

Do Gender and Age Matter? A User Study on Differences in Photo Collection Management

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Abstract. The low cost and ubiquitousness of digital cameras allow users to collect large amounts of photos. Although storage is not usually a problem, selection of content for presentation requires time and work. Thus, we intend to investigate how users currently deal with the tasks of organizing and presenting their photos. A survey was conducted with 100 participants pointing out their preferences and differences related to age and gender in this subject. The research methodology, the experiment and the statistical results are discussed in this paper.

Keywords: photo albums, digital photos, user experience.

1 Introduction

Due to digital photography and the availability of cameras in mobile phones, it is now possible for thousands of photos to be taken in a single year by any individual [17]. Some of the factors that contributed to this are the cost per shot, the immediate results and the large storage capacity of these cameras. Before digital cameras, several issues limited the amount of photos taken and the common practices adopted used to be a small number of photos saved in paper form and the best of them usually selected to create photo albums.

Several authors [7, 8, 11, 14, 19] studied how people handle photo collections and their studies show an evolution in the practices adopted during the transition from non-digital photos to digital ones. Results present a good insight about user behavior, but this has also changed as the tools, the accessibility of the internet, the advent of social networks and available technologies to share, manage, visualize and store photos also have changed.

In order to comprehend how users have changed their photo management habits and whether their behavior has association to age or gender, this work reports a quantitative and qualitative analysis of the data collected from participants of a survey where major research questions are: (a) How people manage and

share their photos and photo albums nowadays? (b) Is there association among gender and/or age on how people manage their photos and photo albums? The results from this study show that there are differences in photo management behavior with respect to participants' gender and age. The main differences found are related to how users store their photos, the main digital devices used to take photos, how they share photos and how they prefer to present them.

Our main contributions in this paper are: (1) A statistical analysis to verify age association to photo management behavior. We found that participants differ significantly in storage behavior, to share photos on social networks and in the habit of creating digital photo albums when age was used as explanatory variable. (2) Moreover, we observe the results using gender as explanatory variable: we found gender association related to printing and photo album creation.

Results from this study can direct digital photo tools to customize environments according to users gender or age and consequently improves the users experience. The remainder of this paper is organized as follows: related works are presented in the next section, followed by study methodology and the results obtained from the survey. The final considerations are discussed in the last section.

2 Related Works

It is possible to observe that as technology evolves people adopt distinct behaviors to take, share, store and organize their photos.

Regarding albums in general, Jin et al. [9] stated that the management of printed photos in an album is easier than with digital photos. They also showed that people typically have more than ten printed albums in their homes and claims that digital photos do not have the same sentimental appeal as the traditional albums.

Khalid and Dix [10] as well as Malinen [13] discuss about sharing photos through online media, such as websites like Flickr¹ and photologs, highlighting that they are appropriate to preserve stories of a group, being a resource for maintaining social relationships with those who are near and far away, and functioning as a kind of "virtual photo album".

Among the studies that address tools, there are those that serve as organizers/archives of photos, showing the pictures like a photo album. Yagawa et al. [21] present a personal file system that allows users to entertain themselves while their archive and retrieve multimedia data. Following this, the article by Jin et al. [9] describes a device that stores and manages digital images also imitating a photo album. The device provides a natural interface, as if the user were turning the pages of a real photo album, using only motion gestures on a touch screen. The work was based on the assumption that emotional satisfaction is more important than efficiency in this kind of task, and it must be also easy to learn by any kind of people. Abdel-Mottaleb and Chen [1] showed a similar

¹ <https://www.flickr.com>

system that allows navigation based on the arrangement face and representing events with a set of composite images.

Also, as the use of mobile devices increases, there are applications being developed particularly for those users that use these devices, to deal with photo collections. Xiao et al. [20] has developed an application for iPhones (called iPhotobook), which allows the creation and edition of photo albums (or photo books). The application automates selection, grouping, editing and layout of images by the user, which would be difficult to accomplish without the help of a larger screen, and then presents an alternative solution to the problem of creating photo books on mobile devices.

In this paper, we intend to verify if there is gender or age association regarding photo management behavior. In the next section we present the methodology used to answer our research questions proposed in this work.

3 Study Methodology

Personal collections of digital and non-digital photos have changed in the way that users organize, visualize, present and share them. Our study was designed to gather information about how users manage their photo collections and the major research questions are:

- How people manage and share their photos and photo albums nowadays?
- Is there association among gender and/or age on how people manage their photos and photo albums?

To gather these information we made available an online survey and asked people to complete it during two weeks. A total of 100 individuals completed the survey, 43% female and 57% male, having ages from 18 to 24 years (26%), 25 to 30 (29%), and more than 30 years (45%). Most of the data obtained from the survey is composed by categorical variables and due to this we use non-parametric tests to analyze the sample. Also, there are some qualitative variables that gave us insight into the participant motivations for use digital albums.

4 Study Results and Implications

We focus the analysis on those questions that could describe user behavior and how they are used to manage their photo collections. Due to the nature of the data we use Chi-square tests to verify the association among gender and age (as explanatory variable) to the behaviors gathered by this survey.

4.1 Dealing with Digital Photos

The access to digital cameras favored the growth of digital photo collections to the disadvantage of non-digital forms, as stated by [5,12,15]. Some of the factors

that contributed for this are the cost per shot, the immediate results and the large storage capacity of these cameras.

We started our survey asking participants about occasions when they are more likely to take photos: participants answered that in general they take photos on events (68%) or trips (71%) and their photos are organized mainly by events and/or date.

Organizing photos by date and events is a common approach adopted by most of photo management systems, but it is not enough for helping users keep their photos organized. Due to the storage facility for keeping digital photo collections, the organization of them become laborious as the number of photos taken increases. There are distinct approaches for helping users to manage their photo and the most recent include location information, content-based organization, tags/annotations, context information and facial recognition (“who is in the photo”) [3, 4].

Regarding the devices used to take photos, participants reported that their preferred are the digital camera and the camera from mobile phone. Moreover, the use of cameras from mobile phones showed a particular association to users having less than 30 years ($X^2 = 7.23$, p -value = 0.026), they are more likely to use it as main device to take photos than users older than 30 years. Cameras from mobile phones have huge potential for helping users to categorize and organize photos since they allow for a range of tools that use network information and the context of photo in the moment it was taken.

Further, concerning photo storage, 45% of the participants are used to choose those photos which should be kept and which not and 32% answered that they usually keep all their photos. We found an association between age and photo storage behavior (Table 1): people younger than 25 are more likely to keep all their photos ($X^2 = 6.46$, p -value = 0.039), while those who are 25 or more are more likely to choose the photos that they want to keep ($X^2 = 11.75$, p -value= 0.002). Nowadays, people are not only taking more pictures due to the advent of digital cameras, but they are also storing more it since devices, image hosting website and social networks allow for users more and more space to keep content.

Table 1. Age association

Behavior	< 24	25 to 30	> 30	Overall	Chi-square
Keep all their photos	50%	22%	26%	32%	$X^2 = 6.46$
Choose photos to keep	20%	63%	51%	45%	$X^2 = 11.75$

The web has also changed the way people share and present their digital photos. Most participants (79%) still use their computer screen or TV to present their digital photos for friends, but they are also sharing it more and more through social networks (SN) (37%) and image hosting websites (34%). Moreover, participants also pointed social networks as the main tool used to publish a complete digital photo album.

In the next section we report the results from this survey related to photo collections management through digital photo albums.

4.2 Dealing with Digital Photo Albums

Digital photo albums may organize photos according to events, dates or places and users use it to preserve the context of the media, their experience and to share moments or subjects. Most participants reported that they like to create photo albums and we did not find any association to this subject related to gender. They reported that social media networks (49%) are the main tool used to create and share digital photo albums, followed by Picasa² (28%) and Flickr (15%). Moreover, we found that users with more than 30 years are less likely (33%) to publish digital photo albums on social networks ($X^2 = 8.68$, p -value = 0.01).

Most users of social networks as tool to publish digital albums were participants with less than 24 years (67%). This behaviour related to age can be associated to the fact that in general teenagers tend to be more active in social networks and this trend declines as age increases [6]. Also, image hosting websites as Flickr and Picasa have evolved into a social environment where users can explore, tagging and bookmarking other users/friends content, thus improving user interaction and management possibilities.

Despite the popularity of digital photo albums and the use of social networks to share it, in this survey participants reported that a printed album is the best way to present a photo collection and we found that this is preferred mainly by female participants ($X^2 = 4.69$, p -value = 0.03).

In the next section we present the results from this survey related to printed photos and how participants deal with it.

4.3 Printing Digital Photos

Even with digital photos, users still believe that printed photos are the best way to present a photo collection. A previous research [8] observed that despite users are continuous using and sharing digital photos, physical prints are again in fashion. Also, sharing photos in person was described by participants of other study [7] as the most common and pleasant way to exchange memories. This leads to a mixture of reminiscence and conversation in which a story is told collaboratively by those who participate in the sharing.

In this survey, most participants (52%) said that they eventually printed photos. We found that there is an association between gender and the reasons to print photos: female participants are more likely ($X^2 = 6.16$, p -value=0.01) to print photos mainly from special events, and consequently male are more likely to never print photos ($X^2 = 9.74$, p -value=0.00). Frohlich et al. [7] stated that few people spent time organizing their digital photos, a phenomenon also discussed by Platt [18]. This author mentions that people “throw” their photos into a folder similarly to the shoe box where printed photos are often stored.

² <http://picasaweb.google.com>

So, even when printed photos are the preferred way to present a photo collection, users are still struggling to organize it in a efficient and easy way.

Next, we report how users deal with their traditional albums and digital photo albums created for posterior printing.

4.4 Printing Digital Albums

As the number of digital photos shared in social networks and image hosting website increases, printed photo collections are still the preferred way reported to present a set of photos. Participants in general like to create photo albums particularly women ($X^2 = 7.77$, p -value = 0.00) and those older than 25 ($X^2 = 9.55$, p -value = 0.00) although, only 24% of them reported that they are used to create traditional photo albums. We also found a gender association in this case ($X^2 = 6.58$, p -value=0.01), female participants are more likely to create traditional photo albums than male users (Table 2).

Table 2. Gender association

Behavior	F	M	Overall	Chi-square
Enjoy to create photo albums	77%	50%	62%	$X^2 = 7.77$
Used to create photo albums	36%	14%	24%	$X^2 = 6.58$

As the popularity of digital photos increases, distinct tools to manage this kind of content have emerged. We also asked participants whether they are used to create digital albums for printing. This kind of photo album in general is created using specific tools available by companies that provide photo printing services. Most participants answered that they never tried to create this kind of photo album before. Moreover, from those participants who had tried, they found it very laborious.

We asked how they would prefer to create digital photo albums: female and male respondents did not differ significantly in their responses, the preferred answer was to create a photo album manually page by page ($X^2 = 2.79$, p -value = 0.09) and the second preferred way reported was with a tool that could create and organize their photos automatically ($X^2 = 0.51$, p -value = 0.47). The less popular way voted by the participants was related to the use of templates to help users create their digital photo album. Surprisingly, most participants who answered before that creating a photo album is laborious, also prefer to create a photo album page by page. In our previous work [2], we performed an experiment asking users to create a digital photo album for posterior printing using a tool that organizes automatically the photos and results showed that users enjoyed the possibility of generating automatic layout, but those users used to full-featured tools demand more liberty to create a photo album.

Next, we report results from a open question asked to understand their motivations for use digital albums.

4.5 Users' Report about Digital Albums

In order to achieve a deeper understanding about user behavior regarding digital albums, users were asked – in a open question – why and when they would use this kind of album. Most users highlighted that they could use them to preserve special moments (as trips, graduations, birthdays and/or special dates). They report some answers as:

“When I have many photos, to keep them organized and remember the name of places, people and events. I also use albums for professional reasons, show work already done and acclimatised, always with their captions and explanations, in order that even the layman understand the subject.”

“I would use to keep special moments.”

Another motivation was to ease the presentation of photos to friends and family and to people that are distant (even to show them anywhere, anytime). Also, some users could use this kind of album to organize their photos, as they have reported:

“To store them in a organized way.”

“For better organization and quality of presentation.”

“I use once a year, to organize and store the best photos.”

In general users use it because digital albums are easy to share and present photos for friends anywhere. Also, as users create a new photo album, the notion of event also emerges from it.

5 Final Considerations

This work describes a comparative study about users photo management behavior regarding participants age and gender. The results show that new phenomena are emerging as the technology and applications for photo sharing and photo storage also emerges: users are more and more using cameras from mobile phones and sharing content via social networks. Okabe [16] reported that most photos taken by camera phones are not sent or shown to others, but are captured as a personal visual archive. However, nowadays there are many applications developed for social photo sharing and we believe it is also changing users' behavior to manage their photos as we have seen in the results from our experiment.

Results from this paper show that the use of mobile phones as main device to take photos has an association with age, we found that younger participants are more likely to use this device as the main way to take photos. Moreover, these same younger participants are more likely to store more photos than older ones.

Also, social networks were the preferred way reported by participants as tool for sharing photo albums and this behavior also showed to be associated to participants age. However, even with the popularity of digital albums in social media and social networks, participants still prefer printed photo albums for presenting purpose. Moreover, we found that female participants are more likely create a printed photo album than male participants.

We believe that since social networks are more and more popular, there is room for sites like Flickr, Facebook³, Instagram⁴ and Picasa to make available printing services to ease this task that was reported as very laborious for most participants.

Thereafter, as smartphones, users and behaviors change, new possibilities and issues associated with photo sharing and visualization constantly challenge developers and application designers. As further research we believe that could be an interested point of view to explore particularly how camera phone users share and storage their photos once this devices and applications are quickly evolving.

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³ <https://www.facebook.com/>

⁴ <http://instagram.com>

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