, such as ergonomic, attitudinal, and visual metrics. He specifies the goal as aligning designers / developers 'understanding of the role a product plays in a person's life' with 'how that person perceives the design of that product'. For example, "the use of devices is rarely the most important activity in someone's life, but the devices form part of a larger flow of needs, desires, and activities. Having an experience may be impossible without the use of a specific device, but the device does not form the whole experience."

All the pre-mentioned definitions introduced so far show that user experience is a complex and multidimensional phenomenon that is affected by three overarching factors: the user her/himself, the designed system, and the context in which the experience takes place. In order to gain deeper understanding of UX, and in particular its practical application, the following sections will discuss UX models and frameworks.

2.7.2 User Experience Models and Frameworks

In the literature, various user experience models and frameworks have been proposed. These numerous models and theoretical approaches have been developed to help understand experience from contributions from cognitive science, social science, and other disciplines (Forlizzi and Battarbee, 2004). All

these disciplines examine experience from a different perspective. Forlizzi and Battarbee (2004) grouped the disciplinary approaches as product-centered, user-centered, and interaction-centered, as follows.

Product-centered models provide straightforward applications for design practice in the form of lists of topics or criteria to use as checklists (Forlizzi and Battarbee, 2004). They provide information on kinds of experiences and issues that should be considered while designing and evaluating products, services and systems. As examples, Forlizzi and Battarbee (2004) mentioned Alben's set of criteria for assessing the quality of experience of a designed product during conception, planning, and execution (Alben, 1996) and Jääskö & Mattelmäki's set of design guidelines for understanding experiences and applying them in user-centered product concept development (Jääskö and Mattelmäki, 2003).

User-centered models aim to help designers to understand the users of their products (Forlizzi and Battarbee, 2004). In order to do this, they combine different disciplinary approaches to understand users' actions and how those actions affect the interaction between the user and the product. As an example, they mentioned Hassenzahl's approach that describes people's goals and actions when interacting with products. Hassenzahl (2003) focused on the mental state of the user by defining two usage modes: goal mode and action mode. In goal mode, goal fulfillment is the focus, where the user tries to be effective and efficient. In action mode, where action is the focus, the user is more spontaneous and explorative. This approach widens traditional task-based thinking by including fun and action-oriented modes of behavior. They also mention Sonic Rim's "say, do, make" categorization to learn about people's experiences and expectations and Cain's user-based "think, do, use" categories (Cain,1998).

Interaction-centered models explore how a product serves in bridging the gap between designer and user. Forlizzi and Battarbee (2004) mention John Dewey's

(1980) approach on qualitative and definitive aspects of experience, which they believe inspired other interaction-centered models. They also mentioned Wright et al.'s (2003) four threads of experience (compositional, sensory, emotional and spatio-temporal), which contribute to actions (such as anticipating and recounting) that create meaning (Wright et al., 2003), Margolin's (1997) four dimensions of how people interact with designed products - operational, inventive, aesthetic, and social uses, Pine and Gilmore's (1998) differentiation between passive and active experiences, and Overbeeke and Wensveen's (2003) approach that focus on the aesthetics of interaction.

Just like all pre-mentioned definitions covered in the previous section, all these different models and frameworks once again shows UX to be a complex and multidimensional phenomenon that is affected by many aspects depending on the user, the designed system and the context. All of these approaches have one more thing in common, which is bringing hedonic aspects of usage into consideration. In a more recent model proposed by Anderson (2011), he proposed that that most of the technology products and service experiences go through six levels of maturity. He explains the basis of his model starting with a quote from Donald Norman: "When technology delivers basic needs, user experience dominates.". He states that the mobile phone industry is a great example of this evolution, considering the things that made old models successful in their time are now already an expectation – such as a phone without wires, or a phone with an Internet browser. He explains mobile phones have become more reliable and usable with useful features over the years, and with the introduction of iPhone in particular, the bar was raised in terms of the way in which people experience information: phones being not only tools but also fun to use. Anderson (2011) based his User Experience Hierarchy of Needs model (Figure 2.14.) on this process of product maturity. The maturity level of a product is represented as a continuum in this model, moving from bottom to top, from (in users; words) "hey, this thing actually works!" to "this is meaningful in my life." Even

though all levels of the triangle build on each other, Anderson highlights that a product can be meaningful without any other levels.

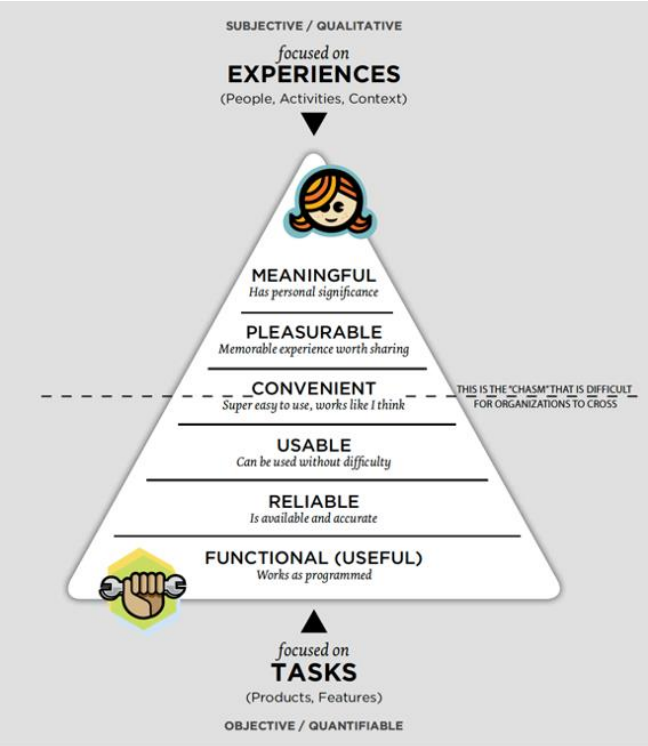

Figure 2.14. User Experience Hierarchy of Needs model by Anderson (2011)

Garrett (2002) proposed a more specific model (Figure 2.15.) by identifying and classifying the elements (planes) that hold the end user experience of software and web sites. Kuniavsky (2010) reported this model to be useful when examining any kind of user experience, since its broad categories can be applied to the creation of devices or services too. He also defined this model as valuable, as it visually shows that many aspects of UX design are interrelated but at different levels of granularity. It shows that even if one level is discussed, the designer actually implicitly discusses all of the layers below it, even if it those levels have not yet been formally defined.

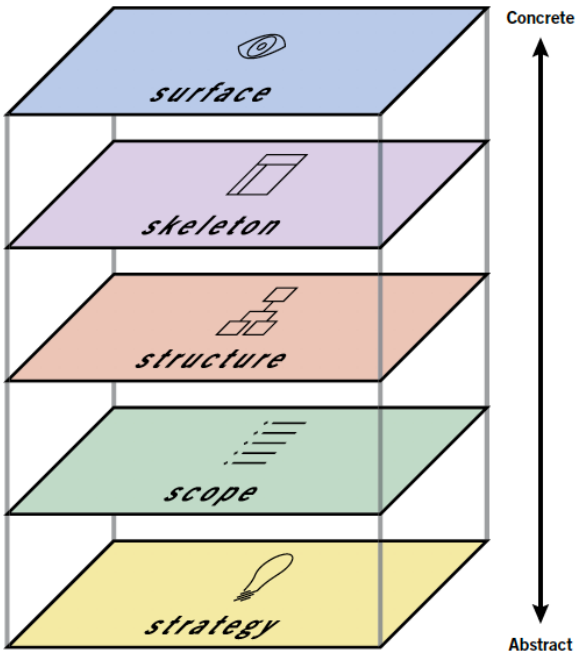

Figure 2.15. Planes of User Experience (Garrett, 2011)

Before examining each plane in detail, it is important to state that Garrett (2011) remarks that when using the term Websites and sites, the intention is to refer to both content-oriented web products and interactive web applications.

The Surface Plane. This brings everything together visually: pages made up of images and text, including buttons and graphical elements. It answers the question 'what will the end product look like?'

The Skeleton Plane. This is beneath the surface, referring to the placement of buttons, controls, text and images. It makes structure concrete. It answers the question, 'what components will enable people to use this site?' It is designed to optimize the arrangement of elements for maximum effect and efficiency.

The Structure Plane. This gives shape to the intended scope. It answers the question, ‘how will the pieces of the site fit together and behave?’ It is more abstract than a skeleton. It can define the placement of the interface elements or the arrangement of navigational elements.

The Scope Plane. This transforms strategy into requirements. It answers the question, ‘what features will the site need to include?’ It defines the way in which features and functions of the product will fit together. Whether any feature is included on a site is question of scope.

The Strategy Plane. This is where it all begins. It answers the questions, ‘what do we want to get out of the site?’ and ‘what do users want?’

In Garrett's model, each plane is dependent on the planes below it. The choices made on each plane affect the choices available on the above plane. The five planes of the model provide a conceptual framework from which to define and discuss UX opportunities and problems, as well as the tools that are needed to reach creative solutions. Figure 2.16. shows a more detailed version of the planes, mapped with component elements. As this current research embraces a ‘research through design’ approach, a possible research outcome can be a software concept as a research artefact; Garrett’s model can be useful when building or evaluating design concepts.

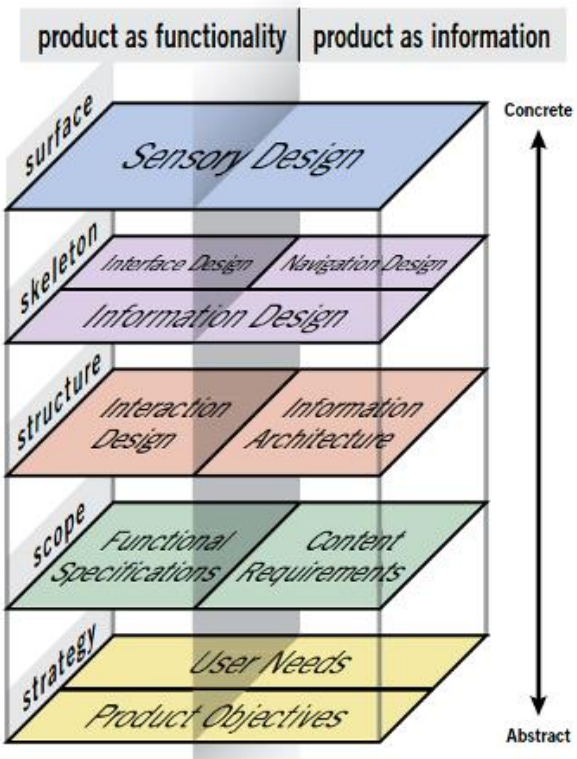

Figure 2.16. Planes of User Experience in more detail (Garrett, 2011)

2.7.3 Usability and Beyond Usability: Creating Playful and Effective Experiences

According to early description, usability was accomplished when one willingly uses a product's full potential effectively (Scerbo, 1995). In the current era, ISO 9241-210 (2019) defines usability as "the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" with two notes to entry:

> Note 1 to entry: "The "specified" users, goals and context of use refer to the particular combination of users, goals and context of use for which usability is being considered."

> Note 2 to entry: “The word “usability” is also used as a qualifier to refer to the design knowledge, competencies, activities and design attributes that contribute to usability, such as usability expertise, usability professional, usability engineering, usability method, usability evaluation, usability heuristic.”

Krug (2005) defined the essence of usability thus: “to ensure that your product works well: that a person of average (or even below average) ability and experience can use it - for its intended purpose without getting hopelessly frustrated” (p.5). Şener & Pedgley (2019) stated three principles of usability and related sub-considerations: effectiveness (the capability of producing a desired result), efficiency (optimal costs, efforts and time) and satisfaction (meeting and exceeding expectations). They also stated five ‘letter-e’ characteristics of usability which must be met for the users of a product: effective, efficient, engaging, error-tolerant and easy to learn. In Figure 2.17., Şener & Pedgley (2019) visualized differences between usability and user experience, clearly marking-up the location of Hassenzahl’s commonly cited pragmatic and hedonic user needs. Parallels can be made here with Anderson’s (2011) user experience hierarchy of needs model, since the base of Anderson’s triangle contributes to pragmatic needs (concerned with achieving a task), whilst the middle to peak of the triangle refers to hedonic needs -beyond usability-, which are concerned with personal fulfillment.

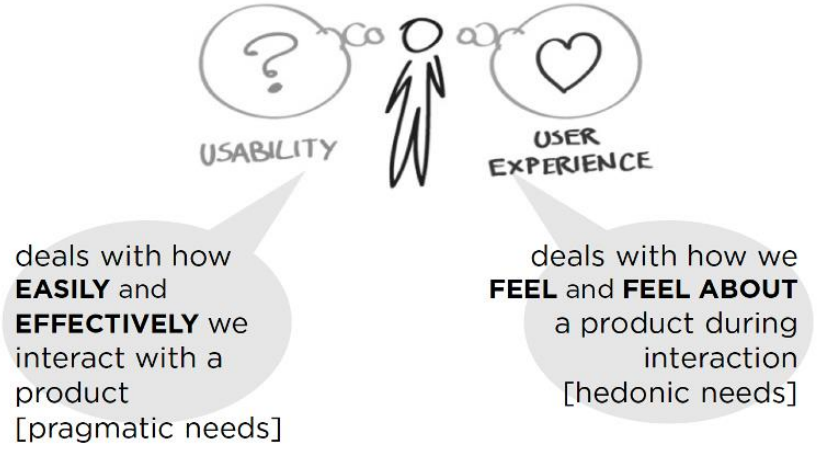

Figure 2.17. What is a product 'like' to use? (Şener & Pedgley, 2019)

Kuniavsky (2010) stated that "while bad usability can break a good product, good usability is insufficient to create a good experience" (p.14), underlining the importance of the maturity levels of a product, previously covered in the Anderson's (2011) user experience hierarchy of needs model. HCI research has long argued that designers should not only concentrate on improving usability, but they should also think about how users experience a product more generally and therefore design for pleasure in use (Jordan, 2000). Design has been said to be in need of supporting playful experiences, in order to fit in with users' multi-faceted needs (Korhonen, Montola and Arrasvuori, 2009).

Anderson (2011) states that usability clears the way for a good experience by eliminating troublesome interface distractions, but a great experience requires more than good usability. He distinguishes 'ease of use' with desiring. He highlights that 'ease of use' is essential, and should be complemented with desirable and playful elements (see Figure 2.18.).

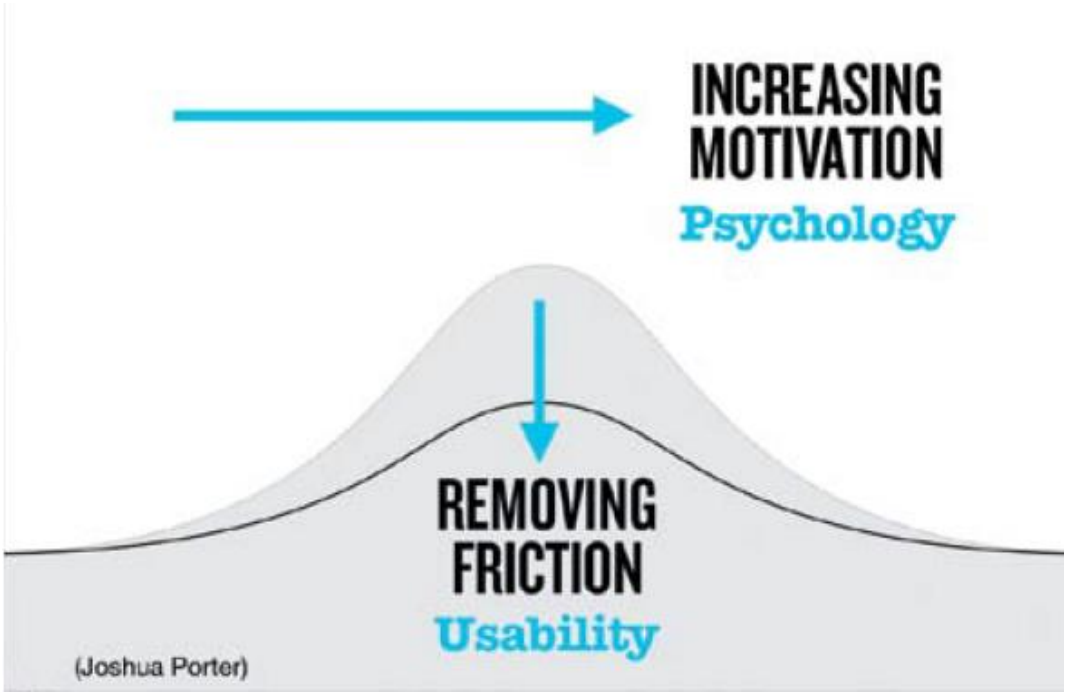

Figure 2.18. Ease of Use (Anderson, 2011)

Anderson (2011) opens his book "Seductive Interactions" by explaining an experiment in behavior change. In this experiment, the context is a metro station and there are two options to meet the sunlight: the stairs and an escalator running next to it. The thing that is exceptional in the stairs was they were turned into piano keys. The researchers watched more people approach to the stairs than the escalator. Even some people, the goal was no longer to exit the station, they were just having fun with the stair 'keys' to create a melody. At the end of the study, it was revealed that 66% more people than normal took the stairs that day. Anderson explains this as a good distillation of ways to influence behavior through fun, playful activities. He also gathered some ideas from psychology as he asked the question 'how to make a user fall in love with a website, application or a service and make them more playful'. His answers are summarized below.

- Sequencing. We are more likely to take action when complex tasks are broken down into smaller tasks.

• Appropriate challenges. We delight in challenges, especially ones that strike a balance between being overwhelming and being boring.

• Status. We constantly assess how interactions enhance or diminish our standing relative to others and our personal best.

• Achievements. We are more likely to engage in activities in which meaningful achievements are recognized.

Costello and Edmonds (2007) created a framework of thirteen pleasure categories of play in order to develop design strategies for stimulating play. They developed the framework as a synthesis of the ideas of six theorists from philosophy, psychology, and game design backgrounds. Figure 2.19. documents the ideas used from each theorist (top row), and shows how each of the ideas relates to a final synthesis of thirteen pleasure categories (right column). The framed ideas span more than one pleasure category. Although this framework was built specifically for the case of interactive art experiences, Korhonen, Montola and Arrasvuori (2009) extended Costello's and Edmonds categories further to make the framework more complete and usable outside the interactive art context, so that the new categories they developed could be applied in the design of interactive products to make them more engaging, attractive, and more playful for users.

Groos	Callois	Csikszent'	Apter	Garneau	LeBlanc	Framework
				Power Creation	Expression	**Creation**
Pleasure of being a cause			Exploration			**Exploration**
				Discovery	Discovery	**Discovery**
		Problem Solving		Intellectual problem solving		
			Challenge	Application of Skill	Challenge	**Difficulty**
	Competition	Competition		Competition Advancement & Completion		**Competition**
	Chance	Risk & Chance	Facing Danger	Thrill of Danger		**Danger**
				Immersion Beauty	Submission	**Captivation**
	Vertigo		Arousing Stimulation	Physical Activity	Sensation	**Sensation**
Aesthetic sympathy						**Sympathy**
Pleasure of make believe	Simulation	Creative	Fiction & Narrative		Narrative	**Simulation**
					Fantasy	**Fantasy**
		Friendship & Relaxation		Love Social Interaction	Fellowship	**Camaraderie**
			Negativism Cognitive Synergy	Comedy		**Subversion**

Figure 2.19. Pleasure framework by Costello and Edmonds (2007)

As it is seen in the Figure 2.19., Costello and Edmonds (2007) defined in total 13 framework categories: *Creation, Exploration, Discovery, Difficulty, Competition, Danger, Captivation, Sensation, Sympathy, Simulation, Fantasy, Camaraderie* and *Subversion*. Korhonen, Montola and Arrasvuori (2009) moved the focus from playful pleasures to playful experiences. They included further discussions on experiences, pleasures, emotions and elements of play, as well as the reasons people play in order to find an answer to the question: "what are the properties of playful products that attract people into using them". They created the playful experiences (PLEX) framework with 20 categories and tested it. Following this study in 2014, Korhonen, Arrasvuori, Lucero and Karapanos revised PLEX further and turned it to its current form (Figure 2.20.). After conducting several workshops, they come to the conclusion that the PLEX framework not only advances understanding of

pleasurable experiences, but also guides more effectively in designing for pleasurable experiences. They state that their work with the PLEX framework, as well as adoption of gamification, is showing the way to create better user experiences.

EXPERIENCE	DESCRIPTION
Captivation	Forgetting one's surroundings
Challenge	Testing abilities in a demanding task
Competition	Contest with oneself or an opponent
Completion	Finishing a major task, closure
Control	Dominating, commanding, regulating
Cruelty	Causing mental or physical pain
Discovery	Finding something new or unknown
Eroticism	A sexually arousing experience
Exploration	Investigating an object or situation
Expression	Manifesting oneself creatively
Fantasy	An imagined experience
Fellowship	Friendship, communality, or intimacy
Humor	Fun, joy, amusement, jokes, gags
Nurture	Taking care of oneself or others
Relaxation	Relief from bodily or mental work
Sensation	Excitement by stimulating senses
Simulation	An imitation of everyday life
Submission	Being part of a larger structure
Subversion	Breaking social rules and norms
Suffering	Experience of loss, frustration, anger
Sympathy	Sharing emotional feelings
Thrill	Excitement derived from risk, danger

Figure 2.20. PLEX framework categories by Korhonen et al. (2014)

As one of the main aims of this current research is to offer a set of specifications / design advice to build a new digital tool (or design features) that can manage and provide access to digital memories in a way that is satisfying, engaging and enjoyable for users, the PLEX framework will be an important reference point.

CHAPTER 3

METHODOLOGY

This research aims to examine how digital hoarding of visual possessions (images and videos) exists and by doing so, investigate the opportunities to improve user experience of digital tools used to manage digital hoarding and navigate through one's personal digital history regarding visuals. To achieve this, the research must first understand the current experiences of users with digital tools and their interaction with their own digital history from their personal perspective, so that potential improvements can be identified. In this regard, it is also important to uncover personal strategies and habits of users regarding those tools and their archives. According to Patton (2015) qualitative research contributes to the field of scientific enquiries by exploring people's experiences, meanings and perspectives, understanding contexts and unexpected consequences, whilst also discovering important patterns and themes across individuals and groups of people. The research reported in this thesis adopts a qualitative research approach, focused on understanding people and their experiences, as well as the meanings they assign to those experiences, in the context of their own world (Merriam, 2009).

Frayling (1993) recognized three types of design research: *research into design, research for design and research through design*. As research into design and research for design foreground the process of designing itself, research through design is a process where the act of designing is used as a method to research (Eggink & Mulder-Nijkamp, 2016). Glanville (2015) discusses that for design practice, the generation of knowledge to help design (or designers) should be the focus point, rather than knowledge of or about design. In other words, design research can be directed in ways to support the act of designing, instead of knowing more about design(s) itself (Eggink & Mulder-Nijkamp, 2016). This research embraces a similar

perspective, also aiming to provide some insights and suggestions to designers who are working on digital tools related to digital hoarding. In this regard, the work also adopts a research through design approach. Archer (1995) defines a research through design as acquiring knowledge through the design process, construction, and testing of extremely immersive prototypes. This study is grounded on such an understanding, albeit on a relatively modest scale, since after the first step of empirical research is completed, design features are offered, which are then evaluated through focus group session. Further details about these steps of the research will be given later in this chapter.

This chapter explains the research methodology and the structure of the thesis that is built around the methodology. Figure 3.1. presents an overview of the research, which is structured in two main parts: literature review and empirical study. The first part includes the investigation of related literature, whereas the second part includes various qualitative research techniques to (a) understand users' experiences, habits and strategies regarding use of tools for digital archiving of visual possessions, and (b) arrive at some design features to be iterated into some insights for designers working on digital archiving tools. Since the literature research has been covered in detail in the previous chapter, the empirical study for the research will be the focus of detail in this chapter.

Figure 3.1. Overview of the study

3.1 Empirical Study

The empirical study comprised five steps enclosed within a research through design approach. Three steps involved data collection, whereas the remaining two involved turning collected data into insights and offer some design features. Data collection was carried out in three sequential stages using different research methods: survey, semi-structured interviews, and a focus group. The following sections give detailed information about these methods, why they were chosen, sampling strategies used for each method, and an outline of the data analysis process.

3.1.1 Survey

The survey was prepared in Typeform, which is a digital tool that makes collecting and sharing information via surveys comfortable and conversational. The survey was distributed via social media platforms, with no prerequisite for filling the survey stated other than giving consent and being older than 18-years old to participate (see Appendix A for the complete survey questions). Later in the survey, by means of the answers received, participants were eliminated if they are not eligible for the study. Elimination occurred by directing them to a 'thank you' screen if any one of the following applied: they don't archive any digital possessions, they don't have an archive regarding visuals, or they don't use any tools to manage their archives. The main aim of the survey was to recruit participants for the following stage of the empirical research in a controlled way, as well as generating preliminary insights. One of the critical questions in the survey asked participants about their tendencies to organize their visual archive. This information was used as a basis for participant sampling for the interviews, in order to have a homogenous participant population representing a variety of hoarding tendencies. Even though the main aim of the survey was to recruit participants as stated, it was also used to gather preliminary information about trends in users' behaviors, trends in user strategies and trends in problems users face with tools, and also which features they efficiently used. This data was used while designing the offered design features. For survey participants

who were chosen by the researcher to also be involved in the interviews, their survey data was utilized in the interviews as a starting point to gain deeper understanding and to give the researcher freedom to dig deeper on any part that had potential to reveal valuable insights. Typeform is connected with the data analysis application Airtable, which allowed the researcher to see results all together in an organized way and determine the trends among users clearly.

Before making the survey live, a piloting was conducted. For the pilot surveys, it was important to be distributed among different age groups to see if the terms and questions were clear among all of the age groups. In this regard, just for the pilot study, participants were selected by the researcher, ensuring that there were at least two participants from all age groups (Age 18-24, Age 25-35, Age 35-44, Age 45-54, Age 55-64 and Age 65+). Figure 3.2. illustrates the participant distribution among age groups in the pilot survey. There were 18 participants in total (with equal male-female participation). Participants are asked to note down the time they spent for the survey. The answers ranged between 5-10 minutes, which confirmed the suitability of the survey duration. Participants were also asked to give feedback about the questions asked and any other part of the survey that may have made them confused. Revisions to the survey were made according to the feedback.

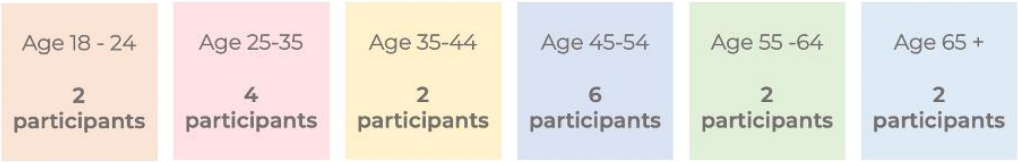

Figure 3.2. Age Distribution of Pilot Survey Participants

As stated before, even though the main aim of the survey was to recruit participants for the interview in a controlled way, the survey was completed by a surprisingly high number of participants (250 in total) and thus became more valuable than anticipated as a source of insights regarding users' behaviors, strategies, problems and expectations for digital hoarding and digital image archiving. The data derived

from surveys are analyzed through a coding, collation and characterization process. Detailed information on the results and insights are given in the later chapters.

3.1.2 Interviews

Semi-structured interviews are a method suitable for collecting qualitative data. The method is used when there is some knowledge about the topic under investigation, but there is opportunity to raise new details and issues prompted by open-ended questions (Wilson, 2014). Even though the interviewer has a set of questions prepared beforehand, the interview does not necessarily follow in the exact order of the pre-prepared questions. As Bryman (2012) states, the interviewer can act flexibly about the question order, since the main concern is understanding the participant. As the focal point of the interviews is to gain a deeper understanding of the user's experience about the tools they use for digital hoarding, semi-structured interviews were justified for use in the research. The semi-structured interviews were planned to be augmented by asking participants to carry out some tasks, so that they could be observed whilst navigating through their own digital history. The participants would also be asked to give a guided tour to the researcher, to enable observation of the strategies and structure they described and also observe how participants interact. The preliminary survey results also guided the researcher about which topics and opportunities should be investigated deeper in this step.

The research was conducted during the COVID-19 pandemic in 2020. As a result of this situation, it was mandatory that interviews were held online rather than 'in person'. However, if given the choice, online interviews would still be a good fit for this study, considering online interviews provide the chance to preserve 'contextual naturalness' (Mann & Stewart, 2002). To explain further, since this research investigated the habits of users regarding personal visual archives and observed users' interaction with those archives, the online interview method provides a chance for the researcher's questions to be answered in the same setting as that of the activity under investigation (King & Horrocks, 2010).

As it is stated before, the participants of interviews were selected among the 252 participants who completed the survey. However, since two participants did not give their consent to participate in the interviews and did not move forward with the full set of survey questions, the total number of potential participants was 250.

Among the survey questions, there was one specific question that was used to define sample groups that will be used subsequently in the thesis as a main way of differentiating the participant sample. This question related to each user's attempt to organize their own archive, with three possible answers: those letting everything in their digital history accumulate, those who have intention to organize their archive but admit it is still not so organized, and those who claim their archive to be organized in a detailed manner. Among the 250 participants, only one did not complete this question. Accordingly, the participant distribution across the three groups was as follows:

- 41/249 let everything in their digital history accumulate.

- 151/249 sometimes try to organize their archive but admit it is still not so organized.

- 57/249 state their archive to be organized in a detailed manner.

Several methods for participant sampling were reviewed, with Purposeful Sampling (also known as purposive sampling), Maximum Variation Sampling and Proportionate Sampling methods found relevant. Their characteristics were combined into a hybrid sampling method. Bryman (2012) defines Purposive Sampling as a non-probability form of sampling, since the researcher does not seek to sample research participants on a random basis. The sampling in this method is made in a strategic way so that those sampled are relevant to research questions and

they differ from each other in terms of key characteristics relevant to the research questions. As Monette, Sullivan and DeJong (1986) state, researchers use their judgement to choose a sample that would best serve the purposes of the study. This method was found relevant, since it fitted to the requirement to define certain groups that were considered to be important in interpreting the data and reaching conclusions. Participants who were more willing to give information about their practices were required for the research. In other words, it was considered beneficial to recruit more "chatty" participants. To determine this, the long text questions in the survey were taken into consideration. Participants who gave longer answers in the questions or stated their personal interest or stated that that they had more to say on the topic were chosen.

Proportionate sampling is a method for which the size of the sample taken from each stratum (group) is proportionate to the stratum's presence in the population (Monette, Sullivan & DeJong, 1986). As this study defines previously stated groups (n=3), their distribution in the total participant population was considered proportionately while sampling participants. Tracy (2019) defined maximum variation sampling as the case where the researcher has access to a range of participants who will represent wide variations under study. This method is suitable for the studies in which the researcher makes claims and defines subgroups, as in this current research. The key characteristics of these three methods were combined to form the specific sampling technique for the interviews. The final criteria determined therefore was to recruit participants: (a) with a proportionate sample size according to defined groups and total population of 250, and (b) who seemed 'chatty', had a good command of the subject matter, and appeared to be aware and technologically capable of using the offered features of digital tools.

Khalaj and Pedgley (2019) investigated the issue of 'saturation' of data, based on a review of previous studies they had investigated. They concluded that a set of diverse impression statements will reach a level of 80-90% saturation (i.e. only a 10-20%

likelihood of collecting statements containing new topics) after conducting twelve interviews. Accordingly, they defined the "n=12 rule", which is also followed in this study, on the basis of defining groups with 12 homogenous participants alongside a consistent interviewing technique. The ideal application of this rule would be to have a minimum sample size of 12 participants for all three of the groups defined in the research (i.e. 36 participants), but according to time constraints of conducting the research, it was decided that the group having the largest distribution among the whole population would have a sample size of 12, whilst the other two group's sample size would be defined proportionally. As the largest group, the "in between" group (with 151/249 participants) was therefore sampled with 12 interview participants. When other groups sample sizes are proportioned, the "accumulator" group is represented by 3 participants and the "organized" group is represented by 5 participants. Therefore, in total, 20 participants were sampled, which was manageable under the practical conditions of the research.

Before conducting the interviews for the empirical study, three pilot interviews were conducted. These involved two male and one female participants, together covering all three sample groups. One participant let everything in his/her digital history accumulate, one participant had the intention to organize his/her archive but admitted it is still not so organized, and lastly one participant claimed his/her archive to be organized very detailed. The pilot interviews provided the researcher with the opportunity to test the tools that will be used in the interview. After the pilots, a Miro board (Figure 3.3. and 3.4, also available in bigger size in Appendix C) was prepared by the researcher to be used during the interviews, in order to take notes and to allow participants to see their answers being written down, which gave them an opportunity to rethink, refine and contribute more. The Miro board also allowed the researcher to take extra notes in the case unexpected issues or insights were raised during the interviews, as was found to be the case during the pilots. All interviews are first transcribed and then later translated by the researcher. An example of transcription can be seen in Appendix D, and an example of translation can be seen in Appendix

E. When analyzing the interview data, the same codes and themes used for the questionnaire were used, as much as possible, before using additional emergent codes (see Appendix F for example coding screens from Airtable.). Outcomes were presented as insights, and some design features were proposed accordingly. Further details on the outcomes of the interviews and the coding processes can be found in the subsequent chapter in the thesis.

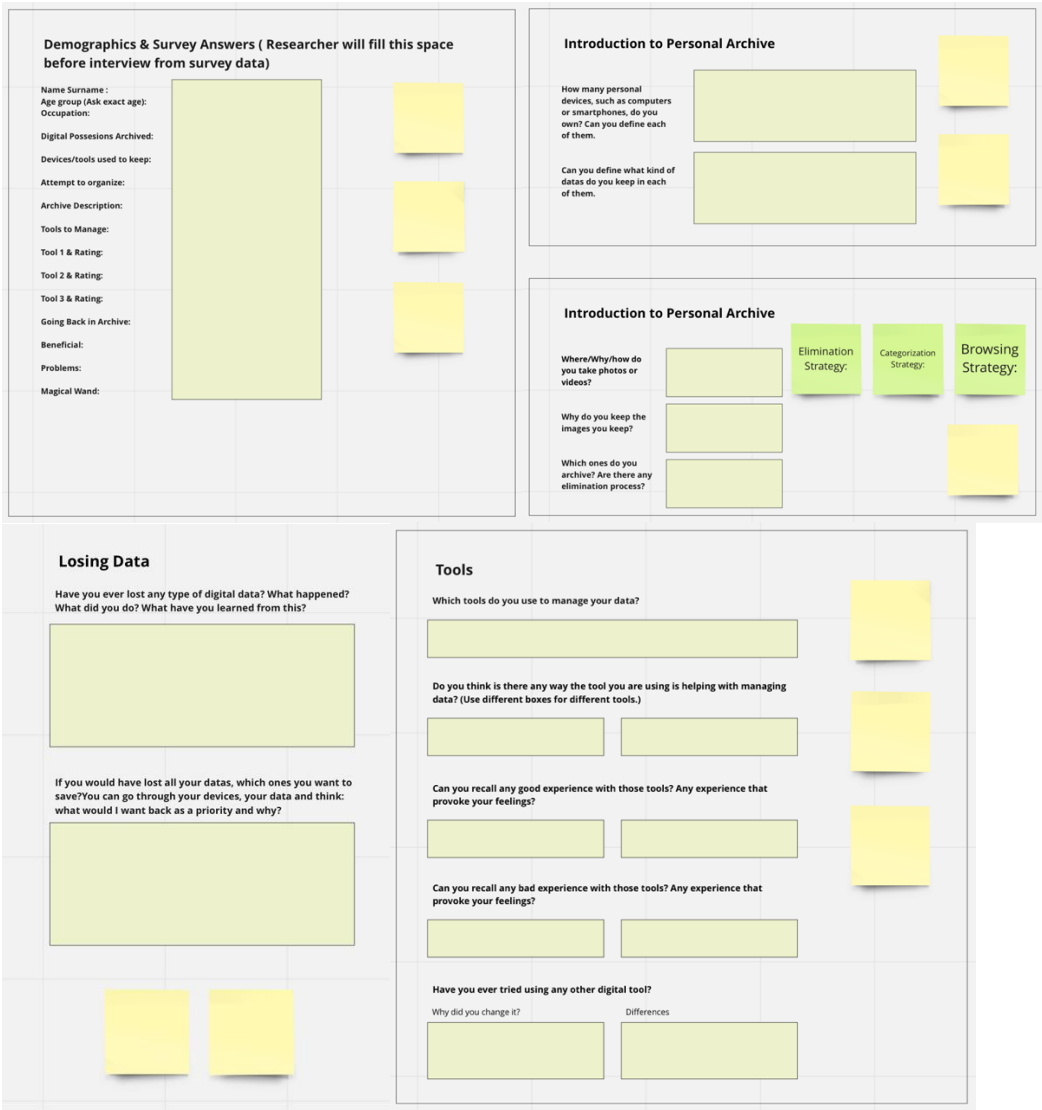

Figure 3.3. Content of Miro Board used for interviews- Part 1

Figure 3.4. Content of Miro Board used for interviews- Part 2

3.1.3 Design Solution

After conducting the interviews, the analyzed data from the interviews and survey, as well as the knowledge gained from the literature, were combined to arrive at insights that could inform the design of possible solutions to be used to managing personal digital archives. Detailed information about the process and solution are found later in the thesis.

3.1.4 Focus Group

A focus group is a planned discussion, designed to obtain the perceptions of a specially assembled group of people on a defined topic. The focus group was used to evaluate, prioritize and develop the design features that were offered in the subsequent stage of the empirical study. It provided the researcher with an overview of how people responded to each other's views of the offered design features and built up a more mature view from the interactions within the group (Bryman, 2012). The multi-actor discussions within a focus group increases the richness of the information gained (Langford & McDonagh, 2003). Also, as Kuniavsky (2003) stated, focus groups are ideally used in the early development of a design, when idea generation, feature prioritization and understanding the needs of the target audience are at their highest relevance, as it is in this research. The focus group was selected as a method since it made it possible to see the reality from the user perspective and to combine different opinions and suggestions that lead to a rich insight about the topic in a relatively quick manner, which is an important aspect considering the time limitation in design processes as well as in the conduct of Master's research.

The main purpose of the focus group was to obtain feedback and suggestions about the offered design features and prioritize the insights that they were built on. In this regard, the focus group was conducted to receive feedback and further developments, coming from a special group of participants who were both 'users' and 'designers'. A designer point of view is considered to be very important for this research, since the aim is to provide insights for them. Among the four common types of focus groups used in software development (exploratory, feature prioritization, competitive analysis and trend explanation), which are defined by Kuniavsky (2003), this research followed the characteristics of 'exploratory' and 'feature prioritization'. It shared characteristics with Exploratory Focus Groups as it helped the researcher to see how "the eventual users of the product will understand it, what words they use to talk about it, and what criteria they will use to judge it" (Kuniavsky, 2003). Also, the chosen approach carried the characteristics of Feature Prioritization Focus

Groups too, as discussion in them centers on what features are most attractive to a group and why (Kuniavsky, 2003). Also, this focus group can be defined as a hybrid method as it also carries the characteristics of a generative design session, as well as a focus group.

Figure 3.5. Focus Group Miro board arrangement

Participants for the focus group was selected among interview participants, main criteria were them for to be ‘designers’ as well as ‘users’. Six out of eleven designers among the interview participants were selected according to their availability. Focus group constructed in two parts. In the first part, researcher presented insights derived from previous empirical study steps, how might we questions and proposed design features to participants. Later, participants were divided into pairs randomly and assigned to private rooms on Zoom. A Miro board was prepared by the researcher for the participants to use during the focus group session. Left side of the Figure 3.5 was a summary of proposed design features, and participants were asked to rank those features and insights that they were build on on a scale from 1-10, with 10

indicating highest importance and 1 indicating least importance. On the second part, each pair was assigned with a proposed feature, and introduced with the PLEX framework by Korhonen et al. (2014). In their pairs, participants were asked to either iterate the design solutions they were given or generate a new design solution for the corresponding insight and 'how might we' question, combining with one or more PLEX framework experiences, to offer a solution with a characteristically playful experience. Right side of the Figure 3.5 was the part of the Miro Board participants were asked to use in this second part of the focus group containing reminder of the Playful Experiences presented in the PLEX Framework, and some assets they can use during the generation process. After generative session, a discussion session was held where all pairts were asked to present their outcomes and comment on each others.

As it is mentioned before, this empirical work was conducted during the COVID-19 Pandemic in 2020-21. As a result, the focus group was held online. This situation did not create any problem regarding the process of the focus group. In fact, it was beneficial from the main advantage of enabling participation of people who are hard to access due to geographical boundaries (Dawson, 2019). Further details on the focus group outcomes are given in the corresponding chapter later in the thesis.

3.1.5 Outcome

Outcomes of the literature search and all steps of the empirical study were combined to present insights and possible improvements and design opportunities, suitable for UX designers to benefit their future work, and for the specification of digital archiving tools that can offer richer experiences for users.

CHAPTER 4

EMPIRICAL RESEARCH PART 1: SURVEY

As articulated in the previous chapter, 250 people participated in the first phase of the empirical research. The outcomes of the survey are analysed in two parts. As the first part of the survey comprised multiple or single selection questions, those questions are analysed with the help of Microsoft Excel, providing quantitative data, whereas the second part of the survey provided qualitative data as participants were expected to give unique written answers. The second part of the survey is analysed with the tool Airtable by coding, using codes that are shared with the analysis of the interviews (Empirical Research Part 2).

4.1 Overview of the Quantitative Data

In the first part of the survey, participants were asked questions about their demographic information, types of digital data they hoard and where they reside, tools they use to manage their archive, size of their archives, and their attempt to organize their archives (see Appendix A for the complete survey questions). Their attempts to organize their archive creates sample groups for the study, such that interview participants are recruited according to the proportion of these defined groups to all participants (as described in the methodology chapter). The questions in the first part of the survey were analyzed according to distribution of answers among all participants and among the predefined groups: those who organize their archives very detailed, those who let all their digital data accumulate, and those who try to organize their archives but state that it is still not so organized.

As seen in Figure 4.1., among 250 participants, the majority of participants (47%) were between ages 25-34. As this study doesn't predict any correlation between age

and meaningful results for the aim of this study, this distribution was not taken into consideration while recruiting participants for the interviews nor in any further analysis of the data.

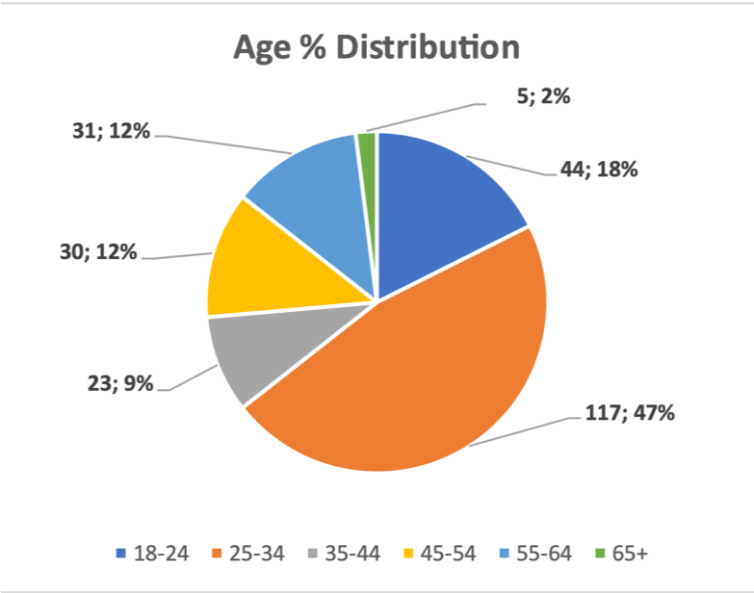

Figure 4.1. Age Distribution of Survey Participants

As it is stated before, in order to define the distribution of sample groups regarding participants' tendencies between hoarding and minimalism and revealing the distributions of each group, a specific question in the survey was used. The question was related to participants' attempts to organize their own archive. Figure 4.2 shows the distribution of the groups among the participants. Only 1 participant (1%) was directed to the 'thank you screen' before answering this question leaving the results as seen. 60% of the participants stated *they sometimes try to organize their digital possessions but they are still not so organized*, making them the most crowded sample group in the population. This sample groups and their distribution were used to recruit the participants for interviews, and also used while analysing the quantitative data from the survey. Table 4.1 illustrates the age distribution of these sample groups within each age group. The first column of the table shows age groups, and the other column shows the percentage of each age group within the stated sample group on the first cell of each row.

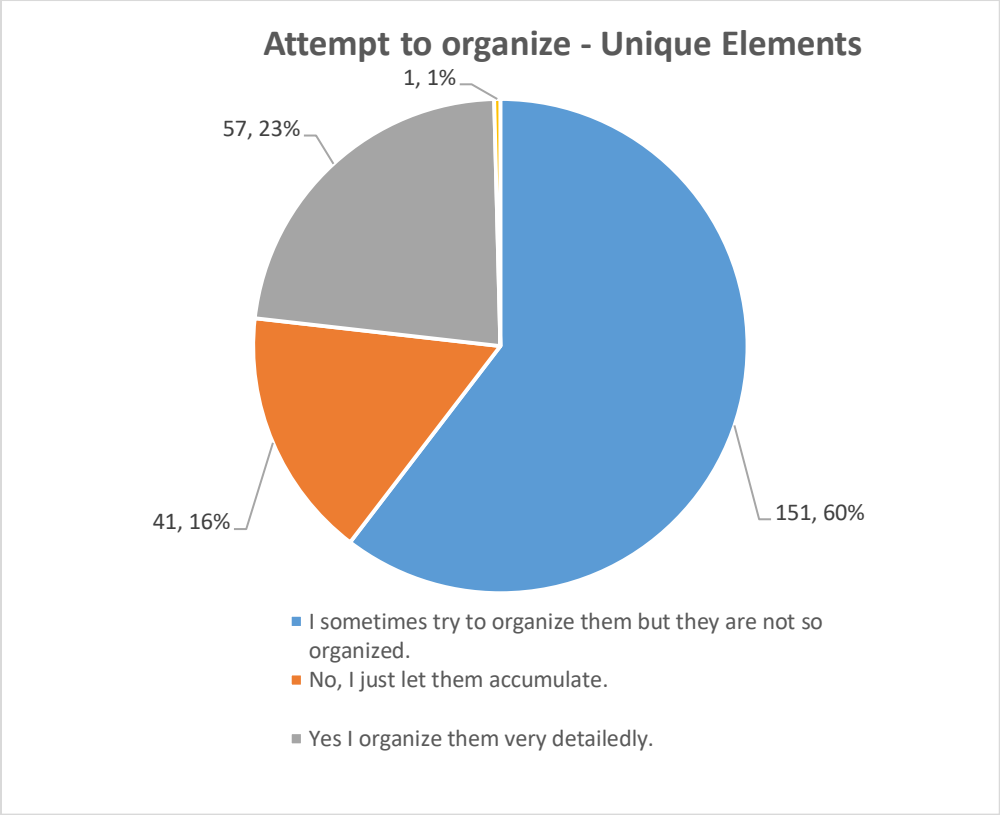

Figure 4.2. Age Distribution of Survey Participants

Table 4.1 Age distribution of sample groups

Age Class	I sometimes try to organize them but they are not so organized.	No, I just let them accumulate.	Yes I organize them very detailedly.	Percentage of all participants.
18-24	63%	21%	16%	18%
25-34	63%	15%	22%	47%
35-44	61%	22%	17%	9%
45-54	70%	10%	20%	12%
55-64	45%	19%	35%	12%
65+	20%	20%	60%	2%

Participants were asked which digital possessions they hoard and they were allowed to select multiple answers among the options. While examining the data, outcomes are handled with a few different approaches. Firstly, the frequency of each answer is examined regardless of the sample groups (Table 4.2). This data shows individual answers repeated among participants. 243 of total 250 participants stated they hoard *Photos*, which forms 97 % of participants as seen in in Figure 4.3. Second popular answer is *Videos* with 215 of 250 participants, which makes 86% of the total sample group stating that they hoard *Videos*. This data makes these two digital possessions the most popular answers. Together, they form visual digital possessions and this percentages can be offered as justification for the chosen focus for this study as it shows the importance of curation of visual digital possessions, being stated as the most hoarded among participants.

Table 4.2 Frequency of digital possessions hoarded by participants

Unique Elements	Number	% Percentage
Photos	243	97%
Videos	215	86%
Documents	169	67,60%
Emails	157	62,80%
Notes	112	44,80%
Voice Recordings	70	28,00%
Sound Files	57	22,80%
None	1	0,40%
Other	0	0,00%

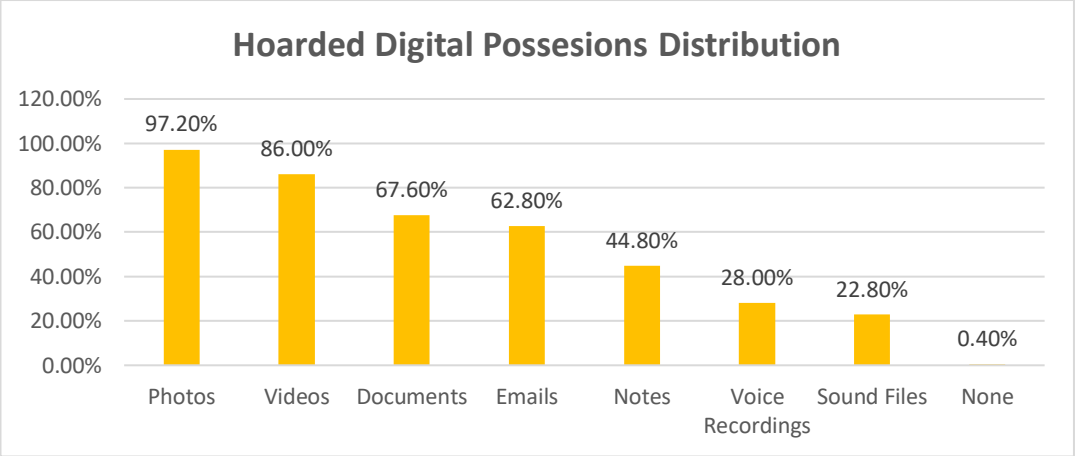

Figure 4.3. Hoarded Digital Possessions Distribution

Secondly, Hoarded Digital Possessions are examined as combinations of single options as selected exactly by participants. This multiple selection created 97 different combinations of answers. Out of 97 different combination groups of answers for the digital possessions participants hoard, there were 20 popular answers receiving above average results. Table 4.3 represents the most popular combination of digital possessions hoarded by participants. It has 3 columns: the first column which is Unique Elements represents the Unique Combinations created by selection of participants. Second column represents number of participants mentioning those combinations, whereas the third column represents the percentage of total participants mentioning those combinations. It is seen that the most popular combination of answers were *Photos, Videos, Emails, Documents* followed by *Photos and Videos* followed by *hoarding all the digital possessions that are proposed*. It can be seen among all the popular answers, *Photos* are the common element inside different combinations as it appears on every answer, followed by *Videos* as the common element in most of the combinations. Table 4.4 indicates digital possessions hoarded by participants among sample groups. Reviewing the data from the point of view of sample groups, it is seen that 99% of the people who sometimes try to organize their archive keep *Photos*, 90% of people who let everything accumulate keep *Photos*, while all of the people who organize their digital visual possessions very detailed keep *Photos.*

Table 4.3 Popular answers on groups of digital possessions kept by participants

Unique Elements (Group)	Number	% Percentage
Photos, Videos, Emails, Documents	22	8,80%
Photos, Videos	18	7,20%
Photos, Videos, Sound Files, Voice Recordings, Emails, Documents, Notes	15	6,00%
Photos, Videos, Documents	15	6,00%
Photos, Videos, Emails	13	5,20%
Photos, Videos, Emails, Documents, Notes	12	4,80%
Photos, Videos, Emails, Notes	10	4,00%
Photos, Videos, Documents, Notes	9	3,60%
Photos, Videos, Documents, Emails	7	2,80%
Photos, Videos, Voice Recordings	5	2,00%
Photos, Emails, Documents, Notes	4	1,60%
Photos, Videos, Voice Recordings, Emails, Documents, Notes	4	1,60%
Photos	4	1,60%
Photos, Documents, Videos	4	1,60%
Photos, Documents	3	1,20%
Photos, Videos, Notes	3	1,20%
Photos, Videos, Emails, Notes, Documents	3	1,20%
Photos, Emails, Documents	3	1,20%
Photos, Videos, Documents, Voice Recordings	3	1,20%
Photos, Emails, Notes	3	1,20%

Table 4.4 Digital possessions within the archives of participants, sorted by sample groups

Digital Possesions Archived - Unique Elements (Ind)	I sometimes try to organize them but they are not so organized.	No, I just let them accumulate.	Yes I organize them very detailedly.
Photos	99%	90%	100%
Videos	87%	73%	93%
Sound Files	23%	24%	21%
Voice Recordings	25%	34%	32%
Emails	68%	63%	49%
Documents	69%	59%	72%
Notes	45%	41%	47%
None	0%	0%	0%
Other	0%	0%	0%

Participants were also asked where they keep these digital possessions. Figure 4.4 shows the frequency of each answer regardless of the sample groups and combinations created by multiple selection. It reveals 58% of participants use *Online Tools*, while 84% uses *Computers* to keep their digital possessions. It is seen that 31% of participants consider *Social Media* as a place to keep their archive. Table 4.5 shows the most popular combinations, showing the combination of hardware tools to be the most popular, followed by hardware tools with online tools added. Out of 83 different combination groups of answers, there were 8 popular combinations that scored above-average results. Table 4.6 shows distribution of single selected places where participants archives reside among the sample groups. It is seen that 83 % of the people who sometimes try to organize their archive, 85% of people who let everything accumulate, and 89% of the people who organize their digital visual

possessions very detailed use *Computers* as the storage location for their archives. *Mobile Phone* storage is used by 75 % of the people who sometimes try to organize their archive, 80% of people who let everything accumulate, and 58% of the people who organize their digital visual possessions very detailed. *Online tools* are used by more than half of the participants among all sample groups, with 60% of them using *Online tools*; the group of people who sometimes try to organize their archive are the group that use *Online Tools* the most.

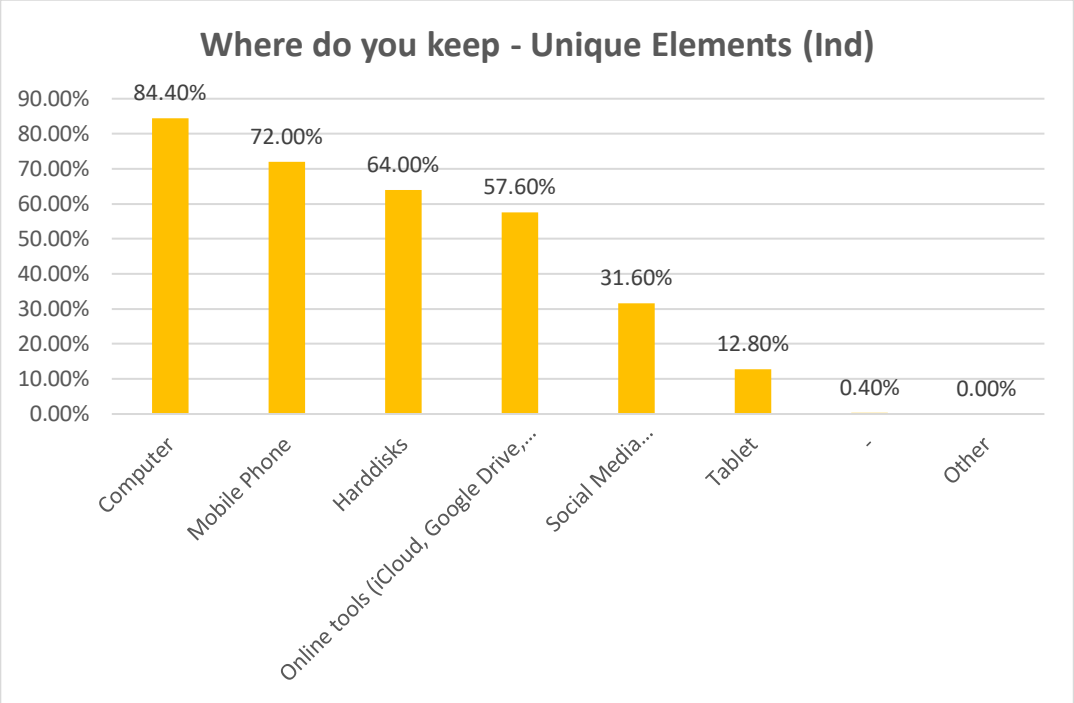

Figure 4.4. Location of participants' digital visual possessions

Table 4.5 Popular answers containing groups for the question “where do you keep your digital visual possessions?”

Where do you keep - Unique Elements (Group)	Number	% Percentage
Computer, Mobile Phone, Harddisks	22	9%
Computer, Mobile Phone, Harddisks, "Online tools (iCloud, Google Drive, OneDrive etc.)"	20	8%
Computer, Mobile Phone, Harddisks, "Online tools (iCloud, Google Drive, OneDrive etc.)", "Social Media Tools(Instagram,Facebook etc.)"	15	6%
Computer, Mobile Phone, "Online tools (iCloud, Google Drive, OneDrive etc.)", "Social Media Tools(Instagram,Facebook etc.)"	12	5%
Computer, Harddisks	12	5%
Computer, Harddisks, "Online tools (iCloud, Google Drive, OneDrive etc.)"	11	4%
Computer, Mobile Phone	10	4,00%
Computer	7	3%

Table 4.6 Places users keep their digital possessions among sample groups

Where do you keep - Unique Elements (Ind)	I sometimes try to organize them but they are not so organized.	No, I just let them accumulate.	Yes I organize them very detailedly.
Computer	83%	85%	89%
Mobile Phone	75%	80%	58%
Tablet	12%	17%	12%
Harddisks	66%	49%	72%
Online tools (iCloud, Google Drive, OneDrive etc.)	60%	51%	58%
Social Media Tools(Instagram,Facebook etc.)	37%	32%	18%
Other	0%	0%	0%

Participants were also asked to describe their archive. Figure 4.5 reveals only 9% of the participants describe their archives as minimal. The percentage of participants with gigabytes (GBs) worth archive is more than 50%, which is a predictable outcome considering how accessible storage options have become. Table 4.7 shows how participants describe their archives among sample groups. 70% of the participants in the group containing people who organize their archive very detailed described their archives as GBs worth, making them the group with the highest proportion of self-defined huge archive owners.

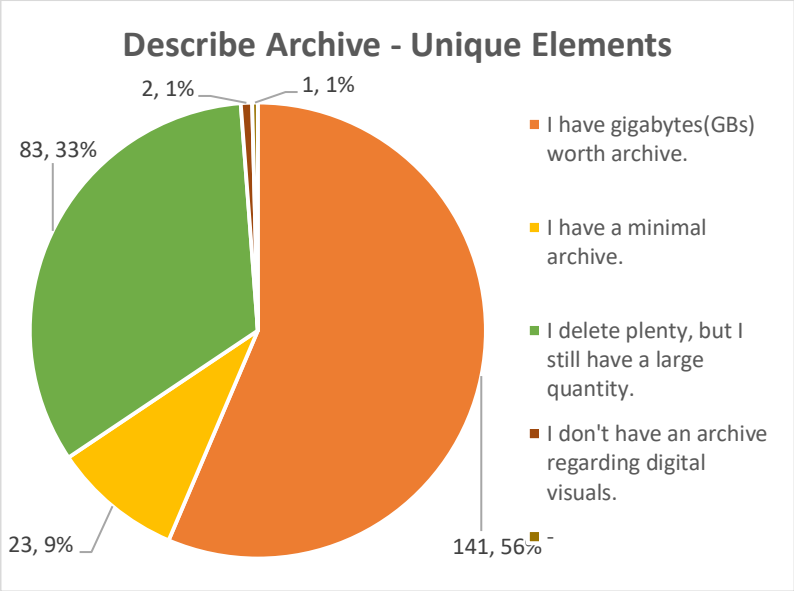

Figure 4.5. How participants describe their archives

Table 4.7 How participants describe their archives, sorted by sample groups

Describe Archive - Unique Elements	I have gigabytes(GBs) worth archive.	I have a minimal archive.	I delete plenty, but I still have a large quantity.	I don't have an archive regarding digital visuals.
I sometimes try to organize them but they are not so organized.	54%	10%	35%	1%
No, I just let them accumulate.	49%	17%	34%	0%
Yes I organize them very detailedly.	70%	2%	26%	2%

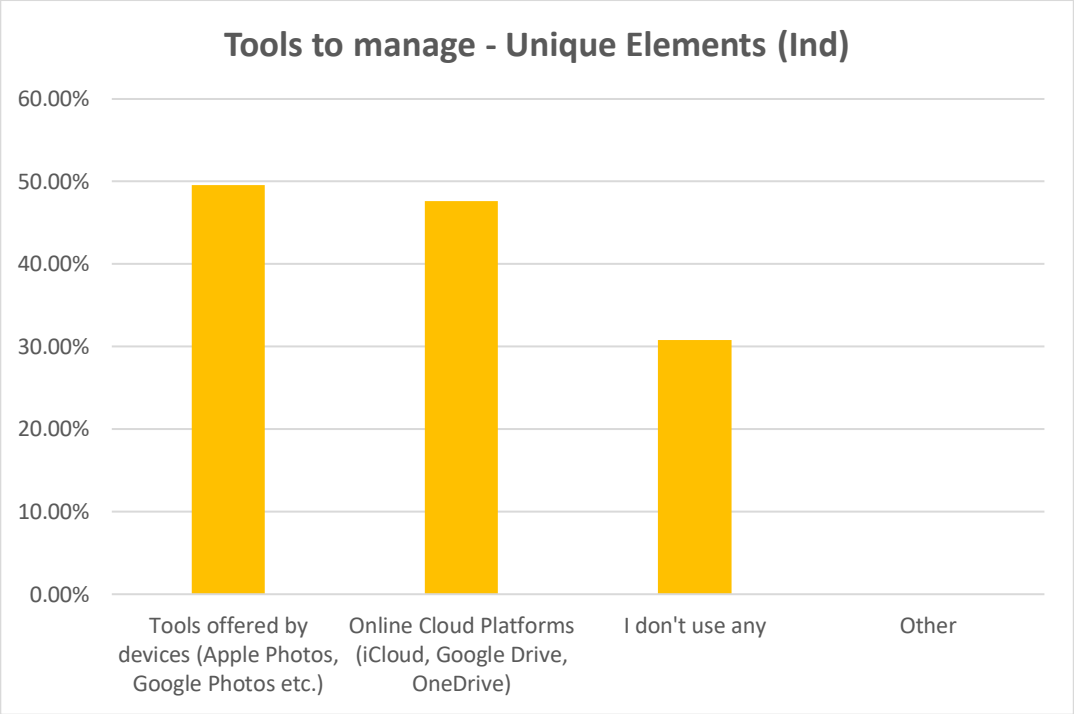

Figure 4.6. Frequency of tools used by participants to manage their archive

Figure 4.6 shows the tools used by participants to manage their archives. While 30% of participants *don't use any digital tools*, half of the participants use either *Tools offered by devices* and *Online Cloud Platforms*.

Even though it is not stated in Figure 4.6 as it only shows frequency of the single answers, when combinations of these answers are examined, it is seen that only 20% of total participants uses both *Tools offered by devices* and *Online Cloud Platforms.*

Table 4.9 shows distribution of the tools used by participants among the sample groups. It can be seen that nearly half of the participants who let their digital possessions accumulate *don't use any of the tools*. The same group has the lowest proportion of using *Cloud Platforms.* It is seen that *Tools offered by devices* are used by nearly half of the participants among all sample groups.

Table 4.8 Tools participants use to manage their visual archive among sample groups

Tools to manage - Unique Elements (Ind)	I sometimes try to organize them but they are not so organized.	No, I just let them accumulate.	Yes I organize them very detailedly.
Tools offered by devices (Apple Photos, Google Photos etc.)	47%	49%	58%
Online Cloud Platforms (iCloud, Google Drive, OneDrive)	48%	39%	53%
I don't use any	29%	46%	25%
Other	0%	0%	0%

The participants who mentioned using at least one of the digital tools were asked about their habits of going back in their archives. 50% stated that they go back in their archives occasionally, while only 9% mentioned going back just in the times of need (see Figure 4.7.). Table 4.9 shows the distribution of frequency of going back into the archive among sample groups. Almost half of the participants in all groups mentioned going back in their archives occasionally.

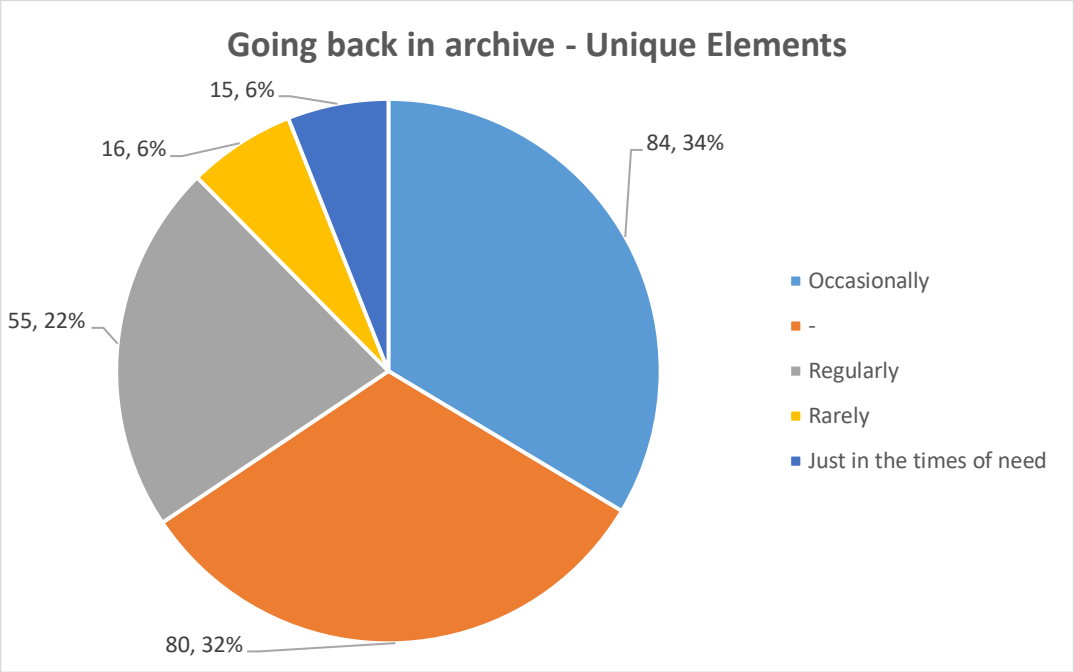

Figure 4.7. How frequent participants go back in their archives

Table 4.9 Frequency of participants going back in their archive, sorted by sample groups

Going back in archive - Unique Elements (Without Spares)	**I sometimes try to organize them but they are not so organized.**	**No, I just let them accumulate.**	**Yes I organize them very detailedly.**
Occasionally	51%	45%	48%
Regularly	25%	36%	48%
Rarely	12%	14%	0%
Just in the times of need	11%	5%	5%

4.2 Qualitative Analysis

For the second part of the survey, a qualitative analysis is used. As there were four questions they were asked to answer by writing, the replies for these four questions are naturally divided under four main themes in this section of the chapter.

4.2.1 Beneficial Features of Tools Used by Participants

Out of the 128 meaningful unique participant responses that were extracted from the survey, it can be seen that the most frequent theme that users mentioned as beneficial was the "Search Options" offered by tools. The most repeated codes for the beneficial features of the tools, in rank order, are as follows:

1. Search By Location (mentioned by 19 unique participants)
2. Advanced Search Features (All categories together) (mentioned by 16 unique participants)
3. Search By Date (mentioned by 14 unique participants)
4. Searching By Face Recognition (mentioned by 13 unique participants)
5. Searching By Object/Subject (mentioned by 12 unique participants)
6. Searching By File/Folder Name (mentioned by 7 unique participants)
7. Search By File Size (mentioned by 2 unique participants)

Following this, a second common theme was actions that participants get to make related to the "Date" of the visuals, including "Sorting By Date" that is mentioned by 27 unique participants and "Searching By Date", which is mentioned by 14 unique participants.

Another common theme was "Foldering", which includes creating folders or albums, according to the tools that participants use, which in total was mentioned by 17 unique participants. It can be also be referred to as the ability to divide an archive into smaller units. This theme is followed by 3 common codes, which are "Memories

(For You)" feature, tools "Being Fast" and tools providing "Accessibility" (all mentioned by 5 different unique participants).

4.2.2 Problematic Features of Tools Used by Participants

Out of the 122 meaningful unique participant responses that were extracted from the survey to the related question, it can be seen that the most frequent theme mentioned by participants was "Out-of-Control Archives" including "Lack of Organization"(12 mentions) , "Archive Getting Crowded and Messy"(9 mentions) and "Difficult to Find" (8 mentions).

Following "Out-of-Control Archives" closely, the "Own Memory" theme was common too, being mentioned by 20 unique participants. This theme includes problems caused by participants not remembering the date or name of the file, or location they save the files. This theme followed by code "Reaching Files That Are Not Named Properly" (17 mentions). "Not Remembering the Name of the File" and "Reaching Files That Are Not Named Properly" codes can be evaluated in a cause-and-effect relation, as not naming files properly can be considered as a trigger to not remember the name of the file in the future. Another code that can be considered related to this issue was "Different Devices Using Different Naming for Visuals", which was mentioned by 2 different unique participants.

Other common codes were "Can't Assign Index Information to Search" and "AI Failure", mentioned by 6 participants each. "Previews Taking Too Long To Load" and "Duplicates" were mentioned by 5 participants each. Then, all mentioned by 4 participants, were the codes "Date Change of The File" caused by transferring between devices and tools, "Changing Archiving Strategy", "Decentralization" which means having too many devices and tools that are used at the same time causing confusion, "Storage Issues" and "Problems That Can Be Solved by AI Search".

4.2.3 Expectations of Users from the Tools

When participants were asked what they wanted to change about the digital tools they used if they had a magic wand, the most repeated code – by 25 unique participants from among 141 meaningful replies – was the mention of needing advanced AI search options, something that is partly offered by some existing tools. This means 25 participants mentioned expectations that can be solved by already offered AI Search options by tools. This result provided an insight that this portion of the participants was not aware of the features that are already provided by the available tools. Also, the 4th most repeated common code was "Voice Command", mentioned by 12 participants, which is already provided by both Android and iOS devices with their default voice assistants, Google Assistant and Siri. This is another feature participants were not aware of. Also, 9 participants mentioned a need for "Video Content Search", which was triggered either by those participants not being aware that it is an existing feature, or the feature as currently offered is found not advanced enough to successfully complete tasks.

20 unique participants talked about "Storage Issues", including comments about wanting unlimited or more storage, free of charge. It can be interpreted that problems users face during the elimination stage can be a subcomponent of this issue.
18 participants mentioned expectations about "Indexing", which includes issues about not being able to add (tag) information manually about visuals such as name, people in it, objects in it, colors in it, related keywords, and notes.

8 participants expressed their need of guidance on elimination especially regarding duplicates or visuals that are shot with a purpose serving an action rather than created as memories and left out in the archive even after they are done with them.
"Device Related Issues" and "Color Searching" is mentioned by 7 different participants each. 5 different participants expressed their need of "Archiving Strategy Suggestions" and "Finding Duplicates" were mentioned by 5 other different participants. "Security Issues", the need of creating a "Subfolder", "More Filtering

Options" and "More Descriptive Search" were each mentioned by 4 different participants. "Multiple Filtering Options" is mentioned by 3 participants and together with "More Descriptive Search", they can be considered as under the same theme, as being more descriptive can be considered as connecting multiple sources of information about a visual.

Less repeated codes include, "Connection Speed", "Naming Issues", "Reminders to Organize", "Working as Own Brain", "Visualization", "Date Change" of files according to transfer, and "Adding Notes".

4.2.4 Further Notes

Lastly, participants were asked to express any other issues that they thought would be relevant to the scope of the study. There were 70 meaningful participant responses that were coded. The most frequent codes that were generated through the coding process of participants' responses were: "Security issues"(8), "Indexing"(6), "Finding Duplicates" (5), "Guidance on Elimination" (3), "Needs AI Search" (3), "Archiving Strategy Suggestions" (3), "Reminders to Organize" (2), "Self Incompetence"(2), "Storage Issues"(2), and "Accessibility" (2). It can be seen that, similar codes generated through other questions' answers were repeated here from other participants.

4.2.5 Key Insights

The generated codes from the survey data were highly nested. Key insights that are highlighted from the survey results can be summarized as follows.

People regard crowded, messy archives as the main problem. This may be interpreted as a result of tools not being sufficient enough to help people organize their archives, but equally tools equipped with features aiming to ease search and hoarding can bring people freedoms to have crowded archives, thereby creating a vicious circle.

The survey participants stated the most beneficial features of the tools are advanced search features offered by devices, and it can be seen that “date” is the most important information that helps participants while interacting with their visual archives.

An noticeable proportion of participants were not aware of the features offered by tools and devices. This can be because tools are not self-explanatory or user friendly enough. Another popular code generated from the survey results related to Videos and how they need similar search features as photos. Often, while conducting searches, tools bring up some video content alongside still images, but as the video results are generally fewer in number compared with photos, the implication is that video searches may not be advanced enough to meet people’s expectations. Another way to interpret this issue is ignorance amongst people about the capabilities of the tools that they use.

Another issue that was common among participants was “Storage Issues”, even though this issue is not directly relevant to the scope of the thesis. Among the answers it is related with is “Decentralization”, since limited storage leads participants to use more tools. The underlying reasons for this storage issue might be interpreted with people’s strategies and needs regarding the elimination cycle of curation, and some possible solutions might be offered accordingly.

Duplicates were mentioned as a problem under several related codes, which shows it is a common problem people face during the elimination stage of curation and directly affects the navigation stage. Participants expressed their need for guidance on elimination, especially regarding duplicates or visuals that serve no more to a purpose, and visuals that they are ‘done with’.

Finally, accessibility of reaching a file was a common issue expressed by participants. This issue is caused by several reasons, such as not naming the files

properly in the first place (which is highly connected with naming files randomly), losing the context they named files over the years, as well as changes in archiving strategy over the years and auto-naming of files by devices that are not meaningful. Duplicates, lack of organization, and people having limited control over adding index information to visuals are other causes that compound the issue. Even though they have some control over adding index information, it is limited through the tools participants used most (the tools they used on their mobile phones). And most of the participants were also not aware of this limited control they have too. The “Indexing” code was frequently used for the survey data, and is highly connected to other codes. This code includes insights related to some more familiar information types regarding visuals, such as date, location, related people, device taken and so on, as well as less familiar types such as personal notes, keywords, and tags.

CHAPTER 5

EMPIRICAL RESEARCH PART 2: INTERVIEWS

Semi-structured interviews were conducted with twenty participants. As mentioned before, while selecting the participants, predefined hoarding sample groups and their proportions amongst all survey participants were considered. There were twelve participants representing the group of people who try to organize their archives but still not so organized, three participants representing the group of people who let their digital visual possessions accumulate, and five participants representing the group of people who organize their archives very detailed. The data gathered from participants were analyzed through an emergent content analysis coding process. First, important data was gathered in Airtable and related information to categorize such as Participant, Participant Sample Group, Questions and Quote were added (see Figure 5.1).

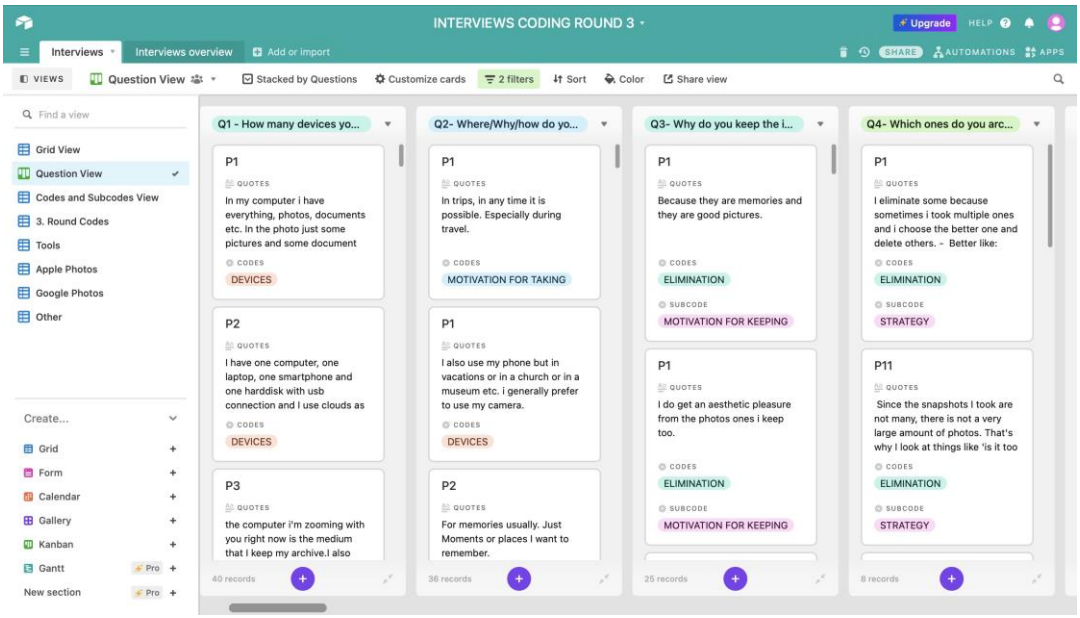

Figure 5.1. Data as quotes and other relevant information gathered in Airtable

Three rounds of coding were held for analysing the interview data. In the first round, ten codes were used, which are: *Devices; Motivation For Taking Photos; Losing Data; Data Prioritization; Tools; Elimination; Categorization; Navigation; Social Media* and *Back Up* (see Figure 5.2).

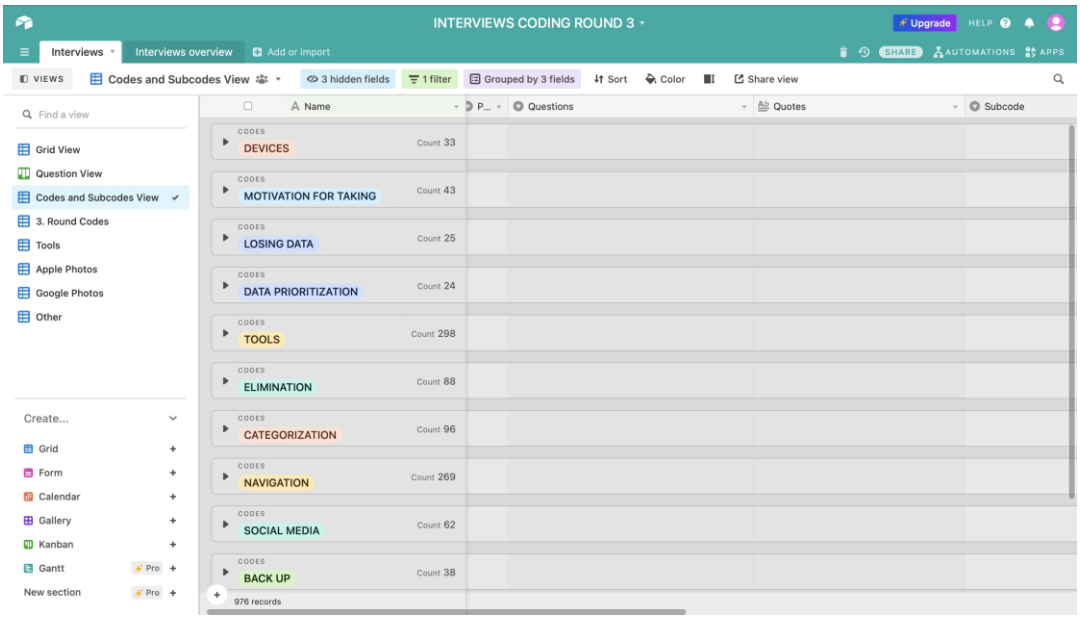

Figure 5.2. First round of coding

After the first round of coding was completed, some subcodes were added in the second round. Also another column were added stating the tool used in the necessary quotes in order this information to provide a categorization of codes related to specific tools when needed. Subcodes were defined as: *Motivation For Keeping; Strategy; Context; Beneficial Features; Problematic Features; Comparison; Good Experience; Bad Experience; Pricing; Habits; Deletable Photos; Browsing Without Purpose; Self-Incompetence; Expectations; Intend to Be More Organized* and *Security* (see Figure 5.3).

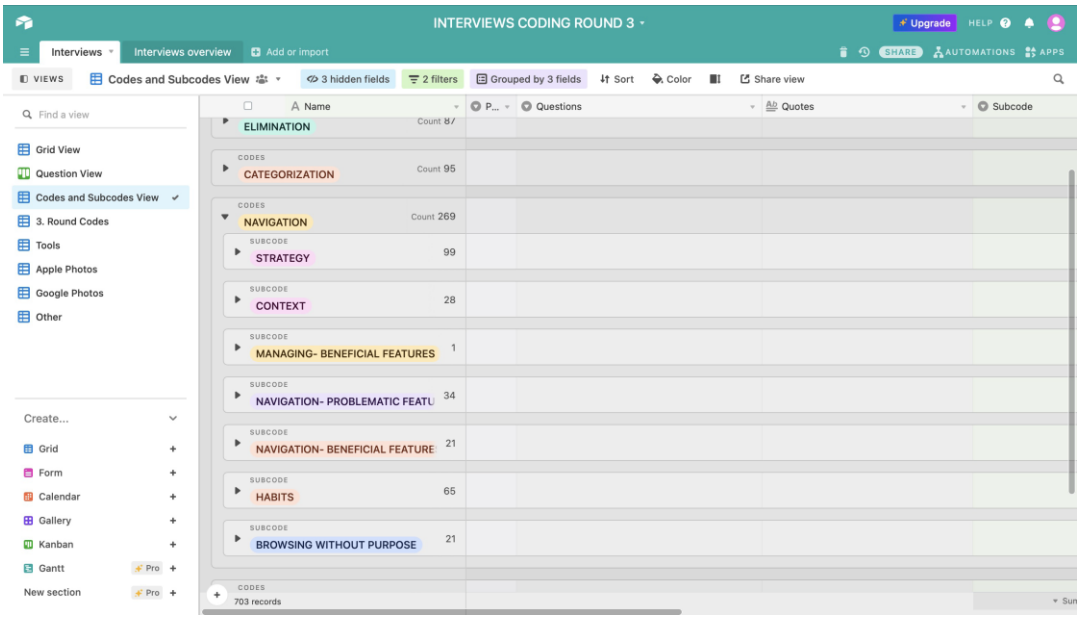

Figure 5.3. Second round of coding

For the third round, different strategies were followed for different questions. Some of the interview transcript data were analyzed without requiring a third round of coding, but rather creating tables. Those data consisted mostly of individual replies, such as strategies. Other data went through a third round of coding, with the same or very similar codes as used for the survey analysis. In total, there were 62 different codes used in the third round (see Figure 5.4). Also, an overview of the analysis were created in order to analyze and summarize that from an overall perspective (see Figure 5.5).

As mentioned, all of the coding was made in Airtable which is a tool that enables researchers to explore the relations between data from different perspectives using various views, filtering and grouping options.

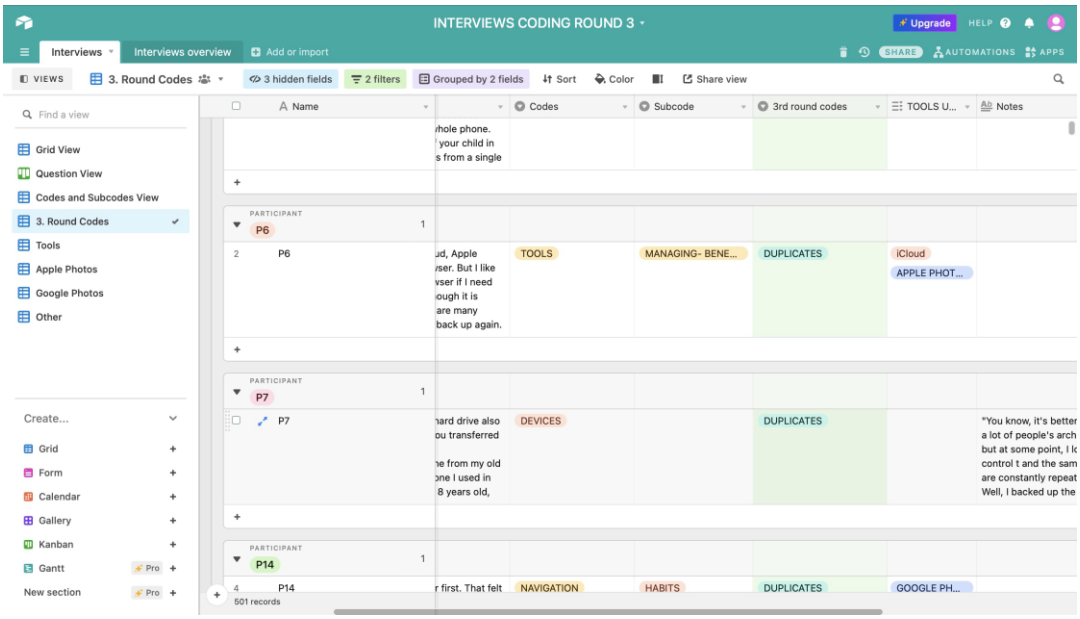

Figure 5.4. Third round of coding

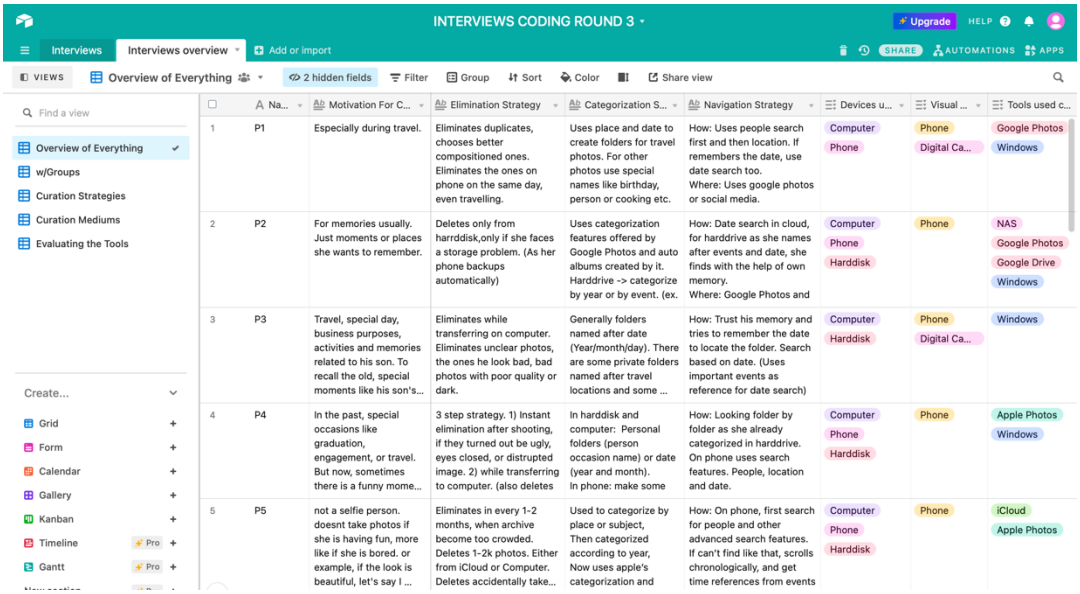

Figure 5.5. Analysis overview

5.1 Creating Photos and Videos

In the interviews, participants were first asked for an overview of their devices they use to store their archives, along with their practices and habits related to personal visual creation. Table 5.1 shows an overview of the status of the interviewes (the sample group they belong to), the devices they use to store their archives and the devices they use to create their visual archives (in other words, on what products they shoot their photos and videos). All the participants mentioned they are using their smart phones to take photos. Six of the total participants mentioned using digital cameras in addition to their phones while shooting photos and videos. They mentioned using digital cameras only on special occasions or for business purposes when higher quality documentation is needed. Some of them (four) even mentioned they stopped using their digital cameras, because smart phone cameras were more than sufficient and they didn't want to carry a separate camera with them. Only three of the participants mentioned using analog cameras. Two of these participants mentioned keeping photos shot with their analog cameras as digital images. There were also four more participants who mentioned transferring printed old photos to digital, to keep in their digital archives.

As for the devices where they store these digital memories, all participants mentioned using computers. Almost all of the participants mentioned using more than one computer, which includes old computers or business computers. All participants except one mentioned using their phones too for keeping their visual archives. Even though P3 had a phone and was using it to shoot photos and videos, P3 did not prefer to keep an archive there and instead transferred the photos and videos to either a computer or hard disk. Twelve participants mentioned having a hard disk (or multiple hard disks) for backups. Other devices mentioned were tablet and USB-stick devices. Participants also mentioned what they keep in their devices, both visual and other data, which showcased the decentralization of data for each participant.

Table 5.1 Overview of the participants & devices

PARTICIPANT	STATUS	DEVICES FOR KEEPING THE ARCHIVE	DEVICES FOR CREATING
P1	IN BETWEEN	Computer, Phone	Phone, Digital Camera
P2	IN BETWEEN	Computer, Phone, Hard disk	Phone
P3	IN BETWEEN	Computer, Hard disk	Phone, Digital Camera
P4	IN BETWEEN	Computer, Phone, Hard disk	Phone
P5	IN BETWEEN	Computer, Phone, Hard disk	Phone
P6	IN BETWEEN	Computer, Phone, Hard disk, Usb	Phone
P7	ORGANIZED	Computer, Phone, Tablet	Phone, Digital Camera
P8	IN BETWEEN	Computer, Phone	Phone
P9	ORGANIZED	Computer, Phone, Hard disk	Phone, Digital Camera
P10	ACCUMULATES	Computer, Phone, Hard disk	Phone
P11	IN BETWEEN	Computer, Phone, Hard disk, Usb	Phone, Digital Camera
P12	IN BETWEEN	Computer, Phone, Hard disk	Phone, Analog Camera
P13	IN BETWEEN	Computer, Phone	Phone
P14	ORGANIZED	Computer, Phone, Hard disk	Phone
P15	IN BETWEEN	Computer, Phone, Hard disk	Phone, Digital Camera
P16	ACCUMULATES	Computer, Phone, Tablet	Phone
P17	ORGANIZED	Computer, Phone, Usb	Phone, Digital Camera
P18	IN BETWEEN	Computer, Phone	Phone, Analog Camera
P19	ACCUMULATES	Computer, Phone, Harddisk, Tablet	Phone, Digital Camera
P20	ORGANIZED	Computer, Phone	Phone, Digital Camera, Analog Camera

Participants' motivations for taking a photo or a video can be summarized under three main reasons: memory, aesthetic and purposeful. *Memory-related* visual creation includes photos and videos taken with or of family and friends, travel photos, special occasion photos or just things from daily life that participants wanted to immortalize to remember. *Aesthetic-related* visual creation includes landscapes, patterns, or - as participants mentioned - random or ordinary things, things that they thought looked appealing, as expressed by P18: "For example I saw something in the garbage and I liked it, I liked the way it looked, I even shot the garbage." Purposeful visuals include business related visuals, future logs and documents or things that contain information that participants thought would be useful in the future. Three of the participants highlighted how visual creation habits changed with the development of technology. P4 expressed this change as follows: "In the past, we used to do these only on special occasions. Like our graduation, engagement, or if we went on a trip at work during our engagement period without a spouse. But now, sometimes there is a funny moment when my daughter and son are studying or eating, we take our phone out and we shoot it instantly."

One of the tasks that participants were asked to do in the second part of the interview was helpful in revealing circumstances when participants do not take photos: when they are sad/unhappy. Thirteen of the participants mentioned this.

As this study was conducted during the COVID-19 pandemic, it is observed that the pandemic situation affected participants' habits regarding creation of photos and videos. Seven participants mentioned this change and it is seen that this happened in two different ways. First it decreased the number of visuals created, as P9 stated: "I don't take too many daily photos right now, because I'm at home. Because it doesn't make a lot of sense.". Secondly, pandemic changed the photo shooting practices. Photos in physical places are replaced by screenshots of virtual meetings as P15 stated: "After all, now that we have gone fully online, memories become screen

shots, in meetings or something. That's why I have a screenshot folder in my computer. From different meetings.”.

5.2 Habits and Strategies

When it comes to curation of visual archives, everyone has their own strategies, which may mirror the way of other people. One of the participants mentioned a personal experience: P8 mentioned that after filling out the survey sent by the researcher, she encouraged an old group of friends to open a shared Google Drive folder to share their university photos there. She mentioned even that 5 people who contributed to that folder had different styles of categorizing their photos from their university years together. Similarly, differences in individual approaches regarding archiving strategies can be seen among participants. The researcher attempted to summarize each individual strategy to see similarities and differences. Even though participants were asked directly about their strategies regarding the steps of curation, most of the participants did not reveal complete strategies as they were either not aware of the full curation process or they did not have a defined strategy. The researcher coded whole interviews in rounds to summarize individual strategies mentioned or revealed while accomplishing the tasks given to participants or while replying to other questions. The next sections will look at users’ various strategies, habits and experiences related to the three stages of visual archive curation.

5.2.1 Keeping: Elimination

Table 5.2 presents an overview of the summaries of participants’ elimination strategies and context (Left column indicates participant and sample group: I.B.= In Between, O. = Organized, A. = Accumulates). Even though individual differences were high, there were some common points. It was observed that there were two common triggers causing participants to eliminate. The first is that a crowded archive makes it hard to find things. The second is related to limited amounts of storage.

Table 5.2 Overview of the participants elimination strategies

P1 (I.B.)	Eliminates duplicates, chooses better compositioned ones. Eliminates the ones on phone on the same day, even travelling. For the ones she took with camera, eliminates while transferring to computer.
P2 (I.B.)	Deletes only from harrddisk,only if she faces a storage problem. (As her phone backups automatically)
P3 (I.B.)	Eliminates while transferring on computer. Eliminates unclear photos, the ones he look bad, bad photos with poor quality or dark. Only deletes the photos of documents that intends to be used in 1-2 day from phone when they are done.
P4 (I.B.)	3 step strategy. 1) Instant elimination after shooting, if they turned out be ugly, eyes closed, or distrupted image. 2) while transferring to computer. (also deletes duplicates from multiple angles like photos of same moments from husband) 3) while transferring to harddisk, decide whether they are neccessary or not. Deletes the ones that involve third parties. Like another children on the stage during her son's theatre. Struggles with eliminating videos as she can't watch them all. Deletes the small sized ones.
P5 (I.B.)	Eliminates in every 1-2 months, when archive become too crowded. Deletes 1-2k photos. Either from iCloud or Computer. Deletes accidentally taken screenshots, eliminates photos related to finished projects, decrease the number of consecutive photos, deletes instant photos she sent to someone through Whatsapp.
P6 (I.B.)	Doesn’t delete photos with friends, even if she looks ugly. For the aesthetic related photos, eliminates the consecutive photos. Eliminates only on phone, as navigation becomes harder and storage issues. Eliminates while she doesnt have an internet connection in the subway.
P7 (O.)	Haven't delete any photos in 3 years. After she started using iCloud and Apple photos, she stopped eliminating.
P8 (I.B.)	Eliminates to avoid mess, and make finding things easier, when she feels like her archive become too messy. Eliminates consecutive ones and left only few best ones that can help remember the moment.
P9 (O.)	Instantly eliminates the ones that come out bad. Chooses the best ones and eliminates the rest. Instantly deletes flickering and blurry images unless it's a photo of a moment will never happen again. Used to eliminate on computer but now she eliminates on phone as her screen is big enough.

P10 (A.)	Usually keeps everything as she considers them as memory. Only delete if she shoots smt accidentally or image turned out to be blurry to manage storage, or sometimes when she's done with school or business related photos, but she states she mostly forgot to delete them too.
P11 (I.B.)	Has really minimalistic approach. Leaves 1-2 photo of an event to remember. Eliminates while transferring to computer and does one more time before he starts sorting.
P12 (I.B.)	Eliminates according to personal aesthetic taste. States trying to keep few versions of each photo group. Does the elimination on the phone. Not right after shooting the visuals, usually when she's bored. Sees elimination as a activity.
P13 (I.B.)	Eliminates on the phone when she feels like the photos are piled up. She shoots many photos and eliminates them according to quality (shifted or blurry), then reduces the number of photos from the same concept (consecutive photos). States doing elimination in few rounds. And she saves only the best ones to the Drive.
P14 (O.)	She eliminates while transferring Google Photos to her harddisk. Eliminates similar photos. Even if she looks ugly in group photos, she doesn't delete them. She eliminates more of her own photos. Directly deletes Whatsapp videos and photos. Keeps everything about and comes from family.
P15 (I.B.)	Eliminates time to time during device changes. Eliminates the ones with duplicates, but gives up as it took too long. Tries to keep things related to closest friends. Sometimes she just takes one photo from the folder and deletes the rest. She became more harsh on deleting stating she deletes everything she knows she would never look at again in her recent device.
P16 (A.)	She only deletes if the storage is full. Eliminates visuals come from whatsapp as they are mostly irrelevant, photos of documents that she is done with, screen shots. If those ones are not enough, she also deletes some blurry and low quality images, and then if needed she only keeps the most beautiful ones if needed.
P17 (O.)	She intends to archive everything but eliminates when storage is full or archive gets crowded. First she eliminates the photos according to her social relationships. Then, she eliminates the photos from the same concepts, consecutive photos. Eliminates from phone.
P18 (I.B.)	He doesn't delete anything as he thinks each photograph is like a memory.
P19 (A.)	Never deletes anything and keep everything in duplicates.
P20 (O.)	Stated since she doesn’t have a storage problem, she doesn’t do a lot of elimination. Reduces similar images while transfering from phone to computer. Sometimes instantly deletes images after shooting if they come out bad and sometimes while scrolling.

Even though storage is a common code among both survey and interview participants, as most of them state they want unlimited GBs, it is seen in interviews that a lack of a limit in storage makes even the more organized participants lazy regarding organizing their archive, which in turn makes it hard to access things and prevents the archive becoming meaningful and organized. Also it is seen that there are some similarities regarding the visuals that participants consider worthy of deletion. Most participants stated they tend to delete the photos that come out bad and lack quality, duplicates, consecutive photos, photos coming from WhatsApp, visuals that they are done with (like receipts, old project photos, photos taken to inform someone and them and needed for a short amount of time). Twelve of the participants mentioned they delete or aim to delete photos that no longer serve a purpose, or the purpose is no longer needed or relevant, yet, especially in the guided tour part of the interview, it was observed that this intention stays mostly only as an intention: those photos and screenshots stay there, adding up to piles, even if they are no longer needed.

Another group that is commonly aimed to be deleted but forgotten is duplicates. P15 expressed the situation that duplicates create: “You look at the screen, scroll and scroll and same things for pages. Which is having duplicate things without being eliminated.” P18 stated: “This photo for example, it exists everywhere, I want one of them of all, copies and backups piss me off.” Without exception, each of the participants mentioned backing up their visual archive, most of them by automatic backup, some with both automatic and manual backup, and a few with just manual backup. While participants were talking about backup, another reason for duplicates was revealed, which is participants were making backups of files they had already backed up, either because they were not sure, or they wanted to guarantee that their visuals are safe. P8 talked about clouds and fear of losing data that leads to making more and more backups on other devices: “I know it won't happen, but I still can't get over that feeling. That's why I feel like I need to back up.” P4 expressed her fear as: “I am in a constant state of anxiety, if something goes wrong with the laptop, or

if something happens to the phone, but at least if something happens to that 1TB this time, they will also be here too, so there is a split." P19 also expressed his fear that led to multiple backups: "If they are deleted or something, that is a heart attack reason for me. It stores duplicates, with double backup. It's stored as a mirror, so it's pretty backed up."

There were also some participants who mentioned never deleting photos, such as P19, who is the participant who had the most struggle during the tasks given during the interviews and failed to complete almost all of them: "And I do not delete, I do not delete data in any way. No one can make me delete things until I'm dead."

Participants also mentioned reasons for keeping the visuals they decide to keep, which are somewhat parallel to the reasons why they take photos in the first place. The most common reason was that those visuals are memories. P17 expressed it as: "After all, our purpose in taking photographs is to look at it years later and remember that moment. So I guess to make some flashbacks more permanent like this."

Regarding habit changes on elimination during the COVID-19 pandemic, only P6 mentioned that the pandemic had decreased the time she had available for elimination, as she preferred to conduct it on the subway while traveling, as she didn't have Internet connection while travelling.

9 of the participants mentioned having difficulties in navigation while finding what they were looking for, due to their crowded archives. As already raised in the literature review, the interviews confirmed that the curation steps are highly nested and that people's strategies regarding elimination have a knock-on effect on their ability to navigate.

5.2.2 Managing: Categorization

Table 5.3 shows an overview of the participants' categorization strategies and context. Just like the previous step of the curation cycle, participants have strategies of their own. However, some similarities can be exposed.

Table 5.3 Overview of the participants' categorization strategies

P1 (I.B.)	Uses place and date to create folders for travel photos. For other photos use special names like birthday, person or cooking etc.
P2 (I.B.)	Uses categorization features offered by Google Photos and auto albums created by it. Harddrive -> categorize by year or by event (ex. Holiday,2019). Home cloud -> Divided by family members, foldered by years (2017,2018 and events (Barcelona, Erasmus, Uni).
P3 (I.B.)	Generally folders named after date (Year/month/day). There are some private folders named after travel locations and some special occasions.
P4 (I.B.)	In harddisk and computer: Personal folders (person occasion name) or date (year and month). In phone: make some folders for occasion.
P5 (I.B.)	Used to categorize by place or subject. Then categorized according to year. Now uses apple's categorization and favourites.
P6 (I.B.)	On phone: foldering for business related visuals, favourites for personal(photos for social media). Uses Automatic Categorization. Computer: Folders by month and year as apple default.
P7 (O.)	On phone: uses apple automatic albums and create some custom folders for random things, created in need to access faster. Computer: First, divided according to device taken, then location and subject and date. For apple folder uses default date categorization of apple. Still has many random folders.
P8 (I.B.)	On phone: Uses google photos self categorization system. Computer: Tried different strategies through years, has folders that she intends to organize later. Categorized some according to location, some with device. No common strategy. Google Drive: Categorized some according to location, some with occasion. but states its messy.
P9 (O.)	Folders a photo as soon as shooting it. Daily photos stays in camera roll, sorts the rest by location. Hard disk: Event/Occasion/Location and date. States changing archiving strategy constantly.

P10 (A.)	Phone: Uses automatic folders and categories. Computer: Uses the default layout of the device it transfers from. Have some main folders and folders in folders, does not have a categorization strategy. Randomly created folders. Some main folders by device.
P11 (I.B.)	Folder according to date first, and then under the date, by subject. Also tags some of the images.
P12 (I.B.)	Categorize by time (Year folders, month/period folders inside). Takes advantage of her phones default categorization when transferring but manually changes too. Folders trips separately, named after location.
P13 (I.B.)	Computer: Only categorizes the important events like Graduation or Abroad trips. She states she folders thematically. Other ones goes to the album called ""My Photos."". Uses Apple's default categoriztion for those. Phone: Uses automatic folders and created a folder called abroad which consists just landscapes.
P14 (O.)	Computer: Used to according to date and school year. Now, Adds folders for trips (locations/date), or for important events/things like thesis works etc. Used to sort by class, then started to folder with the subject, what that album was about. Phone: Very organized. Distributed most of the things into albums named after subject of the album. Categorizes instantly after the event if its smt personal, as she likes archiving.
P15 (I.B.)	Computer: She mostly can't categorizes as its a "serious job", but tries to roughly categorize the same topics under same filter, Tried using tags,color tagging and previews. Google Drive: Foldered with date, location and occasion combinations.
P16 (A.)	Phone: Opens folders in the times of needs for easy access. And has some folders according to some special topics like portfolio. Uses favourites a lot. Computer: Tries to name folders according to subject and gather thins under it, but mostly don't do that. Very messy.
P17 (O.)	Uses iCloud automatic categorization.
P18 (I.B.)	Phone: Google Photos automatic categorizations. Computer: Have some main folders,inside those folders are messy. Keeps important things in the right place. For folders that came from cameras with DSC names, he adds a related word. Uses Date for some. One Drive: Travel photos are seperated also some folders according to subject like university photos.
P19 (A.)	Currently: Doesn't categorize. Uses as iCloud saves by year and month. Used to use different categorization strategies over the years but forgot, so the archive is messy. "So there is no common ground. Such a ridiculous categorization"
P20 (O.)	Categorize according to years and according to events, festival etc. etc. according to the meaning and importance of the day.

Firstly, among the participants common ways to categorize and name folders were date (year, or month, or both), occasion/event and place. Participants use different combinations of these parameters in different orders to create their own categorization strategy. All the participants mentioned making use of computers. Except one participant, they all also mentioned creating folders on their computers to help with categorization. Meanwhile, only six participants mentioned creating manual albums on their phones, and only two of these were observed to do it with consistency. Yet, fourteen participants mentioned using automatic albums created by the tools they use. six participants mentioned having folders that they dump visuals into when they don't have time to deal with them, yet they forgot they were there and never went back to check them. P11 described this situation: "Sometimes I don't have a lot of time on the computer, there are some folders I created to sort them later, but they were never sorted or anything like that. The name of the folder is "sorting" and that's it, they stayed like that. There is "sorting 2". Probably it went like this: 'Oh, there is a file called "sorting", let me open the second one immediately', and it remained too."

Another issue that is common among the participants regarding the managing step of the curation cycle, which directly affects navigation too, relates to naming. As P15 described: "Sometimes, you name the folder to make navigation easier, but that name may not mean anything to you later. Actually, you gathered everything together but didn't think about the name. Then you search and search and search but can't find it.". Eleven of the participants mentioned issues related to naming that cause problems in the exploiting step. They have a hard time remembering the names, caused by either randomly naming files or devices automatically naming files meaninglessly. On the occasions that participants name a file, the problem comes about either when randomly naming the file, as explained by P7: "For example, this photo can be used in the future, but as I save it with a silly name, I can never find it later," or naming the file something that they found meaningful, yet fail to remember later, as explained by P19: "It definitely had a meaning back then when I named it

'L1', but of course I don't remember it now." .When devices were there to do the naming instead of them, another problem arises as devices give meaningless names. Furthermore, different devices use different naming strategies, yet those naming strategies were not providing meaningful relations with the photo or the video. P18 described this as: "There are constantly folders everywhere and I don't like it that I can't find something. Because image files are named something ridiculous like VSC1550, no private names or date."

Another common tendency among the participants regarding this step of the curation cycle was changing their categorization strategy over the years. 6 participants directly addressed this issue. P19 described the situation based on his experiences: "At one time or another, I tried to create such a convention. I thought I would adopt such an archiving strategy and use it for the rest of my life. But I either forgot about it or there were better methods, I didn't use it or something. Sometimes there are critical turning points in life, something can upset you a lot, it can be a change of city, a change of job, can be a change of environment. whatever it is. At that point, I think it also changes archiving habits, changes the way you name folders. it changes how much you care about the folders or not.". P19's description of the theme seemed accurate and insightful, as it was echoed in the responses given by other participants, for example P14 mentioned "I used to have a categorization system that I have been using since the fifth grade, but it was totally according to that period where my life was completely between the lessons and friends, so I was doing it according to the semester." She mentions as she grew up, her life changed, along with her archiving strategies. P8 also reflects on strategies she followed over the years: "I've done it all. Categorizing by date, keyword (…) Who knows how many years have passed since then, but I did not look back and edit it. I think this is also a problem. What reference you should use to categorize? Or you shouldn't. (...) For the other devices, I checked them and still couldn't understand what I was doing back then."

As well as the Keeping stage of the curation cycle, the managing cycle of the curation is highly related to Exploiting. This quote from P4 addresses the situation: “It's much more comfortable in navigation, of course. It is much more comfortable because I categorize them in a beautiful way that I can understand.” The more the managing step is handled in a meaningful way, the more the activities at the next step – exploiting – can be achieved with ease.

5.2.3 Exploiting: Navigation and Search

Table 5.4 Overview of the participants exploiting strategies

	HOW	WHERE	WHEN
P1 (I.B.)	Uses people search first and then location. If remembers the date, use date search too.	Google photos or social media	Navigates through archive when needs information or just feel nostalgic. Browse when bored, or missed old life before pandemic.
P2 (I.B.)	Date search in cloud, for harddrive as she names after events and date, she finds with the help of own memory.	Google Photos and Harddisk	Not a lot. Sometimes when needs to show smo smt or wonder when she went on holiday etc. Sometimes browse when not sure of the exact date, go and browse around.
P3 (I.B.)	Trust his memory and tries to remember the date to locate the folder. Search based on date. (Uses important events as reference for date search)	Computer and harddisk	Browse once in every 2-3 months time. Just for the sake of looking, to reminscence the memories. Without any specific reason.
P4 (I.B.)	Looking folder by folder as she already categorized in harddrive. On phone uses search features. People, location and date.	Phone and harddisk	Daily basis on phone for things that are needed about children education etc. and browsing once or twice a week when have the spare time to remember memories. Harddisk- four times a year, on birthdays of each family member.

P5 (I.B.)	On phone, first search for people and other advanced search features. If can't find like that, scrolls chronologically, and get time references from events to locate the thing she is looking for. Sometimes uses whatsapp	On icloud (mostly on phone interface)	When bored, mostly at nights. Or when she wants to remember some memories, or when feels like sharing smt on social media.
P6 (I.B.)	Scrolling on phone, getting time references from other photos. If can't locate like thath,asks friends or uses Whatsapp chat history to find.	Apple Photos and Computer	Don't have an exact time or description. Just when she feels like it. Mostly when she tries to remember something or thinking about a memory.
P7 (O.)	On phone (apple photos/icloud), uses search features/algorithm.(Location,object,date,face) If that doesnt work, she uses her own memory to remember a close event, search for it and figure out the date from it. On harddisk scroll and check folders one by one as she remembers them.	On phone and harddisk	She tries to remember something, or get bored or a topic is brought up. Not going back very often. Rarely visit harddisk. Never visits without a purpose but she gets carried away mostly while searching for smt specific.
P8 (I.B.)	In Google Photos she has a grasp of what's there as it contains the last 3-4 years of visuals, so she scrolls by checking dates.	On Google Photos	When need to remember something, when Google Photos send notifications, when feel like sharing smt on social media. When bored, which is usually before going to sleep.
P9 (O.)	First remembers the device taken and locates where the visual is among stored places. Then remembers the time and scrolls to date.	Mostly on phone (google photos) and harddisk	When need to find something. browse when bored or a subject is brought up or got carried away sometime when need to find smt. Browsed a lot during quarantine to remember old.

P10 (A.)	Even though she has a messy archive, she has a good memory and remember the location of visuals mostly. Search by scrolling and folder by folder with memory. Gets reference from nearby events.	Mostly on phone, rarely on computer	Often goes back as she defines herself as ‘very needlessly emotional and past-dwelling type’. When she thinks or talks about a memory, or bored, or just want to look at photos and get emotional. Don’t need a reason. Even their friends ask for their photos from her archive.
P11 (I.B.)	First scrolling, with time references. Checks the favourites folder. If still couldn't found, sort. According to date or if using drive, shared person. Sometimes search for tags he added (Windows).	Mostly on phone. Sometimes on Computer and Harddisk	When need to find something. Or a subject is brought up. Or when storage is full and conduct a transfer. Never browse without a reason.
P12 (I.B.)	Computer: Look between folders, that is,between times and back and forth. Phone: Scrolls quickly to check colors.	Mostly computer. and Phone.	When bored, want to show smt to smo, try to remember smt, can't sleep. Also, browse as an social activity, when friends come over, mirrors screen to tv to browse archive together.
P13 (I.B.)	Consider it as an activity, lay down and turn on some music before starting to browse. If there is a related folder, checks that folder first. Otherwise, scrolls to date as she remembers.	Usually from phone, sometimes from computer	When needs to find something,wants to do elimination or rarely to remember the old ones.
P14 (O.)	On hardisk, there are folders inside folders. As they are tidy and categorized well, she navigates with the help of dates and categories. On Google Photos, remembers the date and search by date as month and year, or search by location. Scrolls on the phone as there are less data.	Google Photos and Harddisk	When looking for smt. She browse entire archive when backing up. When an past event or subject is brought up, she navigates to find memories related to it. And browse when she miss someone or some time period.

P15 (I.B.)	iCloud: Usually look and search by date. Takes time reference from events or clusters of photos(similar photos).	Mostly on phone, sometimes on computer (iCloud)	Sometimes when she needs smt, or when she wants to remember old memories when she have spare time. And sometimes, to see the changes in herself (like weight,face, hair) and family.
P16 (A.)	She scrolls, as she browses a lot, she is successful at scrolling. Loves seeing other photos while scrolling too. Uses location search as travels a lot, sometimes use face recognition for some cases. Sometimes check whatsapp chats to find something.	Mostly phone.	Constantly, more than once daily.
P17 (O.)	Either scrolling or searching by location.	Mostly on phone. (Apple Photos) Sometimes if related to specific event, Google Drive	If she's gonna upload smt to instagram, or she feels depressed and want to remember good memories, or misses someone, or when wants to delete something.
P18 (I.B.)	In Google Photos, scrolls and navigates by building historical relationships. Consider this as seeing past directly. Sometimes uses advance search features like location, object and face search.	Mostly Google Photos, sometimes Apple Photos	To search for smt, when talking about a memory, sometimes to edit the visuals. Everytime he gets lost in the archive after. Browses when google photos send reminders.
P19 (A.)	Usually search by date. In NAS devices, remember location of somethings inside folder. If that doesn't work, search with detailed metadata such as date, location, name, format. Or tries to build time references to find close photos.	Usually from his NAS device through the computer. If away from home, phone application of NAS device and iCloud	Rarely when he's bored, get depressed or long for nostalgia. Or when tries to find something.

P20 (O.)	Usually by setting time references and searching manually.	On hard ddisk via computer	When feeling nostalgic, or bored.

As in previous steps, participants had their own ways of exploiting their archives. The most important parameter among the participants was the date (when the photo/video file was created), as almost all of them mentioned using it in their strategies somehow. One of the popular strategies among the participants was getting a time reference from other photos and their related events. Some used this as a main strategy, while others used it only when advanced search options provided by algorithm failed them.

Navigation without purpose was often initiated by boredom, or a trigger to make them remember a past memory or nostalgia. Participants mentioned they were navigating without a purpose to remember old memories, remember good old times, and to see the changes in themselves and loved ones. Even if they were searching for something, seven participants mentioned getting carried away in their archive. P3 described this as follows: “It usually happens like this. I go out to search for a photo, and got distracted by others. (…) I probably won't be able to find the original photo, but we'll be looking at a lot of other photos while looking for that photo.” Some participants even stated during the second part of the interviews, if the researcher hadn’t stopped them, they would have continued navigating in their archives for hours.

Scrolling is preferred by participants, when what they are searching for is in a small group or a recent one. Even though a small portion of the participants embraced scrolling as the only strategy, they also stated the joy they get from this activity, as

they get to see the photos in the form of a timeline. The quotation from P18 elaborates on this: “I build a historical relationship in my head. That was a little before that, that was a little later than that. (…) Since I can see it with relationships, it's like you've seen the past directly. (…) While sliding in between, it is a source of entertainment for me.”. The quotation shows how seeing time relations and witnessing one’s own past creates another experience, an experience any advanced search feature offered by tools can’t provide.

As most of the participants got reference from the events or times while navigating, there were some problems for photos which were not related to a multicategory event, or even an event like biometric photos, credit card information, passports or some documents. Participants had a hard time locating them, which is why they needed to create special solutions for their access. Some participants developed a strategy of storing such photos in a favorites folder, some decided to send them via email to themselves, whilst others kept them in private conversations with themselves in WhatsApp. This surprisingly is not the only part of exploiting they got help from WhatsApp, a popular communication application. 4 participants mentioned they sometimes used WhatsApp, in order to find visuals. P11 mentioned the strategy: “That photo was shared from our group on WhatsApp, I click on the group media and find it.”

Some participants mentioned that the COVID-19 pandemic changed their habits during the exploiting step, as they interacted with their archives a lot more than usual to navigate through it.

The exploiting step is an important step of the curation cycle, as it is the step that makes previous steps meaningful. As P19 stated: “Because it doesn't matter if you can't find the data quickly when you want to show it to your friend or when needed.” This step is highly affected by previous steps, as any problem or issue related to each previous step, shapes navigation experience. Problems such as naming issues, duplicates, missing or wrong metadata, change in archiving strategies and even

decentralization directly affects this stage, along with issues regarding specific tool usage.

5.3 Evaluating the Tools

The tools offered on digital devices or within cloud services have a huge impact on the experiences of users regarding the management of their visual archives. As the tools are are the media through which users get to interact with their archives, the features they offer directly shapes the user's curation experience. Table 5.5 shows an overview of the tools participants were using, including the features they found beneficial as well as problematic. All of these were summarized by the researcher, after analyzing the whole interview data transcripts, including both the question replies and observations during the guided tour and requested tasks.

Table 5.5 Overview of the tools and features experienced by participants

P1	Google Photos, Windows	FOLDERING, SCROLLING, DATE SEARCH, FACE RECOGNITION, LOCATION SEARCH, SHARED FOLDERS, AUTOMATIC ALBUMS, OBJECT SEARCH, DATE BAR, THUMBNAILS, CHRONOLOGICAL SORTING
P2	NAS, Google Photos, Google Drive, Windows	FOLDERING, AUTOMATIC ALBUMS, SCROLLING, DATE SEARCH, SHARED FOLDERS, CHRONOLOGICAL SORTING
P3	Windows	FOLDERING, DATE SEARCH
P4	Apple Photos, Windows	FOLDERING, DATE SEARCH, FACE RECOGNITION, LOCATION SEARCH, FAVOURITES, SCROLLING, MANUAL ALBUMS, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING, OBJECT SEARCH
P5	iCloud, Apple Photos	FAVOURITES, FACE RECOGNITION, SCROLLING, FOLDERING, MANUAL ALBUMS, FOR YOU/MEMORIES, THUMBNAILS, DATE BAR, RECENTLY DELETED, CHRONOLOGICAL SORTING, LOCATION SEARCH
P6	iCloud, Apple Photos, Windows	FAVOURITES, SCROLLING, FOLDERING, MANUAL ALBUMS, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING, LOCATION SEARCH, FACE RECOGNITION
P7	iCloud, Apple Photos, Google Drive	AUTOMATIC ALBUMS, FOLDERING, DATE SEARCH, OBJECT SEARCH, FACE RECOGNITION, LOCATION SEARCH, SHARED FOLDERS, SCROLLING, CHRONOLOGICAL SORTING

P8	Google Photos, Google Drive, Apple Photos	SHARED FOLDERS, SCROLLING, DATE BAR, DATE SEARCH, FOR YOU/MEMORIES, FOLDERING, CHRONOLOGICAL SORTING
P9	Google Drive, Google Photos	FOLDERING, DATE BAR, SCROLLING, MANUAL ALBUMS, SS AND DOC ARCHIVING, AUTOMATIC ALBUMS, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING, LOCATION SEARCH
P10	Android Photos App, Google Drive, One Drive, Windows	AUTOMATIC ALBUMS, FOLDERING, SCROLLING, THUMBNAILS, SHARED FOLDERS, RECENTLY DELETED, CHRONOLOGICAL SORTING
P11	Google Drive, Dropbox, Android Photos App, External Gallery App, Windows	FOLDERING, TAGS, SORTING BY COLOR, FAVOURITES, THUMBNAILS, SHARED FOLDERS, RECENTLY DELETED, SSCROLLING, CHRONOLOGICAL SORTING
P12	iCloud, Apple Photos, Windows, Dropbox	FOLDERING, SCROLLING, DATE BAR, AUTOMATIC ALBUMS, FAVOURITES, FOR YOU/MEMORIES, LOCATION SEARCH, RECENTLY DELETED, CHRONOLOGICAL SORTING, THUMBNAILS
P13	Apple Photos, Google Drive	FOLDERING, AUTOMATIC ALBUMS, SCROLLING, FAVOURITES, RECENTLY DELETED, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING, LOCATION SEARCH
P14	Android Photos App, Google Photos, Google Drive, One Drive	FOLDERING, AUTOMATIC ALBUMS, SHARED FOLDERS, DATE SEARCH, SCROLLING, LOCATION SEARCH, CHRONOLOGICAL SORTING
P15	iCloud, Google Drive, Apple Photos	FOLDERING, SORTING BY COLOR, TAGS, AUTOMATIC ALBUMS, THUMBNAILS, SCROLLING, DATE SEARCH, DATE BAR, FAVOURITES, CHRONOLOGICAL SORTING, LOCATION SEARCH, FACE RECOGNITION
P16	Apple Photos, Windows, Google Drive	FAVOURITES, FOLDERING, LOCATION SEARCH, FACE RECOGNITION, SCROLLING, AUTOMATIC ALBUMS, THUMBNAILS, DATE BAR, FOR YOU/MEMORIES, MANUAL ALBUMS, CHRONOLOGICAL SORTING
P17	iCloud, Apple Photos, Google Drive	AUTOMATIC ALBUMS, SCROLLING, LOCATION SEARCH, THUMBNAILS, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING
P18	Google Photos, Apple Photos	AUTOMATIC ALBUMS, SHARED FOLDERS, FACE RECOGNITION, DATE SEARCH, OBJECT SEARCH, LOCATION SEARCH, FAVOURITES, FOR YOU/MEMORIES, FOLDERING, SCROLLING, CHRONOLOGICAL SORTING

P19	NAS, Apple Photos, iCloud, One Drive	AUTOMATIC ALBUMS, FOLDERING, DATE SEARCH, SCROLLING, FAVOURITES, FACE RECOGNITION, FOR YOU/MEMORIES, CHRONOLOGICAL SORTING, LOCATION SEARCH
P20	Google Drive, Apple Photos, Windows	AUTOMATIC ALBUMS, FOLDERING, SCROLLING, FACE RECOGNITION, LOCATION SEARCH

It is observed that almost all the participants used the tools that are natively integrated with their devices (the default tools that are downloaded on their devices). Only one of the participants expressed they used Google Photos as a cloud storage, while using an Apple iPhone, whilst another participant mentioned downloading another Gallery app from the Play Store, rather than using the gallery app that came with his Android phone. Photo focused tools used in curation of digital archives are Google Photos and Apple Photos. Seventeen of the participants use one of these apps, depending on their device. Nearly all of them use their natively integrated devices, which means if they were using an Apple iPhone, they were also using Apple Photos and iCloud, and if they were using an Android phone, they were also using Google Photos. There is only one exception to this among participants (P18), who described this decision in relation to this as follows: “iCloud offers 5GB for free and you need to pay for more and it's expensive. Google Photos gives you space for free, that's why I use it.”. Twelve participants mentioned using Apple Photos, as they were using iPhones, but only seven of them mentioned using iCloud. Of course, because of the nature of cloud services, accessibility is a key feature that makes them favorable. Yet there were some participants worried about losing data in the case of any cumulative energy cuts or losing Internet connections, which might turn this advantage around. Eight participants mentioned their previous experiences of losing data caused by relying on the cloud.

The most popular features used by participants were again related to the date of image/video creation. Chronological sorting (used by eighteen participant) and scrolling (used by nineteen participant), and date search (used by ten participant)

were the most used features regarding the “Date” concept. Also, “Date Bar”, which means date indicators of the tools, are mentioned by seven participants as useful. As date is the most important parameter for the managing and exploiting step of the curation cycle for participants, it makes sense that the features referencing the “Date” concept are also used commonly. However, there some problems regarding date information of images were highlighted, as in P19’s case: “The date taken looks like 1970. Mistransmitted.”. While transferring between devices and tools, the date is one of the information that can change and cause problems with subsequent navigation. Also, as chronological sorting is highly used, duplicates are considered as a disadvantage, causing slowing down of the navigation process, as they are occupying lots of places. Participants complain of seeing pages and pages of duplicates while scrolling, as explained in detail previously in the “Managing” section.

The second most popular set of features used by participants are gathered around the theme “Location”. Sixteen participants mentioned using search and categorization due to location features offered by devices. Also 4 of them specifically mentioned “Map View” as useful and exciting, which shows visuals distributed among the world map. As P19 stated: “GPS location data is both a part of the memory and makes it easier to find.” Some participants also mentioned using location data as a reminder for their memories, especially the ones they made abroad. As P20 mentioned: “It's especially good when you're traveling abroad, you don't know exactly where it is, but since the location pins it, it's nice to look back and see where it is.” The problems regarding features related to Location are caused by two main things: either the location information is missing for some reason, or during categorization, some tools fail to categorize all related ones according to location. For automatic albums created by Apple Photos or Google Photos, participants stated they are showing fewer photos then normally there was, while searching by location. P16 came across with a similar situation while completing a task during the second part of the interview: “I found Marmaris. Look, when you enter here, there are very few photos here. It's all there above, but why is it showing me these now? Are they chosen, if so why are they the most irrelevant ones? At least show all of them, why

is it giving me a preview? In fact, when you press ‘all of them’ from here, it doesn’t show you all of them in here either. Didn't find all of them in the search.” For the cases where location information is missing, the situation was caused by two things: either location information is not created in the first place, or it was lost/changed while transferring between devices or tools. As P13 mentioned **“**Some photos have this [location] information, but some do not. I've questioned this myself before, but maybe it's related to the shareability of the location where the photo was taken.” This situation can happen because location permissions on devices were accidentally closed, or any unknown problems related to the device. On the other hand, even though information is recorded, it can get lost in device transfer, as in P18’s case: **“**Look, these were sent via WhatsApp, there is no location in them. it means WhatsApp is not sending that information. It would have been nice if he had asked and sent it, of course, at least.”

Face Recognition is a feature that ten participants mentioned using, whilst four participants used Object search. Since these types of searches and categorization do not depend on any type of metadata or information embedded in the image or video file, and instead are conducted through an algorithm, the problematic parts regarding these features are the cases where the algorithm fails. The participants using these systems mentioned that face recognition is not able to recognize all faces, and it is not always as accurate as object search.

Ten participants mentioned using the favorites feature offered by tools. Most people use it for either social media or to keep their photos that they use for instant access for more practical reasons, like credit cards, identity cards, passports. Yet they also express some worries about having those documents in there, as exemplified by P17: “And I always have concerns about the privacy of iCloud... That's why I don't prefer to keep some photos there, my identity cards and such. I think I keep them in that hide this feature in my phone. I guess I think if I hide them, iCloud won't see them. I’m not sure if that's the case, but I assume it. Or even if I don’t do that, sometimes

it asks if I want to synchronize, I decline it and keep them just in my phone. This way I don't have them in my iCloud."

"For you" feature was mentioned as a beneficial to have feature by eleven Participants. P8 stated: "I like the feature of Google Photos to give me these reminders because my purpose of keeping the photos is to experience the emotions, memories of that time or to remember events that happened at that time.". P19 shared a good experience about this feature: "There is a video of my mum and dad dancing in Prague. A street musician was playing the accordion. When my mum and dad heard the music, they suddenly started dancing. That's what I had forgotten, for example, thanks to that tool I remembered it, it brought it to my mind. I sent it to my parents and they were very emotional too." As it can be in this quote too, there were some more participants who mentioned using this feature as a conversation starter with friends and family. Some participants stated that reminders from tools attract them into the tool and their archive and cause them to spend time in there. As P14 stated: "It also reminds me that you did this last year, I love that feature too. Memories. As someone who is ready to be buried in memories at any moment, I start like this, so it takes 1 hour. Then I look at what really happened that day." Some participants also stated that they can't exactly understand how the highlighted photos in the "For You" section are selected, for example P18 stated: "I don't know if it's because I favorited them or something. I don't know how to change them.". Even though most users think this is a pleasant feature, some think it sometimes may cause some unpleasant experiences. As P19 stated: "Sometimes by mistake, I come across with photos of people I don't want to see..." Or with P2's words: "Sometimes I don't want to remember something like that happened five years ago. Sometimes it's good but most of the times I don't really like that feature. (...) I know I can go to the app and turn off the coming back pictures, but it's a notification from nowhere and it's a bit invasive and I have to take the effort to go there and turn it off." Even though P14 didn't experience it herself, she shared some thoughts on the issue: "I thought about something recently. If there is a memory that we don't want to remember, it's about

someone bad. By the way, this came to my mind after you did this study. I mean, it would be very bad if it constantly reminds you of that person or reminds you of that event. I thought it might be bad for someone with a trauma. It didn't occur to me, but it could be.”.

Eight participants mentioned using thumbnail and previews. Especially during completing tasks, it was seen that participants were constantly using thumbnails, by changing their sizes accordingly to their needs. P5 stated: “ I think this is a very good feature, let me show you right away. For example, we enter the archive, we can go back two years by shrinking this or that down, and then we enlarge it again. I think it's very nice.” P11 stated: “Also, if you want to see the photos and videos as a list or as an image grid, you can always adjust the grid according to how much you want to see. For example, if you are looking for a group of photos, or if you are not looking for something very specific, you can zoom out a lot. I can see it from a distance, I zoom out a lot, for example, there are eight photos in a row right now. If you want to see it in more detail, I can zoom in with the pinch movement and see the details.” Also as P12 mentioned, some participants use preview thumbnails of a folder as a reference to remember what’s inside it: “Purely from the preview images, because I know that the photo over there was taken at the beginning of that year, that's how I found it. I wish there was something and I could go through a few photos in preview.”

14 participants mentioned using “Automatic albums” created by their digital tools. It provides an ease for the managing step, as P14 stated: “It would be more accurate to say that Google Photos manages me. I mean, it helps, of course, it's nice that it does what I would normally do one step before me. One day we went on a picnic, for example, I'm going to categorize it and make a folder anyway. Google Photos is making an album for me the next day: here's a Saturday trip.” On the other hand, it is commonly stated that it is not always enough, and while creating those albums, sometimes the tools name them not so accurately or they leave many photos/videos outside. P16 came across with an example of inaccurate naming while completing tasks: “I went to Muğla, we went on holiday at the beginning of the corona to sail in

Marmaris with my friends. It named album 'Muğla Nature Walk'. We also did a nature walk, but the main event was sailing." P14 also expressed how the facility leaves some related visuals outside of the album: "But it often makes mistakes. There are photos it keeps out, sometimes it doesn't include some in the album." They also mentioned they have a hard time understanding how the algorithm works, and it fails them time to time. This also applies to results that come in batches of advanced searches made by location or face. Participants stated there were too many relevant visuals that were kept outside of the search results, both from the items appearing immediately after the search and also when they press the "See all" option, as stated before. Another automatic folder created by Apple Photos are screenshots. They are displayed in an album that is created automatically in Apple Photos. Google Photos has upgraded this to another level and offers users the capability to archive screenshots among document photos, which means it separates those photos from users' main photo gallery, separating them from the main bulk of visuals. This is unlike Apple Photos, which displays screenshots both separately and in the main gallery. Four participants mentioned using this feature of Google Photos.

Two participants mentioned using the tagging offered by Windows, yet they all mentioned they are using this feature for more business-related things. It might be because these two participants were using mainly their phones as a medium to manage their personal archive, rather than their computers. Even though this feature might have been a solution for some of the problems mentioned, adding tags is not offered by Google Photos or Apple Photos. Apple Photos does offer this function within its computer (MacOS) application, but users can't use it on their iPhones.

Two participants mentioned they were using external apps to add notes and stories to a photo or video they had taken. They stated the notes or feelings they wrote down contribute to remembering that moment, strengthening the feeling of the memory. P15 described her experience storing her photos with notes with the application Evernote as follows: "For example, we drink a coffee in Italy, the guy who made it

told the story and added ‘You can’t drink this at breakfast’. I really liked that, that scene reminded me of good things. I took a photo of that coffee and wrote down story as the note. I almost felt like I was there when I look at it.”. Even though as the researcher found out, both Google Photos and Apple Photos offer to add captions to photos, a feature that has been present for almost two years before this study was conducted, none of the participants mentioned being aware of this feature. It might be that the tools are not informing users enough about this feature. Figure 5.1 and Figure 5.2 shows this feature offered by Apple Photos and Google Photos.

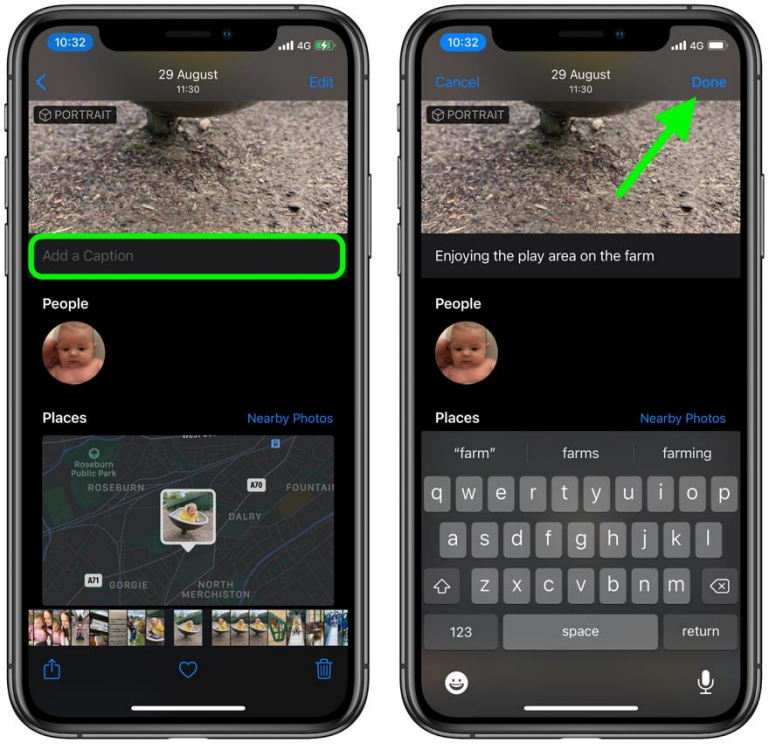

Figure 5.6. Apple Photos; the ‘adding caption’ option is reached by swiping the screen up

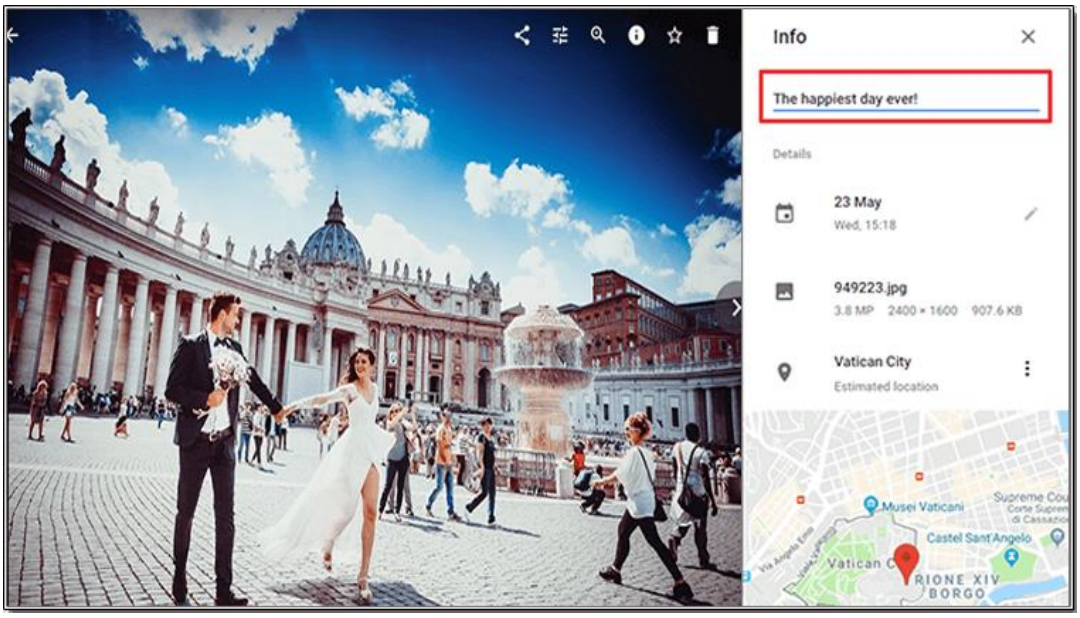

Figure 5.7. Google Photos; the ‘adding info’ option can be accessed only on desktop view

Mirroring the results of the survey, in the interviews it was observed that there were nine participants who were not aware of the features offered by the digital tools that they use. Some of the participants mentioned themselves as self-incompetent, yet the main problem here is that tools cannot communicate their features clearly to all users. They are either not user friendly or not self-explanatory. The only participant who experienced both Google Photos and Apple Photos (P18) reflected on this situation as follows: “I guess Google Photos advertises it more, that's how I’m aware of that. (…) By the way, I think that unlike Apple, in Google Photos, there is an area that always attracts you both on the web and on mobile to use the search tool. Search for cats here or location and so on, Apple is not like that.” Yet, as there were both Apple Photos and Google Photos participants among those who were not aware the features, this problem cannot be credited only to Apple Photos. On the other hand, there were some participants who were well aware of the features, yet they didn’t want to use them, as P9 stated: “I'm aware of the features but I don't use them. I think going through time is a bigger habit for me, frankly I guess I haven't tried others much. (she writes cat in the search bar) actually it works well, but I guess I will still find scrolling through dates, because it is important to go through time, to see the

order, it feels like a small flashback." As they like to see relationships between visuals and witness their own history through it, some participants decided not to use those features.

Another issue mentioned by participants about the tools was a lack of multidimensional approach. As P14 stated: "Also, it's ridiculous, you can separate the folder in one dimension anyway. However, sometimes they belong to something else too. For example, a photo can belong to the travel folder and in the same time it can belong to the June folder, and it can be something that I share with my friends. So it can belong to many folders at the same time. But it makes those connections look very two-dimensional. However, there may be something more complex connected. It would feel like the way our minds are working, and I feel it would be easier for us to remember if we connected things.".

Even though it is not directly in the scope of this study, storage is also one of the most repeated issues that related to tool usage. Participants were unhappy with the free storage offered by tools, some even created some tricks to take advantage of bugs of the companies, like using multiple accounts to get more storage space, or using Google Docs to store visuals. Yet, having a limitation in storage is the main trigger for most participants for elimination. It can also be seen that participants use storage as a criterion for which tools they will select to use. Google Photos holds the advantage at this point as it offers free unlimited storage (at the time the interviews were held; however, since June 2021, it no longer offers unlimited storage). The freedom of unlimited storage might lead to disorder, as P14 reflected: "Normally I have a layout on my computer and phone. (...) But as everything is automatically backed up in Google Photos, Google Photos is a complete pile of garbage, an unbelievable pile of garbage." P7 shared her reflection as follows too: "iCloud had made me lazy. I really like that it has a direct search feature. Either from your phone or computer you can access it. It's easier to search for, even though I collect everything like garbage."

Among the online tools that do not offer photo/video focused solutions, Google Drive is the most used by participants for their visual archives. Twelve participants mentioned using Google Drive, while only three mentioned using One Drive and only two mentioned using Dropbox.

When it comes to Google Drive, the most mentioned feature is its shared folders. Even though Google Photos and Apple Photos have similar features enabling users to share albums and visuals, they are not as widely accepted and used as Google Drive shared folders. Most participants mentioned using Google Drive especially for the Shared Folders feature. Participants mentioned favoring shared folders not taking up space on their personal Drive, but when the folder owner deletes that folder it is deleted for everyone else, and unfortunately, they don't get to notified about it. Even though it is offered by other tools such as Apple Photos and Google Photos too, participants seem to identify this feature with Google Drive. Even though they are other tools as main locations to store their visual archives, participants expressed they were using Google Drive specifically for this feature. A few participants mentioned that while they were using Google Drive, they were using "Shared with" feature as a criterion for search. Different from Apple Photos and Google Photos, Google Drive enables users to change the name of the file, which is appreciated by the participants. As P13 stated: "Drive is a vehicle that I am in control of for me. 'Oh, it has this feature here too'. I did not encounter anything that surprised me." Also it can be seen that participants acknowledged Google Drive is not a tool heavily focused on visual content curation, as P15 stated: **"**Because Drive is a storage tool. They have two options in storing: square and list. They use those two with everything. But I think in iCloud, as it is more specified on photos, they thought about the needs."

5.4 Key Insights from Empirical Research Part 1 and 2

The key insights from parts 1 and 2 of the empirical research can be summarized as follows.

The digital tools used by people to help their visual content curation process differ with various features and in various ways. Some of the tools are considered helpful, whilst for others some problems are spotted. Even though there are some participants who were heavily really on tools regarding curation, it is seen that there are some pain points tools have, in which they are fail to be helpful enough and needs improvements, or needs some new features to address some problems. Also, even though participants need guidance and help on curation, and appreciate those, it is acknowledged that some involvement of the individual is needed in order to create a meaningful archive. P14 stated this as follows while talking on Google Photos: **"**But it doesn't do what it's supposed to do, so it doesn't do the hard part. Isn't it strange anyway: if I don't edit it at first, it will be very difficult for me to remember later. It feels like I should be involved in making it."

Before going into the features offered by the tools, and the problems users experience with them or problems they fail to acknowledge, the first step is to point out that most of the users are not fully aware of the features offered by the tools. This point was revealed through both parts of the empirical research. It can be discussed that the tools are either not self-explanatory regarding this issue, or not user friendly enough. As a tool can reach its maximum potential when it serves the user with all of its features, this issue can be considered while designing for visual curation.

Both the survey and the interview data showed issues related to naming in the managing step of curation, which leads to some problems in the navigation steps. Participants either suffer from randomly named files, or files they purposefully named once but forgot about over the years, as well as files that are named by devices

that are not related to context. Another common issue found in both interviews and surveys was the problem created by having lots of duplicates of visuals, which arise from having the freedom to shoot photos without storage concerns, fear of losing data causing too many backups, and participants not having the time or will needed to delete duplicates one-by-one. It is seen that duplicates are also one of the issues that makes exploiting the visual content harder. Along with duplicates, visuals that have a certain lifespan for the participants, mostly serving a particular purpose on a particular occasion, are left out in the archives, making their exploitation harder.

Another common issue found in the survey and interviews that makes exploiting harder is changing archiving strategies over the years. People have complex and multiple tendencies to relate memories, and visual memories, which influence their archiving strategies. As people change over the years, so too do their priorities and the ways in which they relate their memories, requiring shifts in their archiving strategies. As they were not willing to change all previous categorizations they made, or fail to remember exact strategies they followed, different styles of categorization create a confusion in people's archives, making exploitation harder. Tools are also not reflecting on this complex way of relating their visual memories, which is another issue that should be considered while designing for curation experience.

The algorithms of tools fail people from time to time. For example, face recognition is not able to recognize all faces, and it is not always so accurate as mentioned repeatedly by participants. Tools only allow users to add names to a face it already recognizes, but doesn't allow to manually tag. So, the success of this feature depends completely on the tool algorithm and its ability to detect a face. Allowing users to manually tag people might help both the user and the algorithm. It will help the user to categorize according to people in the images more accurately, including unusual angled or silhouette types of photos in which algorithms have a hard time detecting a face, and also support artificial intelligence (AI) learning to improve the recognition process.

As it is stated, metadata can cause some problems too. Sometimes there are missing metadata, such as date and location information about the image/video files. Apple Photos does not allow users to edit the metadata. This can be achieved only by using an external app. Even though Google Photos has features that allow users to change the date and time, none of the participants was aware of this feature. The researcher found out that Google Photos even allows users to edit the locations of a batch of photos and videos, which is again another feature participants were not aware of. Yet there are some comments in the forums stating this does not change the EXIF data (the metadata contained in a universal format within image files), so even though something changes, the metadata is doomed to get lost or changed during any type of transfer.

One of the other common problems mentioned regarding metadata was loss of, or changes to, metadata while transferring files from device to device or through online applications. Even though this study is not able to propose a technical solution to this issue, since it is mentioned frequently among both survey and interview participants, it should be stated as an important issue to consider while designing for personal archives. As P13 stated: “Sometimes it gives information about where the photograph was taken, but it varies according to the system. But it's a nice feature when done correctly. For example, it would be much better if the date, time and where the photo was taken were always available. It helps if it can.”. This issue is made worse by decentralization, with lots of devices and tools available for visual content storage, and hence a need to share or transfer between devices.

Decentralization was observed as an issue for most participants with a wide range of tools and devices available. Integration problems makes this situation worse.
Participants mentioned that when they can’t find something by scrolling, or due to an algorithm fail to find a photo or video they were looking for, they try to find something they can get a reference from. Even though they did not directly relate

this practice with it, some of the participants mentioned using the “Find file location” feature on windows, which might be a helpful feature to adopt or integrate into mobile visual focused archive management tools too, as it is seen that it is a common strategy among the users to find an event or a photo close to the one that they are searching, as a step to reaching exactly what they were looking for. This strategy is not adapted enough in the advanced features, as they are pointing directly to results, whereas users also need to see chronological and other complex relations to make sense of the visual they were looking for, which contributes to the exploiting experience itself.

Stated by participants, the main point of having a visual archive is reminiscing over old memories and remembering them. That is why it is an important issue to consider everything related to creating a memory, and how those items contribute to remembering the experience surrounding those memories. One of the outcomes of the empirical research was that some participants were using notes to reflect on their memories, which they consider to contribute to remembering that memory as it becomes associated with their feelings and thoughts. Even though some tools offer this option, participants were not aware of this fact. They were using some external tools to do so, which came with some integration problems, such as notes not being connected to the original photo, and getting lost while change of devices.

Favorites is a common feature offered by tools and is used my many users. It is the most used way to “create an album”, and the only album some participants use. This special folder generally serves to gather together personal visuals that users like and would like to share on social media, or else it provides an easy access to documents including passports, identity cards and credit cards. Users continue to store this kind of private document in a favorites folder, whilst stating their concerns about security. Also, by its nature, favorites serve to be a separated folder that allows easy access to some files, yet it might get crowded from time to time (too many favorites), making it lose its main advantage and reason for existence.

The steps of the curation cycle are highly nested. Problems in elimination (such as duplicates) and in categorization (like naming issues) directly affect navigation. While in search for answering the main research question of this study, the nesting characteristics are considered. The following section proposes some design features for visual content apps that might directly or eventually enrich the exploiting experience.

5.5 Towards a Design Solution: Proposed Features

Key insights from both parts of the empirical research were analyzed and reflected on by proposing some design features that could improve the user experience of current tools that are used to manage personal digital visual archives.

5.5.1 Design Feature 1: Favorites

Insight: The favorites feature is widely used by users. Even though usage areas vary between individuals, it is seen that favorites are used by most participants for either social media or identity/document/credit card quick access to visual content. Other issues related to this concept are that some of the participants mentioned concerns about security of their documents and cards, and sometimes the favorites folder gets crowded and loses its aim to provide fast access to files.

How might we improve the users' experiences of the favorites feature, considering these issues?

Proposed Feature 1: Divide the favorites into two easy access folders, one for easy access to visual documents secured with a password, and the another that users can use to store visuals that they can upload to social media. The icons and usage of the folders can be customized by users (Figure 5.3.).

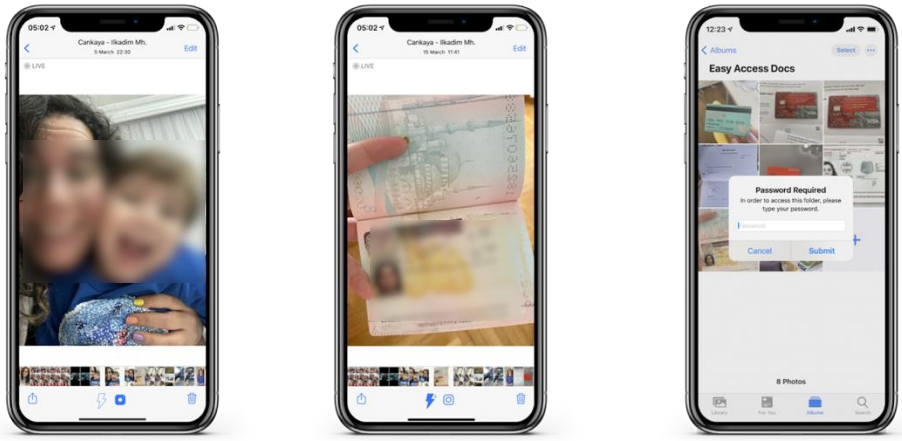

Figure 5.8. Design Feature 1: Favorites

5.5.2 Design Feature 2: Lost in Transfer

Insight: There is a decentralization that all users face, owing to the wide range of tools and devices available to use. While transferring between the devices, some important information related to a file such as date, location, people in it, device taken, mode of shooting etc., can be either changed unintentionally or completely lost. This causes problems while exploiting those visuals.

How might we keep file-specific information safe from any issues that might happen during transfer between tools and devices?

Proposed Feature 2: Information considered important by the user can be selected to create a customized name for each file, that can be kept safe while transferring (Figure 5.4).

Figure 5.9. Design Feature 2: Lost in Transfer

5.5.3 Design Feature 3: Naming

Insight: While images are being archived, naming issues including randomly named files, or files named by devices independent from the context or with a meaningless name, make it hard to exploit visuals.

How might we prevent naming issues that cause problems in navigation?

Proposed Feature 3: This feature can be integrated in the camera, allowing users to name photos as they prefer. They can be reminded by the strategy they previously embraced and set a time duration for that naming to be used (Figure 5.5).

Figure 5.10. Design Feature 3: Naming

5.5.4 Design Feature 4: Changing Strategies

Insight: People tend to change their archiving strategies over the years, which causes disorganization and chaos in their archives.

How might we prevent the disorganization caused by changed categorization strategies over the years?

Proposed Feature 4: The tool can prompt users on the archiving strategy they want to follow. The user can customize this, and also change it later so that the tool can also help change the whole organization of the archive according to new strategy the user adopts (Figure 5.6).

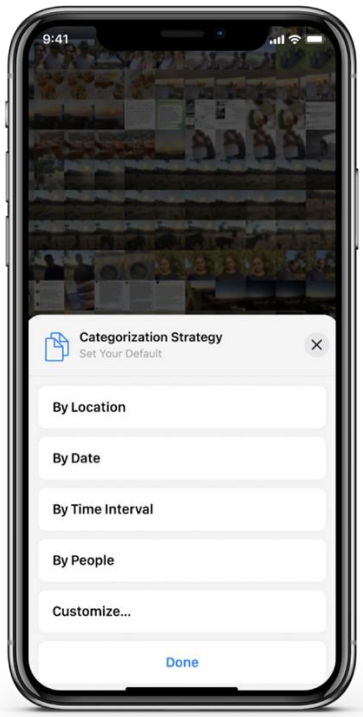

Figure 5.11. Design Feature 4: Changing Strategies

5.5.5 Design Feature 5: Remembering

Insight: When remembering a visual memory, associations are made to the date, location, people etc., relevant to that memory. Yet, current solutions are not

sufficient to reflect the complex structures of these relations in archiving practices while searching.

How might we accommodate the complex structure of associations that come into play during visual archiving practices while searching?

Proposed Feature 5: A multiple filtering approach might be adopted in an advanced search, allowing users to build a descriptive explanation of the memory including complex associations (Figure 5.7).

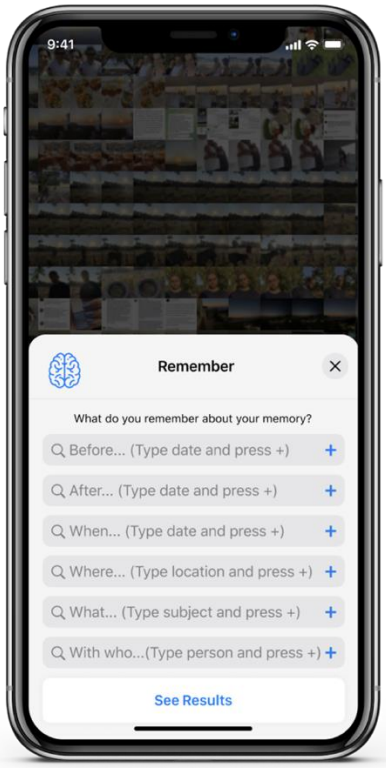

Figure 5.12. Design Feature 5: Remembering

5.5.6 Design Feature 6: Features

Insight: Current digital tools offer a wide range of features for users to use. Yet, many users are not fully aware of the availability of the features offered by the tools they use.

How might we make tools more self-explanatory for users to be more aware of the full set of features, or how can we encourage users to learn about these features?

Proposed Feature 6: A smart assistant can be provided who 'looks after' the archive, helping users to discover features they are not using and encourage them to get the most help out of the tool they are using (Figure 5.8).

Figure 5.13. Design Feature 6: Features

5.5.7 Design Feature 7: Disposables

Insight: Many people keep images in their archives that are disposable. For example, images taken instantly and sent to someone, screenshots or photos taken before taking an exam. Even though users know when they will be done with those visuals, these visuals are mostly forgotten later by the user and even if they intend to be deleted, they can remain in the archive and contribute to clutter.

How might we make it easier for users to eliminate unwanted or unneeded content in their archives?

Proposed Feature 7: An integration for the camera that allows users, immediately after shooting an image, to set when the image will be automatically deleted (Figure 5.9).

Figure 5.14. Design Feature 7: Disposables

5.5.8 Design Feature 8: Notes

Insight: Some users think that visual memories become richer when accompanied with written feelings and thoughts, so they use various third party applications to achieve this. In fact, most people were not aware that popular digital tools already offer this kind of feature.

How might we integrate an anecdote feature into existing tools in a way that is more visible and enriches the memory retention experience?

Proposed Feature 8: The anecdote feature can be made more visible by integrating it into the camera. Users can setup reminders to be prompted to write something about the image to enrich reminiscing down the years (Figure 5.10).

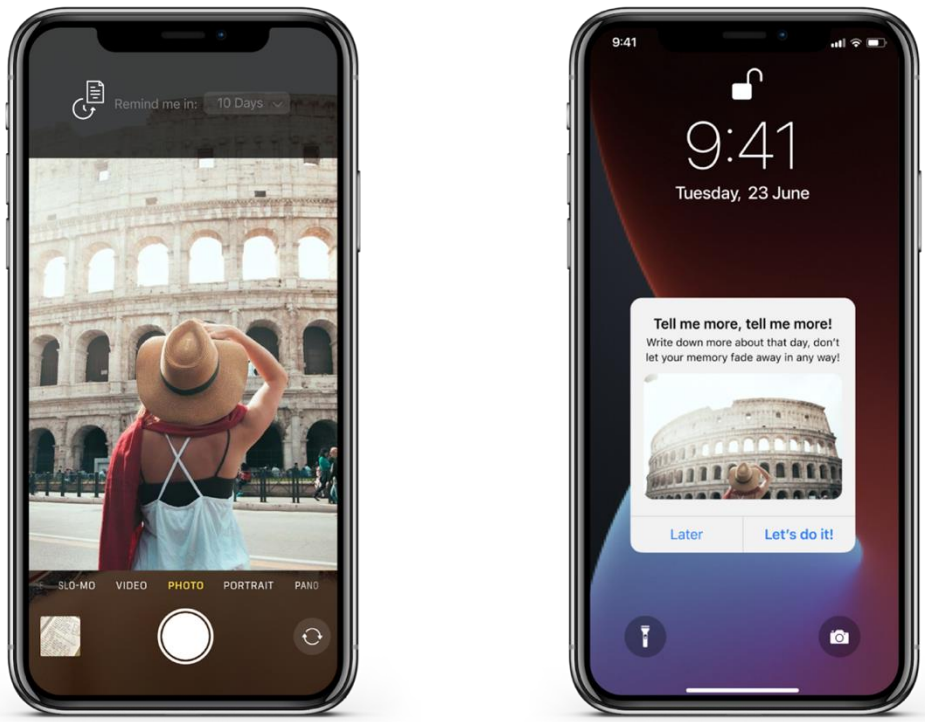

Figure 5.15. Design Feature 8: Notes

5.5.9 Design Feature 9: Duplicates

Insight: Duplicates are a consistent problem that take up space in archives.

How might we prevent duplicate files, to make the navigation experience less frustrating?

Proposed Feature 9: Users can manually select batches of duplicates and group them, so that they shrink down into a single version in the gallery with a stack icon. Stack icon shows that image has duplicates and when user press that icon, each visuals can be accessed by the user (Figure 5.11).

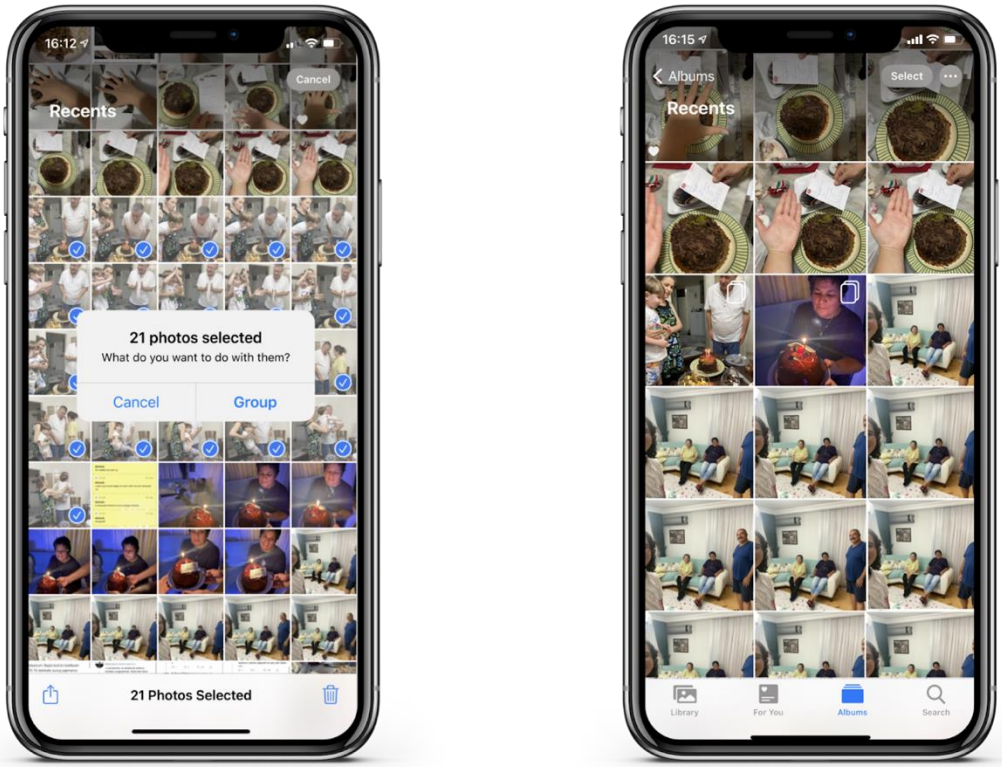

Figure 5.16. Design Feature 9: Duplicates

5.5.10 Design Feature 10: Relations

Insight: People like to see the relationships between the images in their archives in a chronological order, and experience them as flashbacks, witnessing their associations.

How might we emphasize a timeline experience into advanced search options offered by tools?

Proposed Feature 10: While searching using a sliding mode, a visual algorithm can highlight related images within the context of the whole archive, rather than separating them from the context. In this way, adjacent images and memories may be more easily found (Figure 5.12).

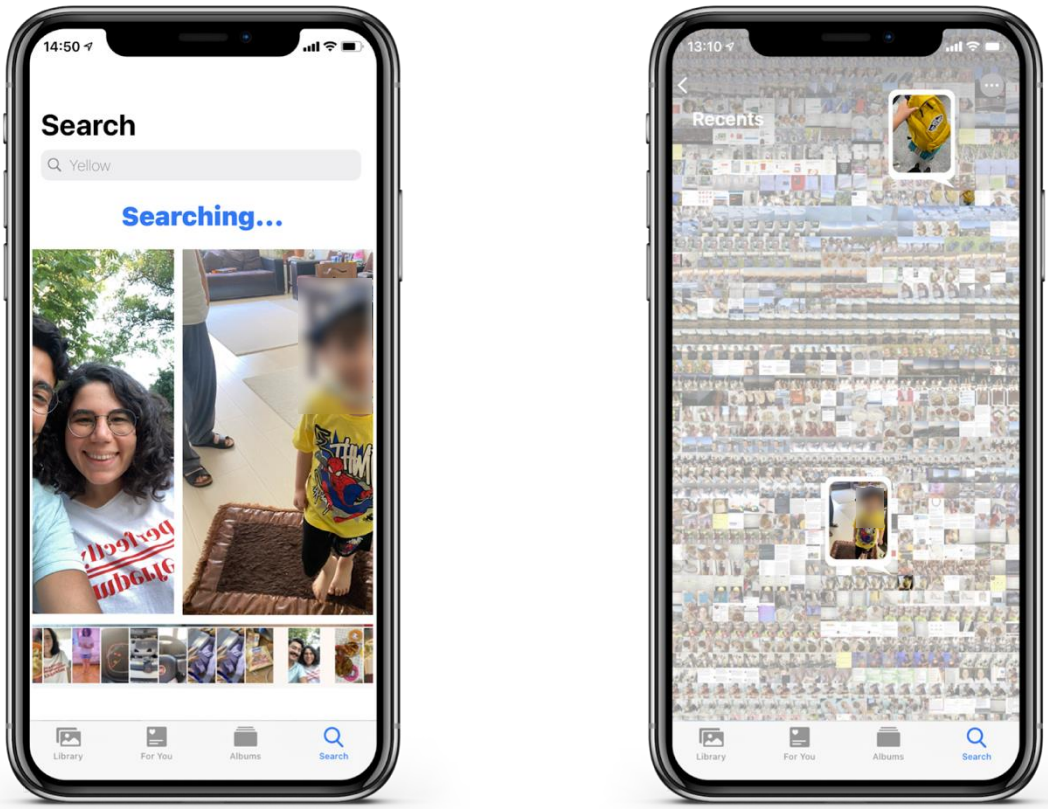

Figure 5.17. Design Feature 10: Relations

CHAPTER 6

EMPIRICAL RESEARCH PART 3: FOCUS GROUP

This chapter discusses the main outcomes and insights from the focus group, which was set up to systematically evaluate the design features proposed in the previous chapter and provide opportunity to improve the features through design iteration or design alternative features.

6.1 Outcomes of the Focus Group

The focus group was conducted with six designers online via Zoom, selected from interview participants. Participants were divided into pairs randomly. Three breakout rooms were created so that each of the pairs could work privately. To begin with, the researcher presented the previously mentioned insights, the 'how might we' questions and the proposed design features. Firstly, participants were asked to rank the proposed design features via a discussion with their pairs. They were asked to sort the features on a scale from 1-10, with 10 indicating highest importance and 1 indicating least importance. After each pair reported their rankings, an average grade for each feature was calculated. The top three ranked features were then distributed among the rooms. The researcher then presented the Playful Experiences Framework (PLEX) by Korhonen et al. (2014). In their pairs, participants were asked to either iterate the design solutions they were given or generate a new design solution for the corresponding insight and 'how might we' question, combining with one or more PLEX framework experiences, to offer a solution with a characteristically playful experience. As a reminder, the PLEX framework categories can be found in Figure 2.20. After the generative sessions, a discussion session was held where all three rooms were asked to present their outcomes and comment on each others.

A Miro board was prepared for each room, allowing the participants to collaborate through. Figure 6.2 shows an overview of the Miro board, which consisted of a summary of each design feature and a table allowing participants to take notes and make their rank on the left. On the right, the PLEX framework was presented, along with some wireframe mockups just in case they wanted to use them, and a big white page for them to work on, with only two post-its asking them to state which feature they are working on and which PLEX will they integrate into it.

Figure 6.1. Focus Group Miro board arrangement

6.1.1 Feature Prioritization

During the Feature Prioritization part of the focus group, participants conducted private discussions in their breakout rooms. Each breakout room was recorded, and discussions were reviewed by the researcher. Table 6.1 shows the rankings of each design feature by each room, along with the average (mean) scores for each feature. Feature 1 ranked with the highest importance with 9.7 overall ranking, Feature 3

ranked second with overall 9, Feature 5 ranked third with 7.67 overall ranking and Feature 7 ranked fourth with 6 overall ranking. Room 1 was assigned with Feature 1 to work on, Room 2 assigned with Feature 5 and Room 3 was assigned with Feature 7 to work on. An error occurred with the Excel Average function during the Focus Group, which meant that at the time it was thought Feature 7 was ranked in third place instead of Feature 5.

Table 6.1 Overview of the tools and features experienced by participants

Design Feature	ROOM			
	1	2	3	AVERAGE
1	9	10	9	9,33
2	7	1	3	3,67
3	10	7	10	9,00
4	3	3	2	2,67
5	8	8	7	7,67
6	2	2	4	2,67
7	4	6	8	6,00
8	1	9	1	3,67
9	5	4	6	5,00
10	6	5	5	5,33

First Ranked: Feature 1 - Favorites (Overall 9,33)

Figure 6.2. Design Feature 1: Favorites

Room 1, who rated this feature with 9, stated they found it very important. They mentioned a recent feature of the tool OneDrive “Personal Vault”, which offers a protected area for personal files that even Microsoft can’t reach. It is suggested by OneDrive that even if one’s cloud is hacked, the only thing hackers will access is encrypted data. OneDrive only allows three files to be stored in the Personal Vault with its free plan. This feature of OneDrive can be regarded as an important model, especially for the technical side of the security concern regarding personal documents. It is important that this feature can be integrated into other tools that are widely used by considering user product interaction.

Room 2, who rated this feature with 10, stated their personal experiences regarding the favorites folder being too full and needing subfolders or other divisions even in this separated folder. They stated it is sensible to use a familiar interaction and build upon it. They valued the design as it was both simple yet familiar, which they believe will create a successful user experience.

Room 3, who rated this feature with 9, also stated its importance and how they related to it, since they were using a Favorites folder frequently. They regarded this feature with a high chance to succeed as it offers familiar interaction and is enabled with quick actions.

Second Ranked: Feature 3: Naming (Overall 9)

Figure 6.3. Design Feature 3: Naming

Room 1, who rated 10, considered this feature really important and stated it could only be achieved while shooting; otherwise it gets harder and is avoided being done, causing lots of trouble.

Room 2, who rated 7, stated that naming a file is a real issue. Especially when a file is transferred from phone to computer, one should look at the visuals one by one to identify something, as it doesn't offer any other parameter and name is irrelevant from the context, given automatically by the phone. They also stated this might be considered as a tagging system but highlighted its important to not force the user to do this mandatorily for every photo. It should be customizable and something that users can do when they need or want to. They also compared it to Feature 1:Favorites, stating that Feature 1 is offering two tags while Feature 3 offers more tags, and it can

be really helpful especially for ‘archive geeks’. They also suggested it can be easily combined with Feature 8:Notes.

Room 3, who rated 10, stated they found this feature really important, stating it can even propose a solution for Feature 2 with some arrangements and besides password protection, it can answer to Feature 1 too.

Third Ranked: Feature 5: Remembering (Overall 7,67)

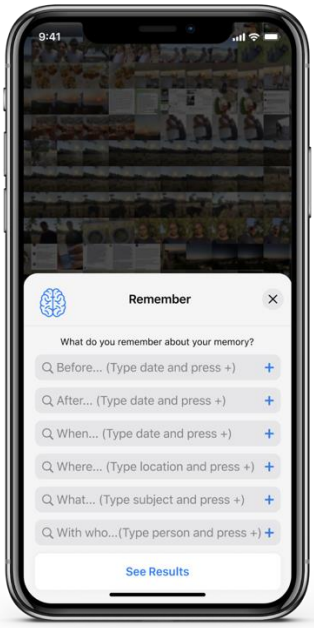

Figure 6.4. Design Feature 5: Remembering

Room 1, who rated 8, referred to an old project they conducted. In this project they suggested that people tag products/objects (alongside people) inside a photo, and conducted user research, which revealed the approach to be highly needed as metadata is one of the parameters people use to remember moments. They also suggested mood information can be another association to consider, such as happy, fun etc., and suggested something like a mood scale can be added, mentioning they

consider some key events like breaking up with a girlfriend or boyfriend as a reference point, to refer to events like “It was 2 days after I broke up with my fiancée.”

Room 2, who rated 8, especially mentioned that the ‘before’ and ‘after’ parameter are really important. And they suggested if the user needs to add information to provide necessary information beforehand, it can pop up like an iPhone screenshot screen, so that the user can do it if they want, which is something that can also be applied to Feature 8.

Room 3, who rated 7, suggested it would be really helpful, considering how they normally remember a memory. They also highlighted the ‘before’ and ‘after’ parameters as really important.

Fourth Ranked: Feature 7: Disposables (Overall 6)

Figure 6.5. Design Feature 7: Disposables

Room 1, who rated 4, stated that elimination of files takes too much time, and that setting an auto-elimination date while shooting is a sensible solution. They stated while ranking this feature that they compared it with the solution regarding duplicates and ranked Feature 9: Duplicates higher, as they consider duplicates is a more important problem.

Room 2, who rated 6, stated the underlying issue as being common, yet it might be a problem for users to define exactly when to delete, which is why they suggested setting up reminders. They also talked about utopian cases where the tool can detect their exam week or similar important events and auto-delete when the events pass.

Room 3, who rated 8, stated the feature as important while also stating it should be considered that some hoarders might have concerns just in case those images will be needed some day. Yet, as long as the user has the control and states when deletion will happen, it will be useful.

Fifth Ranked: Feature 10: Relations (Overall 5.33)

Room 1, who rated 6, stated they loved the idea and resembled it with highlighting a PDF file with a yellow highlighter.

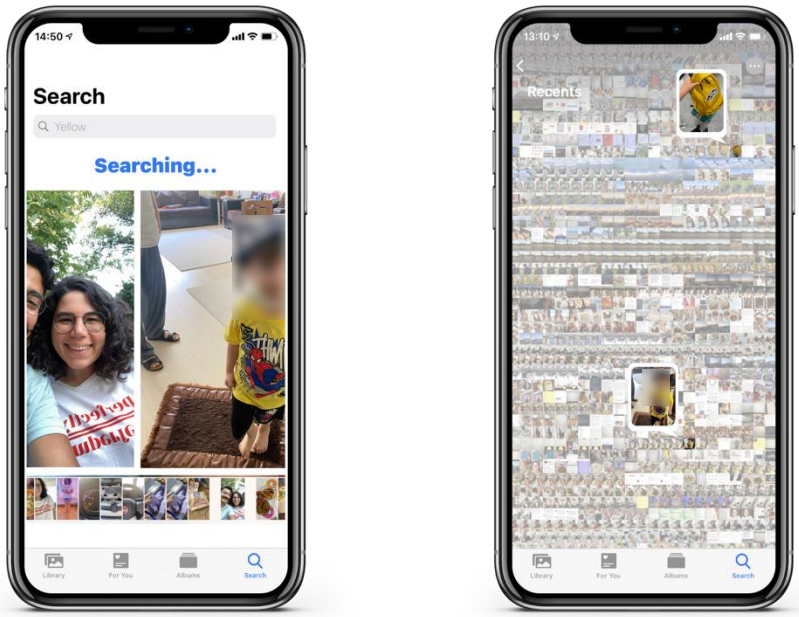

Figure 6.6. Design Feature 10: Relations

Room 2, who rated 5, stated they thought the screen on the right was really successful, yet practically it would be important to know how the highlighted images are chosen.

Room 3, who rated 5, stated in relation to the left screen, if every photo will be seen sliding, it can be a tiring and slowed down experience. They stated even though the idea visualized on the left slows down the experience, the one on the right offers a faster transition. They also stated they found the ‘how might we’ question really important, and the feature was definitely worth developing. They highlighted the case if the search results photos can be carefully considered, then the visual can become more complex than this version.

Sixth Ranked: Feature 9: Duplicates (Overall 5)

Room 1, who rated 5, considered this feature as a successful sub-foldering approach.

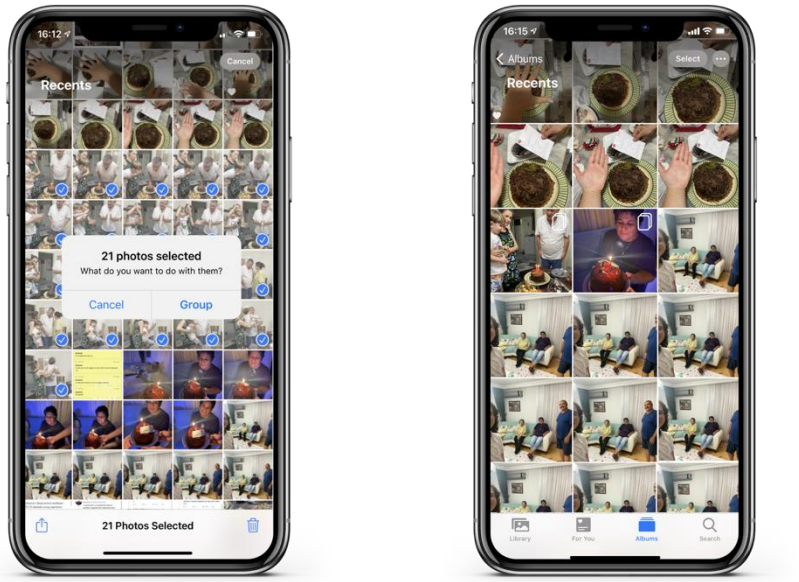

Figure 6.7. Design Feature 9: Duplicates

Room 2, who rated 4, mentioned that the feature recalls another familiar interaction, yet it is a good point that the user can take control, and it can be used for other groupings, also for other things than duplicates.

Room 3, who rated 6, stated they found it really helpful, as both participants mentioned problems with duplicates. They offered an alternative usage scenario, for people who are making stop motion movies.

Seventh Ranked: Feature 2: Lost in Transfer and Feature 8: Notes (Overall 3,67)

Feature 2: Lost in Transfer and Feature 8: Notes scored the same overall ranking.

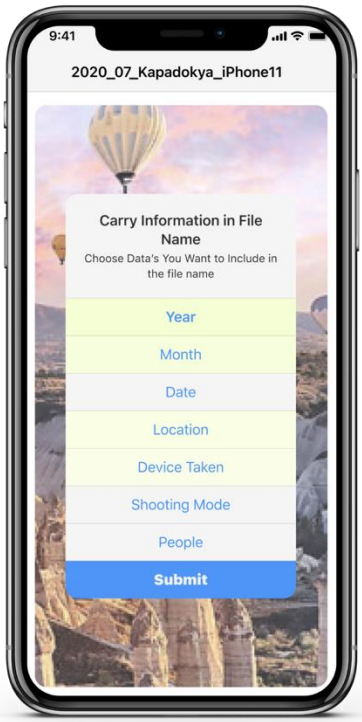

Figure 6.8. Design Feature 2: Lost in Transfer

Room 1, who rated 7, mentioned they experience unpleasant information loses due to sending images through WhatsApp, and stated Feature 2 should be considered important.

Room 2, who ranked 1, and Room 3, who ranked 3, stated Feature 2 should not be something that the user needs to do repeatedly for each photo, as it would really confuse the already problematic naming issue.

Figure 6.9. Design Feature 8: Notes

Room 1, who ranked 1, stated that Feature 8 would take too much time and users wouldn't be happy dealing with this, and since other proposed features utilizing naming or labeling can be done properly, this feature would not be needed.

Room 2, who ranked 9, suggested that this feature might pop up like Apple's screenshot feedback and it can be included in the journey, for example it can pop up while navigating in the archive.

Room 3, who ranked 1, stated this is the most specifically targeted and niche feature. They stated people who are into journaling might use it.

Eighth Ranked: Feature 4: Changing Strategies and Feature 6: Features (Overall 2,67)

Feature 4: Changing Strategies and Feature 6: Features scored the same overall ranking.

Figure 6.10. Design Feature 4: Changing Strategies

Room 1, who ranked 3, stated some tools actually offer the functionality of Feature 4, but it is not common and integrated to all tools and most people are not aware of it.

Room 2, who ranked 3, resembled it to regular sorting.

Room 3, who ranked 2, stated that it resembled Feature 2: Lost in Transfer but Design Feature 4: Changing Strategies can contribute to a longer-term organization, whilst Feature 2 felt more personal.

Figure 6.11. Design Feature 6: Features

Room 1, who ranked 2, stated that Feature 6: Features can be skipped as a regular onboarding screen, unless some measurements are made in order to prevent this and persuade user to keep using it somehow.

Room 2, who ranked 2, stated the ‘how might we’ question is an important point, yet it might be related to somehow users not using those features because they do not know about them. They stated this situation might be fixed either by offering fewer functions in the tool or creating better experiences whereby the functions are more obvious or accessible. One of the participants shared an experience from work and mentioned that in the company she works for, several features were launched in an app, without doing a user testing, and which in the end were not used by people. She

stated among those features, they conducted user testing for some, which increased usage from 2% to 50%.

Room 3, who ranked 4, stated it is important to teach users how to use a new app. They also stated if the frequency of Feature 6 is too much, it can be frustrating, which is why having a 'leave me alone' option is sensible. In this regard, they suggested that it might work when a new feature is launched. Also, they stated the reason might be the features are not marketed enough, or hard to use.

6.1.2 Further Developments Suggested by Participants

As mentioned before, for the second part of the focus group, all rooms were asked to redesign a proposed design feature, combining it with some of the principles of playful experiences.

Room 1 was assigned with Design Feature 1: Favorites. They generated different scenarios and solutions, combined with different playful experiences.

Figure 6.12. Design Feature 1: Favorites

The first suggestion they made was adding a preview to a sensitive/private document. For example, when a user wants to open a passport photo, without going through biometric verification, a blurred version of the photo appears. They stated if everything is password protected, the user won't know which one to choose or open.

Another solution might include storing those documents in a separated place, which creates another step to complete the action. In order to prevent that, they offered seeing a blurred version of the sensitive document in the main gallery instead of not seeing it at all, to create a seamless experience. Even though blurred, the document owner would be able to detect if it was the correct image they were seeking.

In the second idea, they included 'THRILL' PLEX. The inspiration point was a story about Photoshop, as they mentioned. The word has it that if someone tries to open a money visual in Photoshop, to prevent money duplication and printing, Photoshop automatically closes. Room 1 thought that if it can detect a money visual, it can in principle also detect visuals containing data. If there is an interruption and a password cannot be entered correctly, or a verification can't be completed successfully, they offered tool that can delete the source file, along with a ripping of a paper sound effect. For another interpretation of this idea they included the 'CRUELTY' PLEX, for when burglars try to use users' sensitive documents for illegal intentions. If the tool detects that the user is not keeping documents safe with the features tool provided, keeping all credit card and other sensitive information on the gallery, it can pretend to have stolen the user's information as if like a burglar or online hacker.

Another scenario they offered, which included the "FELLOWSHIP" PLEX, was a fellow tool that can help user on trips, while shopping, or even in government offices. For example, when someone enters an airport, it can ask them "Do you have your passport ready? Here it is if it is not, I can show you." In case that person lost their passport or did not have it to hand etc., it can help. Room 1 described this tool as a context sensitive tool working proactively. It makes a categorization beforehand to separate images of credit cards, passports, etc., so it can offer-up those images whilst shopping, at passport checks, on the airplane etc.

Another PLEX they used was “SIMULATION”. In this scenario, they stated they focused on social media, rather than security, in contrary to the other scenarios. Similar to the shopping baskets found in online shopping apps, users stock their photos in a photo basket. When they open Instagram, this basket appears asking which ones the user wants to share. Also, with AI assistance, the feature can simulate how many ‘likes’ a photo has potential to receive, who will like it, etc. It can even remind the user to share visuals during the peak usage hours of Instagram.

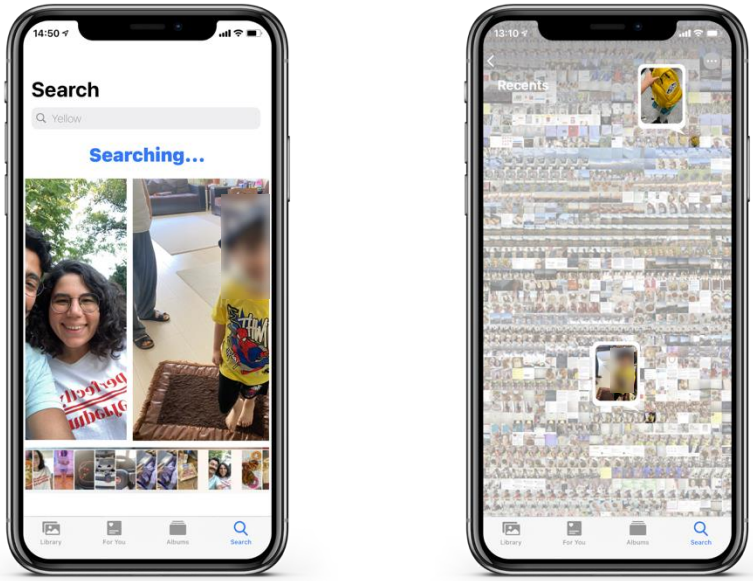

Figure 6.13. Design Feature 10: Relations

Room 1 also decided to iterate on Feature 10: Relations, by adding ‘EXPRESSION’ and ‘FANTASY’ PLEXs. They offered while searching, visuals can appear as pop-ups like tinder cards, and the tool will ask questions such as “Was this there too? Was it at this time, at this location?”. As popups appear while conducting another search, users will need to answer to conduct search faster, which will enable ‘machine teaching’ as they expressed, as while user answering question it actually teaches algorithm information about visuals. Room 1 explained this as follows: when

a tool names some photos ‘Holiday’, the idea of the holiday it labels and the ideas in the user’s mind might not always match. With this feature, the user can communicate and teach its expectations to the tool. Then, for the ‘FANTASY’ PLEX, they included reference to the gestural hologram graphical user interface from the movie “Minority Report”. While navigating, the user will use a three-dimensional system of hand gestures (Figure 6.14). Since it is three-dimensional, there is potential to reach the results more easily. Three dimensions can permit linking amongst things that are semantically related, not restricted only to time, location, etc., but maybe reasons and causes too. They stated this kind of interaction with a visual archive can be closer to our cognitive processes, more like a mind map. Even though date and location are really important for memory, having a mind map type structure might feel closer to our cognitive process, as Room 1 stated.

Figure 6.14. Movie mentioned by Room 1

Room 1 also offered a new (extra) feature, inspired when they saw the ‘CAPTIVATION’ PLEX. They mentioned the main inspiration point was “Captivating a person in a moment, making user live a moment again”
Instead of showing a visual, they asked the question “Can we add mixed multimedia, or different feedback?”, for example where a user can hear the sound of the video from that day, or if the day was really hot, the photo can become sepia toned. In this way, they searched for something to activate more of the user’s senses. Not like metadata, but a way to enrich the feeling of re-living a moment.

Room 2 was assigned with Design Feature 3: Naming. Room 2 preferred to create a user journey for the problem and focus on offering one main feature.

Figure 6.15. Design Feature 3: Naming

One of the participants in Room 2 mentioned a search conducted in her workplace. This research was focused on tagging, where participants were given cards to sort whilst being allowed to create their own tags. Another participant group was created, this time asked to sort cards using only pre-defined tags. In the end it was seen that,

even though the participants in the first group were allowed to create tags of their own, they followed a similar structure to the group who has predefined tags, wanting to group similar things together. As a result, they had seen that having a pre-defined number of tags, leading the user to follow a journey, resulted in better experiences. Considering this research, they decided to create tags for users as a development for Feature 3:Naming. As they were familiar with the present study from the presentation made by the researcher about the insights and design features offered, they developed their tags accordingly. They integrated selected playful experiences based on those categories.

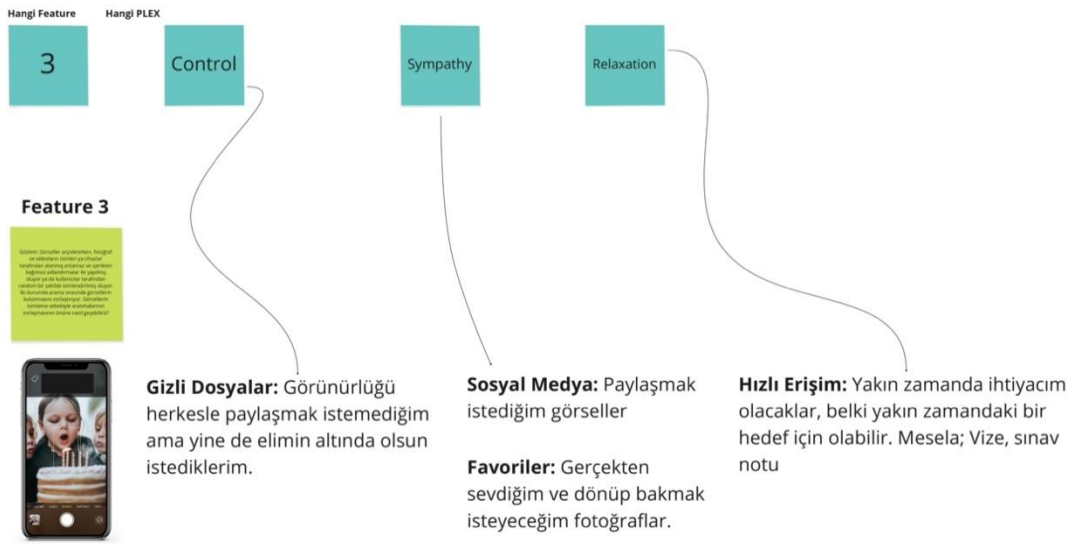

Figure 6.16. Room 2’s PLEX and offered tags board

They matched each tag with a PLEX:

Private/Secret: For files that users do not want to share visibility with everyone, but still want to keep in the archive and access fast. They matched this tag with the 'CONTROL' PLEX.

Social Media: Visuals that users want to share on social media. Favorites: visuals that users really like and want to look back to see. They matched these two tags with the 'SYMPATHY' PLEX, since with these two tags emotions are a strong point; they include either a person, a location, an animal etc. that the user loves and even though they are not aware of that, emotions are included in the categorization.

Easy Access: For visuals that users will need in a short period of time. For example, notes for exams. They matched this with 'RELAXATION' PLEX, stating that by giving access to files that the user needs immediately, a cognitive load is lifted and a reassurance is provided.

Room 2 participants wireframed a journey, thinking it through step-by-step. They defined two main paths, one where the user takes a normal number of photos, such as with casual usage, and one where the user shoots consecutive photos of a point of interest.

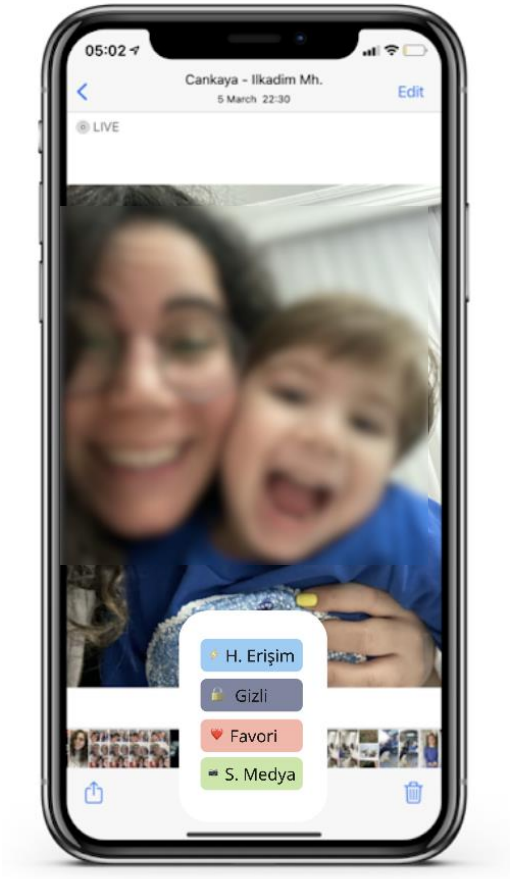

Figure 6.17. Room 2: Suggested micro animation

When the behavior is normal, the user has the chance to go back and tag the visuals. They also defined color codes for the tags, thinking it will ease the navigation for the stacked view in the gallery. They did not change the usual 'favorite' icon, as by default users would continue to use it, stating that they did not want to interfere with a habit, but contribute to it. When the user clicks on the heart, a micro animation comes up, presenting the user with three different options (see Figure 6.17). An alternative interaction is offered at this point, especially when after the user learns this feature, a tag menu opens when the user presses longer. In the gallery, color codes match with the tags, enabling users to see visuals in groups, even in the full view of the gallery (see Figure 6.18). They stated this might help with search and categorization, enabling easy access while scrolling too. They also discussed, in line

with the filled heart favorites in Apple Photos, a similar approach can be embraced, and related icons of the tags can be seen on top of the visual while navigating in the gallery.

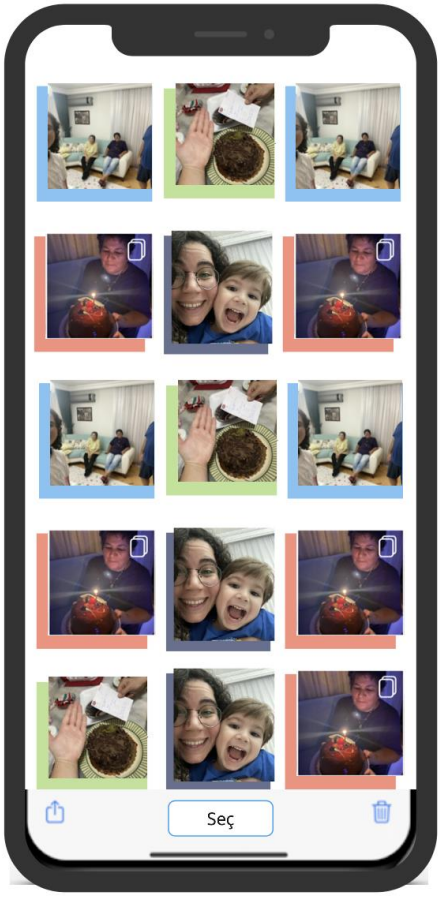

Figure 6.18. Room 2: Gallery view

On the other path they defined for users, in the scenario where users shoot consecutive photos or videos, the tool recognizes this as an unusual behavior, and communicates with users: " I see you are shooting too many photos, want to group them under a tag?" If the user opts to, they can select a tag and the tool can gather all photos under that tag until the request to auto-tag is cancelled (see Figure 6.19). For example, it can be either a holiday or taking photos for an exam: users can benefit from easily grouping consecutive visuals.

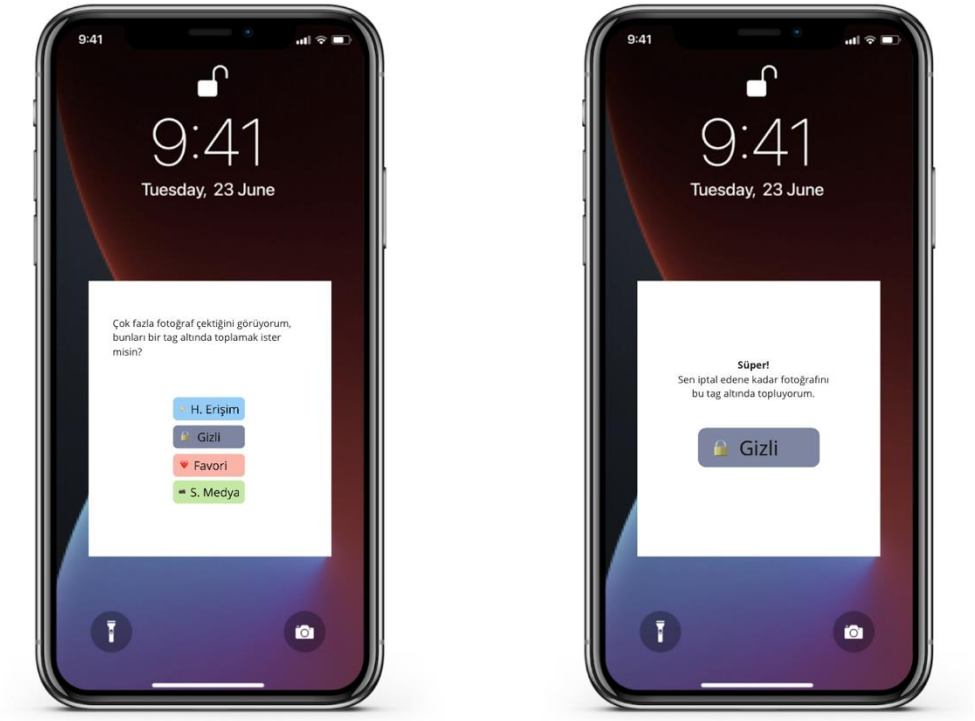

Figure 6.19. Room 2: Unusual behavior popup

Other participants from other rooms commented on the outcomes. Some stated for the Private/Secret files tag, a way of password protecting or hiding them can be embraced. Yet, as there are too many possibilities under this security subject, all possibilities should be carefully thought through before making a design decision. Other participants also stated having too many different colors, combined with colors that already exist in the visuals in the gallery can create a cognitive overload. Maybe separating tag content from the overall gallery or keeping the visuals together somehow might be a better approach. Yet Room 2 stated if Apple decided to keep it simple and just add a simple filled heart, it might be a huge design decision to add colors, yet it can be offered as a version.

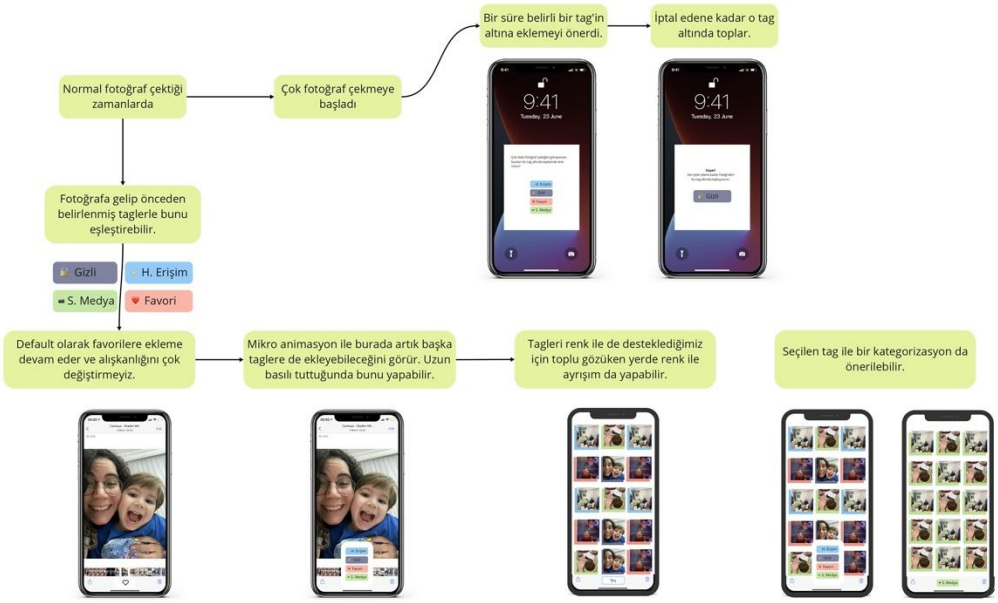

Figure 6.20. Room 2: User journey and wireframes

Room 3 was assigned with Feature 7: Disposables. They also created a user journey and developed the feature defining two main paths. Since the offered feature was aimed to be used “during photo shooting”, they also developed the feature to include visuals that need to be deleted that are already on the gallery.

Figure 6.21. Design Feature 7: Disposables

On the aspect of the developed feature addressing the visuals that are already in the gallery, and which are in need of deletion, the user come across with some popups while browsing their archives. In those popups, the user sees own selected photos, (four to five different photos) and has the freedom to select them individually and delete. Those selected photos consist of blurry photos, consecutive photos, and documents. If the user does not want to select these suggestions, they can randomize the photos and visuals and change to new ones (see Figure 6.22). Room 3 also wanted to include the 'HUMOR' PLEX and offered a feature that can make funny comments on the visuals that users delete, based on the category of the visual. For example, if the photos for deletion are most likely belonging to a city, the tool can comment: "Do you want to burn that city down or what?" Or if they belong mostly to a single person, "It looks like you two don't get along". Just as how users are excited to use Siri to see its limits, they might be encouraged to see what it will come up with, and at the same time achieve a necessary cleansing of their archive.

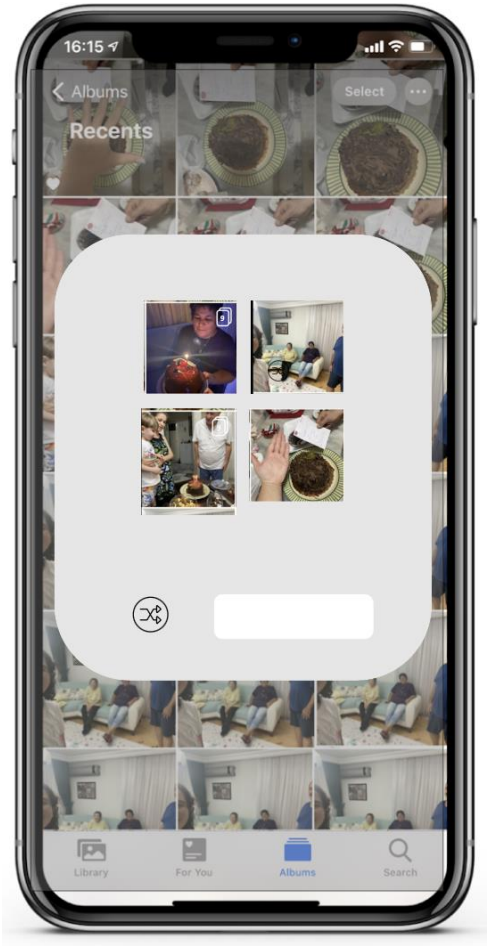

Figure 6.22. Room 3: Randomizing photos

If there are consecutive similar photos, these can be seen as groups (similar to the offering in Design Feature 9: Duplicates), and when clicked individual photos from the group can be selected and deleted. On the last step of deletion, Room 3 included the “SUFFERING” PLEX and determined that the tool can ask something humorous such as “Are you sure you want to delete? You are going to lose all your memories.” They mentioned the sound effect while deleting something on an Apple Mac, which is very relieving and suggested a similar sound can be used alongside the “RELAXATION” PLEX, along with a small micro animation to contribute to the accomplished feeling while eliminating. They also suggested this accomplishment

feeling and the “RELAXATION” PLEX can be realized via a notification stating to the user “You have more storage left now!”.

According to the user’s behavior, an AI engine can track the occasions the user makes use of this feature, for example when there is no connection, right before going to sleep, or whilst spending more screen time due to being less busy etc. In those times AI detected, it can prompt the user to do more deletion by popups.

The feature designed by Room 3 does not rely only on popups, but also offers a separated group, filled with visuals that the user can potentially delete. It also offers deletion of photos as a batch, based on the tags used.

Besides this scenario, Room 3 also offered an improvement for the scenario proposed by the researcher. They added a line to customization screen of the feature which can be used to set deletion date for more than one photo. For example, if a user is shooting consecutive photos for an exam, after setting up the date, he/she can use the line to pull it (Figure 6.23) and add all the photos she/he recently shot instead of selecting a date to delete for each one, one by one.

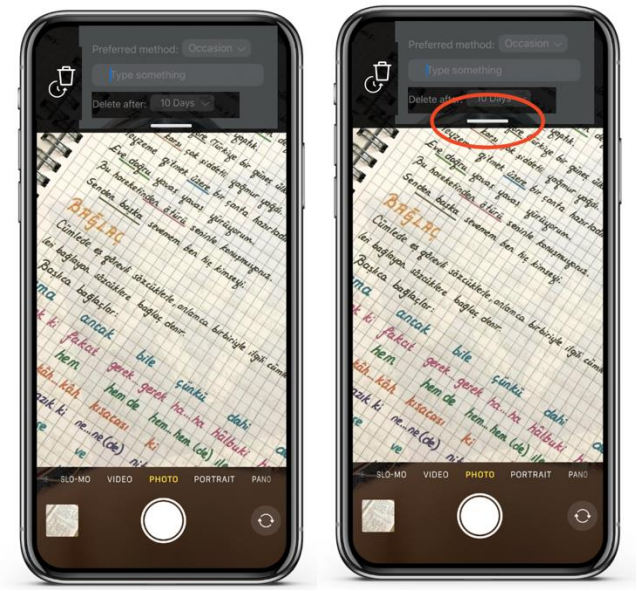

Figure 6.23. Room 3: Setting date as groups

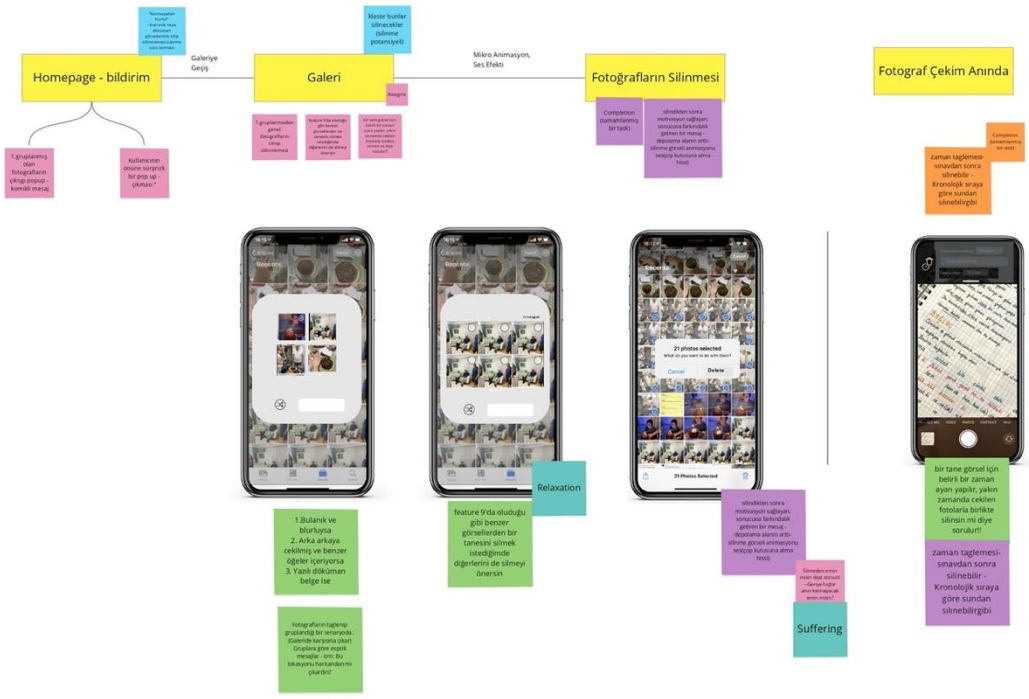

Figure 6.24. Room 3: User journey and wireframes

6.2 Overview of the Focus Group Insights

One of the key insights of the focus group step of the empirical study was that participants found the principle of making archival actions at the moment of shooting a visual valuable and important. This can be taken into consideration as a sample design direction, since none of the existing tools offer such an approach.

The second part of the focus group, where participants used the researcher's Design Features as a springboard for their own interpretations, iterations, and refinements was found especially valuable. It led to insights and new design features in response

to the design challenges and opportunities identified by the researcher in the preceding stages of the research.

Firstly, Design Feature 1 (Favorites) can be developed in a way to offer a better experience regarding the retention of private documents, by adding blurry previews with biometric verification rather than password protection. This can create easy access and hits two key specifications: it keeps the document private but provides sufficient clues to the user to successfully identify the document despite the blurring. This feature can be combined with several playful experiences within different scenarios, also motivating the user to keep their private documents safe or contributing to their social media experience.

Secondly, Design Feature 3 (Naming) can be developed with an approach to guide the user with predefined labels, corresponding to different playful experiences. The development of the feature targeted a way to include already taken photos too, and suggested to build on a interaction style/approach that the user is likely to be already familiar with.

Thirdly, Design Feature 7 (Disposables) can be developed by including visuals that already exist in the user's gallery, are in need of deletion, but have not been deleted (yet). Playful experiences are suggested to be used so that the user can be better bonded to this feature, on a more personal level, emphasizing an accomplishment feeling when the deletions are made.

Throughout the focus group session, the only PLEX used by more than one room (as used by two rooms) was Relaxation. Other Playful Experiences used by participants were: Thrill, Cruelty, Fellowship, Simulation, Expression, Fantasy, Captivation, Control, Sympathy, Suffering, and Humor. It is observed that the PLEX framework worked as a sparking point for creative solutions with some unusual categories such as Thrill and Cruelty. Participants integrated these playful experiences into proposed

design features. These playful experiences help them approach insights from a creative perspective and improve these features to offer a better experience by contributing from both a designer and user perspective.

CHAPTER 7

CONCLUSION

7.1 Overview of the Study

The aim of this study was to reveal and understand the opportunities to improve the user experience of digital tools used to manage and navigate through one's personal digital history of images and videos and to respond to the issue of digital hoarding.

To provide answers to the research questions presented in the Introduction, a combination of literature search and a three-step empirical study was made. Firstly, relevant publications were investigated to understand the principles and ideas put forward in related research (see Chapter 2). Secondly, a empirical study with 3 steps (namely survey, interviews and focus group) was conducted. Based on the results of the survey and the insights from the interviews, a set of design recommendations and design features were proposed as a response to improving the curation process of digital visual content (Chapter 4 & 5). These design features were evaluated and iterated by designers recruited for the focus group, whilst also integrating selected playful experiences into their design proposals (Chapter 6).

This final chapter revisits the research questions, highlights limitations of the study and presents avenues for further research and design development.

7.2 Revisiting Research Questions

The main aim of this study was to arrive at answers to the research questions posed in the Introduction, Detailed answers may be found in the previous chapters, however concise answers are stated here for ease of access and understanding.

- *How can the curation experience of digital visuals on our personal electronics be improved?*

To form a basis for the main research question, the hoarding concept, curation cycle steps, digital tools used in personal visual archive management, and related user experiences literature, were examined and reported upon in the literature review chapter. In contrast, users' strategies and habits regarding curation cycle steps, and their interactions with their archive through digital tools, are examined through the study survey and interviews. It was found that in order to offer solutions the curation process, one should understand that all three steps of the curation cycle are highly nested. Any action or problem that happens in one of the steps, directly affect others. Enriching the experiences in these steps and making them easier for the user has an important role on the overall curation experience too. Figure 7.1 illustrates the key insights of the study in relation with the curation step they positioned closer. More details on key insights and other insights can be found on Chapter 4,5 & 6. It is important to note that key insights stated in different steps directly or indirectly affect other steps and especially the ones in Keeping and Managing steps directly affects the Exploiting step. A set of specially prepared Design Features were created in response these insights raised in the survey and interviews, together offering solutions and possible ways to improve the curation experience. Details on Design Features can be found on Chapter 5. These offered features can be considered to have a secondary role as a research artifact, used to boost discussion around key insights and primary findings. Yet, as the nature of Research Through Design, exposure to this research artefacts is also important and aimed to inspire further design work. These features were specifically created so that further modifications could be easily made on them. The focus group, conducted as the third step of the empirical study, aimed to evaluate the

insights offered features were built on and further develop the features. Details on the focus group and outcomes can be found on Chapter 6.

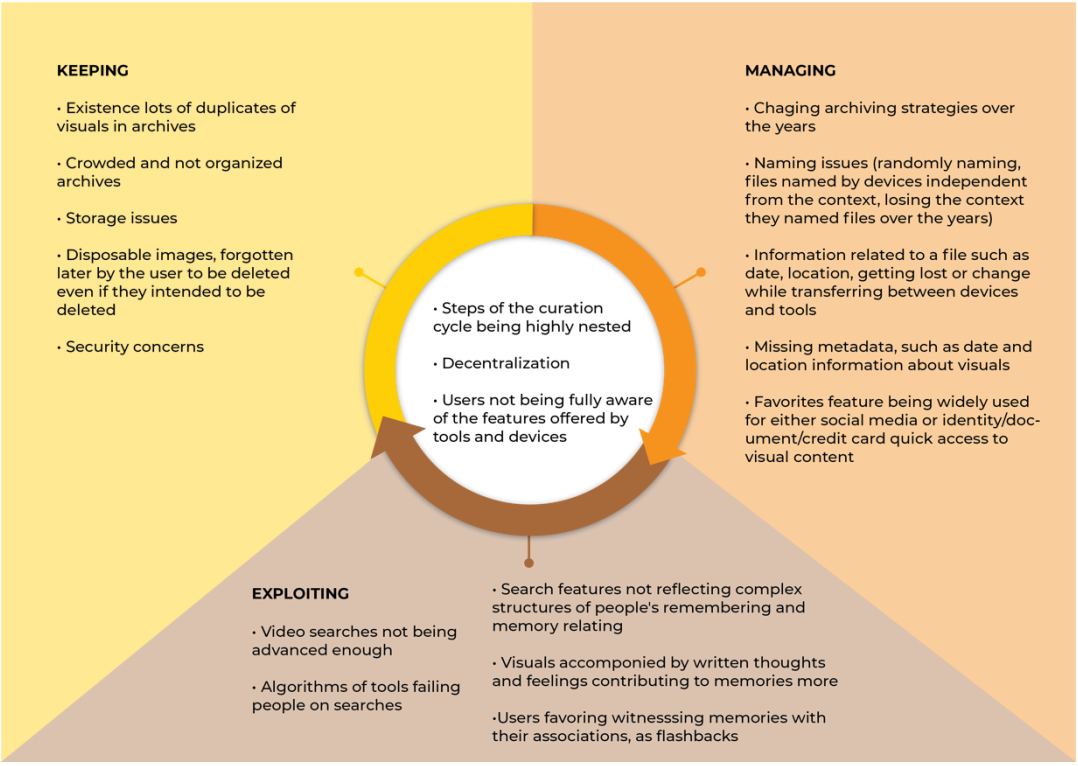

Figure 7.1. Summary of key insights

- *What are the strategies or tendencies people use while keeping, managing and exploiting their personal digital history related to digital visuals?*

The strategies people use while keeping, managing, and exploiting their personal digital histories shows individual differences, yet similarities and common tendencies are observed. It is seen that the strategies do not show a meaningful similarity tied to predefined sample groups (those who organize their archives very detailed, those who let all their digital data accumulate, and those who try to organize their archives but state that it is still not so organized), but overall similarities to some extent. Even though these

strategies and their reflections on users' practices vary due to the tools and devices used, an accurate summary of each step can be proposed as follows.

Keeping: It is observed that common triggers for users to eliminate files were crowded archives and storage issues. It is seen that with the developments in technology and increases in storage capacity, users become less eager to eliminate. The common visuals that are intended to be eliminated by users – whether successfully eliminated or not – are: photos that came out bad and lack quality, duplicates, consecutive photos, visuals that don't belong to them (such as shared via WhatsApp) and visuals they consider have expired (no longer needed).

Managing: It is seen that the parameters users employ to categorize their visuals show similarities. The main parameters are determined as: date (year, or month, or both), occasion/event, and place (location). Various combinations of these parameters are used to create personal categorization strategies.

Exploiting: It is seen that the strategies users follow in this step contain the date parameter and getting time references from mentally associated digital memories while navigation or searching for specific visuals.

- *How do existing tools shape personal data management experience in terms of digital visuals?*

With tools offering users a variety of features and easiness for each step, users' strategies and habits vary to some extent based on less or more requirement from the user to interfere. The tools provide some freedoms for users to spend less time on the steps of the curation cycle, with tools making use of categorization and search features enhanced by algorithms and

artificial intelligence. Accompanying this of course is the ability in the current era to store high volumes of visuals easily, because of the abundance of gigabyte storage on desktop and portable devices. The advanced search features of existing devices introduce users to a very different approach than conventional archiving practices. Also, the features of devices prompt users to create new strategies, as users get use to them. For example, some of the combined exploiting strategies included using advanced search features to define the date of a searched visual and then search for the exact visual by date manually. Another example includes the "favorites" feature offered by tools, bringing to users a new kind of habit for categorization. From the analysis done by coding, the emergent codes showed especially which features shape the experience of visual content curation: Automatic Albums, Favorites, Shared Folders, Scrolling, Chronological Sorting, Advanced Search Features (Date, Location, Face, Object), For You/Memories Reminders, Thumbnails and Previews.

- *In which aspects are existing digital tools incapable of satisfying the needs and expectations of users in terms of personal data management experience regarding digital visual curation?*

  AI Fails, Missing/Wrong Metadata, Naming Issues, Decentralization, Changing in Archiving Strategies, and Users Being Not Aware of Some Features of the Tools were the generated codes that most revealed the aspects of current digital tools that can be improved. The research went beyond just the identification of these problems, to include creative design proposals (as a set of Design Features) generated by the researcher and focus group participants, each addressing a particular way in which existing tools are not capable of satisfying the needs and expectations of users.

7.3 Limitations of the Study

This study took place during the COVID-19 pandemic. Even though the initial intention of the researcher was to conduct a empirical study in a physical setting, because of the pandemic situation, all empirical study steps had to be held online. For the semi-structured interviews, as participants being in a sincere environment was important so that they could feel comfortable and convey their authentic habits, it can be said that having interviews online was even beneficial. Yet, having the focus group session in a physical environment would be preferred, since group interactions are considered to occur more naturally and flowingly in such a setting. Another limitation caused by COVID-19 was, as mentioned by many of the participants across the survey and interview stages, the pandemic had changed some of their habits regarding creating visuals. In many cases, participants needed to share their experiences from two perspectives, referring to them as pre-COVID and the current situation. If possible, having the chance to conduct interviews in an ordinary daily life order might provide more accurate results as it would have helped users express their ordinary behavior better, rather than trying to remember how it was and expressing it. Another limitation caused by the pandemic was that most participants visited their visual archives more than usual due to quarantine, so they were a bit more familiar with their archives than pre-pandemic. Familiarity with their archive was also heightened since the researcher asked the participants for a guided tour of their archive as part of the interviews. Informing participants about the guided tour was necessary to get consent and having the participants and their tools ready for interviews, yet it might have affected the user's familiarity with the archive as some of them mentioned they took a look at their archive before the interview, and also during the guided tour just before the tasks were given by the researcher. However, since the study was not looking specifically at speed or ease of access to archival images/videos, these conditioning effects were not considered to be problematic.

Another limitation of the study was the limited time of the researcher, which especially affected the design activities contained within the study. With more time,

and some different structuring of the empirical study (for example, having the first round of Design Features generated in between the survey and interviews), it may have been possible to reach more developed design solutions. Nevertheless, the design solutions were not planned as the main focus or outcome of the research, but rather they promote a route for design intervention to help alleviate the problems users face in their visual content curation processes. These problems may be responded with different Design Features of course, but the included solutions comprise thought-through and evaluated proposals that may be refined into a finalized digital tool. Furthermore, the included Design Features comprise modest research artefacts that helped to reveal in more detail the problems and potentials of better tools for supporting the visual content curation process.

7.4 Avenues for Further Research and Design Development

This study has explored and discussed the possible ways to improve user experience of the tools that are used to manage and navigate through one's personal digital history of images and videos by adopting a 'research through design' approach. Exploration of the subject has been made by conducting a literature search and empirical study which consisted of survey, interviews and focus group. As a designer point of view was considered important for the study, and due to time limitations, the focus group session was held only with designer participants. Yet, for further developments, a more detailed iterative design process can be conducted, followed by evaluation and testing with users. Also, the PLEX framework experiences that are offered to be used as part of the design solutions presented in the thesis can be evaluated and tested with users and their potentials can be explored more.

Again, due to time limitations, the design outcomes were presented as separate features rather than a whole conceptual tool. Those features were addressed to different steps of the curation cycle with the aim to improving the exploiting step, and offered some interrelated solutions that can also be handled with an integrated

approach. For further developments, a conceptual design tool – based on existing or totally new solution – can be presented with a working digital prototype rather than just GUI screenshots.

This study provided rich insights regarding users' strategies, expectations, problems, and interactions with tools regarding personal digital history of images and videos, with some related design features addressing these issues and evaluation of these features. With further research, these can be expanded to a design guideline or set of specifications for designers to adhere to when designing apps that serve the curatorship process of images and videos. For the study, only the most important highlighted insights were turned into design features and evaluated, yet the research revealed other nuanced topics that still carry potential to be developed into further features that serve to improve the user experience.

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APPENDIX A

SURVEY QUESTIONS

Welcome Screen:

This study is conducted by Çağın Başkan who is a master's student in Middle East Technical University Department of Industrial Design, supervised by Prof. Dr Owain Pedgley.

Purpose of the research is to understand how digital hoarding of digital possessions exists and managed by users in order to create a better experience for them.

This survey takes approximately 10 minutes. Only researchers can access the collected data. The results of this research can be used in scientific and professional publications or for educational purposes. The data used will remain anonymous, meaning that you will not be identifiable, and your comments and actions will be confidential in this research.

You can contact with Çağın Başkan (baskancagin@gmail.com) to get more information.

1) I read the consent form in the welcome screen and I accept that I voluntarily participate in this study and give consent for my contributions to be used anonymously for research purposes.
I accept.
I don't accept

2**)** **Your Name & Surname**

3) Your Age
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

4) Your Gender
- Female
- Male
- Other
- Prefer Not to Say

5) Your Occupation

6) Which digital possesions you prefer to archive (keep and not delete)? (*You can select more than one option.)*

- Photos
- Videos
- Sound Files
- Voice Recordings
- Emails
- Documents
- Notes
- None*(Jumps to Thank You Screen)*

7) Where do keep your personal digital archive?*(You can select more than one option.)*

- Computer
- Mobile Phone
- Tablet
- Harddisks
- Online tools (Icloud, Google Drive, One Drive etc.)
- Social Media Tools(Instagram,Facebook etc.)
- Other *(Free text box)*

8) Do you attempt to organize your archive regarding visual digital possesions such as photos and videos?

- Yes I organize them very detailedly.
- I sometimes try to organize them but they are not so organized.
- No, I just let them accumulate.

9) How would you describe your digital visuals archive?

- I have gigabytes (GBs) worth archive.
- I delete plenty, but I still have a large quantity.
- I have a minimal archive.
- I don't have an archive regarding digital visuals. (Jumps to Thank You Screen)

10) Which digital tools you use to help you manage and organize your personal archive? *(You can select more than one option.)*

- Tools offered by devices (Apple Photos, Google Photos etc.)
- Online Cloud Platforms (Icloud, Google Drive, One Drive)
- Both
- I don't use any
- Other *(Free text box)*

11) In the next question you will be asked to evaluate a digital tool in terms of sufficieny regarding finding the thing you want quickly or effectively. Can you name the tool you are most familiar with before evaluation?

12) How would you evaluate ___(answer from previous question)__ in terms of sufficiency regarding finding the thing you want quickly or effectively?

13) In the next question you will be asked to evaluate another digital tool in terms of sufficieny regarding finding the thing you want quickly or effectively. Can you name another tool you use commonly before evaluation?

14) How would you evaluate ___(answer from previous question)__ in terms of sufficiency regarding finding the thing you want quickly or effectively?

15) In the next question you will be asked to evaluate another digital tool in terms of sufficieny regarding finding the thing you want quickly or effectively. Can you name another tool you use commonly before evaluation?

16) How would you evaluate ___(answer from previous question)__ in terms of sufficiency regarding finding the thing you want quickly or effectively?

17) Do you go back to your archive and navigate through it?

- Regularly
- Just in the times of need
- Rarely
- Never

18) **Is there any specific feature provided by the tool or device you use that you find beneficial while searching for something in your digital archive?**

19) Are there any problems you are facing when you are going through your personal archive and trying to find something? Can you describe them?

20) If you had a magical wand you can use to alter these devices or tools that you use for archiving, which kind of changes you would make or additional features you would add?

21) Is there anything you would like to add that you believe will be beneficial for the study regarding your experiences of digital hoarding and management of digital possesions?

22) Would you like to participate in an interview regarding your digital archive & habits regarding managing this archive, and contribute to this study further?

- Yes
- No(*Jumps to Thank You Screen)*

23) Please provide your email so the researcher can contact you for further studies.

24) Please provide your phone number so the researcher can contact you for further studies.

Thank You Screen: Thank you so much for your contribution!

APPENDIX B

Informed Consent Form

This study is conducted by Middle East Technical University Industrial Design Department Graduate Studies student Çağın Başkan. This form intends to inform you about this study and ask for your consent.

Aim of the Study

The purpose of this study is to understand how digital hoarding of digital possessions such as photos and videos exist and managed by users in order to create a better experience for them. Your participation in this study will help the researcher understand the users habits and behaviors regarding their own digital archive, and their experience with current solutions regarding managing this archive. Your participation is part of the field research of the MSc study of the researcher Çağın Başkan.

Voluntary Participation

You will be asked to participate in an interview session with your electronic device/ devices that you keep/manage your digital archive. This session may take between 45-60 minutes. Your participation in this study is voluntary, as you can refuse to take part at any time without giving a reason. During the study you may ask questions at any time.

Information to be Collected
During the interview, you will be asked to give a tour through your personal digital archive and be asked to complete some tasks regarding your archive. Then you will be asked a set of questions regarding this personal archive. The interviews will be recorded. The recordings will include your voice, your face, and your computer screen during the interview. Before recording starts and after recording ends, you will be notified.

Your Consent

The researcher and the researcher's supervisor may watch the recordings of your interviews for her research aims. No-one else will see the records. A thesis will be published containing your contributions. The data used in this thesis will remain anonymous, meaning that you will not be identifiable, and your comments and actions will be confidential in this research.

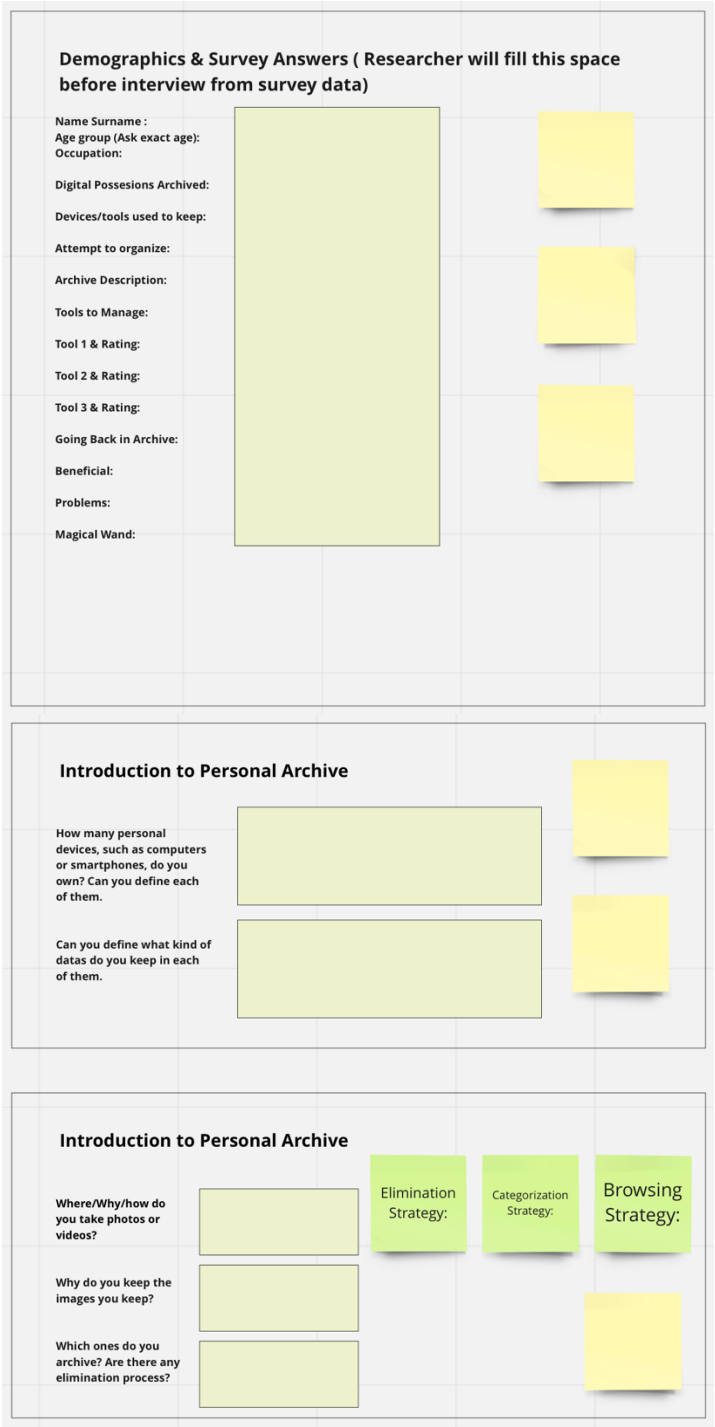
If you have further questions and comments, you can contact researcher through the contact information below;
Çağın Başkan
Phone: +90 542 330 06 36
Adress: İlkadım mahallesi, Dikmen yıldızı sokak, 18/19 Çankaya/ANKARA
E-Mail: baskancagin@gmail.com

I read the consent form and I accept that I voluntarily participate in this study and give consent for my contributions to be used anonymously for research purposes.
(Please hand back the consent form to researcher after you read and sign it.)

Name Surname Date Signature
. ……/……/……

APPENDIX C

MIRO BOARD FOR INTERVIEWS



Losing Data

Have you ever lost any type of digital data? What happened? What did you do? What have you learned from this?

If you would have lost all your datas, which ones you want to save?You can go through your devices, your data and think: what would I want back as a priority and why?

Tools

Which tools do you use to manage your data?

Do you think is there any way the tool you are using is helping with managing data? (Use different boxes for different tools.)

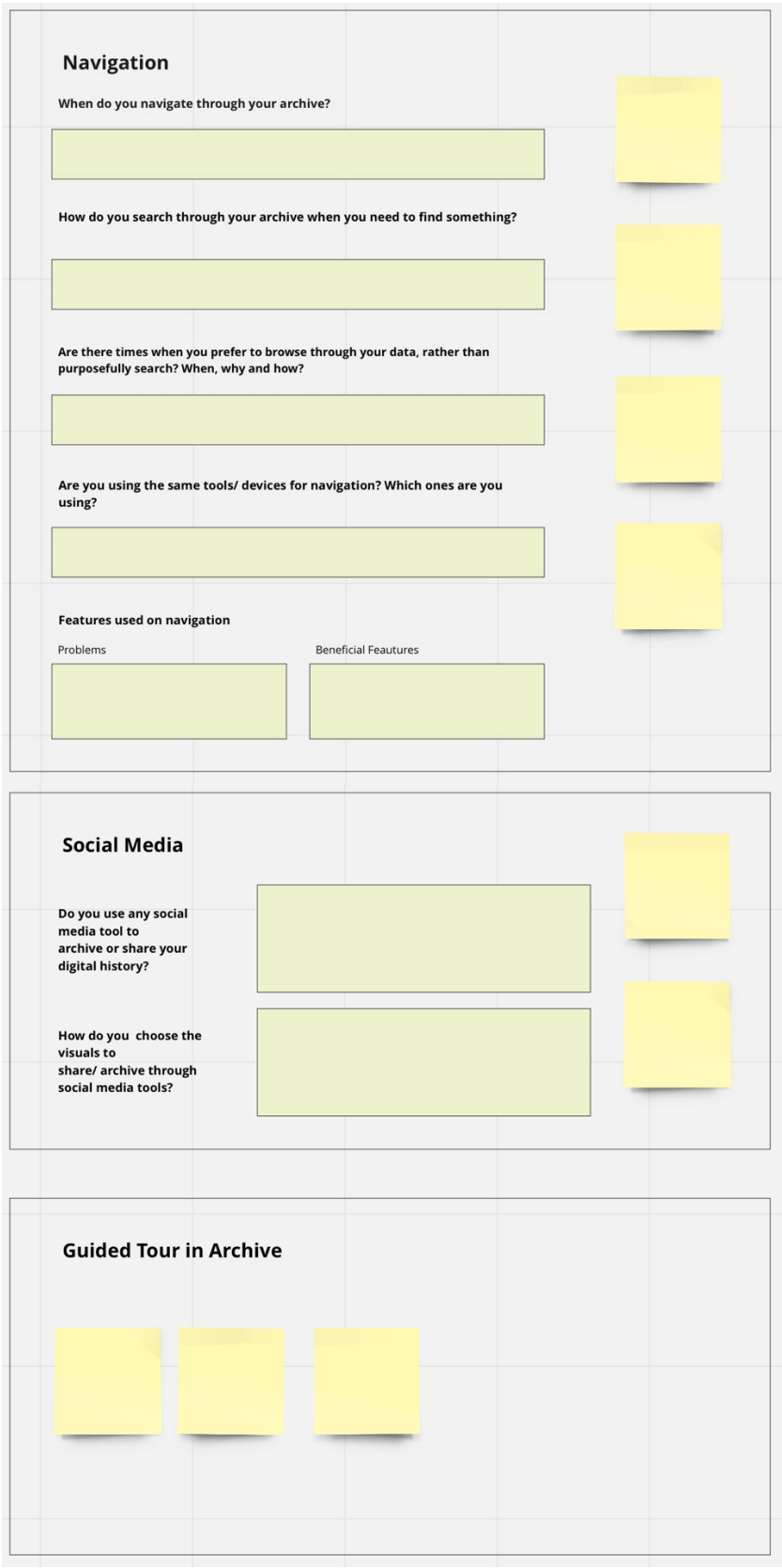
Can you recall any good experience with those tools? Any experience that provoke your feelings?

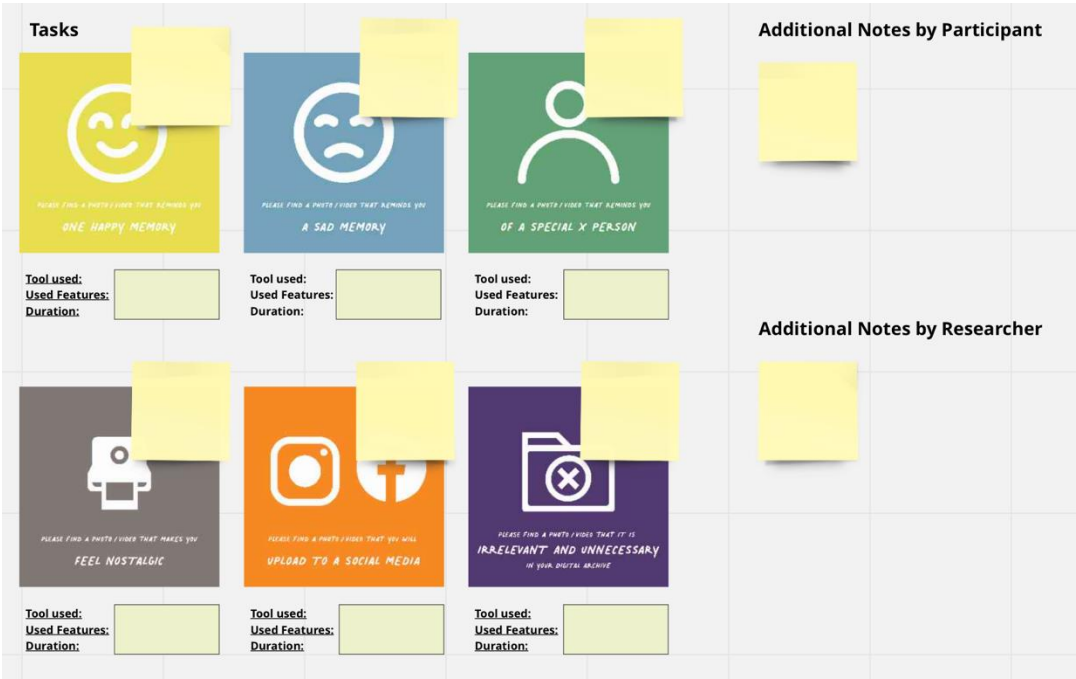
Can you recall any bad experience with those tools? Any experience that provoke your feelings?

Have you ever tried using any other digital tool?

Why did you change it?

Differences


Navigation
When do you navigate through your archive?
How do you search through your archive when you need to find something?
Are there times when you prefer to browse through your data, rather than purposefully search? When, why and how?
Are you using the same tools/ devices for navigation? Which ones are you using?
Features used on navigation
Problems
Beneficial Feautures
Social Media
Do you use any social media tool to archive or share your digital history?
How do you choose the visuals to share/ archive through social media tools?
Guided Tour in Archive


Tasks
PLEASE FIND A PHOTO / VIDEO THAT REMINDS YOU
ONE HAPPY MEMORY
Tool used:
Used Features:
Duration:
PLEASE FIND A PHOTO / VIDEO THAT REMINDS YOU
A SAD MEMORY
Tool used:
Used Features:
Duration:
PLEASE FIND A PHOTO / VIDEO THAT REMINDS YOU
OF A SPECIAL X PERSON
Tool used:
Used Features:
Duration:
PLEASE FIND A PHOTO / VIDEO THAT MAKES YOU
FEEL NOSTALGIC
Tool used:
Used Features:
Duration:
PLEASE FIND A PHOTO / VIDEO THAT YOU WILL
UPLOAD TO A SOCIAL MEDIA
Tool used:
Used Features:
Duration:
PLEASE FIND A PHOTO / VIDEO THAT IT IS
IRRELEVANT AND UNNECESSARY
IN YOUR DIGITAL ARCHIVE
Tool used:
Used Features:
Duration:
Additional Notes by Participant
Additional Notes by Researcher

APPENDIX D

INTERVIEW TRANSCRIPTION EXAMPLE

This is the transcription for Participant 11. "C" stands for researcher while "H" stands for participant.

C: Bilgisayar ve akıllı telefonda dahil, tabletler, harddiskler, usbler dahil kaç tane cihaza sahipsin arşivini tutmak için? ve bu cihazlarda ayrı ayrı ne tür bilgileri ve görselleri tuttuğunu detaylandırır mısın?

H: Tabii. Cep telefonumu üç farklı şekilde kullanıyorum diyebilirim. Birinci olarak, 16 GB boyutunda kendi dahili hafızası var. Onu daha gündelik şeylerim için kullanıyorum. İkinci olarak, içinde bir tane SD kartım var. Onun içinde daha büyük boyutlu dosyaları tutuyorum. Çünkü fotoğrafları ve videoları genelde yüksek çözünürlükte çekmeyi ve saklamayı seviyorum. Bu SD kart 64 GB boyutunda. Bir de son olarak, telefonun içinde bir tane ikinci alanım var. Ona farklı bir şifreyle giriliyor, orası da daha kişisel dosyalarımı falan tuttuğum kısım. Onu dışında hep anahtarlığımda taşıdığım muhtelif miktarda USB'ler var.

C: Evet.

H: Yani sırf ev anahtarında üç tane USB var. Bir 8GB boyutunda, iki tane de 16 GB'lık var. Onun dışında çantamda taşıdığım birkaç tane 16 GB'lık var. Cüzdanımda taşıdığım bir tane 32 GB'lık MicroSD var. Gerçekten lazım oluyor.

C: İnanırım. Ama garanticisin yani o da belli.

H: Harddisklerden bahsedicek olursak da, harddiskleri gerektikçe alıyorum. Mesela okulda ek dosya aldığın bir çalışmaya katıldığında hard disk alman gerekiyor zaten. İçinde bulunduğumuz her proje için bir hard disk var. Onları çekmeceye atıyoruz, yapacak bir şey yok. Üç sene sonra başka projede yeniden kullanabiliyoruz. İki sene dokunamıyoruz koruma zorunluluğundan dolayı. Film vs. işleriyle uğraştığım zamanlarda genelde bir tane hard disk alıyorum. Onlar şu anda başka bir arkadaşımda. Beraber iş yaptığımız için harddisklerimin büyük bir kısmı orada. Sundance Festivali'nin destek olduğu bir film çekimi işi oldu, onun için 2 yeni harddisk alındı, "backup"lı çalışılması gerektiği için. Okulun verdiği asıl bilgisayar var, onun harddiski filan da var. Bir tane çok eski bilgisayarım var, lisanstan kalma. Onun içinde bir tane 1TB'lık bir tane de 250 GB'lık SSD var. O bilgisayarı artık kullanmıyorum ama onlar storage olarak duruyor. Bir de evde tamamen bana ait olmayan ama benim de aktif olarak her şeye erişebildiğim bir storage sistemi var. Artı üç ya da dört tane Google Drive'ım var.

C: Üç dört mü?

H: Yani üç dört farklı mail üzerinden farklı hesapla açtığım Google Drive'larım var. Okulun mailiyle aldığım hesap Google Drive'da sınırsız depolama veriyor. Bu çok büyük bir avantaj. Baya bir şeyi orada tutuyorum. Özellikle projelerle ilgili olan dosyaları, videoları vs. orada tutuyorum. Başka ufak tefek cihazlarım daha da var ama onları kişisel verilerimi depolamak için değil de böyle daha önemsiz şeyleri geçiçi olarak tutuyorum, aktarım için filan kullanıyorum. Dropbox'ları Mega Arşivleri filan saymıyorum daha.

C: Onları ileride çok daha detaylı olarak soracağım. Bu anlattığın cihazlarda, kişisel görsel arşivin, yani günlük hayatınla,sosyal yaşamınla ilgili olanları nerede saklıyorsun? Onu yakalayamadım tam.

H: Genelde kendi fotoğraflarımı telefonumda ya da USB'lerimde saklamayı tercih ediyorum. Telefonun da bir limiti olduğu için, çok dolduğu durumlarda bilgisayarlarıma ya da Google Drive'a aktarıyorum. Kendim elemeden geçiriyorum önce, sonra aktarıyorum.

C: Tamam, eleme süreciyle de ilgili biraz sonra detaylı sorular soracağım. Ama önce, kişisel arşivinde olan bu fotoğrafları ne zaman, nasıl ve neden çekiyorsun?

H: Çok sebep olabilir. Yani genelde günlük hayatta çektiğim fotoğraflar vesaire oluyor. Geziye gittiğimde, lab'da bir etkinlik yaptığımızda, doğum günü falan türü durumlarda çektiğim görseller. Zaten benim çok kendi fotoğrafım yoktur, genelde ortamların ya da durumların fotoğrafını çektiğim için daha çok o tarz fotoğraf ve videolar vardır arşivimde. (Bir süre düşünür) Başka… Bir tane start-up'ta yarı zamanlı çalışıyorum. Onların da arşivinde biriksin diye, spor etkinliklerinde filan bazen fotoğraf ve video çekiyorum. Stok fotoğraflara para vereceğimize, kendimiz biriktirelim, güzel görseller olsun, illa ki kullanılır diye. Websitesinin giriş sayfasında bir "place-holder" var, onu değiştiririz diye düşünerek çektiğim fotoğraflar çok oluyor. Bir de çok nadiren de diğer çalıştığım yerin sosyal medyasında kullanmak için görsel çekiyorum, çalışma arkadaşlarım çok ısrar ettiği için.

C: Bu fotoğraf ve videoların hepsini telefonla mı çekiyorsun?

H: Şöyle, kendi kişisel görsellerimi hep telefonla çekiyorum. O konuda telefondan memnun sayılırım. Daha profesyonel işlerde, mesela bahsettiğim sosyal medya için, iş yerine ait canon bir kamera var, onunla çekim yaptığım oluyor.

C: Anladım. O kamerayla sen kendi kişisel fotoğraflarını çekmiyorsun.

H: Yok aynen, sadece iş için.

C: Tamam. Peki mesela o kamerayla çektiğin fotoğrafları da kendi arşivine alıyor musun yoksa iş yerinin arşivinde mi bırakıyorsun?

H: Bilgisayara aktarırken, işime yarabileceğimi düşündüklerimi, mesela komik olanlar ya da güzel olanları ayrı bir dosyaya atıyorum. Zaten bütün görseller asıl iş yeri klasöründe, Google Drive'da, herkesin erişebileceği şekilde duruyor. Diğer

start-up'da da aynı durum söz konusu. Bütün görseller Google Drive'da biriktiriliyor.

C: Anladım. O iş yerine ait arşivlere aktarıyorsun am beğendiğin, işine yarayacağını düşündüklerini de alıyorsun kendi arşivine .

H: Aynen, işime yarayacakların bir kopyasını mutlaka kendi arşivimde de tutuyorum diyelim.

C: Tamam. Peki kendi kişisel arşivinde sakladığın diğer fotoğraf ve videoları neden tutuyorsun? Sebebi ne oluyor?

H: Eğer ileride "haha böyle bir şey olmuştu" diye bir komikliği ya da bir anısı olmayacaksa çok tutmuyorum genelde. Ben muhabbetlerde eski anılardan bahsedilince o anıyla ilgili görselleri paylaşmayı seviyorum. Mesela üniversite whatsapp grubumda kullanabileceğim, "o fotoğraf ya da video şimdi gelse çok komik olurdu", "ileride bu hatırlansa güzel olur" diyebileceğim şeyleri tutuyorum daha çok.

C: Gerekli yerlerde kullanılabileceklerini yani, evet.

H: Onun dışında, mesela kar yağdı onun fotoğrafını çektim, bu tarz görsellerin bence çok bir anlamı yok. Evet çok güzel görüntü var ama 2020 yılında da uzun süreden sonra kar yağmıştı falan diye saklamak çok benlik değil. Daha çok içinde insan olan, etkileşim olan, olay olan görselleri tutuyorum.

C: Tamam, teşekkür ederim.

H: Mesela üniversite bir arkadaşımın çok komik bir düşüş videosu var, asla kaybetmem. Bir arkadaşımızın çiçeğine kedi işemişti, onun fotoğrafları, asla kaybetmem.

C: Peki mesela gezdiğin, yurt dışına çıktığın vs. fotoğrafları da mı saklamıyorsun?

H: Saklıyorum ama zaten çok çekmiyorum öyle zamanlarda. Mesela İtalya'ya Erasmusa gitmiştim. Orada İtalyayla ilgili neredeyse hiç bi fotoğrafım yok, genelde insanlarla. Mesela oradaki sınıf arkadaşlarımla geziye gitmiştik, Fransa sınırına, Alplere. Orada tüm arkadaşlarım çılgınlar gibi fotoğraf çekilmişti, ben o anı yaşamayı tercih etmiştim. Daha toplu fotoğraflar, insanlarla olanlar daha cazip geliyor.

C: Tamam. Peki, hangilerini arşivlediğden aşağı yukarı bahsettin. Peki elimine etme süreci nasıl oluyor? Direkt hiç mi çekmiyorsun fotoğrafları, yoksa çekip sonradan mı eliyorsun, arşivine atmadan önce? O süreç nasıl işliyor?

H: Anlık çektiğim fotoğraflar da çok olmadığı için, çok ciddi yığın miktarda fotoğraf olmuyor. O yüzden elerken de 'çok bozuk çıkmış mı', 'göze batan bir detay var mı' tarzı şeylere bakıyorum. Bir olayın tek bir fotoğrafı benim için yeterli oluyor, iki üç farklı açıdan çekilmiş fotoğrafları genelde siliyorum. Mesela köpeğimin fotoğrafı bende hiç yoktu. Ve ki 14 yaşında hayvan. Geçen Ankara'ya döndüm, artık çok

yaşlandı, ölüme yaklaştı. O yüzden artık o bir oturup kardeşimden hatırlamak için görseller olsun diye fotoğraflar aldım. Sadece 4-5 tane küçüklüğünden fotoğraf ayırıp, gerisini eledim. Babam çok üzülüyor. O her şeyi tutar arşivinde, ben daha minimal takılıyorum.

C: Tamam, teşekkür ederim. Mesela az fotoğraf çektiğini, daha sonra bozuk olanları sildiğini söyledin. Bu silme işlemini ne zaman gerçekleştiriyorsun? Mesela hemen çektikten sonra mı, aktarırken mi, nasıl işliyor o süreç?

H: Şöyle, her aktarımda bir tur eliyorum. Mesela telefondan bilgisayara aktarırken mutlaka bir eleme yapıyorum. Mesela telefonum şu anda çöplük gibidir diye tahmin ediyorum, çünkü çektikten hemen sonra bunlara çok "reflect" edecek şansım olmuyor. Ama telefonumdan bilgisayara atarken, o partide bir eleniyorlar. Bilgisayarda bazen çok vaktim olmuyor, bunları "sort" edeceğim diye yaratttığım bazı klasörler var, ama asla "sort" edilmemişler filan. Direk klasörün adı "sorting" ve öyle kalmış. "sorting 2" var. Bir tane daha açmaya çalışmışım "Abi 'sorting' diye dosya varmış hemen ikinciyi açıyım." ve o da kalmış. Ama "sort" ederken de bir part daha eliyorum. Hem o olayı hatırlayayım, hem de şurada bir tane daha fotoğrafı vardı onu da eliyim diye bir dönmeye çalışıyorum.

C: Evet. Yani iki aşamalı bir "elimination"dan geçiriyorsun aslında.

H: Evet, hatta isim veriyorum diye hatırlıyorum ama röportaja girmeden eski bilgisayarı açıp bir baktım, "New folder 2" "New folder 3" falan diye birkaç tane "New folder" var direkt.

C: Niyetlensen de her zaman yapamıyorsun demek ki.

H: Mesela bir tanesine girip baktım, eski telefonum öldüğünde, çok acil bir şekilde dosyaları aktarmam gerekmişti. Oradaki fotoğrafların bir kısmını okulla alakalı,arkadaş grupları falan diye ayırmışım. Ama büyük bir bir kısmına girememişim ve "New folder 3"te duruyor öyle.

C: Bir gün ayıklanmayı bekliyor orada bir yerde.

H: Bir diğerinde de üniversite ikinci sınıfta bir geziden kalma fotoğraflar var mesela. Normalde onları o okul senesinin dosyasına atmam gerekir. "Fabrika Gezisi" diye, o senenin altına dosya açarım normalde. Ama o fabrika gezisinin tüm fotoğraflar tek bir dosyada "sort" edilmemiş şekilde duruyor.

C: Anladığım kadarıyla arşivinin bir kısmı çok düzenli, bir de düzenlenmeyi bekleyen karışık bir kısım var herhalde.

H: Evet. Bir Araf'ta kalmışlar var, bir de oturmuşlar var artık.

C: Peki o zaman bu düzenli kısmında özellikle, kategorize etme stratejin nedir? Neye göre kategorize ediyorsun?

H: Başlangıç olarak en iyisi tarih oluyor. Özellikle fotoğraf gibi görsel içeriklerde, tarihe göre, tarihin altında da konuya göre klasörlüyorum. En sağlıklı bu şekilde

oluyor. Çünkü böyle olunca bulmam gerektiğinde, ‘bu olay ikinci sınıfta olmuştu, o da 2014-2015 senesi’ diyerek ulaşabiliyorum aradığım görsele.

C: Anladım. Arşivinde geri dönüp bakmak için kullandığın stratejin bu şekilde mi?

H: Okul ödevlerinde de kullandığım bir taktik vardı, onu da söyleyeyim. Windows File Explorer’ın tag ekleme özelliği var. Paftalarda kullanmak için indirdiğim görselleri tagliyordum. Daha sonra aramadan direk o tag ile arayabiliyordum. Bunları konsept fikirler için kullanmıştım, bunlar ön jüri görselleri vs. diyerek tag ekleyip ayırarak saklıyordum. Yani dosyalara yine ayırıyordum, ama dosyanın içinde tag ile arama yapmak için görselleri tagliyordum.

C: Anladım, zaten bir klasöre toplamış oluyorsun. Ben okulda indirdiğim dosyaları hep indirilenler klasöründe bıraktığım için, 4 senelik birikmiş indirilenler klasörü geldi gözümün önüne.

H: Yok, indirilenler klasörüme, özellikle okulun verdiği bilgisayardaki indirilenler klasörüme, çok iyi baktığımı söyleyemeyeceğim. Baya doluyor arada. Kişisel fotoğraflar da filan, bahsettiğim tarih taktiği çok işe yarıyor ama doktoraya başladığımda farklı bir problemle karşılaştım. Proje dosyalarında senelere bölmek, proje bir seneden uzun süren bir süreçse biraz sıkıntı oluyor. O zaman, daha farklı çözümlere gitmek gerekiyor. Mesela uzaktan eğitim için ‘uzaktan saçmalık’ diye bir klasör açtım, içinde 104 dersi 1. ödev, 2. ödev filan diye gidiyor. Duruma göre birimlendirme değişebiliyor.

C: Anladım. Teşekkür ederim. Şimdiye kadar hiç görsel verilerini kaybettiğin oldu mu?

H: Bir kere oldu. Daha doğrusu iki kere oldu. Bir tanesi, eski telefonum öldüğünde oldu. O zamanlar telefonu çok yedeklemiyordum. Senede bir filan yedekliyordum. Orada bir miktar kaybettim. Şimdi daha sık yedeklemeye çalışıyorum, en azından dört beş ayda bir. Ve telefona daha iyi bakıyorum. Bu arada çok fazla USB’m çalındı, onları saymıyorum. Ama o usblerde kritik dosya tutmuyordum asla. O yüzden üzülmüyordum. Ama lisansta printer’a giderken kaç USB kaybetmişimdir haddi hesabı yok. Bir de, ilk depolama yapmaya başladığım zamanlara aldığım bir hard disk vardı. Bu MicroUSB’yle çalışanlardan. Zamanında çılgın parayla 1TB almıştım. O zaman çok pahalıydı. Bir kaç kere düşüp hasar gördü, dosya bozuldu direk. O zaman da biraz veri kaybetmiştim. O kadar.

C: Peki bu anlattığın iki olayda ne yaptın? Kurtarmak için belli bir çaba gösterdin mi? Ve ne öğrendin bunlardan?

H: Harddisk olayında çılgınlar gibi dosya kurtarma programları Torrent’lemiştim. Çünkü çok pahalılardı. Yani, acayip pahalılardı. Kalitelileri özellikle birkaç yüz dolardan başlıyordu o zamanlar. Ama tabi o kadar kalitelilerdi ki, neredeyse bilgisayarı ben satın almadan önce mağazada yüklenmiş fotoğrafı çıkarıyordu içinden, o kadar sağlam şeyler vardı. Telefon olayını yaşayalı zaten üç sene falan oldu. Doctor Phone diye bir program vardı. Onunla telefondaki tüm dataları bilgisayara kopyalayıp, onun içinden kurtarabildiklerimi kurtarmıştım.

C: İki durumda da kurtardın verilerini yani aslında.

H: Telefonda çok büyük bir kısmını kurtardım. Hard disk konusunda çok çok kurtaramamıştım çünkü orada üstüne yazınca falan hepsi gidiyor ya. Üstüne bir seri veri gidiyor.

C: Evet hard disk gidince gidiyor. Çok kötü bir şey, ben de kaybettim birkaç kere.

H: Hatta bir kere bir arkadaşımın bir projeyle ilgili USB'sini kurtarmaya çalışmıştık. Bir kaç tane Word dosyası bulmuştuk mesela, isimleri vs. çıkıyor ama içleri bozulmuş. O da ayrı bir hüsran oluyor. Sana bir liste gösteriyor 'bunları kurtardım' diye, tam kurtardım sanıyorsun, ama dosyanın içine giriyorsun ancak yarısı kurtarılmış falan.

C: Peki bu yaşadığın iki olaydan ne öğrendin? Telefonla yaşadığın olaydan sonra daha çok yedeklemeye yapmaya başladığını söyledin, başka sana öğrettiği bir şey oldu mu bu kayıpların?

H: Online "back-up"a güvenmeyi öğrendim. Yani Google Drive'ların falan güzelliğine güvenmeyi öğrendim. Onun dışında bir de, kritik dosyaların birkaç kopyasını tutmaya başladım. En başta bahsettiğim Ankarada ailemin evinde olan sistem, "Raid Sistemi"yle çalışıyor. Yani iki hard disk var. İki harddiskte de aynı dosyaların kopyası var. Sürekli birbirlerinden "check" ettikleri bir yazılımsal sistemler var.

C: Anladım. Peki bütün datalarını kaybedecek olsaydın hangilerini kurtarmak isterdin? Yani senin için en önemli olanlar hangisi? Bunu da kişisel fotoğraf arşivinden diye düşünebilirsin.

H: Çok fazla internetten yüklediğim görsellerin olduğu büyük bir arşiv var. Bulunsun, ihtiyacım olabilir diye düşünerek oluşturduğum. Mesela Facebook'tan filan indirdiğim fotoğraflar var o arşivde. Onları zamanla bir şekilde yeniden yaratabilirim. Zaten onlar çok mühimde olmaz. En büyük sıkıntı kendi çektiğim ve çok paylaşmadığım fotoğraflar da olurdu. Onları net kurtarmak isterdim. Çünkü tamam olayı hatırlıyor olabilirsin, ama bir an geldiğinde "a bak seninle şöyle bir şey yaşamıştık" diye bir kişiye attığında, onun o kişide yarattığı etki çok farklı, onu yapamazsam boynu bükük kalırım.

C: Evet yerine koyabilcek çok bir şey yok maalesef.

H: Bir fotoğrafçı olarak bu acıyı çok çektiğine eminim.

C: Defalarca maalesef, kaç kere harddiskim bozuldu. Geçen sene bilgisayarım düştü komple hard diski yandı, bilgisayarcı ile kurtaracağız diye öldük gerçekten. Neyseki çoğunu kurtardı da. Bir de benim arşivi dijitalde depolamak için server filan kurmam lazım, en az 10TB boyutunda bir arşivim var şu an, Drive'la vs idare edebilecek bir boyutta değil.

H: Çok sıkıntı ya. Aslında internetin çok iyi olsa Drive çok güzel bir şey. Mesela ben normalde okulun interneti çok daha hızlı olduğu için, oradaki bilgisayarımda açık

bırakıyorum yüklemeyi, haftasonu o yüklensin diye. Pandemide artık o şansım da yok. Neyse ki pandemide çok bu tür içerik de üretemiyorum o kadar rahat. Ama tabi Drive'da da "Şöyle bir şey vardı a şu sene miydi?" falan diye girdiğinde, aradığın görseli bulmak, onu indirmeye çalışmak bazen daha büyük bir işkence oluyor.

C: Evet. Drive'ın ara yüzü o açıdan biraz sıkıntılı bence de.

H: Muhtemelen ilerideki soruları önceden cevaplıyor olacağım ama, Google Drive ilk çıktığında, Google'ın dosya limitini aşmamak için bir trick'im vardı, fotoğrafları çünkü Drive'ın saklama kapasitesinden düşüyordu. Bir tane Google Docs dokümanı açıyordum. Ve fotoğrafları içine atıyordum. Docs dokümanlarının boyutunu, Google'ın sistemlerinden saydığı için, Drive'ın saklama kapasitesinden düşmüyordu.

C: Şaka yapıyorsun.

H: Tabi canım. Mesela annem takı yapıyordu, annemin takıları için fotoğraflardan broşür yapacaklardı. Zaten zorlanıyordu bu konularda, bir tane Sheets Sheets dokümanı açıp bütün fotoğrafları içine yüklemiştim. Sanırım geçen sene düzelttiler bu açığı.

C: Google bu bug'ı düzelttikten sonra annenin takılarına ne oldu mesela? Eskiden yapılan dokümanlara bir zarar geldi mi o sırada?

H: Yok zarar gelmedi. Düzelttiklerinde önce 'Limitin doldu, daha fazla dosya yükleyemezsin diye uyarı veriyor Google. Yeni bir dosya yükleyemiyorsun, ama var olanları indirebiliyorsun. Hatta Gmail'in şöyle bir şerefsizliği var diyeyim, dolduğu zaman mail almayı bırakıyor.

C: Evet, bana da yapıyor onu bazen.

H: Bu arada şimdi baktım da, mesela anneme aralık ayında ankara'da yaptığımız döküman duruyor. 0 bayt olarak görünüyor ama aslında baya büyük boyutlu görseller var içinde… Yani ilk dosyayı açtığında bile yavaş yükleniyor fotoğraflar.

C: Düzeltememişler hala o zaman?

H: Onu çok umursamıyorlar sanırım. Ama şöyle bir değişiklik var, artık sheets'in içine fotoğraf atmak için sanırım önce Drive'a yüklemen gerekebiliyor.

C: "Keep" diye bir tool var bir de. İndirirken falan da onun üzerinden indirebiliyorsun.

H: Direk bilgisayardan sürükle bırak yaptığında ona takılıyor. İkinci bir trickte, bilgisayarında bir excel dosyası yapıyorsun. 1GB oldu diyelim. Onu Sheets'te açıp, sheets olarak kaydediyorsun. Diğer türlü çünkü sürükle bırak yapmanın önünü kestiler, Drive'a bir şekilde linkleyerek ekleyip, boyutundan düşüyorlar.

C: Anladım. Kırk yıl düşünsem aklıma gelmezdi gerçekten.

H: Modern sorunlar modern çözümler gerektirir. Fotoğraf videoyu dışında, doküman,kitap vesaire için de bedava hesapları kullanıyorum. Bazı dosya depolama şirketleri ilk açıldıklarına "free account" veriyorlar birkaç yüz GB'lık. Onlardan çok vardı bir ara bende. Hepsine dağıtıyordum. Çünkü çok da önemli değil, sırf arşivi olsun diye. Mesela havacılık tarihi üzerine kitaplar filan depoluyordum. Hayatta açmayacağım çok net bir şekilde belli. Ama hani bir gün gerekirse, nerede olduğunu bildiğim 50GB bir tane Mega klasörü var öyle.

C: Çok mantıklı. Ama mesela Dropbox, belki hatırlıyorsundur, bir ara "metumail" uzantılara 200Gb falan alan verdi, sonra onu geri aldı.

H: Benim de Dropbox'ım şu anda öyle. Yaklaşık 30GB veri var içinde, ama limiti 10GB gibi bir şeye düşürmüş.

C: Evet, 2 GB.

H: Dropbox'tan hiçbir şeyi şey yapamıyorum. Ve her dört ayda bir de girmem gerekiyor ki silinmesin. Bir de o var. Mesela eskiden Google Drive'da sınırsız girmeme hakkın vardı. Ama son 5 yılda hepsi bazı kuralları getirdi. Eğer belli bir boyutun üstünde, 'oversize' bir Gmail'in ya da Google Drive'ın varsa ve son 3 ayda ya da 6 ayda girmediysen, siliyorlar. Yani aktif değilseniz sileceğiz diyorlar.

C: Anladım. Devam Ediyorum. Peki o zaman bu bahsettiğimiz dijital araçlardan hangilerini kullanıyorsun?

H: Çok net bir şekilde en çok Drive'ı kullanıyorum şu an. Dropbox'ı bazen kullanmam gerekiyor, bundan hiç memnun olmasam da. Mesela bir proje var, Dropbox'tan başlatmışlar, eskileri kimse Drive'a taşımadığı için Dropbox'tan devam ediyor. Onun dışında, bilgisayarın kendi içindeki Windows Explorer kullanıyorum. Kendi kişisel işlerim için bunları kullanıyorum.

C: Telefonun ara yüzünü kullanmıyor musun?

H: Telefonda iki tane ara yüz var. Benimki Xiaomi zaten, Xiaomi'nin kendinden gelen File Explorer'ı var, File Manager'miş adı. Bir de, benim fotoğraflar için indirdiğim Gallery diye ekstra bir uygulama var. Adamın biri olabildiğince "low" bir uygulama yazmış. Hem klasöre göre, hem de tarihe göre vs. sınıflandırabiliyorsun. Favori yıldızlama gibi seçenekleri var. Çok hızlı çalıştığı için seviyorum. Mesela Whatsapp fotoğraflarım 14.507 tane diyor. Normalde telefonda rastgele "scroll" ettiğimde bir yerde durdurduğumda, iki saat sürüyor preview yüklemesi. Ama bu uygulamada "preview"lar çok hızlı çalışıyor.

C: Telefonda "preview"ları yavaş yüklemesinin sebebi Cloud'dan çekmesi mi yoksa kendi hafızasındakileri de mi yavaş gösteriyor?

H: Yok hepsi hafıza da aslında ama, telefonun işlem gücü vs. yetmediği için saçmalıyor. Yüklenene kadar çok uzun bir süre gri kutucuk olarak görüyorsun fotoğrafları.

C: Anladım, teşekkür ederim. Bu bahsettiğin araçlar arşivini yönetirken sana nasıl yardımcı oluyor? Mesela 'gallery' uygulaması için ön gösterimleri hızlı açmasından bahsettin. Başka aklına gelen var mı?

H: Çok basit bir "sorting" mekanizması var. İsme, dosya lokasyonuna, boyutuna, en son modifikasyon tarihine, ne zaman çekildiğine göre artan azalan şekilde sort edebiliyorsun. Bir de random seçeneğini getirmişler. Filtreleme de yapabiliyorsun dosya uzantısına göre. Fotoğraf mı, gif mi, animated gif mi, dosya uzantısına göre filtreliyorsun. Hatta ön kameradan mı arka kameradan mı çekilmiş ayrımı da var. "Hidden folder" vesaire yaratabiliyorsun istersen. Bir de fotoğrafları ve videoları liste olarak mı, "image grid" olarak mı görmek istiyorsun, "grid"leri kaça kaçlık görmek istiyorsun hep ayarlayabiliyorsun. Mesela bir grup arıyorsan, ya da çok spesifik bir şey arıyorsan baya bir "zoom out" yapabiliyorsun. Uzak bakıştan anlayabiliyorsam baya "zoom out" yapıyorum, mesela bir sırada sekiz tane fotoğraf var şu anda. Daha detaylı görmek istiyorsan "pinch" hareketiyle yakınlaştırıp detayları görebiliyorum. Özellikle o bilgisayardaki ön gösterim boyutu, büyük göster ya da küçük göster, çok işe yarıyor.

C: Tamam, Drive'da ve ya Windows Explorer'da var mı aklına gelen sana yardımcı olan özellikler?

H: Drive'da eğer birisiyle dosya paylaşabilmek çok güzel. Mesela beraber bir geziye gitmişsin arkadaşlarında, ortak klasör yapıyorsun, herkes yüklüyor, o fotoğrafın ya da videonun kimden geldiğine göre arayabiliyorsun. "From: Birileri"ni yazdığın anda o kişiden gelenleri gösteriyor. Ya da tarihini filan arayabiliyorsun, öyle spesifik şeylerle arama yapmayı çok seviyorum ben. "Date:" ya da şu "keyword"leri içersin falan gibi aramalar yapıyorum. O çok faydalı.

C: Bu "keyword" dediklerin dosya isminde geçen "keyword" mü, yoksa algoritma fotoğrafın içindeki yazıyı arayabiliyor, öyle bir şey mi?

H: Yok isimdeki "keyword".

C: Tamam.

H: Onun dışında, zaten klasik "sort" etme mekanizmaları var, yine onları kullanıyorum. Mesela "priority" seçenekleri var Drive'ın. Güncel projeleri önceliklendirip, aşağı topluyor, onu kullanıyorum. Drive çünkü Windows Explorer'a baya benziyor. Zaten Windows Explorer'da da neredeyse bunların aynılarını kullanıyorum.

C: Bir de Windows'u soracağım. Windows'ta da mı benzer şeyler diyeceksin?

H: Windows'ta paylaşımlı klasörler, kimden geldi özelliği vs. olamadığı için klasör isimlerinden böyle alt başlıklara giderek kullanıyorum. "Tag" olayını şu an aktif kullanmıyorum, eskiden kullanıyordum. Direkt dosyaya sağ tıklayıp,detaylar kısmına girdiğinde orada "tags" diye bir yer var. Oradan "tag" ekleyebiliyorsun, onu kullanıyordum. Onun dışında yine klasik: listeye göre "sort" et, tarihe göre ayır falan seçenekleri var, onları kullanıyorum.

C: Tamam, teşekkür ederim. Bu bahsettiğin araçlarla hatırlayabildiğin iyi bir deneyimin var mı, özellikle verebileceğin bir örnek?

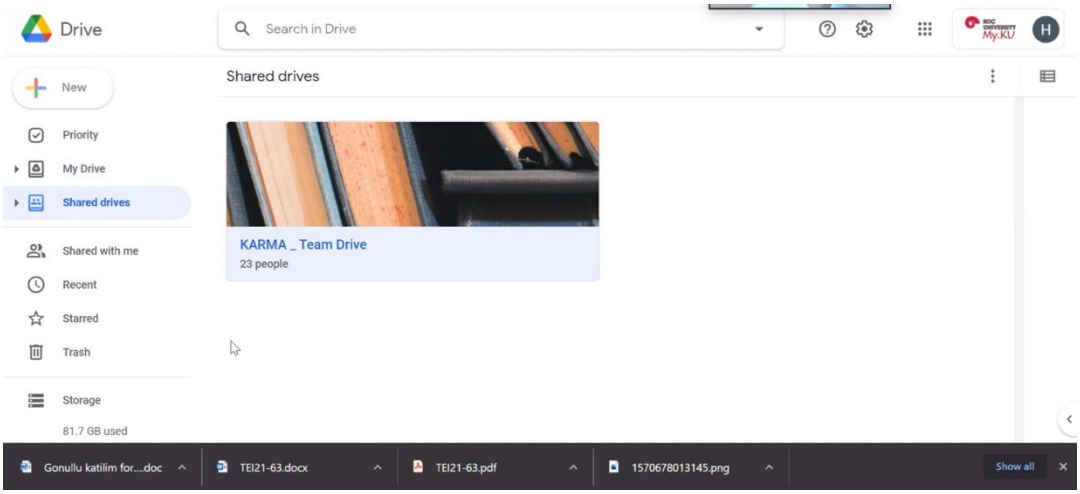
H: Özellikle Drive'da bu kimden geldiğini gösterme özelliği aşırı mükemmel çalışıyor, hayat kurtarıyor. Mesela kendi Drive'larımı birbirine bağlıyorum. Okul Drive'ımın alanı sınırsız, esas aktif olarak kullandığım eski mailimle olan hesabım var, bir de bir kaç tane başka dersler için açtığım maillerle hesaplarım var. Onları kiminle paylaşmışım, başka hangi insan "collabrative" diye arayabiliyorum. Geçen yaz arkadaşlarla Kaş Caz Festivali'ne gitmiştik. Oradan fotoğraf bulmam gerektiğinde, ağustosta mıydı temmuzda mıydı diye hatırlamakla hiç uğraşmayıp, direk Pelin vardı, yazdı, onların hepsinden ortak faydalanma çok iyi çalışıyor. Baya Venn diyagramı gibi kullanıyorsun aslında.

C: Kesişimleri bulup yani. Çok ilginç. Ortak hesapları bağlıyorum dedin. Onda da mesela bir Drive'ındakini diğer hesabınla da paylaşıyorsun. Sınırsız olanın alanını kullanıyor ama sen diğer Drive'dan da kullanabiliyorsun. Bu gerçek bir "life hack"tir. Koşarak gidip ben de yapacağım. Çok iyiymiş.

H: Bir de sadece kurumsal hesaplarda var sanırım, direkt tüm Drive'ı paylaşabiliyorsun.

C: Öyle mi?

H: Ekran yansıtıp göstereyim. Bak şurada 'shared drives' çıkıyor ve içinde kaç kişinin olduğunu görebiliyorsun.



C: Çok iyiymiş gerçekten. Peki diğer bahsettiğin araçlarda var mı hatırladığın iyi deneyimin?

H: Özellikle bu telefondaki galeri uygulamasında, bana telefondakileri göster, sd karttakileri göster seçeneği sunuyor. Normalde telefonda bunu yapamıyorsun. Bu olay çok güzel. Bir de geri dönüşüm kutusu özelliği var o da iyi. Bir de, normalde telefon klasörleri içinde no show diye bir dosya açtığın zaman, bu dosya içinde hiçbir şeyi göstermiyor sana. Jpegde olsa galeride görünür hale gelmiyor. Bu uygulamada

bunları aç kapa yapabiliyorum, bu tür özellikleri görmek istiyor muyum, istemiyor muyum. Bir de telefonumda fotoğraf olmayan ama fotoğraf bazında çalışan çok döküman var. Mesela çizgi roman sevdiğim için bi kaç bin sayfalık çizgi roman var. Onlarında her biri taranmış birer sayfa aslında. Yani normalde olsa fotoğraflar arasında geri giderken, o çizgi romanın yeni sayısı çıktığı hafta bi anda arada 1000 fotoğraflık eklenti olacak. Kendi içinde zaten hidden klasör özelliğini uyguluyor, galeride bazı şeyleri saklıyor, açmak istiyorsan geri açıyorsun filan.

C: Peki herhangi bir kötü deneyim geliyor mu aklına?

H: Drive versiyon tutması açısından çok iyi. Fotoğraf videoda atınca 'üstüne atıcam,bak aynısı var, yazıyim mi üstüne?' diye soruyor, 'evet ama diğerini de tut' diyebiliyorsun, tek dosya gibi gözüküp eski versiyonlarına ulaşabiliyorsun. Galeri uygulamasındaki sıkıntı ise, bilgisayarda mesela yer kaplamasın diye ön izlemeleri filan silerim çok sık, bunda öyle bir seçenek yok. Yeni fotoğraf çektiğinde hemen düşmüyor, refresh etmen gerekiyor. Acil bir işin varsa biraz tatsız olabiliyor ama ağır hayat kalitesi düşürücü bir sıkıntı değil.

C: Daha önce başka bir araç deneyip değiştirdiğin oldu mu hiç? Neden değiştirdin? Farkları neydi şu an kullandıklarından.

H: İlk data işlerine ilgi duymaya başladığımda bazı programların bedava sürümlerini deniyordum. Ara yüzleri customize edebildiğin, winamp zamanları, çok özelliği olmayan programlar. Sanayi devlerinin kullandığı programlar ama adamlar paralı diye güvenip almışlar. İşte onların bedava sürümlerini filan deniyordum. Ama benim çok niche bir ihtiyacım olmadığı için, arayüzü filanda çok olmadığı için tutunamıyolardı. Mesela fotoğraflar için metadataları görüp hangi kamerayla çekildiğine göre ayırabiliyordum. Biyolog bi abi önermişti, onlar tabii 10 tane fotokapan kuruyorlar, hangi cihazdan çekildiğini anlamak için görüntünün kullanıyorlardı. Ama bana gerek yoktu yani o yüzden değiştirmiştim.

C: Anladım, Teşekkür ederim. Ne zamanlar arşivinde geriye dönüp bakıyorsun?

H: O konuda çok amaç odaklı bir insanım ben, gerçekten sadece bir şey bulmam gerektiğinde dönüp bakıyorum. Uzun süredir arşivime girmiyordum, senle röportaj yapıcaz diye bi bakındım biraz toparladım. Ya da bir proje oluyo, sınıf grubunda bir şey yazılıyor 'dur vardı bi yerde bunun fotoğrafı' filan diye düşünürek arşive bakıyorum. Ya da yeniden bi sorting yapmam gerektiğinde, mesela telefonum doldu bi bilgisayara atayım ya da bilgisayarım doldu bi drivea atayım senaryosunda giriyorum. O kadar.

C: Bir şey bulman gerektiğinde nasıl arama yapıyorsun arşivinde?

H: Nerede bulmam gerektiğine bağlı. Yakın dönemden bir fotoğraf video içeriği arıyorsam %99 telefonumda vardır zaten. Scroll edip bakıyorum, buldum bulamadım. Favori klasörüm var bi tane mesela çok sık ulaşmam gereken şeyleri attığım. Zaten orada çok fazla şey yok, maksimum 100 tane filan fotoğraf var. Bir scrollla görüyorsun hepsini. Hatta asıl favoriler klasörümde 17-18 tane var, scrolla bile gerek yok, hepsini görüyorsun. Eğer daha spesifik bir şet bulmam gerekiyorsa,

diyelim ki işte çekilmiş bir fotoğraf gerekli, scrollayıp gözüme takılana kadar aramam gerekiyor. Bundan bi kaç gün önceydi filan gibi referanslı ilerliyorum. Diğer türlü hiç bulamadıysam, çok eski, context bağlamını kuramayacağım bir şeyse, sort ediyorum orada,yapacak birşey yok. Orada genelde tarihe göre sort ediyorum. Drive'da filansa participantlardan filan. Bilgisayarda çok seçeneğin yok ama drive'da hem kişi hem tarih ile venn diagramı gibi arayabiliyorsun. Bilgisayarda bi kere sadece tarihe göre. Gerçi sanırım bilgisayarda da aslında yapabiliyorsun arama bardan, ama biraz daha zor çalışıyor.

C: Arşivinde amaçsızca dolandığın, öylesine geri dönüp baktığın oluyor mu hiç?

H: Yok. 'Arşivimde ne varmış ay bi bakayım' dediğim pek olmamıştır. Benim yaptığım bir şey değil.

C: Navigation içinde aynı toolları mı kullanıyorsun peki?

H: Amaçla baktığım için aşağı yukarı yerini biliyorum. O yüzden o cihazdan spesifik ilerliyorum. Zaten çok önemli birşey ise telefona kesin atmışımdır, o favoriler klasörüme.

C: Arşivinde gezinirken kullandığın özelliklerle yaşadığın problemler ya da faydalı olduğunu düşündüğün özellikler var mı?

H: Çoğu şey üniversiteden filan olduğu için, ve akademik yıl ocaktan ocağa değilde eylülden yaza gibi olduğu için, yılla değil de, bu olay 3. sınıfta olmuştu gibi aramam gerekiyor, öyle hatırlıyorum. Dönem eylülde mi başladı ekimde mi başladı filan gibi, o bi ayla bile uğraşmak gerekiyor. Cihazda çünkü last modified sayısına bakıyor. O uyuşmayınca problem oluyor.

C: Ben ayrıca bir şey merak ettim, bu kadar teknolojiyle yakından ilgiliyken neden cloud kullanmıyorsun?

H: Daha önce bu konuda başıma sıkıntılı bir durum geldiği için. Cloud'u kullanmanın belli güvenlik riskleri var. O seviyede hiç bi datam olmadı neyseki, o ayrı bir sorumluluk ve dert. Ama birisi bir hata yapar, bir şey olur diye korkuyorum. Çünkü mesela tüm okula yanlışlıkla deney sonucu dağıtan filan çok gördüm, sonra al başına belayı. Bizim labda mesela, lab hocamızla aynı isimde ve benzer mailde bir öğrencimiz vardı, ufak bi dikkatsizlikle mailler yanlış kişiye gidebilir filan. Ama usb'yi yanlış kişiye verme ihtimalin yok. Tabi harddiskini filan kaybedersin, çalınır riski olsa da drive'ın o riski yok. O işte trade off.

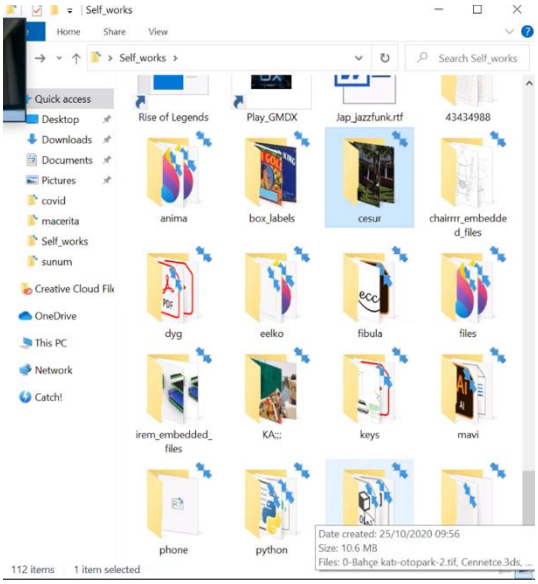
C: Sosyal medya kullanıyor musun herhangi bir şekilde?

H: Whatsappta sadece kendimin kaldığı gruplar var. Mesela Depo 2 gibi değiştirip ismini arşivliyorum. Onları bazen hızlı erişmem gereken şeylere erişmek için kullanıyorum. Mesela işle ilgili şeyler biliyorum ki 'depo 2'de. 'Dump transfer' var mesela, bilgisayardan telefona atmak için kullandığım bir grup. İçinde yine tek varım. Başka facebook vs. kullanmıyorum. Facebookta profil resmim ortaokuldan filan kalmaydı yani. İnstagram'a koymam gereken şeyleri, biraz daha personal blog

tadında paylaşıyorum. Bizi represent edicek persona yaratmamızı istediler bir derste, o dönem paylaştım. Ancak ondan sonra bıraktım yine. Şey güzel oluyor mesela, sete girdiğimizde çıkışta orada paylaşıyorlar, seçme fotoğraflar orada oluyor. O açıdan güzel oluyor ama kendim paylaşımda bulunmuyorum. Çok çok eskiden, tumblrn ilk dönemlerindeyken, biraz daha pinterestimsi kullanıyordum ama sonra bıraktım tabi.

C: Benim sorularım aslında bu kadardı, teşekkür edeerim. Şimdi kişisel arşivinde şöyle bir gezdirmeni rica edicem senden, sonrada bir kaç görsel bulmanı isteyeceğim.

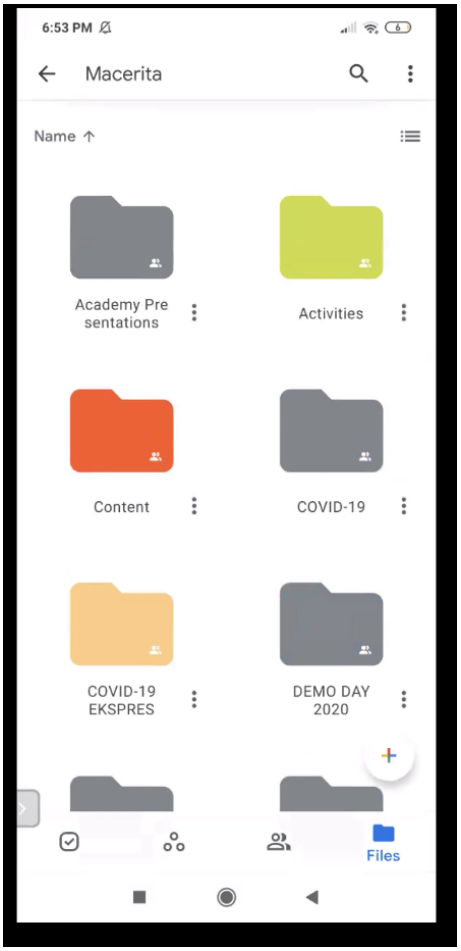
H: (ekran yansıtır) Bu gündelik kullandığım bilgisayar. (Quick access barında dolanır) Mesela 'self works' diye bir klasör var, bütün projelerin vs. olduğu. Mesela 'kaş klasörü' de var fotoğraflar da var. Çünkü bu bilgisayar çok arşiv gibi değilde ara eleman olduğu için klasör klasör gidiyor, hepsi aynı yerde. Pictures da mesela işle alakalı şeyler var, program otomatik olarak oraya atmıyorsa, daha tüm konuyla alakalı fotoğraf ve dosyaların bir arada olacağı bi yerde biriktirip, sonra esas yerine geçirmeyi tercih ediyorum. Drive'ı göstereyim. Bu okul mailim olduğu için burada çok kişisel görseller yok, sadece annemin filan birkaç şeyi var. 'Uzaktan saçmalık' klasörü online eğitim dönemindeki her şey. Bilgisayarda biriktirip hepsini buraya atıyorum. Buradaki klasörde işlerde var, derslerde var, katıldığım online etkinliklerden görsellerde var, herşey var. Benim için uzaktan dönem bu olduğu için her şey var.



C: Telefondan çekip aktardığın bir klasör var mı?

H: Burada galiba, onu paylaşmadım. Onun için telefona girmem lazım,bir dakika. (Telefondan ekran paylaşımı açar). Hah, buradan drive'ı açıyorum. Mesela bu şirket mailimin hesabı. Burada girdiğimde mesela biraz color coding filan da var. Bunun içinde mesela sırf bir tane görsel klasörümüz var. Kendi çektiklerimiz, stock olanlar, kameradan çekilenler, telefondan çekilenler, dronela çekilenler vs. var. Bu şirket mailiydi. Şimdi kendi mailime geçiyorum. Resimler klasörü var burda. Bak hemen

uyarı verdi ‘storage alanı dolmak üzere’ diye. Derslerin kendi klasörleri var, arkadaşlarımın ödevleri görselleri filan var. Sadece fotoğraf değilde, böyle karışık klasörler. Fotoğraf da var tiff’de var filan gibi.



Arkadaşlarımın fotoğrafları da var. Biraz harmanlı bir arşiv. Klasör oluştururken mesela, insanlarla paylaşırken, onlar bakmıycaksa bile kendim ararken kolaylık olsun diye mutlaka onları da ekliyorum içine.

C: Bir de biraz aile arşivinin olduğu internal server’dan bahsedelim mi?

H: Olur tabii. Telefondan göstereyim, çünkü diğer bilgisayara zoom yükleyemedim. Mesela okul projelerimin ve fotoğrafların olduğu bir klasör var. İçinde bir sürü ‘new folder’da var maalesef. Bunlardan birinin içine proje görselleri atmışım. İsimleride render 1, render 2 filan. Mesela bazılarında tag eklemişim. ‘İdeation’ diye tag eklemişim bunlara. Mesela fire fighter ve firefighter diye iki tag var. Ortak tag’i kullanmada hata yapabiliyorsun, bu biraz sıkıntı. Sonra tagleri advanced search’den arayabiliyorum. Bilgisayarımın diskleri de sistem,hobi filan diye ayrılıyor zaten. Ben bu fotoğrafı gördüğüm an mesela, hepsi fabrika gezisinden diye anlayabiliyorum. Bu untitled folder gibi bir şeyin içinde. Muhtemelen telefonumda yer dolmuş. O zaman çok fotoğraf çekin, dökümanda kullanıcaz demişlerdi. Ben de hepsini ayrıştırmadan

atmışım, new folder 3 diye atmışım ve öyle kalmış. Aile fotoğraflarının olduğu server'da, biraz daha babamın düzeni işliyor. Aile fotoğrafları, sonra seneler başlıyor, sonra aylar başlıyor. Ama bazen bir şey oluyor, diyelim ki bandırmaya gitmişiz, bandırma diye bir klasör oluyor. Orası babamın düzeni olduğu için bir kaç kademede ulaşabiliyorsun herhangi bir şeye. Yine bir şey lazım olduğunda gittiği için işe yarıyor, ama öylesine bakılacak bir şey olunca oraya gir ordan çık, yapılacak iş değil. Mesela işte pandemiden dolayı annenanne, babanneyle 'hadi zoom görüşmesi yapalım,bütün fotoğraflarımıza bakalım' dediğinde, yok öyle bir dünya. Çünkü 'biz size hangi senenin yazında, hangi ayda gelmiştik ' filan diye bakmak gerekiyor.

C: Şimdi senden bir kaç görsel bulmanı isteyeceğim. İlk olaraak mutlu bir görsel bulmanı isteyeceğim. Ancak önce bulmak istediğin fotoğraf ya da videoyu bana anlatmanı, daha sonra bulmanı istiyorum.

H: Jazz festivalinde çektiğimiz fotoğrafları bulmak istiyorum desem, yerini biliyorum. 'Self works'un içinde 'kaşş' diye bi klasör var, orada mesela direk festival logosuyla çekildiğimiz fotoğraf, çok net bi şekilde bulabiliyorum. (Quick access bar'dan, self works klasörü, kaşş klasörü, ve biraz scroll ile hemen bulur). Mesela başka bir tane bulacak olsam, yaz sonunda bir sete girmiştik, setin bitişinde mutfakta bir fotoğraf çekmiştik, güzel bir anıydı. Bulmak için iki seçeneğim var. Ya whatsapptan setin grubundan paylaşıldı, grup medyasına tıklayıp bulurum. Ya da tarihi hatırlıyorum, galeriye girip scroll ederek bulabilirim. Yani mutlu bir anı, çok ekstremse belki favorilere atmış olabilirim. Ama çok ekstremse atmışımdır çünkü orada da genelde kağıt,döküman filan oluyor.

C:Tamam teşekkür ederim. Bu seferde, tam tersi, mutsuz bir anıyla bağdaştırdığın bir görsel bulmanı isteyeceğim.

H: Mutsuzsa çekmemişimdir yüksek ihtimal ya. Hüzünlü olacaksa, mesela eski sevgilim filan diyebilirim. Yine telefondan whatsapp görüşmemizdeki medyalara ya da bilgisayardaki şu klasörden beraber yaptığımız şeylere bakarım. Contex hatırladığım için oradan çekmek çok zor olmuyor.

C: Bir de, spesifik bir insanla olan bir görsel bulmanı isteyeceğim.

H: Onur diye bir arkadaşım var, İzmirde bir fabrikaya video çekmeye gittik. Organik imalat tarzı bir yazının altında fotoğraf çekmiştik, onu kamerayla çektim. Orada iki tane var kamera klasörü. Biri telefona kaydettiğim, diğeri sd karta kaydettiğim. Yaklaşık tarihini bildiğim için thumbnaili küçültüp scroll edeceğim. Mesela bu setteyken, demekki yakınlardayım,biraz daha ilerleyip buluyorum.

C: Bir de nostaljik hissettirin bir fotoğraf bulmanı isteyeceğim.

H: İtalya'da erasmusa gittiğimde bir hocamız vardı. onla alkolsüz bira içmiştik, ordan fotoğrafı bulacağım, whatsapp grubuna atmıştık. Olay bir şey olduğu için o favori dosyamda. işte burda.

C: Şimdi son olarak da arşivinde silinebilir, gereksiz olarak nitelendirdiğin bir kaç görsel bulmanı istiyorum. Bunu istersen gezinerek de bulabilirsin.

H: Direk whatsapp'a giderim, galeri dediğinde bi senin telefonundaki standart klasörleri gösteriyor, aşağıya inince atıyorum sadece umuta attığım fotoğraflar gibi şeyleri de gösteriyor. Şu gruptakiler, şuna kişiye attıklarım filan gibi. Onlara girip 'ekonomi haberleri' diye bir grup vardı, onun bütün görsellerini silebilirim. Mesela üniversiteden eski bir arkadaşımla olan konuşmada okul fotoğraflarını filan atmışızdır o yüzden ordan bir şey silmeyi düşünmem. Ama mesela şu an evde 3 kişi kalıyoruz, bir whatsapp grubumuz var. Orada eminim ki kedinin 20-30 fotoğrafını atılmıştır, bunlar hep silinebilir fotoğraflar. Ev grubu daha anlık şeylerin atılabileceği bir yer, oradaki fotoğrafları silebilirim.

APPENDIX E

INTERVIEW TRANSLATION EXAMPLE

This is the translation for Participant 11. "C" stands for researcher while "H" stands for participant.

C: How many devices do you have, including computers and smart phones, tablets, hard drives, usbs to keep your archive? And what kind of information and visuals you keep on them, can you elaborate on this?

H: Of course. I can say that I use my mobile phone in three different ways. Firstly, it has its own internal memory of 16 GB. I use it for my more everyday things. Second, I have one SD card in it. I keep larger files in it. Because I usually like to shoot and save photos and videos in high resolution. This SD card is 64GB in size. And finally, I have a second space inside the phone. It can be accessed with a different password, and that is the part where I keep my personal files and stuff. Apart from that, there are various amounts of USBs that I always carry in my keychain.

C: Yes.

H: So just in my home key chain, there is three USBs attached. I have one 8GB size and two 16GB ones. Apart from that, I have a few 16 GB USB's that I carry in my bag. I have one 32GB MicroSD that I carry in my wallet. It's really needed.

C: I believe. But you're a guarantor, that's obvious.

H: If we talk about hard disks, I buy hard disks as I need them. For example, when you participate in a study in which you receive additional files at school, that means you already need to buy a hard disk. There is a hard drive for every project we are in. We throw them in the drawer, nothing to do. We can use it again in another project after three years. We cannot touch them for two years because of the obligation to protect. I usually buy a hard drive when I'm busy with movie related production work. They are at another friend of mine right now. Most of my hard drives are there because we currently do business together. There was a movie shooting job supported by the Sundance Festival, 2 new hard drives were bought for it, because there was a need to work with backups. There is the actual computer given by the school, it also has a hard drive or something. I have one very old computer, from my bachelor years. It has a 1TB SSD and a 250GB SSD in it. I don't use that computer anymore, but they remain as storage. There is also a storage system at home that does not belong entirely to me, but where I can actively access everything. Plus I have three or four Google Drives.

C: Three or four?

H: In other words, I have Google Drives that I opened with different accounts through three or four different emails. The account I got with the school's email gives unlimited storage in Google Drive. This is a huge advantage. I keep quite a thing there. Especially files, videos, etc. related to projects. I keep them there. I have other small devices, but I keep temporary and less important things in them, they are not for storing my personal data, I use them for transmission and so on. I'm not counting Dropbox or Mega Archives yet.

C: I will ask about them in much more detail later. Where do you keep your personal visual archive, that is, the ones related to your daily life and social life, in these devices you have described? I couldn't quite catch that.

H: I generally prefer to store my own photos on my phone or USBs. Since the phone has a limit, I transfer it to my computers or Google Drive when it gets too full. I eliminate some first, then transfer.

C: Okay, I'll ask more detailed questions about the elimination process a little later. But first, when, how and why do you take these photos that are in your personal archive?

H: There could be a lot of reasons. I mean, there are the photos I take in daily life and so on. Images I took when I went on a trip, when we did an activity in the lab, on birthdays or something. Anyway, I don't have much of my own photos, since I usually take pictures of environments or situations, I have more such photos and videos in my archive. (Thinks for a while) Other than that… I work part-time at one start-up. I sometimes take photos and videos at sporting events so that they can be saved in their archives. Instead of giving money to stock photos, let's save them ourselves, so that we have beautiful images, in case they are used. There is a "place-holder" on the home page of the website, there are many photos I took thinking we could change it. I also very rarely shoot images to use on the social media of my other place of work, because my colleagues insisted.

C: Are you taking all these photos and videos with your phone?

H: Well, I always take my personal images with my phone. I'm pretty happy with my phone. In more professional stuff, for example, for the social media I mentioned, there is a canon camera belonging to the workplace, I sometimes shoot with it.

C: Got it. You don't take personal photos of yourself with that camera.

H: No, just for business.

C: OK. For example, do you take the photos you took with that camera into your own archive or do you leave them in the archive of your workplace?

H: When transferring to the computer, I transfer the ones that I think that can be useful to me, for example the funny ones or the beautiful ones, into a separate file. All the images are already in the main workplace folder, on Google Drive, where

everyone can access them. The same is true for other start-up that I work. All images are stored in Google Drive.

C: Got it. You transfer them to the archives of that workplace, but you also take the ones you like and think will be useful to your own archive.

H: Exactly, let's say I always keep a copy of the things that will be useful for me in my own archive too.

C: OK. So why do you keep other photos and videos that you keep in your personal archive? What's the reason?

H: I usually don't keep them if there won't be something funny or a memory saying "haha something like this happened" in the future. When old memories are mentioned in conversations, I like to share images about that memory. For example, I mostly keep things that I can use in my university whatsapp group, that I can say "it would be very funny if that photo or video were sent now", "it would be nice to remember this in the future".

C: The ones that can be used where necessary, yes.

H: Other than that, for example, it snowed, I took a picture of it, I think that such images do not make much sense. Yes, there is a beautiful image, but keeping it thinking 'it snowed in 2020 after a long time' doesn't sound like me. I mostly hold images that contain people, interactions and events.

C: OK, thank you.

H: For example, a college friend of mine has a very funny falling video, I never lose it. A cat pissed on a friend's flower, photos of that, I'll never lose.

C: Well, for example, when you traveled abroad, etc. don't you keep those photos too?

H: I keep them, but I don't shoot images much at times like that anyway. For example, I went to Italy for Erasmus. I have hardly had any photos of Italy there, mostly people. For example, I went on a trip with my classmates there, to the French border, to the Alps. All my friends took photos there, like crazy, I preferred to live that moment. Group photos, those with people, are more appealing to me.

C: OK. Well, you mentioned more or less which ones you archived. So how does the elimination process go? Is it that you don't take the photos in the first hand, or do you take them and eliminate them later, before transfering them into your archive? How does that process work?

H: Since the snapshots I took are not many, there is not a very large amount of photos. That's why I look at things like 'is it too messed up' or 'is there any glaring detail' while I'm eliminating. A single photo of an event is enough for me, I usually delete photos taken from two or three different angles. For example, I never had a photo of

my dog. And that's a 14-year-old animal. I returned to Ankara last year, now he is very old, he is close to death. That's why I took some photos from my brother to have visuals to remember. I took only 4-5 photos from when he was a puppy and eliminated the rest. My father is very upset about this. He keeps everything in his archive, I have a more minimalistic approach.

C: OK, thank you. For example, you said that you took few photos and then deleted the corrupted ones. When are you performing this deletion? For example, right after shooting or while transferring, how does that process work?

H: Well, I'm eliminating one round in each transfer. For example, when transferring from the phone to the computer, I always make an elimination. For example, I guess my phone is like a garbage dump right now, because I don't have a chance to reflect them much right after I shoot them. But when I transfer them from my phone to the computer, some get eliminated at that stage. Sometimes I don't have a lot of time on the computer, there are some folders I created to sort them later, but they were never sorted or anything like that. The name of the folder is “sorting” and that's it, they stayed like that. There is "sorting 2". I tried to open another one. "Brother, there is a file called 'sorting', let me open the second one immediately." and it remained too. But while sorting, I eliminate one more time. I'm trying to go back so I can remember that event, and delete some photos I haven't yet.

C: Yes. So you are actually going through a two-stage "elimination".

H: Yes, I remember even naming it, but before I went into the interview, I opened the old computer and looked, there are several “New folders” called “New folder 2” “New folder 3” and so on.

C: Even if you intend to, you can't always do it then.

H: For example, I opened and looked at one of those folders, when my old phone died, I had to transfer files very urgently. I have reserved some of the photos there as school-related, friend groups, etc. But I couldn't start with the most of it and they stay in "New folder 3".

C: It's out there waiting to be sorted and eliminated one day.

H: Another folder has photos from a trip in the second year of university, for example. Normally I have to move them into that school year's folder. Normally, I open a folder named "Factory Trip" under that year. But all the photos from that factory tour stays unsorted in one folder.

C: As far as I understand, part of your archive is very organized, and there is probably a messy part waiting to be managed.

H: Yes. There are those who have stayed in Purgatory, and there are those who are in their right places.

C: Well then, what is your categorization strategy, specifically in this organized part? How do you categorize?

H: To begin with, date is the best. Especially for visual content such as photographs, I folder according to date, and then under the date by subject. This is the healthiest way. Because when I have to find it like this, I can reach the image I'm looking for by saying 'this incident happened in the second grade, it was the year 2014-2015'.

C: Got it. Is this also your strategy to go back and look in your archive?

H: There was a tactic I used in school assignments, let me tell you that too. Windows File Explorer has the feature of adding tags. I was tagging the images I downloaded to use in my presentation boards. Then I could search directly with that tag from search bar. I was tagging them and categorizing them thinking I used these for concept ideas, these are for pre-jury images etc.. So I was separating it into folders still, but I was tagging the images to search inside the folder with tags.

C: Got it, you've had already collected them in a folder. Since I always leave the files I downloaded at school in the downloads folder, the 4 year old download folder came to my mind.

H: No, I can't say that I took good care of my downloads folder, especially my downloads folder on the computer given by the school. It's filling up a lot. Personal photos and such, the date tactic I mentioned works very well, but when I started my PhD, I faced a different problem. Dividing the project folders by years is a bit of a problem if the project takes more than a year. Then it is necessary to go for different solutions. For example, I opened a folder called "remote nonsense" for distance education, in it 104 lessons go as 1st homework, 2nd homework and so on. Unitization may vary depending on the situation.

C: Got it. Thank you. Have you ever lost any visual data?

H: It happened once. Actually, it happened twice. One was when my old phone died. Back then I wasn't backing up the phone much. I was backing up like once a year. I lost some there. Now I try to back up more often, at least every four or five months. And I take better care of my phone. By the way, too many of my USBs have been stolen, I'm not even mentioning them. But I never kept critical files on those USBs. So I was not upset. But there is no limit to how many USBs I have lost while going to the printer center in the license. There was also a hard drive I bought when I first started making storage. This one works with MicroUSB. I bought 1TB for crazy money at the time. It was very expensive then. It fell a few times and was damaged, the files was corrupted directly. I lost some data back then, too. So.

C: So what did you do in these two cases you described? Did you make a certain effort to save them? And what did you learn from them?

H: In the case of the hard disk, I torrented file recovery programs like crazy. Because they were very expensive. I mean, they were insanely expensive. Especially quality

ones started at a few hundred dollars back then. But of course, they were of such high quality that it almost bring back the photo uploaded in the store before I bought the computer, there were such solid things. It's been like three years since the phone thing happened. There was a program called Doctor Phone. With it, I copied all the data on the phone to the computer and recovered what I could from it.

C: In both cases, you actually saved your data.

H: I brought back most of it on the phone situation. I couldn't save much from the hard disk because when you overwrite there, they all disappear. A series of data goes on it.

C: Yes, it goes away when the hard disk is gone. Too bad, I lost a few times too.

H: We even tried to recover a friend's USB for a project once. For example, we found a few Word files, their names etc. It comes out, but it's broken inside. It causes disappointment. It shows you a list saying 'I saved them', you think you saved it, but you go into the file, only half of it is saved.

C: So what did you learn from these two events? You said you started making more backups after the incident with the phone, is there anything else that these losses have taught you?

H: I've learned to trust online back-up. So I've learned to trust the beauty of Google Drives and stuff. Apart from that, I started keeping a few copies of critical files. The system I mentioned at the beginning, which is in my family's house in Ankara, works with the "Raid System". So there are two hard drives. There are copies of the same files on both hard drives. There is a software system that they constantly check from each other.

C: Got it. So if you were to lose all your data, which ones would you want to recover? So which ones are the most important to you? You can think of it as your personal photo archive.

H: I have a large archive of images that I have downloaded from the internet a lot. I created it thinking that I might need it. For example, there are photos that I downloaded from Facebook or something in that archive. I can recreate them somehow over time. They're not that important anyway. The biggest problem would be the photos I took myself and didn't share much. I would like to save them for sure. Because, okay, you may remember the event, but when a moment comes when you say to a person, "Look, we had something like this with you", the effect it has on that person is very different, if I can't do it, I will be sad.

C: Yes, unfortunately there is not much to replace.

H: As a photographer, I'm sure you have suffered a lot.

C: Many times, unfortunately, so many times my hard disk is broken. Last year, my computer crashed and its hard disk burned down, we suffered a lot trying to bring them back with the computer guy. Fortunately, he saved most of them. Also, if I were to store my archive online, I need to set up a server to store, I have an archive of at least 10TB at the moment, it is not at a size that can be handled with Drive etc.

H: It's very troublesome. In fact, Drive is a very good thing if your internet is very good. For example, since the school's internet is much faster, I leave it open on my computer there so that it can be uploaded at the weekend. In the pandemic, I don't have that chance anymore. Fortunately, I can't produce much of this type of content in the pandemic too. But of course, in Drive, when you go back in your archive thinking "There was something like this, was it this year?", finding the image you are looking for and trying to download it sometimes becomes a greater torture.

C: Yes. I think the interface of Drive is a bit troublesome in that respect.

H: I'll probably be answering questions ahead of time, but when Google Drive first came out, I had a trick to not exceed Google's file limit because photos were making Drive's storage capacity run out. I was opening a Google Docs document. And I was throwing photos into it. Because it counts the size of Docs documents from Google's systems, it did not detract from Drive's storage capacity.

C: You are kidding.

H: For example, my mother was making jewelry, they were going to make brochures for my mother's jewelry from photographs. She was already having difficulties in these matters, so I opened a Sheets document and loaded all the photos into it. I think they fixed this gap last year.

C: What happened to your mother's jewelry after Google fixed this bug? Was there any damage to the old documents at that time?

H: No, there was no damage. When they fix it, Google warns that "Your limit is reached, you can't upload any more files." You cannot upload a new file, but you can download existing ones. Let's just say Gmail has something of a disgrace, it stops receiving emails when it's full.

C: Yes, it does that to me too sometimes.

H: By the way, now that I looked, for example, the document we made for my mother in Ankara in December is still there. It looks like 0 bytes, but it actually contains very large images. So even when you open the document first, the photos load slowly.

C: They still haven't fixed it then?

H: I guess they don't care much about that. But they made a change, now I think you may need to upload photos to Drive to insert photos into sheets.

C: There is also a tool called "Keep". You should download photos through it.

H: When you drag and drop directly from the computer, it gets stuck on it. In a second trick, you are making an excel file on your computer. Let's say it's 1GB. You open it in Sheets and save it as sheets. Otherwise, because they prevented drag-and-drop, they add to Drive by linking it somehow and decrease its size.

C: Got it. I wouldn't have thought of it for forty years.

H: Modern problems require modern solutions. Apart from photography and video, I also use free accounts for documents, books, etc. Some file storage companies give a "free account" with few hundred GB when they first launch. I used to had a lot of them. I was distributing my stuff across them. Because it's not so important, just for the sake of having an archive. For example, I was storing books on aviation history and stuff. It is very clear that I will not open it in my life. But if a day comes when they are needed, there is a 50GB Mega folder that I know where it is.

C: Make sense. But Dropbox for example, you may remember, once gave “metumail” extensions 200Gb of space, then took it back.

H: My Dropbox is like that right now. It has about 30GB of data in it, but it has reduced the limit to something like 10GB.

A: Yes, 2GB.

H: I can't do anything from Dropbox. And I have to log in every four months so it doesn't get deleted. There is that too. For example, you used to have unlimited right to not access to Google Drive. But in the last 5 years, they all made some new rules. If you have an oversized Gmail or Google Drive and you haven't accessed it in the last 3 months or 6 months, they delete it. So if you are not active they say they will delete it.

C: Got it. Moving on. Then which of these digital tools we mentioned you use?

H: Clearly, I use Drive the most right now. I have to use Dropbox sometimes, although I'm not at all happy with it. For example, there is a project that they started from Dropbox, it continues from Dropbox because no one has moved the old ones to Drive. Other than that, I use the Windows Explorer inside the computer itself. I use them for my own personal work.

C: Don't you use the phone's interface?

H: There two interfaces in my phone that I use. Mine is Xiaomi already, Xiaomi has its own File Explorer, it's called File Manager. There is also an extra application called Gallery that I downloaded for photos. A guy wrote that app as low as possible. Both by folder, by date, etc., you can classify. They have options such as favorites, starring. I like it because it works so fast. For example, I have 14,507 Whatsapp

photos . Normally, when I randomly scroll on the phone and stop it somewhere, it takes two hours to load the preview. But in this application, previews work very fast.

C: Is it slow loading previews on the phone because it downloads from the Cloud or is it showing slower ones in its own memory?

H: No, they are all in memory, but the processing power of the phone etc. is not enough, that why it's acting nonsense. You see the photos as gray boxes for a very long time until they are downloaded.

C: Got it, thank you. How do these tools help you manage your archive? For example, you talked about the quick opening previews for the gallery app. Anything else comes to your mind?

H: There is a very simple sorting mechanism. You can sort by name, file location, size, last modification date, and when it was taken in ascending or descending order. They also brought the random option. You can also filter by file extension. You filter by file extension, whether it is a photo, a gif, an animated gif. There is even a distinction between whether it was taken from the front camera or the rear camera. You can create a "Hidden folder" etc. if you want. Also, do you want to see the photos and videos as a list or as an image grid, you can always adjust the grid according to how much you want to see. For example, if you are looking for a group of photos, or if you are looking for something very specific, you can zoom out a lot. If I can see it from a distance, I zoom out a lot, for example, there are eight photos in a row right now. If you want to see it in more detail, I can zoom in with the pinch movement and see the details. Especially the preview size on computer, show big or small, it works very well.

C: Ok, do you have any helpful features in Drive or Windows Explorer that comes to your mind?

H: It's nice to be able to share files with someone on Drive. For example, you went on a trip with your friends, you create a shared folder, everyone uploads it, you can search according to who the photo or video came from. As soon as you type “From: Someone”, it shows what comes from that person. Or you can search for a date or something, I love searching with such specific things. I'm doing searches like "Date:" or you include those "keywords" or something. It is very useful.

C: Is this keyword, the keyword in the file name, or the algorithm can search for the text in the photo, something like that?

H: No keyword in the name.

C: OK.

H: Other than that, there are already classical sorting mechanisms, I use them again. For example, Drive has priority options. I prioritize current projects, collect them

down and use it. Because Drive it looks a lot like Windows Explorer. I already use almost the same ones in Windows Explorer.

C: I'll also ask about Windows. Are you going to say similar things on Windows?

H: As there is no shared folders, or it came from this person kind of features, I use it by going to the subheadings from the folder names. I am not using the tags actively at the moment, I was using it in the past. When you right click on the file and go to the details section, there is a place called tags. You can add tag from there, I was using that. Other than that, classicly: there are options to sort by list, sort by date, etc., I use them.

C: OK, thank you. Do you have any good experience you can remember with these tools you mentioned, an example you can give?

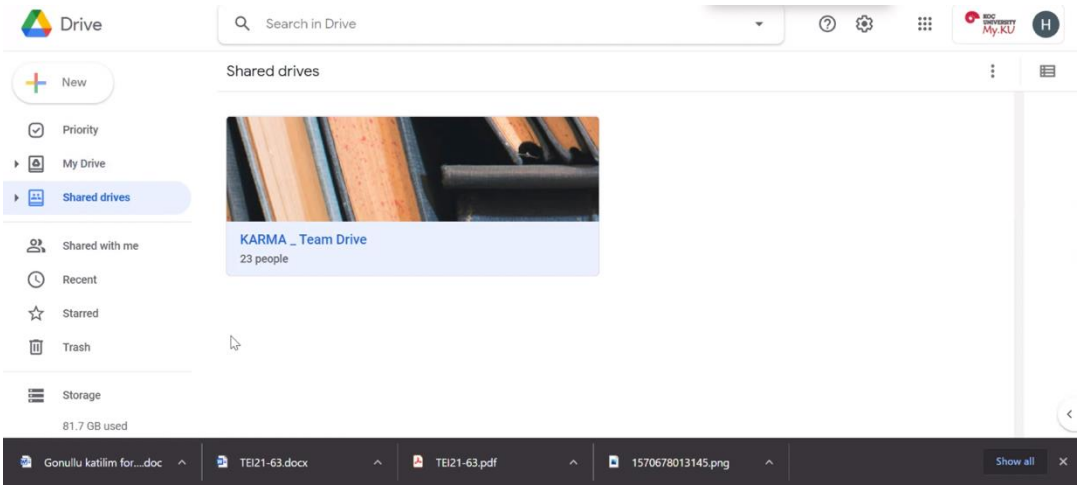
H: Especially in Drive, this feature of showing who it is from works extremely well, it saves lives. For example, I connect my own Drives. The space of my School Drive is unlimited, I have an account with my old e-mail that I use actively, and I also have accounts with a few e-mails I opened for other lessons. I can search with the information of with whom I shared them and who can collaborate. Last summer, we went to the Kaş Jazz Festival with my friends. When I needed to find a photo from there, I didn't bother to remember whether it was in August or July, and I went there with Pelin, it was summer, the common use of all of this information works very well. You actually use it like Venn diagram.

C: Find the intersections. Very interesting. You said you're linking joint accounts. In that case, for example, you share the one in your Drive with your other account. It uses the space of the unlimited one, but you can also use it from the other Drive. This is a real life hack. I'm going to do it immediately. So nice.

H: There is also only corporate accounts, I guess, you can directly share the entire Drive.

C: Is it?

H: Let me mirror the screen and show it. Look, 'shared drives' appears here and you can see how many people are in it.



C: It's really good. So, do you remember any good experience with the other tools you mentioned?

H: Especially in the gallery app on this phone, it gives me the option to show what's on the phone, show what's on the sd card. Normally you can't do this on the phone. This is beautiful. There is also the recycle bin feature, which is good too. Also, when you normally open a file called no show in phone folders, it doesn't show you anything in that file. It doesn't become visible in the gallery even though its in jpeg. I can turn them on and off in this application, do I want to see such features or not. There are also many documents on my phone that are not photos but work on the basis of photos. For example, because I love comics, there are a few thousand pages of comics. Each of them is actually a scanned page. In other words, while going back through the photos normally, the new issue of that comic will be an add-on with 1000 photos at a time when it comes out. It already implements the hidden folder feature in itself, hides some things in the gallery, if you want to open it, you open it back and so on.

C: Can you think of any bad experiences?

H: Drive is very good in terms of version retention. When you take the photo in the video, it asks, "I'll throw it on, look, it's the same, should I write on it?", you can say "yes, but keep the other one", you can access the old versions by looking like a single file. If the problem with the Gallery application is, I often delete previews so that they do not take up space on the computer, for example, there is no such option. When you take a new photo, it does not drop immediately, you need to refresh it. It can be a bit unpleasant if you have an urgent job, but it's not a serious life-destroying nuisance.

C: Have you ever tried and changed another tool before? Why did you change? What was the difference from what they are using now?

H: When I first became interested in data work, I was trying free versions of some programs. Programs without many features, winamp times, where you can customize

interfaces. Programs used by industrial giants, but they trusted and bought it just because they were paid. Here I was trying their free versions and all that. But since I don't have a very niche need, they couldn't hold on because there wasn't a lot of interface or something. For example, I could see the metadata for the photos and separate them according to which camera they were taken. A biologist suggested, of course, they set up 10 camera traps, and they used the information to understand from which device photo was taken. But I didn't need it, so I changed it.

C: Got it, thank you. When do you look back in your archive?

H: I'm a very purposeful person in that regard, I really only look back when I need to find something. I haven't been in my archive for a long time, I browsed a bit as I will have an interview with you, I organized it a bit. Or there is a project, something is written in the class group, I look at the archive thinking, 'stop, there was a photo of this somewhere'. Or when I need to do a sorting again, for example, my phone is full, I should transfer it to a computer, or my computer is full, I should transfer it to drive. That's all.

C: How do you search your archive when you need to find something?

H: Depends on where I need to find it. If I'm looking for a recent photo or video content, 99% already have it on my phone. I've been scrolling and looking, have I found it or not. I have a favorite folder, for example, I keep the things that I need to reach very often. There isn't much there anyway, there's a maximum of 100 or so photos. You see them all with a single scroll. In fact, there are 17-18 in my main favorites folder, you don't even need to scroll, you see them all. If I need to find a more specific shot, let's say I need a photo taken at work, I have to scroll and search until it catches my eye. I'm moving forward with references like 'it was a few days ago before this photo'. If I haven't found any otherwise, if it's too old, something I can't set the context for, I use sorting, there's nothing to do. There I usually sort by date. From the participants in the Drive and so on. You don't have many options on the computer, but you can search both the person and the date in the drive like a venn diagram. On the computer only by date. Although I think you can actually do it on the computer from the search bar, but it works a little harder.

C: Do you ever wander aimlessly through your archive, just looking back?

H: No. It's not often that I said, "Let me see what's in my archive." It's not something I do.

C: Are you using the same tools in Navigation?

H: I know more or less where it is because I look with purpose. That's why I'm going specific from that device. If it is something very important, I have definitely put it on the phone, it is in my favorites folder.

A: Do you have problems with the features you use while browsing your archive, or do you have any features that you think are useful?

H: Since most things are from university or something, and the academic year is from September to summer, not from January to January, I have to search by year, as if this happened in the 3rd grade, I remember. Did the term start in September or October, etc. You have to deal with even that one month. Cause on the device it looks at the number of last modified. There is a problem when it does not match.

A: I was also wondering something, why don't you use the cloud when you are so tech-savvy?

H: Because I had a difficult situation about this before. There are certain security risks to using the Cloud. Fortunately, I did not have any data at that level, it is a separate responsibility and trouble. But I'm afraid that someone will make a mistake, something will happen. Because, for example, I've seen a lot of people accidentally giving out experimental results to the whole school, then take the trouble. For example, in our lab, we had a student with the same name and similar e-mail as our lab teacher. But there is no chance of giving the usb to the wrong person. Of course, you will lose your hard disk or something, although there is a risk that it will be stolen, the drive does not have that risk. That's the trade off.

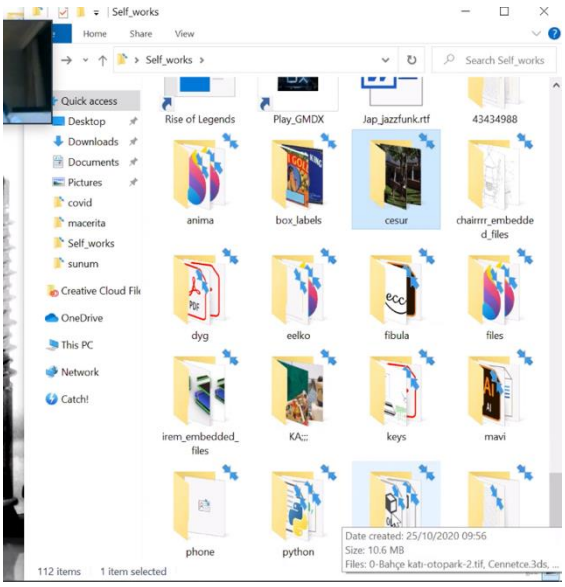
C: Do you use social media in any way?

H: There are groups on Whatsapp where I'm the only participant. For example, I change it's name to 'Warehouse 2' and archive it. I use them sometimes to access things I need quick access to. For example, I know work-related things that are in 'warehouse 2'. For example, there is 'Dump transfer', a group that I use to transfer from computer to phone. I am alone in it too. Other than that, I don't use facebook vs. So my Facebook profile picture was from middle school or something. I share the things I need to post on Instagram in a more personal blog style. They asked us to create a persona to represent us in a lecture, which I shared at that time. But after that I quit again. It's nice, for example, when we start a movie set and right after it finishes, they share it there, the selected photos are there. It's nice in that respect, but I don't share it myself. A long time ago, when I was in the early days of tumblr, I used to use it a little more like Pinterest, but then I stopped.

C: That's all my questions actually, thank you. Now I will ask you to take a look at your personal archive, and then I will ask you to find a few images.

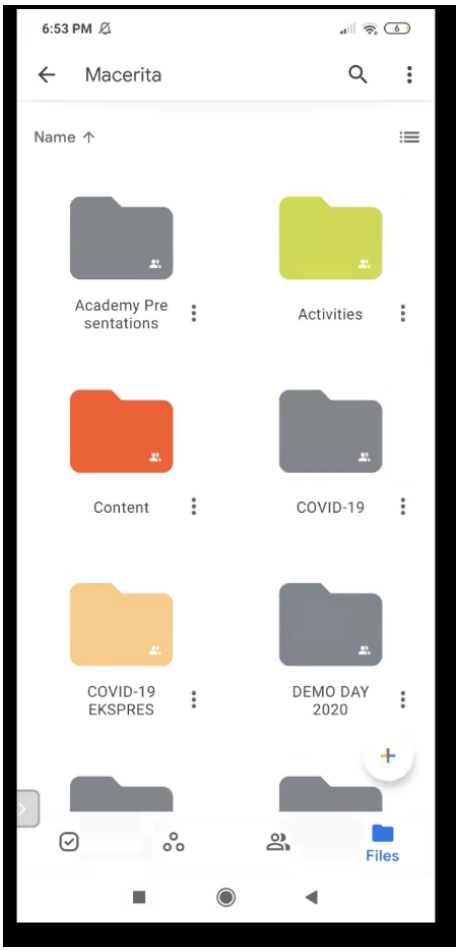
H: (Shares Screen) This is the computer I use daily. (Wanders around Quick access bar) For example, there is a folder called 'self works', all projects etc. is inside it. For example, there is an 'Kaş folder' and there are photographs. Because this computer is not like an archive, but because it is an intermediate element, there are different folders, all in the same place. In Pictures, for example, there are work-related things, if the program does not automatically put them there, I prefer to save them in a place where all the photos and files related to the subject will be together, and then move them to their main place. Let me show you Drive. Since this is my school mail, there are no very personal images here, just few things of my mom. The 'remote nonsense' folder is everything in the online education period. I save them on the computer and

throw them all here. In the folder here, there are works, there are lessons, there are visuals from the online events I attended, there is everything. Since this is the remote period for me, everything is there.



A: Is there a folder you transferred from your phone?

H: Here, I guess, I didn't share it. That's why I have to get on the phone, wait a minute. (Opens screen sharing from phone). Hah, I'm opening the drive from here. For example, this is the account of my company mail. For example, when I enter here, there is also a little color coding. In this, for example, we have only one image folder. Our own shots, stock ones, camera shots, phone shots, drone shots, etc. there is. It was company mail. Now I'm switching to my own mail. Here is the pictures folder. Look, it immediately gave a warning saying 'storage space is about to be full'. Lessons have their own folders, my friends have homework images, etc. Mixed folders like this, not just photos. There is a photograph, as well as a tiff.There are also photos of my friends. A somewhat mixed archive. For example, when creating a folder, sharing with people, even if they won't look for it, I always include them for convenience when searching for myself.



A: Let's talk about the internal server with the family archive?

H: Sure. Let me show you from the phone, because I couldn't install zoom on the other computer. For example, I have a folder with my school projects and photos. Unfortunately, there are a lot of 'new folders' in it. I put project images in one of them. Their names are render 1, render 2 and so on. For example, I added tags in some of them. I added the tag 'Ideation' to them. For example, there are two tags, fire fighter and firefighter. You can make mistakes in using the common tag, it's a bit of a problem. Then I can search the tags from advanced search. The disks of my computer are already separated as system, hobby or something. The moment I see this photo, for example, I can understand that they are all from the factory tour. It's inside something like an untitled folder. Probably my phone was out of space back then. Then they said take a lot of photos, we will use it in the document. So I transferred them all without eliminating, I transferred them as new folder 3 and it stayed like that. On the server where there are family photos, my father's order is working a little more. Family photos, then years, then months. But sometimes something happens, let's say we went to a trip to Bandırma, there is a folder called Bandırma. Since it is my father's order, you can reach anything in a few levels. Again, it works because it is used when something is needed, but when there is

something to look at without a purpose, get in and out of folders, it's not easy. For example, because of the pandemic, when your grandmother and your father say, "Let's have a zoom call, let's look at all our photos", there is no such world. Because it is necessary to look at things like 'we came to you in the summer of which year, in which month'.

C: Now I will ask you to find some images. First I will ask you to find a happy image. However, I want you to describe the photo or video you want to find first to me, and then find it.

H: If I say I want to find the photos we took at the jazz festival, I know where they are. There is a folder called 'kaşş' in 'Self works', where I can find, for example, the photo we took directly with the festival logo, definetly. (From the Quick access bar, finds the self works folder, 'kaşş' folder, a little scrolling and finds it). For example, if I were to find another one, we went on a set at the end of the summer, took a photo in the kitchen at the end of the set, it was a good memory. I have two options to find it. It was shared from the set's group on whatsapp, I click on the group media and find it. Or I remember the date, I can find it by entering the gallery and scrolling. So if a happy memory is too extreme, maybe I might have put it in the favourites. But only if it's too extreme, because there's usually paper, documents, etc. in my favourites.

C: Ok thank you. This time, I'm going to ask you to find an image that you associate with an unhappy memory.

H: If that is a unhappy memory, I probably didn't shoot it. If it's going to be sad, I can say, for example, my ex-girlfriend. Again, I look at the media in our whatsapp conversation on the phone or the things we did together from the folder on the computer. Since I remember Contex, it is not very difficult to find it from there.

A: Also, I would like you to find an image with a specific person.

H: I have a friend named Onur, we went to a factory in Izmir to shoot a video. We took a photo under an 'organic production' written sign, I took it with the camera. There are two camera folders there. One that I save to phone, the other one that I save to sd card. Since I know the approximate date, I will shrink the thumbnail size and scroll it. For example, this one is when I'm on this set, it means I'm close, I go a little further and find it.

C: I'll also ask you to find a photo that will make you feel nostalgic.

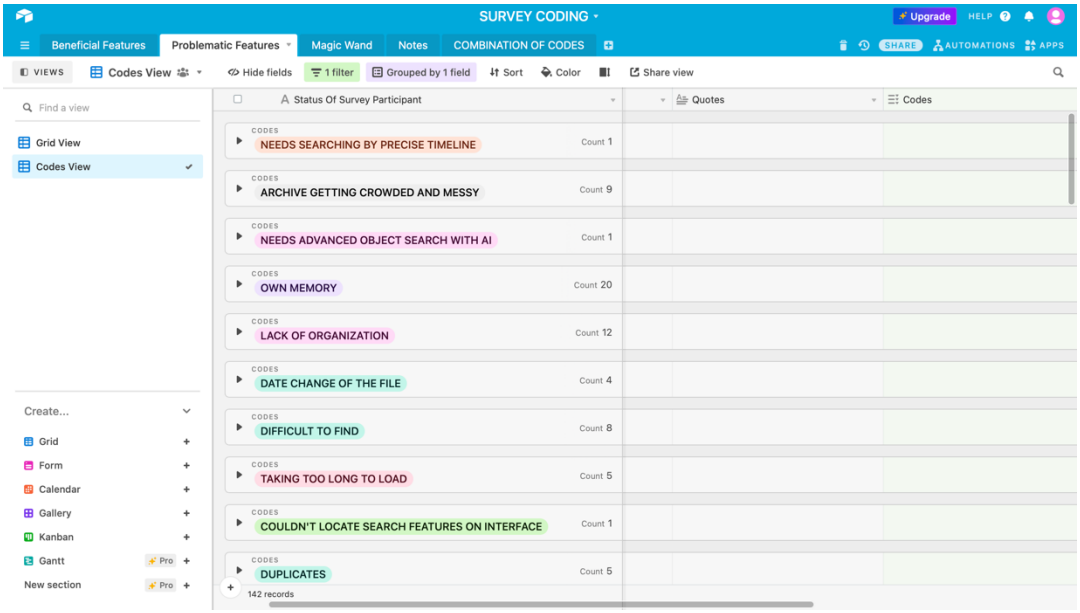
H: When I went to Erasmus in Italy, we had a teacher. We drank non-alcoholic beer with him, I will find the photo from that day, we send it in the whatsapp group. It's in my favorites folder because that event was something important. Right here.

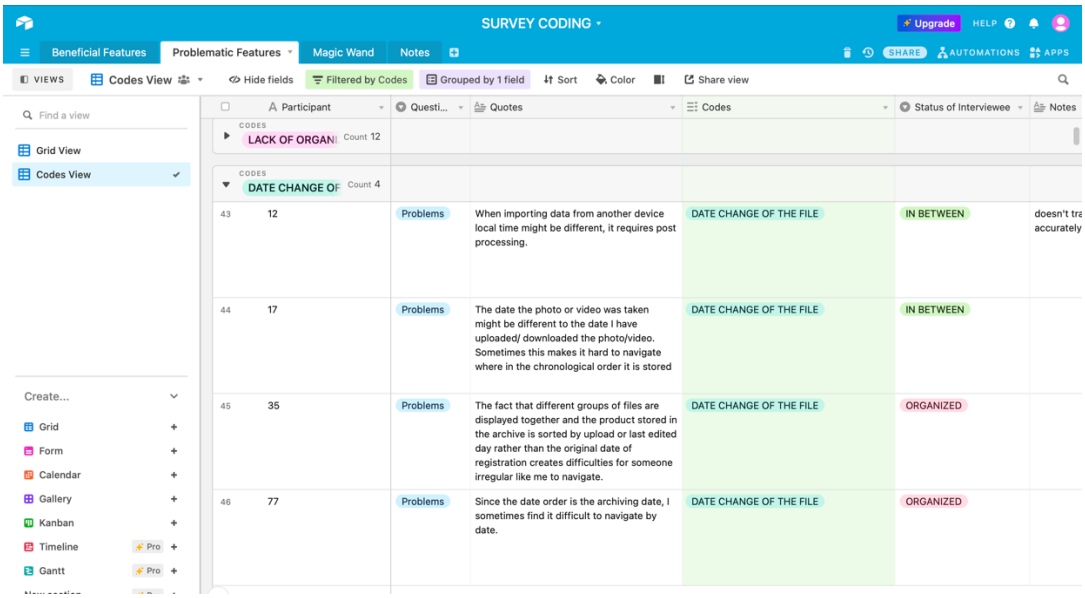
C: Now, finally, I want you to find a few images in your archive that you consider unnecessary and deleteable. You can find it by browsing if you want.

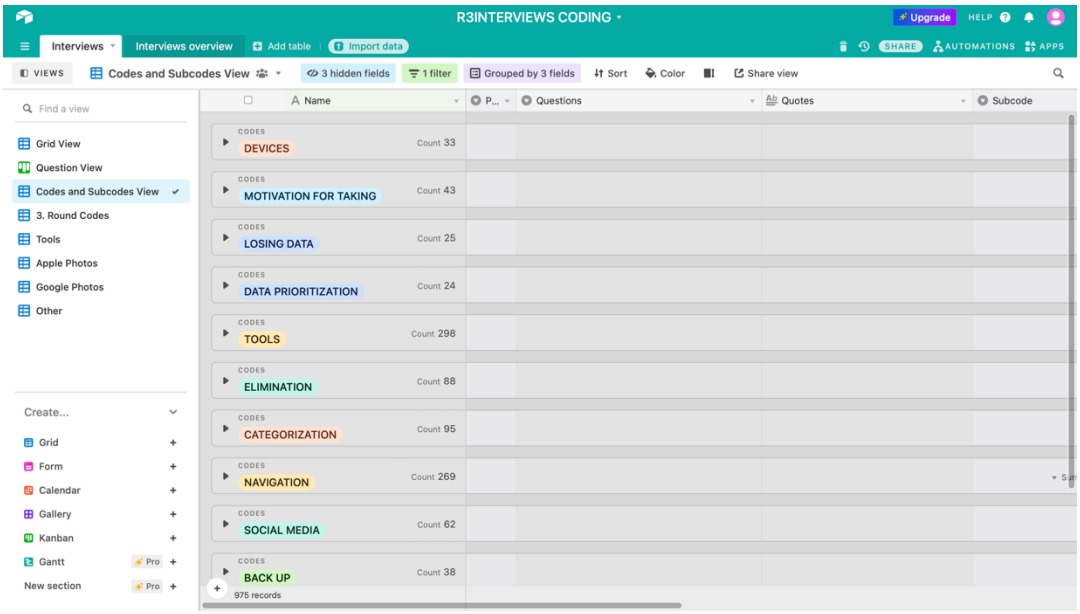
H: I go directly to whatsapp, when you say gallery, it shows the standard folders on the phone, when I go down, it only shows things like the photos I sent for my friend Umut. Those in that group, like what I send to X person and so on. There was a group called 'economy news' , I can delete all images from that WhatsApp group. For example, in the conversation with an old friend from college, we probably have send away school photos or something, so I don't think about deleting anything from there. But for example, we are staying at home with 3 people right now, we have a whatsapp group. I'm sure 20-30 photos of the cat were posted there, these are always erasable photos. Homegroup is a place where more instant things can be thrown, I can delete photos there.

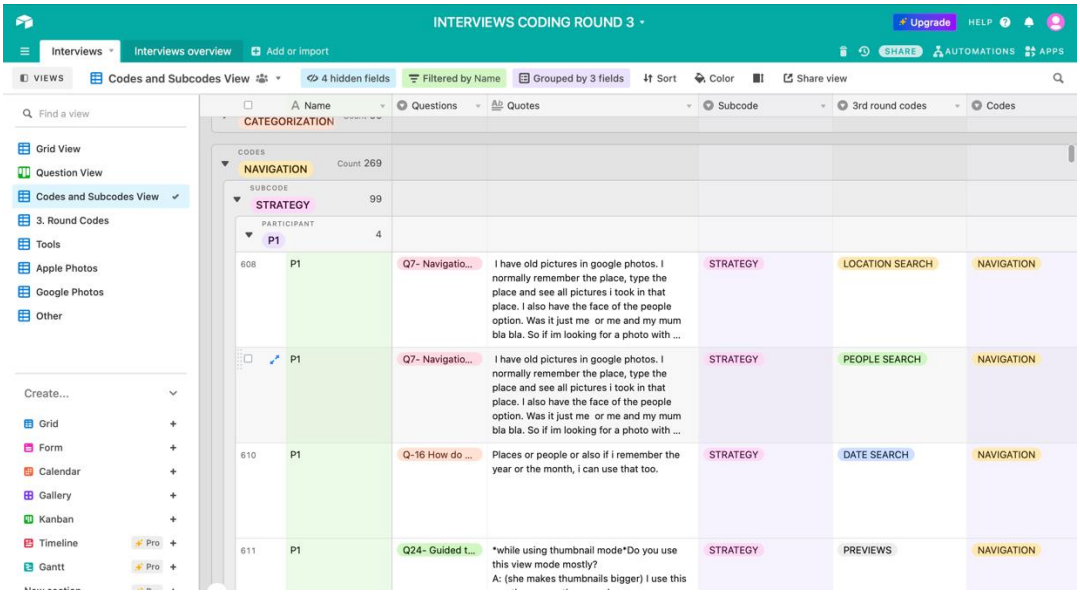
APPENDIX F

CODING SCREENSHOT EXAMPLES FROM AIRTABLE






R3INTERVIEWS CODING
Upgrade
HELP
Interviews
Interviews overview
Add table
Import data
SHARE
AUTOMATIONS
APPS
VIEWS
Codes and Subcodes View
3 hidden fields
1 filter
Grouped by 3 fields
Sort
Color
Share view
Find a view
Grid View
Question View
Codes and Subcodes View
3. Round Codes
Tools
Apple Photos
Google Photos
Other
Create...
Grid
Form
Calendar
Gallery
Kanban
Gantt
New section
Name
Questions
Quotes
Subcode
CODES
DEVICES
Count 33
MOTIVATION FOR TAKING
Count 43
LOSING DATA
Count 25
DATA PRIORITIZATION
Count 24
TOOLS
Count 298
ELIMINATION
Count 88
CATEGORIZATION
Count 95
NAVIGATION
Count 269
SOCIAL MEDIA
Count 62
BACK UP
Count 38
975 records


INTERVIEWS CODING ROUND 3
Upgrade
HELP
Interviews
Interviews overview
Add or import
SHARE
AUTOMATIONS
APPS
VIEWS
Codes and Subcodes View
4 hidden fields
Filtered by Name
Grouped by 3 fields
Sort
Color
Share view
Find a view
Grid View
Question View
Codes and Subcodes View
3. Round Codes
Tools
Apple Photos
Google Photos
Other
Create...
Grid
Form
Calendar
Gallery
Kanban
Timeline
Gantt
Name
Questions
Quotes
Subcode
3rd round codes
Codes
CODES
NAVIGATION
Count 269
SUBCODE
STRATEGY
99
PARTICIPANT
P1
4
608
P1
Q7- Navigatio...
I have old pictures in google photos. I normally remember the place, type the place and see all pictures i took in that place. I also have the face of the people option. Was it just me or me and my mum bla bla. So if im looking for a photo with ...
STRATEGY
LOCATION SEARCH
NAVIGATION
P1
Q7- Navigatio...
I have old pictures in google photos. I normally remember the place, type the place and see all pictures i took in that place. I also have the face of the people option. Was it just me or me and my mum bla bla. So if im looking for a photo with ...
STRATEGY
PEOPLE SEARCH
NAVIGATION
610
P1
Q-16 How do ...
Places or people or also if i remember the year or the month, i can use that too.
STRATEGY
DATE SEARCH
NAVIGATION
611
P1
Q24- Guided t...
*while using thumbnail mode*Do you use this view mode mostly?
A: (she makes thumbnails bigger) I use this
STRATEGY
PREVIEWS
NAVIGATION