

How to build better participative digital libraries and their user communities – Insights from the user study of the Facebook heritage group “Zagreb kakav je bio nekada” (Zagreb as it used to be)

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Research paper

Abstract

This study has provided insights into the activities of members of the Facebook heritage group “Zagreb kakav je bio nekada” that can support the creation of the old Zagreb image collection and the building of the user community around this collection. We have used historical and content analysis to examine the relationships between the characteristics of images posted in this group and activities of its members. Based on the findings from this research, we have made recommendations to the creators of digital libraries which could help them plan and build better participative digital libraries and their user communities. We hope that the insights obtained by this research as well as the novel methodological approach used in this study will be valuable as a foundation for further research.

KEYWORDS: participative digital libraries, Facebook heritage groups, Web 2.0

Introduction

Memory institutions such as libraries, archives and museums have to adapt to the challenging digital environment (Fourie 1999, Anderson 2011). Many of these institutions have built digital libraries to present their collections to the public. There are many technological and social factors and requirements which could be taken into account when building digital libraries. Considering the popularity of Web 2.0 platforms, such as Facebook and YouTube, a reasonable way for memory institutions to build and enhance digital libraries is learning about interface functionalities and user communities of Web 2.0 platforms (Snickars and Vonderau 2009, Reagle 2010, Kietzmann et al. 2011, Burgess and

Green 2013). If they want to attract users to their digital collections and motivate them to get involved in the creation of collections, memory institutions can learn a lot by analysing various aspects of Web 2.0 platforms. Insights from these analyses could be used to identify useful interface functionalities and to learn how to build, maintain and enhance the community of users of the participative digital libraries. Additionally, Web 2.0 platforms could be integrated with digital libraries of memory institutions. For example, the Smithsonian, an important memory institution based in the USA, selected from its collections a large number of digitized old photographs and uploaded them on Flickr, one of the most popular Web 2.0 platforms. Thereafter, the Smithsonian was able to monitor information contributions by users and how the photographs were used by numerous Flickr users. This also enabled the Smithsonian to obtain insights into “what kind of content is desired by the Web 2.0 world, how to bring crowdsourcing into professionally curated collections, and how to bring diverse institutional skills together in a collaborative project.” (Kalfatovic et al. 2008, 267). There are other Web 2.0 platforms that could serve as valuable models for building participative digital libraries. For instance, YouTube is a very popular Web 2.0 platform, which could be used by memory institutions as an integral part of their own digital libraries. Pietrobruno describes YouTube as “a participatory and interactive archive, which allows users to add to core collections, enabling a popular voice to enter into centrally controlled collections.” (2013, 1262). He also describes the participatory archive model designed by Isto Huvila. Huvila developed the archives of two Finnish cultural heritage sites in which users can participate by adding and describing the content of the archives (Huvila 2008, 10-11). Wu and Ke have explored various Web 2.0 platforms to find out how to build a better participative digital library for audio books. These audio books will be produced by users. To build a digital library that will enable user participation, Wu and Ke analysed Web 2.0 digital platforms such as Project Gutenberg and Wikipedia (Wu and Ke 2013, 5).

Main facts about Facebook heritage group “Zagreb kakav je bio nekada”

The Facebook group “Zagreb kakav je bio nekada”¹ (Zagreb as it used to be) was created with the goal to publish old images of the City of Zagreb. Through images and texts that describe them, visitors of this group’s page can gain a better understanding of the history and heritage of the capital of Croatia. Members of this group can only publish images of Zagreb created before 1987. Every member of this group can publish images and describe them. It is important to mention that this Facebook heritage group is a public group. This means that all the images and various activities of the group’s members such as comments, likes, and shares, can be seen by any visitor of the page. However,

1 Zagreb - Kakav je bio nekada. 2016. Last modified January 30. <https://www.facebook.com/media/set/?set=o.292980229098&type=3>.

only members of the group can post images, write comments, communicate with other members, like and share the images, etc. The group is quite popular – on 13 January 2016, it had 33,271 members. It is a very vibrant community. Members post many old images of Zagreb, write many comments, like, share, and communicate with each other a lot.

Research questions

Main research question:

- How do the activities of the members of the Facebook group "*Zagreb kakav je bio nekada*" support the creation of the old Zagreb image collection and its user community?

The following member activities will be explored in more detail: posting or creating of Facebook posts with images, other media content and descriptions; liking or clicking the like button to show appreciation for the published content and contributors of this content; commenting or writing comments and replies to comments through which members of the group communicate and give additional information about various topics, mainly related to the content of the main post on which comments and replies to comments are written; sharing of posts and images with other Facebook users who are not members of this group. We will also explore the activity of posting media content in comments (posting images, videos, animations, photo albums...). We have created a list of member activities with an aim to identify those elements of Facebook interface that allow members to engage in them. The list includes the activities in which members of this heritage community mainly engage.

An additional research question, which will help us get a better insight into the main research question:

- What is the relationship between the characteristics of images posted in this group and the activities of its members?

The following image characteristics will be determined by using content analysis adapted for analysing images: image topic, image type, image location, image creation date, presence of image blurriness, presence of image colour. The first four image characteristics were selected because they are very important for heritage custodians in any type of library or memory institution. The two remaining image characteristics that will be explored, i.e. the presence of image blurriness and the presence of image colour, might be somewhat less important for analysis; however they will provide further insights into the variety of images in this group and its member activities.

Research approach and methods

An explorative approach has been taken in this research to gain insights into a new, rarely explored phenomenon – Facebook heritage group. The explorative approach is also reflected in the fact that we have attempted to identify and analyse the characteristics of a Facebook heritage group and its users that could be helpful in the planning and building of participative digital libraries and their user communities.

Two research methods will be used to answer the research questions: historical analysis and content analysis. Historical analysis is based on the examination of traces of human behaviour. It can be described as an unobtrusive research method because it does not intrude into the phenomenon being studied (Case 2006, 224-227). Another unobtrusive research method that will be used in this paper is content analysis (Ibid, 227-229). By using historical analysis of the traces left by members of the group "Zagreb as is used to be" and by using content analysis of the posted images and their descriptions, we will explore the following aspects:

- a) activities of the group members
- b) image collection created by the group members.

In the following part of the text we present in more detail the research methodology:

a) To obtain the answer to the main research question, activities of group members will be explored through quantitative and qualitative historical analyses of the members' traces. Quantitative analyses will be used to determine the number of members uploading images and writing image descriptions; the identity of the most active image contributors (uploaders); the percentage of various member activities; total and average number of posts, likes, comments, replies to comments, and shares; the total number of the activities recorded in member comments: likes, images, web links, animations, icons.

By using qualitative analysis of the traces of member activities, various topics will be explored: which images have attracted the greatest number of likes and shares; which images have attracted the smallest number of likes and shares; what are the topics of the images and web links posted in comments; have any of the images and their descriptions provoked a discussion among members, etc.

We will also collect personal information of the most active image contributors, i.e. their age, sex, residence, education, and workplace by taking a look at their publicly available Facebook profiles. The names of the image contributors will be kept anonymous.

b) To answer the additional research question, the images posted by group members will be explored by using quantitative and qualitative content analyses adapted for analysing images. The following image categories will be explored:

image topic, image type, image location, image creation date, presence of image blurriness, presence of image colour. Using content analysis the subcategories of these image categories will be created and percentages of these subcategories will be calculated. We will determine the percentages of specific image subcategories by analysing the content, type and technical characteristics of the posted images as well as by analysing the image descriptions written by the group members. This is an exploratory approach because in the process of analysing the content, type, technical characteristics and descriptions of individual images, we will identify sets of images with similar characteristics and based on that we will create image subcategories as the main elements for further content analysis. Content analysis of the image collection will also provide additional insights into member interests. For example, we can get the impression about the member interests by exploring how many members engage in activities related to images with particular topics and by exploring member comments, likes and shares of images with particular topics.

Expected results

It is expected that insights obtained from this research will be valuable in the planning and building of participative digital libraries and their user communities. For example, if digital library creators knew which images users prefer in terms of the image topic, location, type and creation date, then they could try to find and offer more of these images in their digital libraries. Also, they could improve the presentation of images in which users were less interested. The findings of this study will provide insights into the interests and activities of members of the Facebook heritage group "Zagreb as it used to be". These findings could help expand the image collection and increase the number of members of this heritage group. They could also be used in the planning and building of other participative digital collections and libraries and their user communities. The insights from this study could also serve as a foundation for further research, for example, into the role of the most active digital library users or content creators in the development of digital libraries and their user communities. An additional contribution of this study is its novel methodological approach which could be used for the analysis of other Facebook heritage groups and various digital libraries. We intend to identify the various important aspects of Facebook heritage group and its user community and based on them create categories and subcategories of posts and images that could be used to analyse other Facebook heritage groups, digital libraries and their user communities. Based on the study findings, we will identify issues that need further research.

Research results and discussion

Two hundred image posts have been analysed. These posts were published by 23 contributors in seven consecutive days – from January 1 to January 7. These 200 image posts have a total number of 29,724 likes, 1,421 comments, 385 replies to comments, and 807 shares. On average, each of the 200 posts attracted 148.63 likes, 7.11 comments, 1.93 replies to comments, and 4.04 shares. It is evident that this user community is very active.

In Table 1 we can see the number of posts with images of various categories and subcategories. Using content analysis, we have created 11 subcategories in the image type category. Photos are the most frequent image type published in posts. Of 200 images posted, 174 are photos, accounting for 87% of the total number of images. Among the remaining 13% of images, the most frequent are photos with text (9 images), illustrations (5 images), pages from books and other printed material containing text and images (4) and posters (2). Images in the subcategory "photos with text" usually contain only the name of the location (city and street name) and therefore they are very similar to photos without text. We categorised as illustrations those images that are primarily made by a drawing technique, by using either analog or digital drawing tools. Illustrations mainly depict pre-20th century Zagreb scenes. For example, there is an illustration depicting Zagreb in 1639.² This image depicts the oldest view of the City of Zagreb. The second oldest view of the City of Zagreb is depicted in an illustration from 1852. The illustration depicts Jurja Ves gardens which were then located on the outskirts of Zagreb.³ Poster subcategory includes posters containing text and illustrations. There are only two posters and both announce the upcoming events (motorcycle race; week of Croatian culture). Six image type subcategories contain only one image (advertisement, photo collage...). The only image in the photo collage subcategory depicts the Zagreb synagogue in the early 20th century.⁴ On the left side of the photo collage is the synagogue as seen from the street and on the right side of the image is the interior of this religious building. Given that only a single image is needed to show two aspects of the same object, the technique of photo collage is very convenient for presenting the images in this Facebook heritage group. This technique could also be used to place next to each other, i.e. on a single image, the views of an object or a scene from different time periods. For example, one part of the collage could be an image of a building from the early years of the century and another part of the collage could be an image of the same building 50 years later. An interesting image was found in subcategory "album cover". It

2 <https://www.facebook.com/photo.php?fbid=10207854825389435&set=gm.10153815189934099&type=3&theater>

3 <https://www.facebook.com/photo.php?fbid=10208523970678966&set=o.292980229098&type=3&theater>

4 <https://www.facebook.com/photo.php?fbid=10207271208731202&set=o.292980229098&type=3&theater>

is the album cover of the music band called Azra⁵. It depicts the lead vocalist with a little girl. It is also interesting from the heritage point of view because in the background we see one of Zagreb's landmarks – a building created by the famous sculptor Ivan Meštrović. In front of the building colloquially known as Džamija, there is a police car.

Table 1. Number of posts in image type, image topic and image location subcategories

Image Type	Posts	Image Topic	Posts	Image Location	Posts
Photo	174	City exterior	78	City centre	115
Photo with text	9	Specific building	36	Central square	40
Illustration	5	Specific activity	32	Around city centre	20
Page with text and image	4	People	23	Around Zagreb	8
Poster	2	Specific manifestation	17	Across Sava	6
Copy of published post	1	Text	5	No location	11
Advertisement	1	Sculpture	4		
Photo collage	1	New Year greeting	3		
Calendar	1	Specific object	2		
Animation	1				
Album cover	1				

In addition to the image type subcategories, we have also created seven subcategories in the image topic category and six subcategories in the image location category. Table 1 shows that the most represented image topic category is the subcategory "City exterior" with 78 images or 39% of the total number of 200 images. In this subcategory we included images that depict the scenes from Zagreb streets, squares, parks and other locations, without focusing on any particular building, person or event. Usually, "City exterior" images show a wide perspective of a street or a square. Following this subcategory, the four most represented subcategories contain images of a specific building (36 images or 18%), specific activity (32 images or 16%), specific person(s) (23 images or 11.5%) and specific manifestation (17 images or 8.5%). An example of image depicting a specific manifestation is photo of a bicycle race around the City park Zrinjevac from 1888.⁶ The photo is small and blurry; nevertheless we can see old bicycles with small rear and very large front wheels and the cheering audience standing around the racetrack. One image from the subcategory "specific activity", which attracted a lot of member comments (23), likes (369), and shares (27), is a photo of a boy drinking water from the fountain located at the main Zagreb square from 1933.⁷ This photo provoked a discussion among the members about the state of drinking fountains in the present-day Zagreb and criticism of the City's

5 <https://www.facebook.com/photo.php?fbid=10208538506482352&set=o.292980229098&type=3&theater>

6 <https://www.facebook.com/photo.php?fbid=1361715907178485&set=o.292980229098&type=3&theater>

7 <https://www.facebook.com/photo.php?fbid=912328402169398&set=o.292980229098&type=3&theater>

water utility company. Table 1 shows that in the image location category, the most represented subcategory is "City centre" with 115 images or 57.5% of the total number of 200. In this subcategory we included images depicting scenes from the City centre. The next most represented subcategory in the image location category is "the central square" (40 images or 20%). It contains images with scenes of the central square of the City of Zagreb nowadays called Ban Jelačić Square. Images of this square were so common that we decided to create a separate subcategory. "City centre" and "central square" subcategories contain 155 images and account for 77.5% of all images. Therefore it can be concluded that the large majority of images in the sample depict scenes from the city centre. Images depicting scenes from other parts of the City of Zagreb were put in the subcategory "outside city centre". There are only 20 of them or 10%. There are also 6 images with the scenes from Novi Zagreb, a part of the city built in the late 20th century, located on the right bank of the Sava River. Finally, there are 8 images with the scenes from the areas outside the City. These images depict scenes of sites that are/were popular among Zagreb citizens as excursion destinations, for example, Zagreb cable car⁸ and a mountain lodge at Medvednica Mountain⁹, located near Zagreb.

Table 2 shows the average number of various activities of Facebook members of this heritage group, i.e. their likes, comments, replies to comments, shares, and posts. These activities are presented by previously described image (sub) categories. The data gathered indicate what kind of images members prefer (number of likes) and what kind of images prompt the members to write comments, reply to comments, and share interesting posts and images with other Facebook users who are not members of this group. In the image type category, we see that photos are the most popular image type as indicated by the number of likes. Each photo got 156.14 likes on average. When summarised, the remaining ten image type subcategories contain just 13% of images and each image attracted 98.27 likes on average. From the data it can be concluded that members prefer photos with Zagreb scenes.

In the image topic category we see that the following four subcategories are the most popular subcategories: "specific activity" (each image post got 173.19 likes on average), "specific building" (166.5 likes), "people" (162.78 likes), "sculpture" (152.25). The subcategory "City exterior", which came fifth (143.9), contains the largest number of images in the category "image type", as we have shown previously (78 images or 39%). From comparison of these four most popular "specific" subcategories and the "non-specific" subcategory "City exterior", it can be concluded that members prefer posts with images that are thematically more focused, i.e. images that are more specific than those depicting wide areas of streets, squares or similar areas not focusing on a specific object or event.

8 <https://www.facebook.com/photo.php?fbid=10208546354078537&set=o.292980229098&type=3&theater>

9 <https://www.facebook.com/photo.php?fbid=910558292346409&set=o.292980229098&type=3&theater>

The same conclusion is corroborated by the data about the average number of comments, replies to comments, and shares. Table 2 shows that these activities have a positive correlation with the average number of likes – the more likes an image post in a particular subcategory has, the more comments, replies, and shares it will attract. For example, the subcategory “specific activity” with the largest number of likes (173.19), was shared 4.78 times. The subcategory “City exterior”, which attracted 143.9 likes, got a smaller number of shares on average – 2.67.

Table 2. Average number of likes, comments, replies to comments, shares, and percentage of posts in image type, image topic, and image location subcategories.

	Likes	Comments	Replies	Shares	Posts
Image Type					
Photo	156.14	7.47	2.06	3.56	87%
Other images	98.27	4.69	1	7.23	13%
Image Topic					
Specific activity	173.19	7.84	1.78	4.78	16%
Specific building	166.5	10.28	2.94	4.14	18%
People	162.78	6.96	2.13	3.17	11.5%
Sculpture	152.25	8	2.25	3.75	2%
City exterior	143.9	6.27	1.79	2.67	39%
New Year greetings	122.67	5.33	0.33	55.67	1.5%
Specific manifestation	108.94	5.06	1.18	2.29	8.5%
Specific object	78.5	1.5	0	1	1%
Text	46.8	2.8	0.6	0.2	2.5%
Image Location					
Around Zagreb	200.13	12.88	2.75	5.38	4%
Outside city centre	193.1	11.05	3.1	6.9	10%
Central square	162.33	6.85	1.95	3.73	20%
City centre	144.07	6.54	1.85	2.65	57.50%
Across Sava	61.83	3.5	0.33	0.17	3%
No location	75.36	4.55	0.73	15.55	5.5%

Subcategories are listed in a descending order according to the average number of likes they got in a specific subcategory.

As evident from Table 2, two subcategories with specific focus are not very popular: “specific manifestation” (108.94 likes) and “specific object” (78.5 likes). That could mean that specific scenes are less popular than general scenes in the subcategory “City exterior”. The reason for this could be that there is a significant difference between these two specific subcategories that are less popular and four specific subcategories that are the most popular types of images. The “specific manifestation” subcategory is focused on a specific event,

for example, the visit of King Alexander to Zagreb in 1925¹⁰ or a boy scout parade through King Zvonimir Street.¹¹ A considerable number of members possibly do not know much about these events or do not have an interest in them. On the other hand, the majority of members of this group has probably had a chance to see a specific building or a sculpture because they are located in Zagreb and the members of this group probably live or have lived in Zagreb and therefore have had a chance to see them or hear about them from other people living in Zagreb. In contrast, the “specific manifestation” subcategory includes posts with images depicting manifestations held in Zagreb, usually a long time ago. Therefore, in addition to the distance barrier, there is also a time barrier for members to overcome. This may be the reason why posts and images in this subcategory have resonated less with members and the reason why they were less prone to liking posts and images in this subcategory. “Specific object” is another less popular subcategory. Given that only two posts with images of specific objects were posted, it is not possible to make a reliable conclusion based on such a small sample. A particular characteristic of these two images is that they depict a single object: a motor vehicle.¹² That could decrease the level of relatability to these images because except for the main object, there is nothing else in the image. With regard to these images, the following questions could be raised: Is there a point at which too much specificity of objects or scenes depicted in images decreases the members’ motivation to engage in Facebook communication activities? What is an optimum level of image scene specificity that will motivate a member the most to engage in Facebook communication activities? It would be worthwhile to explore these issues in further research.

Table 2 shows the popularity of the image posts in the “image location” subcategories. The data gathered provide some interesting insights. For example, posts with images depicting scenes outside the centre of Zagreb and scenes outside Zagreb are considerably more popular with members than posts with images of the City centre. This is somewhat surprising considering the fact that the most represented posts are those with scenes from the City centre. It seems, though, that posts with images that are considerably less represented (subcategories “around Zagreb” and “outside City centre”) attracted considerably more likes, comments, replies to comments, and shares. One implication of this finding could be that the members’ interests were not optimally satisfied and that more posts with images depicting scenes outside Zagreb centre should be posted in this heritage group. However, there is one counterargument to this conclusion: the subcategory “across the Sava River” is the least popular subcategory, although it contains posts with images of the scenes outside the

10 <https://www.facebook.com/photo.php?fbid=1034714219924970&set=o.292980229098&type=3&theater>

11 <https://www.facebook.com/photo.php?fbid=911150112287227&set=o.292980229098&type=3&theater>

12 <https://www.facebook.com/photo.php?fbid=10208538589204420&set=o.292980229098&type=3&theater>

city centre. A possible explanation for this exception is that the images in the posts of this subcategory lack focus. They show empty streets and wide areas with buildings and some people in the distance. This could be a factor affecting negatively the interest of members in the posts and images in this subcategory.

Another important aspect of posts with images of the old Zagreb is the diversity of time periods in which the posted images were created. This aspect was also analysed. We have created categories for time periods of ten years. There is only one image that was created in the 17th century, whereas all the other images from the sample were created after 1851. Therefore, the first category included images created from 1851 to 1860, the second included images created from 1861 to 1870, the third included those created from 1871 to 1880, etc. The last category does not cover an entire decade but the years between 1981 and 1987 because one of the rules of this Facebook heritage group is that images created after 1987 will not be accepted. Figure 1 shows that the largest number of posted images were created in the period from 1961 to 1987 (53 images or 26.5%) and the period from 1901 to 1940 (86 images or 43%). The number of images created grows towards the end of the mentioned periods: from 1971 to 1987 (38 images or 19%) and from 1921 to 1941 (59 images or 29.5%). What could be the explanation for the strong presence of images from these particular periods? A possible explanation is the development of photography technology and a growing number of people who could afford the equipment. The development of photojournalism in the early twentieth century could also be an important factor contributing to the wider availability of photos from this period. Figure 1 shows considerable decrease in the number of images published during the two world wars. These wars and the recovery period that followed could be another reason for a fall in the production of images, books, newspapers and other printed materials in Zagreb during this period. We have mentioned these documents because they are the most popular sources of old photos.

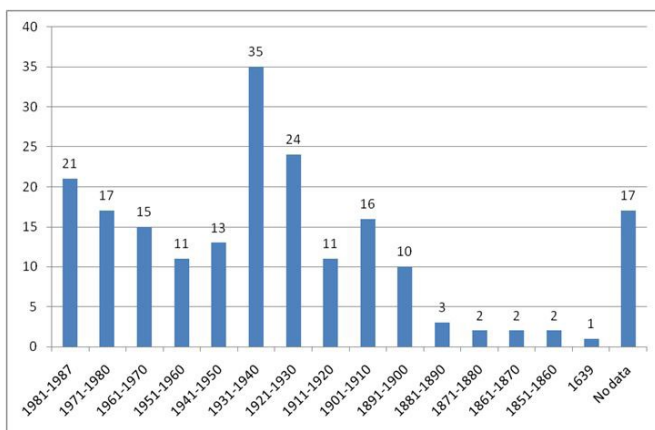


Figure 1. Distribution of posts with images created in different time periods

It is somewhat unexpected that the period from 1921 to 1940 is the most prolific period in terms of the number of created images. The second most prolific period is the period from 1971 to 1987. Surprisingly, this is not the most prolific period despite the fact that a photo camera became available to the majority of the population during that very period. It seems that in this heritage group old books, newspapers and archives are more important sources of old photos of Zagreb than personal collections. This is in spite of the fact that this group was created by "ordinary people" interested in Zagreb history and not by professionals working in archives, libraries or museums. Figure 1 shows that there are a few posts with images from the late 19th century and that there are no images from earlier periods, except for one image from 1639. This is a clear indication that contributors of images and descriptions in this heritage group are mainly posting images of Zagreb from the 20th century.

Another interesting aspect is related to the creation date of the posted images: the average number of member activities with regard to the creation date of images. Table 3 shows that members predominantly like the most recently created images.

Table 3. Average number of likes, comments, replies to comments, shares, and the percentage of posts with images created in different time periods

	Likes	Comments	Replies	Shares	Posts
1981-1987	238.14	10.95	2.43	14.71	10.5%
1971-1980	263	12.06	2.29	7.35	8.5%
1961-1970	171.4	5.67	2.8	3.4	7.5%
1951-1960	119.91	5.64	0.36	1.09	5.5%
1941-1950	120.77	4.31	0.85	1.54	6.5%
1931-1940	124	5.49	1.6	2.49	17.5%
1921-1930	101.83	5.52	1.78	1.74	12%
1911-1920	115.09	6.82	2.09	0.91	5.5%
1901-1910	99.19	5.44	1.38	1.06	8%
1891-1900	108	4.6	1.9	2.6	5%
1881-1890	75.67	1.33	2	1	1.5%
1871-1880	74	3.5	1.5	2	1%
1861-1870	107.5	5	3	0.5	1%
1851-1860	83.5	9	1	1.5	1%
1639	290	12	3	11	0.5%
Other posts	177.47	11.35	2.82	5.06	8.5%

The older the image, the fewer likes on average it will get from members. For example, the post with an image created in the period from 1981 to 1987 garnered 238.14 likes on average. The post with an image created in the period from 1951 to 1960 garnered 119.91 likes on average. Finally, the post with an image created in the period from 1901 to 1910 attracted 99.19 likes on average. There are slight deviations from this decline of interest, for example, a post created in the period from 1971 to 1980 received more likes than the post

with an image created in the following decade. But these deviations are the exception rather than the rule. These deviations are small and they occur only in neighbouring decades. Looking at this development over a longer period of time, the average number of likes for posts with older images is continuously falling. Previously, we have shown that the majority of the posted images was created in the period from 1921 to 1940. However, judging by the average number of likes garnered, it seems that members gave posts with images created in the period from 1971 to 1987 approximately twice as many likes as posts with images created in the period from 1921 to 1940. Preference of members towards posts with more recently created images was also confirmed when other member activities were taken into account. For example, members shared posts with images created in the period from 1971 to 1987 approximately five times more than posts with images created in the period from 1921 to 1940. Members also wrote approximately twice as many comments and replies to comments on posts with images created in the period from 1971 to 1987 as for posts with images created in the period from 1921 to 1940.

Other statistics related to specific image features were also calculated and presented in Table 4. It was found that members liked colour images twice as many times as black and white images. It is important to note that the large majority of images posted in this heritage group is black and white (86.5%).

There are only 13.5% of colour images. Colour images are more recent and they depict objects, people and events that are more familiar to the members, which may be one of the reasons why they like them more. Some members may prefer recently created images to older ones because they are in colour.

Table 4. Average number of likes, comments, replies to comments, shares, and the percentage of posts with regard to the presence of image colour and blurriness

Image Features	Likes	Comments	Replies	Shares	Posts
Color image	254.67	12.78	3.19	8.22	13.5%
Black & white image	132.07	6.22	1.73	3.38	86.5%
Non-blurred image	150.6	7.28	1.88	4.11	92%
Blurred image	125.81	5.06	2.5	3.19	8%

Another image feature that we put in relation to member activities is image blurriness. The majority of the published images is not blurry or not blurry to a considerable measure (92%). As expected, members prefer clear images to blurry ones. Blurry images are mainly older and that may also have a negative effect on the members' interest. Finally, it is important to emphasize the fact that other member activities are interrelated with members' likes. For example, members comment, reply to comments, and share colour images approximately twice as many times as black and white images. Members also comment on and share clear images much more frequently than they do with blurry images. The only exceptions are members' replies to comments which are given more often

when images are blurry. This pattern is identified in previously described analysis (subcategories of image types, topics and locations; posts with images created in different time periods). We found some deviations in the pattern, but mainly there is consistency. There is a positive correlation between this particular aspect of image posts with the number of likes, comments, replies to comments, and shares. It would be worthwhile to explore this relationship in further research.

Next, we will present the characteristics of comments and replies to comments on image posts. There are 1,421 member comments and 385 replies to comments on a total of 200 image posts. That means that on average each post attracted 7.11 comments and 1.93 replies to comments. These comments are mainly text-based, but they also include other types of media. It was found that comments and replies to comments contain in total: 141 images, 12 videos, 6 animations, 12 web links, 2 photo collages, 1 photo album and 331 icons (mostly smileys). Member comments and replies to them are a rich source of data about the scenes and topics presented in the main post. For example, images published in comments depict additional views of the scenes depicted in the main post image. Many images posted in comments depict the same location as the one in the main post, but the way it looks today. For example, a contributor of an old image posted in the main post has photographed the same scene in the present-day Zagreb and uploaded the recent image in the comment. The comment attracted many likes probably because it helped members to recognize the location depicted in the old image and make comparisons between the two photos of the same scene taken in different time periods. In the comments we also found image maps in which locations of the scenes shown in the main post were marked. Another such example are images depicting different aspects of the image from the main post: interior of a building; another point of view; another phase of a specific activity depicted in the main image, etc. Many videos that we found in the comments are music videos from YouTube. The topics of the posted songs are related to the topics shown in image posts. For example, in one post there is an image of a popular restaurant called "Dvije lipe".¹³ One of the comments on that post contains a link to the song "Kod Dvije lipe" whose lyrics are related to the restaurant "Dvije Lipe". Finally, it was also found that participation of members posting comments is highly appreciated. This is confirmed by the considerable number of likes that other members' comments garnered: 1,452. On average, each comment posted attracted 7.26 likes and replies. Appreciation for engagement of other members is also confirmed by the number of likes given to the images published in comments: 535 likes. Each such post got 2.68 likes on average.

We have also explored in more detail the contributors or members of the group who publish posts with old images. 200 posts were posted by 23 contributors. That means that every contributor posted 8.7 posts on average. But, as we

13 <https://www.facebook.com/photo.php?fbid=10208531395304577&set=o.292980229098&type=3&theater>

can see in Figure 1, there is a great variability in the number of posts written by individual contributors. Contributor 1 wrote 69 posts or 34.5% of the total number of posts. Contributor 2 wrote 41 posts (20.5%). Contributor 3 wrote 25 posts (12.5%). These three contributors together wrote 135 posts accounting for a staggering 67.5% of all posts. The total number of posts written by five most prolific contributors is 158 or 78% of all posts. The remaining 18 contributors wrote just 42 posts or 22% of all posts. Therefore, it can be concluded that the majority of posts was written by a small number of contributors. It is interesting that the distribution of posts in this Facebook heritage group is very similar to the distribution described by Chris Anderson in his Long Tail theory (Anderson 2007). This theory has been very popular and has inspired many scientific studies (Brown 2008, Brynjolfsson et al. 2011, Enders et al. 2008,). The insights from these studies could help us gain a better understanding of the behaviour of contributors in this and similar Facebook heritage groups.

Of the 23 contributors, 13 are male and 8 are female. The three most prolific contributors are male and the fourth and fifth most prolific contributors are women. According to their Facebook profile information, ten contributors live in Zagreb, one lives in Kutina, and another one in Slavonski Brod. Two contributors do not live in Croatia: Contributor 1 lives in Phalaborwa, South Africa. Contributor 2 lives in Remagen, Germany. However, it is important to note that these data can be made up. Contributors may have written a false current city to protect their identity or for fun.

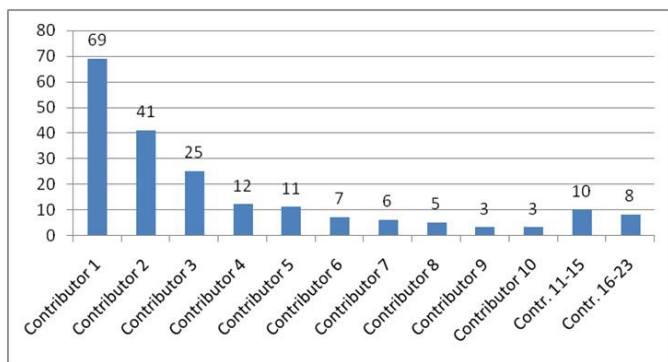


Figure 2. Number of posts by contributors

Recommendations for creators of digital libraries

Digital libraries (DL) should contain various types of images. Photos may be the most numerous, but librarians should publish diverse types of images. For example, photo collage images could be suitable for presenting two or more aspects of the same scene depicted in the image. Also, a photo collage image can consist of two images of the same scene created in different time periods. Adequately described images of the following type have a potential to

attract DL visitors and encourage their activities: music album covers, photos with text, illustrations, pages with text and images, posters, advertisements, album covers. If a digital library is created by an institution that maintains a considerable number of various analog documents, they could be digitized and published in a DL. For example, advertisements and illustrations can be found in old newspapers. The animations were not extensively used in the analysed Facebook heritage group, but DL creators could also create animations using old images. DL creators should consider integrating into DL interface the functionalities that enable visitors to chose digital objects from a DL collection to create calendars, posters, or advertisements. The resulting images could help raise the level of visitors’ satisfaction. Images created by users could also be used for the promotion of a DL.

If DL creators want to satisfy user interests and encourage them to engage in various activities related to DL collections and digital objects, then they should consider posting more images and other digital objects with specific topics and descriptions. However, these digital objects may be harder to find than those with more general topics (images of streets, squares...). However, images such as those depicting street views should not be neglected. They could be presented in combination with images with a more specific topic or with a more specific description which could compensate for the lack of topical specificity. In this way images with a more general topic could be made more interesting to users. However, regarding the effect that the specificity of image topic has on users, there are some questions that need to be answered: Is there a point at which too much specificity of objects or scenes depicted in images lower the level of user motivation to engage in digital library communication activities? What is an optimum level of image scene specificity that will encourage users to engage in digital library communication activities? It would be worthwhile to explore these issues in further research. Also, there is another issue regarding the images with a specific topic. For example, we found that the posts with images depicting a specific manifestation are less popular among members than posts with images depicting city exteriors, such as city streets and squares. The reason for that could be that a considerable number of members probably do not know much about these manifestations, especially if they took place a long time ago. It could be that posts with such images are less relatable for the members of this Facebook group due to the knowledge and time barriers. Therefore, DL creators should be knowledgeable about the events depicted in images and they should invest time and effort into describing them to attract and familiarize users with images depicting scenes whose topics are less familiar to them.

Judging by the interest of members, more posts with images depicting scenes outside the centre of Zagreb should be posted in the Facebook heritage group “Zagreb as it used to be”. Similar research on the user interest should be conducted in other Facebook heritage groups as well as in various digital libraries. Based on the findings, DL creators should seek to publish more images with locations which are more interesting to users. However, they should not

completely disregard images depicting locations which are less interesting for users. DL librarians should endeavour to select, publish and describe digital objects with an aim to satisfy the interests of DL visitors as well as to present diverse aspects of their heritage, without neglecting less popular documents.

Similarly, DL creators should monitor the number of images or other digital objects in a DL, and seek to create and maintain a balance in terms of the date of their creation. To attract visitors to digital libraries and to encourage their engagement in activities involving digital objects, DL creators should consider publishing more recent content. However, as guardians and promoters of heritage objects from different periods, they should create DL interfaces in order to integrate older with more recent digital objects. DL creators should explore the history and the context of digital objects in their collections to identify relationships that will help them integrate older with more recent content as well as stimulate visitor interest in digital objects by writing informative and interesting descriptions.

DL creators should identify, explore and monitor various characteristics of digital objects published in digital libraries as well as the user preferences and activities in relation to these characteristics. When they identify the characteristics of digital objects for which users have shown preference, DL creators should seek to offer more digital images with these characteristics. However, if certain valuable types of digital objects are less popular with users, then the DL creators should seek to find a way to increase the level of user interest in these objects. This could be done by describing the relationships between these and some other objects in more detail and in a clear and interesting way. They should also seek to find ways to adapt the DL interface so that the digital object which was initially less interesting for users, is presented in a way that will encourage users to look them up. This could be done by presenting in the same digital library the potentially "less interesting" digital objects with those that attracted greater interest.

An interesting finding from this research is that member activities on Facebook interface are correlated. By analysing the number of likes, comments, replies to comments, and shares, it was found that these four activities are often in a positive mutual relationship, i.e. there is a positive correlation between them. For example, colour images were preferred to black-and-white images and attracted twice as many comments, replies to comments, and shares. Also, clear images were preferred to blurry images and attracted a considerably larger number of comments and shares. This pattern in which various member activities have a positive correlation is also identified in the analysis of subcategories of image type, topic, location and time period. This indicates a consistency in the relationship between various member activities. It would be worthwhile to explore this relationship in further research on Facebook heritage groups and various digital libraries.

The majority of image posts in the analysed Facebook heritage group was posted by a small number of contributors. The distribution of activities is very similar

to the distribution described by Chris Anderson his Long Tail theory (Anderson 2007). This theory inspired the many scientific studies. DL creators could explore whether the distribution of activities in their DL libraries is similar to the long tail distribution. The insights from other "long tail" studies could also help us gain a better understanding of the behaviour of contributors in this and similar Facebook heritage groups as well as in various digital libraries.

Member comments and replies to them were found to be a rich source of data about the scenes and topics presented in image posts. Members are very appreciative of the comments written by other members. This has been confirmed by the considerable number of likes given to their comments. Digital library creators should also seek to create similar DL interfaces to enable the communication between users and their interaction involving digital collections and digital objects. If digital libraries had this kind of functionalities then users would be able to contribute content and descriptions and in that way enhance the value of collections. Enabling this type of user interaction and participation is also desirable because it seems that many users have a strong intrinsic motivation for engagement. They appreciate the recognition and praise from other users. Enabling user interaction and participation through an adequate DL interface is a necessary precondition for building a strong, motivated community of users and DL creators. This community should be mutually supportive and stimulating for members to contribute digital objects and descriptions to build better collections. The role of DL creators in the building and supporting of this type of community is very important. DL creators should closely monitor and support the activities of DL members. For example, they should expand on descriptive comments written by members. DL creators should also post additional digital objects in comments, seek to answer user questions and encourage and support user discussions and sharing of information about various topics related to digital objects.

Conclusion

The study has provided insights into the ways in which activities of the members of the Facebook group "*Zagreb kakav je bio nekada*", support the creation of the collection of the old Zagreb images and the building of its user community. We have also gained a better insight into the relationships between the characteristics of images posted in this group and the activities of its members.

Using content analysis, we have identified the subcategories of Image Type, Image Location, Image Topic and Image Creation Date. We have calculated the percentage of these subcategories in the total number of image posts included in the analysis. We have also calculated the percentage of image posts with regard to the presence of colour and blurriness in the posted images. In the phase that followed, we determined the frequency of various member activities related to the identified subcategories and image characteristics: members' likes,

comments, replies to comments, and shares. We found that the distribution of posts in this Facebook group is very similar to the distribution described by Chris Anderson in his Long Tail theory: the majority of image posts was published by a small number of contributors.

Based on the findings from this research, we have made recommendations for the creators of digital libraries which could help them plan and build better participative digital libraries and their user communities. We hope that insights obtained from this research will be valuable as a foundation for further research, for example, to explore the following questions: What is the role of the most active digital library users or content creators in the development of digital libraries and their user communities? Is there a point at which too much specificity of objects or scenes depicted in images lower the level of user motivation to engage in digital library communication activities? What is an optimum level of specificity that will motivate users to engage in digital library communication activities?

An additional contribution of this study is its novel methodological approach which could be used for the analysis of other Facebook heritage groups and various digital libraries. The findings could be used to validate the findings from this study as well. We hope that our study will give impetus for further similar studies on various digital collections and libraries, and that the methodological approach and findings from this study will provide a good foundation for further research.

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