# Some problems of professional processing of online social networks archives

Miroslav Novak, Ph.D.
Regional Archives Maribor
Glavni trg 7
SI-2000 Maribor
Tel.: + (386 2) 22 85 013
miro.novak@pokarh-mb.si

Tatjana Hajtnik, M.Sc.
Archives of the Republic of Slovenia
Zvezdarska 1
SI-1000 Ljubljana
Tel.: + (386 1) 24 14 200
tatjana.hajtnik@gov.si

## ABSTRACT

On online social networks generate contents, which have potential archival value and should be treated as archival material. In this regard, archivists must pay attention to this kind of content at already appraised creators of traditional (physical) archives. In the evaluation, acquisition, preservation and use of such records appear many archival professional questions. They are not so much tied to technological solutions of individual accomplishments of creation, preservation or acquisition of such records, but primarily on their complete and authentic form of content, which has immediate archival value, including its own authentic and reliable content and authentic content of authority records. For these reason these contents must be verified either in the procedures of data capturing in creation agencies or during the acquisition to archival institutions. The practical implementations of acquisitions however really show the complexity of the archival professional treatment of these types of archives.

## Categories and Subject Descriptors

H.3.7. [**Information storage and retrieval**]: Digital libraries – *collection, dissemination, standards, system issues, user issues.*

## General Terms

Management, Documentation, Reliability, Security, Theory, Legal Aspects.

## Keywords

Keywords: Web2.0, social network (the Internet), evaluation, methods of operation, archival professional principles, long-term digital preservation, use of materials, original decoration, original presentation, modifications to the material

## 1. INTRODUCTION

Development of modern online social networks is intense in recent years, and has a vast direct impact on the changes in wider formal or informal social communities such as "Arab spring" [1]. The impact refers to the formation of public opinion[1] and

expressing the views of individuals within certain groups[2], or to simple informing about individual events or other entities[3]. For this reason, the content of online social networks gets the subject of professional archival research and discussions, both in terms of their appraisal as well as the search for long-term storage method including an understanding of their integrity, usability and public faith. Let us mention only a few archival professional questions that appear in this context:

- Can be records created in online social networks actually defined as archives? If so, In which segments of social networks, these records truly have archival value;

- How to implement the basic principles of archival profession, particularly the principle of provenance and the principal of original order, in these environments and how to interpret them in specific cases;

- How to carry out the appraisal of records on social networks with relatively simple technological support;

- How to contextualize the records with archival value with related records, that are not defined as archives and thereby reduce the level of the resulting information and communication noise;

- How to implement the proactive role of the competent Archives over these records in terms of quantity, scope and method of administration of individual online social networks.

In identification of archival professional problems and their solutions [6], we will focus only on some basic methodological issues of implementation of professional archival principles and on appraisal of such records.

## 2. ONLINE SOCIAL NETWORKS IN BRIEF

Online social networks are applications, Web services, platforms or websites that build social relationships between people by means of modern technological solutions. [7] These now support different areas of human activity, including entertainment, participation in public affairs, distance learning, exchange of scientific and cultural information, financial transactions, etc. From the perspective of archival theory, online social networks are interesting mainly because of its dual nature. On the one hand, they represent the media of modern communication of multitude

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[1] Let us mention the Facebook Page »Franc Kangler should resign as a mayor of Maribor (Franc Kangler naj odstopi kot župan Maribora)« with total of 39.316 likes [2].

[2] Let us mention the Facebook Pages: »Barack Obama« with total of 42.618.068 likes [3] and »Tina Maze« with total of 337.544 likes [4].

[3] As an example, let us mention the US National Archives FB Page with 85.125 likes [5].

of individuals on their own behalf or on behalf of the legal person, on the other hand it is the modern way of expression, information exchange and ultimately, a form of two-way reciprocal social relations between individuals or between individuals and various groups. Online networks are communication channels for data transfer on entities in real life, and thereby the environment in which data get its meaning and existence. At this level, archivists must follow the principles of archives known for example from technologies of communication based on analogue technologies.[4]

Other, more complex nature of online social networks, we can define however as mapping of real life into their virtual version. In doing so, we are facing a systemic problem of distinguishing between the conceptions and contents such as "fiction", "virtual art", "virtual reality",[5] etc. Such archival professional problems are known from the past in real world for example in the relationship between the real event or person from the past and his poetical, musical, or artistic interpretation.

The third, most complex nature of social networks can be defined at the level of archival professional processing of authority contents, especially yet the fundamental entities of social networks. In the real world, it is possible to identify the natural or legal person by name, title, place of birth, establishment, dissolution or death and other identifiers, which are verified through a variety of legal, judicial and other procedures. In the sphere of online social networks, we are not familiar with the formal procedures that would ensure the credibility of captured authority content. Individuals can be members of different social networks where they usually do not have, or have only in exceptional cases, a reliable system of identification in various environments. However, if such an identifier exists, then it can be a problem in the process of formation of the authority record and its public faith. The content can be false basically, because the pseudo-code of a person without connection to a real person was used. However, the captured authorized contents can also be outdated, intentionally or unintentionally malformed or otherwise misleading.

It is expected that the problem will become even more complex when the number of migrations from one network to another will increase, the data on persons will be long-term stored in one or more source networks without being properly verified and ready for long-term preservation. From this, we can create an archival

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[4] For example 294 letters of Franc Miklosich, sent to his brother Morisu, preserved by Regional Archives Maribor [8]. Another example: 248 preserved letters of the soldier Žiga Janko from Motvarjevci, written from the front between the years 1914-1918, also preserved by Regional Archives Maribor [9].

[5] Discussed concepts often refer to identical content, but for the purposes of this paper they are defined as follows: "**fiction**" includes all online activities such as online games, their results and other mechanisms of expression of individuals (photomontages, fictional events, entities, etc.), even if based on events or facts from real life. The term "**virtual art**" defines all the results of artistic creation or re-creation of individuals or groups who have or do not have the basis in the events or facts from real physical or virtual life of persons, corporate bodies or other related entities. The term "**virtual reality**" defines all entities that are dealt with in a virtual environment and have their foundation in the real persons, corporate bodies or other real or virtual entities that have directly expressed public faith.

methodological problem of data capturing of authority content of "current" real entities, which are not always properly implemented in their "current" virtual entities.

At the same time, we can already find effective methodological solutions of links between the "past" real and "current" virtual environment in the presentation of archival material on the data level.[6] A consequence is the professional recognition that every entity from the reality must be unambiguously identified in a virtual environment, following the procedure that includes the validation of captured data. Individual entities can thus be defined in different ways for example with a unique geo location for spatial entities, creation of unique virtual profiles for natural and legal persons, assignment of unique identifiers of authority content, identification of the number and value e.g. bitcoins for performed work or payment etc..

During the "virtual" life, individuals or other entities are confronted with similar situations as in real-life, e.g. with the fluctuation in the intensity of communication, with the increase or decrease of the number of connected persons or other entities, with the volume of content, with the speed of information exchange, as well as deviations such as cybercrime.[7] At the same time their users face problems with the implementation of substantive corrections, consideration of legal limitations relating to the protection of personal and other data, data migration from one to the other comparable network or on local media and last but not least the problems of closing and termination of profiles. Users face also the problems related to the documenting of contextual information or data structures. From the archival theory and practice perspective arise issues such as how changes are implemented and how they affect the public faith of considered content within time and space?

## 3. ARCIVAL CONTENTS IN ONLINE SOCIAL NETWORKS

It is not easy to form the answer to the fundamental question relating to the content of social networks, whether they have archival or just temporally and spatially limited information value? There are many reasons. Let us mention only the outstanding dynamics and the scope of such systems, a relatively low formalized level of their legal protection, lack of the necessary historical distance, problems relating to the lack of professional criteria and procedures for their appraisal, etc. Solutions to these problems should be searched for in the relations between the physical form of archives and their derivatives on online social networks. The basic focus of archival professional activities should be given to the content analysing their form of appearance however, will obviously need to be defined as corrective factors of archival professional solution.

In designing the general archival professional point of view on content of online social networks, we have to distinguish the contents that were "born" in these environments from the contents

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[6] For example, the presentation of historical maps of the Habsburg Empire and the Austro-Hungarian Empire interacted with modern technologies of geographic information systems [10].

[7] In this context, let us mention only the assurance of the integrity of individuals against abuses such as unauthorized access to the data, integrity of individuals, online child safety, etc.

that are merely derivatives of content from other environments. [11]

Already archived contents to other media represent an example of derivatives, while online social networks serve only for their dissemination, promotion, etc. [12] In this context are popular activities in Slovenia, for example, the "Document of the Month" prepared by Archives of the Republic of Slovenia [13 ] and Historical Archives Ljubljana [14]. Online social networks are used not only for the purpose of presentation of archival material but also to inform the professional archival public about the various professional activities of archival institutions [15] or professional associations, for direct exchange of expert opinions between different practitioners or for notifying in critical situations.[8] Even in these cases, we can define the contents of the online social networks as derivatives of archival or non-archival contents from other technological environments.

Unlike derivatives, these environments contain "digital born" contents also. Thea are formed in the context of the functioning of social networks where there are also used and where they remain. Archivists must first appraise such contents as archival material [17]. In this context, we have to limit ourselves to those archival contents created by the creators of archives.

In the context of understanding and formation of general archival professional point of view, a survey conducted by the National Archives and Records Administration (NARA) between governmental institutions regarding the use of Web 2.0 is interesting. It shows that information on online social networks do not represent the official and credible source for the investigated state institutions.[9] This cognition results from the observation that such information is duplicated, the question remains however, which is the official source of information.[10] With online Web 2.0 tools, users simultaneously have the possibility of changing and adapting the appearance of the interface used for reviewing the information, they can improve processes and functionalities and add metadata and other functions. By adding new contextual contents they change the original context of the information (information "look and feel" is not static) and change consequently its value. The investigated institutions warn at the same time, that the disappearance of information from online social networks would be interpreted in the eyes of the public as avoidance of responsibility or desire to conceal. Despite the fact that the information no longer has the business value for their institutions they believe that it is difficult to find the real reasons for deleting information from social networks. In this context, we should mention also a document already adopted by UNESCO in

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[8] Cf.: information regarding the fire in the Archives of Bosnia and Herzegovina on February 2014 submitted by Facebook page.[16].

[9] The survey was conducted in 2010 and included state institutions: Department of State, Environmental Protection Agency, Joint Staff, NASA, United States Army, United States Geological Survey.[18]

[10] Institutions have indicated that many online tools (internal and external) have in-built rejections that make clear that the information has no official character. At the same time, they redirect the user on their official website, for example the Facebook and You Tube of the Department of State, where it is stated: "If you are looking for the official source of information about the Department of Justice, please visit justice.gov." [19]

2003 [20] that points to a number of factors that threaten the existence of digital records. Not only obsolescence of hardware and software, but also uncertainties about resources, responsibility and methods for their maintenance and preservation, and the lack of appropriate legislation.

In the continuation of the research, we will be limited only to the information and data structure legitimacy provided in the context of online social networks from the archival and information science point of view.

## 3.1 Methods of archival content appraisal on online social networks

It is well known that professional issues related to the appraisal of archival content are complex as rule. The answers often depend on well-established professional archival traditions, established levels of national consciousness and whit this associated consciousness of cultural property protection, financial and technical capacities of archival institutions, etc. In exceptional social conditions, answers regarding the appraisal of archival content depend also on the political, military or other repressive mechanisms. In the information technology era, technological solutions represent among others, an important factor of (none) appraisal of relevant content, including archival.

The evaluation of a creator of the physical archival material is carried out in accordance with a law or with the procedure of promulgation of an institution as a creator of archives. In case that the status of a creator derives from the law, criteria, under which certain legal persons have a status of a creator of public archives, must be defined. The same applies to the evaluation of creators on basis of the promulgation. Behind the evaluation criteria and lists generated on this basis, we can see a multitude of methods on basis of which we can define the criteria or individual evaluation entities. [21]

It is the same for the appraisal of physical archival material of individual creators. Archivists can help themselves with the provisional lists of document categories that always have a character of archival material. When archives in physical form are appraised, such an entity remains unchanged in form, content, scope, etc., regardless of whether we look at it from the perspective of the creator or the end user. Moreover, in terms of content and logic, links in the material remain unchanged, "frozen" at a given time and usually also in the space.

Evaluation of potential creators of archival material on online social networks can result at this stage of archival professional development also from the evaluation of real creators, regardless of whether they are defined on basis of the law or on basis of their promulgation procedures.

At the level of the appraisal of archival content of individual creators within online social networks, get procedures and decisions from the archival methodological point of view complicated. Such contents are often mutually related in terms of content, but sometimes only in terms of context. One can observe that some of these connections are very weak and exist only for a short time, while others are strong and defined as the fixed link. Weak contextual links are e.g. advertisements and other parallel communications that occur, and thereby dynamically change the whole presentation of this type of archival content in time and space.

Another problem arises when we export the contents of archival value from the original environment to the local environment. The subject of export are in the rule only "appraised" contents with solid connections in terms of content, while their weak versions in the rule are not subject to export. From a methodological point of view, the question arises as to whether archivists should evaluate only the content and its strong links in terms of context, which is the view of the creator of content or whether they should in the evaluation take into account the sight and feeling (Look & Feel) of a user. A third possibility is for archivists to preserve two forms (appearances) of the same content. This raises a multitude of other issues, to mention only:

- How to proceed if the same content occurs and is represented through two or more different user interfaces?

- How to deal on long-term with contents with strong in-built contextual connections, where the target content no longer exists (no information) or we have instead a completely different content (disinformation)?

We have to look for the answers to these and similar questions in the current archive doctrine, according to which the archives are stored in the original, arranged and generally in the specimen. We will have to complete this paradigm and develop methods and ways of appraisal of such archival content, which are not limited to archival content from online social networks only, but also on the content of the databases and static or dynamic documents that contain substantial contentual and logical connection.

## 3.2 Tools for managing archival contents on online social networks

Various services (free of charge and payable), which can be found on the web today offer a very good and useful functions related to the management of content in online social networks, but they are far from ideal. Many of them are experimenting with formats (formats), functionalities and capabilities they offer and change at any time. Usually they arise from commercial activities and are as such particularly problematic, as for example the company Backupify. [11]

Services that enable quite easy management of information on social networks are the ContextMiner and SocialSafe.

ContextMiner is a framework for the collection, analysis and presentation of contextual information along with the data. [23] It is based on the idea that when describing archival object contextual information helps to substantiate this object or allow its better preservation. It provides tools for data, metadata and contextual information collection from the web with automated searches. Currently ContextMiner supports automated investigation of blogs, YouTube, Flickr, Twitter and the open web. It also collects connection information for YouTube videos from the web. It works by selecting a source for collecting data and contextual information by entering search strings (queries), or URLs.

With the help of SocialSafe [24] service, we can get a copy of all records that have been posted (even if only written and never published) on Facebook, Twitter, Instagram and other networks.

Technological solutions, which enable the preservation of records transmitted to the public through their profiles (e.g. Twitter, Facebook), are also available to individuals. Through function in the settings of its profile, the user can sent a request for data export to the server, while the information is sent over a pre-determined e-mail address in the form of a zip file. Thus, for example archival content is located in the tweets.csv files, which can be accessed through the interface defined in the file index.html. Other files in the folder are necessary for the presentation of content in the local environment. [25]

Websites can also be saved (stored) using "save as". The entire content of the website is stored on disk as .mht file. It is still possible to use solutions such as capturing content in static, common JPG format with the help of functions for recording screen content [26]. Such content can be captured in a dynamic form like AVI as well.

However, in the case of these solutions we are talking about the "manual" processes, which quickly become impractical. Websites and social networks are complex sets of pages with links to other websites and contents. It would be difficult to use these practical "manual" methods, if we would like to keep all changes of the records of social networks. That would mean to use them several times a day (how many?) or even for multiple users (e.g. for all employees within the organization). We must not forget even on problems related to traceability of records and their modifications, and the problem of proving the authenticity, formats that become obsolete over time and records become illegible, etc.

There are also many archival and library initiatives, which began to engage themselves intensively with the management of records in online social networks. [27] The first example of capturing and storing tweets is the Library of Congress in Washington, to which the company Twitter donated its entire archives from 2006 to 2010. [28] However, later they have reached an agreement and they continue to preserve the tweets. In early 2013 they had in custody about 170 billion of tweets and their quantity is increasing daily. The volume of preserved tweets has risen since February 2011 from 140 million a day to almost half a billion tweets per day from October 2012. Any concern about modest documentary value of tweets is superfluous, since the Library of Congress wrote in their statement that the "preservation will enable the users in the future more comprehensive insight into today's cultural norms and trends". Although the archives were not yet available to researchers, they have recorded in early 2013 however, already about 400 inquiries of researchers from around the world.

Issues related to the long-term preservation of contents from social networks are closely related to the problems and solutions of storage and capturing of web sites. There are several known projects in this area carried out by The American Library Association, The Australian National Library and The Library of Congress. [29] Internet Archives keeps over 430 billion web pages [30] in special archival formats (arc, warc) which can be used only with a special interface Wayback Machine, developed by the Internet Archives. It enables browsing on the web archives and display of captured web sites in normal web browser. In Slovenia the National and University Library uses a similar solution [31]. Access to preserved web contents is commonly free, but the problem lies in the fact that they are captured only from time to time and the time of capturing is unknown and unpredictable. Even all the contents of these websites are not equally accessible than they were in their original form.

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[11] The company Backupify announced on December 2012 that they will no more provide security copies of the data of social network LinkedIn.[22]

## 4. AN EXAMPLE OF PROCESSING OF ARCHIVAL CONTENTS IN ONLINE SOCIAL NETWORKS

Already during the implementation of the project Maribor 2013 - European Capital of Culture, the Regional Archives Maribor established that the creator is a public legal person, which is obliged in accordance with the law to transfer archives to the competent archival institution. At the end of the project issues related to the storage and subsequent use of its content, including online social networks have become topical. Basic analysis of their contents showed that in the present case, we found duplicates of the content of the web pages on the project Facebook page, at the same time however, they provided additional information on the events at the web network Twitter and on e-mail.

From archival theoretical point of view were the contents of the treated creator of online social networks evaluated as archival material, which must be transferred to the Archives. In this context, the challenges in the field of implementation of the relevant acquisition in accordance with existing archival professional standards including problems associated with so-called anonymous administration of such systems, appeared. [17]. In the continuation we will discuss only the content of social networks Twitter and Instagram, which were established in the framework of the project Maribor 2012 - European Capital of Culture.

### 4.1 Transfer and processing of contents from social network TWITTER

In the social network Twitter were contents related to the project "Maribor 2012 - European Capital of Culture", presented in two accounts: @Maribor2012. Evropska prestolnica kulture Maribor 2012. Zavrtimo skupaj[12] and @ LifeTouch_2012 tweets that have been submitted in connection with the fourth programme topic of European Capital of Culture Maribor 2012 entitled Life on the touch.[13] In the process of transfer, the contents were packed in two independent Submission Information Packages (hereinafter SIP), which have been prepared separately. Solutions, allowed only by online network Twitter, were used. This means that in the present case advanced automated support solutions, developed for example by the competent archival institution, were not implemented.

Downloaded content was described in the archival information system of Regional Archives Maribor (hereinafter PAM) in accordance with the standards. Thereby Dissemination Information Packages (hereinafter DIP) were created. The difference between SIP and DIP is only, that PAM added the user interface in Slovenian and constant connection to the description

of the material. It was published in an appropriate secure an accessible web site within the domain under own administration.

PAM has not yet implemented any interventions on the content of the DIP. DIP data level analysis does not indicate potential problems, for example at the level of coding tables or functioning of links. Big professional challenges have been observed at the level of the functioning of external resources references located in reused domains on which the competent archive does not have their professional competence. This in practice leads to misinformation. Therefore, it will be necessary to implement interventions for the correction of references to external resources. That rises some archival professional questions. Let us expose only the questions relating to the implementation of the changes of archival content in such a way, that the corrected references would function properly, but at the same time, we would not need to interfere the content. There are also questions like How to create the presentations of the content in DIP, especially if it is changing dynamically already at the creator? It appears that in this case, on the one hand, it would be necessary to take the dynamics of the single presentation of the content into account, and on the other to carry out one or more snap shots from the pre-determined time.

It should be noted that in PAM they did not specifically commence the development of Archival Information Package, (hereinafter AIP) but have temporarily left the original data structure and organization of files. Only information about the username and password of each account separately was added.

### 4.2 4.1 Transfer and processing of contents from network ISTAGRAM

Instagram is an online service that allows mobile photo, video and related services sharing, enabling users to capture photos and video clips using on them the appropriate filters and then share them through various social networks like Facebook, Twitter, Tumblr and Flickr. [34]

Within the framework of the project "Maribor 2012 - European Capital of Culture" among others, Instagram photo contest CATCH YOUR INSPIRATION (UJEMI SVOJ NAVDIH) was organized. The competition has received nearly 1,000 photos in the context of three themes: #EPKUTRINKI, #EPKLJUDJE and #EPKSHARK. Photos and accompanying contents of the contest are stored within transferred online content of the entire project. At the same time, photographs were treated as a collection of photos in a special series, divided into three sub series, which correspond to three themes. The decision for such a solution was taken because the content of a website was designed on the model of open logical information loop, but from archival professional point of view, it was necessary to conclude the loops at least logically. That was carried out with the formation of static DIP. This is represented by archival description on the level of sub series [35] including presentations of photos submitted to the contest. To each photo in the DIP they added above in a package the narrow range that contains information such as:

- Reference code, which defines a unique place of the content of the photograph within the archival information system,

- Title of the series, which defines the basic contextual environment of photograph,

- Code of the photograph, which is unique and derives from the original title of the photograph.

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[12] On this account, 1365 tweets were created. They were organized into 61 files and 12 folders in total size of 2.92 MB (3,066,094 B). The page was followed by 1251 people (followers), the page itself however followed 346 other pages (following). [32]

[13] On this account, 1872 tweets were created. They were organized into 46 files and 12 folders in total size of 2.84 MB (2,982,965 B). The page was followed by 309 people (followers), the page itself however followed 341 other pages (following). [33]

In the context of the creation of DIP they were very mindful on the management of the sequences of individual entities in the sub series.

In the case of preserving photos with online social network Instagram, the Maribor archivists faced with similar archival professional issues such as the preservation of content from Twitter, especially with regard to design, AIP and DIP. Even in this case structures of files in the AIP have not been specifically tackled. They were temporarily left in their original data structure and organization. Added them only the information on the user name and password for access to the Instagram network.

## 5. CONCLUSIONS

Professional issues related to the preservation of online social networks contents of evaluated creators of archives can be dealt with on at least three levels: archival, informational and technological. On the archival professional level, in particular, contexts must be checked and evaluation of the content in accordance with professional archival principles must be implement. On the informational level entities such as information and misinformation, their completeness, correctness, clarity, integrity, and credibility, etc. should be checked. At the technological level, we have to deal however, mainly with correctness of the functioning of the content at technical level, the modalities for its presentations in a variety of environments including the modalities of implementation of their involvement in both the original as well as in the archival environment.

Key challenges in the management of online social networks contents represent their large quantity, rapid variability, mutual interpenetration, multiplication, rapid technological development and the lack of clear rules and standards for their management. Due to the large volume and constant changes of information on social networks, from the technological, as well as archival professional point of view, it will probably never be possible to preserve these contents fully. Therefore, it is necessary to develop methods for their evaluation. In doing so, it is possible to rely in some extent on known solutions, which are implemented for archives in physical form.

First archival experiences in this field show that the complex problem of long-term preservation of such content should be approached with all professional responsibility. Ability of comprehension of such kind of archival professional problems reflects the level of theoretical and practical development of modern archival services.

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