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O HISTORIADOR E UM MÉTODO: A MEMÓRIA SOCIAL DE UM DESASTRE VIA HASHTAG THE HISTORIAN AND A METHOD: THE SOCIAL MEMORY OF A DISASTER VIA HASHTAG

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PT | EN

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Abstract

Cyberspace is an operating environment of civil society of extreme importance in contemporary urban activities. Digital objects in cyberspace are potential historical sources. The objective of this study is to explore a possible way to produce these sources. Here, one can find methodological issues identified along a path followed by a historian, a laywoman in digital technologies, who explored a method of producing historical documents about a disaster using a search engine and a hashtag. The article provides a brief history of hashtags, justifies the use of this tool, and suggests important resources to observe when defining keywords. It indicates the action protocol used to deal with the hypertextuality of the collected and saved objects. Finally, it provides an overview of the content present in the documentation produced, which is accessible via a link and points out the complications and potentials identified in the employed method.

Keywords: Digital object, History, Hashtag, Social memory, Mariana disaster

1 Introduction: why should the historian explore methods that employ digital objects?

The idea that we are in a "digital age" illustrates the relevance of the production of digital artifacts to the detriment of the already known analog artifacts. Although the latter still have great importance, the first have generated impactful questions to the historian's craft. With various forms and contents, the digital artifacts, which result from the everyday practice in cyberspace, impact different social dimensions and generate problems to be explored by scientists of our time.

We understand that the historian produces documents (Certeau, 1982). We recognize that the collection of data, testimonies, images, and so many other forms of a trace (Bloch, 2001) are an essential part of our profession since the historical narrative must be based on evidence (Hartog, 2011). We assume that the relationship with this evidence also changes as new configurations arise in the spaces that store these pieces.

In this case, cyberspace is unstable and flexible, upgradeable, and erasable. Therefore, the historian needs to face such changes in favor of broadening the means of carrying out his profession. We have to adapt.

This study presents the experience of a historian who employs an unpaid search engine and a digital indexing tool to produce documents and compose the social memory of an event. The biggest challenge of this experiment was to know "how" to perform it since the reactions of the digital environment to the methods employed were unpredictable.

Roy Rosenzweig (2003) problematized the production and control of digital artifacts. He questioned whether the historian of the future would have to deal with the abundance or scarcity of digitally produced information. Between 2003 and 2019, there was no technical apparatus that guaranteed the availability of digital artifacts produced in the present for the study of historians in the future.

Besides the problem of whether available or not, we recognize that digital objects have specific characteristics and that, to identify them, we need to explore them. Questioning which information these objects will contemplate, Pimenta (2016) defends that, since society is culturally immersed in digital practices and that these, in turn, involve the use of technical objects, the relationship between practice and technique is essential for the production of knowledge (Pimenta, 2016). This highlights the importance of exploratory research that can elicit the different perspectives involving technical digital objects and digital objects from specific practices of the digital era.

In an interview, Professor Daniel Alves of Universidade Nova de Lisboa stated that the overabundance of data is perhaps the most significant challenge to be faced because it would cause changes in the way "the historian builds his vision of the past" (Alves, 2017, p. 4). The elaboration on a past requires from historians a documental basis and is, therefore, an exercise closely linked to the production of documents.

Exploring the production of born-digital historical sources¹ requires considering that the digital environment is composed of a multitude of environments, which each is designed to support, in a more satisfactory way, specific formats of artifacts while offering distinct functions and tools. Citing some examples, there are: for videos, Youtube; for images, Instagram; for small texts, Twitter. Some environments, such as blogs and websites, support more than one format. Among the tools, we mention the search engines and content indexers, for example, Google and hashtag, respectively. Far from exhausting the problems that encompass this exercise, we believe that, by providing a perspective derived from an empirical study, we contribute to the improvement of methods and/or the creation of tools that will help future historians to use these sources.

The data presented herein were obtained in research developed during the years 2017 and 2018 in PPGHPB (FGV/CPDOC)². Applying guidelines and experiences from communicational, computational, informational, and social sciences, we prepared and conducted an exploratory study using the hashtags #SOSRioDoce and #1AnoDeLamaELuta as keywords. This way, we recovered digital memories produced due to the disaster that occurred on November 5, 2015, in the subdistrict of Mariana, Minas Gerais (Brazil). We employed a digital search tool, Google, to recover contemporary digital artifacts produced in the context of the Mariana disaster through an indexing tool – the hashtag.

2 Method: create samples, save documents and organize data

To analyze the stability of the recovery of digital objects related to the disaster, we executed three Recovery Tests (TR) with each hashtag, in the same standards but on different dates. These repetitions generated three answers to the same question and the comparison of the results allowed us to check the recovered data and identify potential changes in the results. That is, with these three samples we were able to identify the appearance or disappearance of digital objects. Table 1 below details the dates on which each test was conducted.

TEST	#SOSRioDoce	#1AnoDeLamaELuta
TR 1	October 23, 2017	September 6, 2017
TR 2	November 23, 2017	November 9, 2017
TR 3	December 23, 2017	December 6, 2017

Table 1: Schedule of tests performed. Source: Author, 2020.

It is impossible to escape all these influences or even understand all the decisions made by the search engines in providing the results. Enabling incognito browsing (Ctrl+Shift+N)³ and setting filters that guide the results

contribute to the reduction of certain influences and the presence of information outside the scope of the search. At Google, we apply the following filters to #SOSRioDoce: Any country > In any language > (Custom Interval) November 1, 2015 - November 30, 2015 > Sort by date > All results. For #1AnoDeLamaELuta, we applied the same filtering options with a different custom interval from November 1, 2016 - November 30, 2016 (#1AnoDeLamaELuta was created only in the year 2016). After the completion of each TR, Search Result Saving (SRB) was performed and then each URL present in the search result was accessed and the content transformed into PDF.

Digital objects are capable of carrying their hypertextuality even after their conversion into PDF. The hypertext establishes links between pieces of information of different sources and formats, generates different "nodes", and build a network of associations with other documents through different *links* (Lévy, 2010). Hypertextuality significantly expanded the choice of what to validate or not in the search results and required us to adapt our method by including organizational criteria and protocols to define the scope of our observations.

For items that contained sub-items, i.e., that indexed other publications contemplating the predetermined criteria, these sub-items were considered as branches of their original items. For example, when Item 26 directed to another relevant publication, it generated 26-1, and so on, 26-2, 26-3. With all the SRBs of the three Tests and having the contents of each Item recovered and saved in PDF, we moved on to the collection of information.

There were action protocols. First, a content shared by third parties always had its original producer identified, and the URL to access the publication was saved. Second, for considering the contents accessed by hypertextuality, they needed to have the searched hashtag. The identification of the validation, or not, of the recovered objects, as well as the other data extracted from these contents, were organized in Excel spreadsheets, which generated a structured database.

The attributes employed in the organization of the data were defined during the survey to facilitate the observation of the information collected in the recovered publications. The columns containing *Item*, *Cleanup*, *Description*, *Publication Date*, *URL*, and *Notes* were important, respectively, to: quantify, select, transcribe or explain contents, confirm the date, register publication address, and add extra information about the recovered digital object. Through the attributes @user, hashtag, and Platform we identified, respectively: the actors responsible for the publication; the tags indexed to the main tags; the digital environments that allowed access to the contents containing the searched hashtags.

The structuring of the spreadsheet with the information about the produced documentation was the first result obtained. Spreadsheets and publications in PDF format are available in "Documentary Corpus #SOSRioDoce and #1AnoDeLamaELuta" through an electronic address (Lúcio, 2018).

3 Hashtag: understanding these tags

The hashtag is a digital tag capable of organizing and indexing information (Caleffi, 2015, Boyd et al., 2017). Initially carried out by professionals of the informational field, the indexation with hashtags is an increasingly common practice among non-specialized Internet users, who enjoy the autonomy of tagging their publications and third-party publications. The use of hashtags became popular with Twitter and was encouraged by the technologist Chris Messina. In 2007, Messina informally suggested to the network administrators the application of the *hash* (#) symbol as a tagging strategy to organize publications. Since then, the company has used and encouraged the use of *tags* in *tweets* (Boyd et al., 2017).

This symbol had already been used in communication technologies prior to social networks (Carlsen, 1996). However, programmers were the great responsible for its use as the # (*hash*) symbol operator of a function (Boyd et al., 2017, Salazar, 2017). The *hash* function uses an algorithm that creates indexes that facilitate content retrieval. The symbol that operates the process was the inspiration for the conception of what we know today as the hashtag.

Currently, these theme tags are produced and reproduced on different platforms and the digital memories they index are hosted on different servers. Its indexing capacity contributes to the retrieval and compilation of the content created by different users through search engines, leading to their evaluation as a set of information on the same theme. In fact, there are countless objectives and reasons for the insertion of a hashtag into the content.

The hashtags may arise *ad hoc*, conceived by recent events, and *praeter hoc*, focusing on debates and other content on future events (Brunns, Stieglitz, 2012). Each reuse of the same hashtag created for a specific purpose is understood as the endorsement of users regarding the default purpose for that tag. The manifestation of these tags is always expressed through the terms that compose them. The linguist Paola M.

Caleffi identified that, besides categorizing, the hashtag has served to emphasize things said, warn, express personal feelings or emotions, support events or movements, self-mockery, brand promotion, and participation in chat or conference (Caleffi, 2015).

Examples of the use of hashtags show the link between their terms and the motivations for the use of tags besides reinforcing the versatility of this tool: #sandiegofire was used for the first time in 2007, indexing information on open roads and other practical issues related to the fire that took place in the San Diego region (California, USA); #ForumZLu and #archivesforfuture, was used by participants during debates at the first Z Forum, whose theme was "Archives for the digital age" (Spirinelli, 2017); #sidibounzid, was used by protesters dissatisfied with Ben Ali's government after the publication of the video of the self-immolation of a young man from the city of Sidi Bouzid; #occupywallstreet, associated with the U.S. social justice movement that occupied Wall Street in the Financial District in New York (Castells, 2013); #SGMemory, was a tag headed by the State of Singapore that resulted in more than 38,000 tweets referring to Singapore and constituted a collection of memories (Tang, 2013).

These practices reinforce the Internet user's performance as a producer – an organizer even in a lay way – of digital objects, whether publishing a family photo, a comment during an event, spreading ideas about a movement, or simply expressing a feeling.

The disaster that occurred in 2015 in Mariana, Minas Gerais, generated several public manifestations in the network that were indexed by different hashtags. Among so many, the *ad hoc* #SOSRioDoce, posted by the profile @sosriodoce, incited people to tweet about the issue and became a *Trending Topic*. *Praeter hoc*, the #1AnoDeLamaELuta, released by MAB - Movimento dos Atingidos por Barragens (Movement of Dam-Affected People), indexed contents aiming to invite society to a march that would take place on the first year after the disaster.

These tags were chosen because they were created at different times and with different objectives. While #SOSRioDoce indexed digital objects created during the days when toxic mud hit several cities until it reached the coast of Espírito Santo, #1AnoDeLamaELuta was a tag used almost a year after the disaster, indexing digital objects. Such objects stimulated the exercise of remembering the disaster and called for a space in the social memory of this past that still impacts the lives of people affected.

Using the hashtag as the keyword is a way to collaborate with the filtering of the content you want to find. Therefore, it is important to know the context of tag creation. Even if this is not a fully functional strategy, it favors greater preciseness regarding digital objects. Formed by words, as expressions manifested in tags, the hashtags transmit judgments, values, and perspectives, which, endorsed by their users, criticize or praise their contexts. This understanding extends even to hashtags employed in association with others we use as keywords.

4 Google: what samples told us about the search engine

Using the *trending topic* #SOSRioDoce, we obtained a much more significant quantitative result than with #1AnoDeLamaELuta. In one of the tests, we managed to access 95 digital objects with #SOSRioDoce, while we obtained the maximum of 19 objects with #1AnoDeLamaELuta. The observation of the environments where we found these objects provided an idea concerning the expansion of cyberspaces considered receptive to this type of tagging. As the hashtag started to index content in diverse digital environments, its identification became a historical exercise of recognizing its application and a strategy to evaluate its functionality as a recovery mechanism in cyberspace. To distinguish the "places" accessed by the search engine via hashtag, we established, during the search, a typology containing API (Application Programming Interface); Blog; Platform (crowdfunding or video-sharing); Social network; various content producer; Online magazine; News website.

The oscillation in the samples generated different possibilities of accessing different contents in different digital environments. In each TR performed, the sources accessed through the same hashtag were not identical, as well as the environments provided them, reflecting directly on the typology of the recovered contents. Among the digital environments that offered access to content with #SOSRioDoce, we had the gradual increase of Instagram image recovery APIs. Although using Mulpix and Imgrum⁴ since TR1, the publications recovered through them have oscillated both in content and quantity. The increase of APIs allows us to interpret that such tools, Picstoc and SocImage, were not part of the scope of APIs accessed by Google in the periods when they were absent from TRs.

The samples captured during the three tests performed with #1AnoDeLamaELuta indicate that 11 items from TR 1, whose contents were created on a news website, a social network, and a website, were absent during TR 2 and TR 3. The period in which the researcher conducts the search also influences the results. It became

clear that the further away from the date of the event, the smaller the result of memories obtained, especially with a hashtag that did not become a *trending topic*.

The results obtained with the research especially reinforced the unstable character of cyberspace. However, the massive use of networked digital devices is one of the aspects that historians should overcome in favor of a historical production reconciled with the use of digital objects.

5 #SOSRioDoce and #1AnoDeLamaELuta: the @users of these tags

The samples indicated a continuous production of tweets made by user @agenciamosca, which started at 6:08 am on November 13 and stopped at 8:48 am on the same day and became the biggest content multiplier with #SOSRioDoce. Between 6:08 am and 6:43 am, @agenciamosca was close to reaching the frequency of one publication per minute. The contents accessed through #1AnoDeLamaELuta did not indicate any user as the main multiplier of the tag. However, observing the tests individually, we identified that, in the TR 1, the MAB Nacional (Movement of Dam-Affected People) was the user that most applied the tag in publications, whose contents disappeared from the results obtained in the following tests.

Most of the documentation originated during the tests performed with #SOSRioDoce registered the use of social network profiles created by individuals or companies related to *marketing* and communication activities on the *web* and associated with Governador Valadares, one of the affected cities. The #1AnoDeLamaELuta, however, was more employed by pages of institutions and did not stand out through social network profiles.

6 Hashtags that report, inform, locate, and mark the time

Associated with #SOSRioDoce, a tag that asks for help for a river, we identified other 135 hashtags present in the contents recovered during the three tests. Most of these tags contained city names or claims for prayers, help, and donations. Still, according to documentation, the hashtags most reproduced in association with #SOSRioDoce sustained an informative and reporting tone. Namely: #estamossemágua, #imprensacalada, #nãofoiacidentefoicrime, #riodoce morto.

Among the geographical locations identified through associated hashtags, we identified the #BentoRodrigues, a tag with the name of the first subdistrict hit by the waste; the #RioDoce, referring to the river that carried out the toxic mud; #GovernadorValadares, a city that held a significant water crisis caused by the disaster; #EspíritoSanto, referring to the second State to receive the waste; #Linhares and #Regência, a municipality and a district, respectively, where the mud passed before reaching the Atlantic Ocean.

Among the localities that were off the path of the waste, #Paris called attention for referring to a locality in another continent. The association between #Paris and #SOSRioDoce took place because the city of Paris was the target of several attacks in the same month the mud flowed throughout the States of Minas Gerais and Espírito Santo. This association reveals the link created between distinct events, which agglutinated born-digital memories, evoked through the networks, of a given period within an intercontinental context. Differently from #SOSRioDoce, the documents presented the association of #1AnoDeLamaELuta with only 32 hashtags. The most reproduced tags were the #RiodeGente, whose terms seek to illustrate the proportion of people affected by such disaster, and the #NãoFoiAcidente, a tag that has a denunciation character.

The first information provided by the #1AnoDeLamaELuta is temporal and relates to the '1Ano' (1 year) period after the disaster. The following terms qualify this '1Year' as 'DeLamaELuta' (of mud and struggle). This timestamp caught our attention to its actual functionality after we identified a change or adaptation of users by employing this hashtag. In September 2017, a few months before the disaster complete two years, some users started using #2AnosDeLamaELuta, which we consider a tag of continuity to #1AnoDeLamaELuta.

Today, it is already possible to find, on the web, contents about the disaster indexed through #3AnosDeLamaELuta and #4AnosDeLamaELuta, which are also linked to contents that deal with subsequent ruptures of dams.

7 The Mariana disaster: a brief story told with digital artifacts

On November 5, 2015, one of the dams of Samarco Mineração S.A. – an enterprise owned by Vale S.A. and BHP Billiton – collapsed, spread a toxic mud, and destroyed the subdistrict of Bento Rodrigues, in the municipality of Mariana, Minas Gerais, Brazil. Hundreds of people were left homeless and seventeen died (Minas Gerais, 2016). The mud caused an environmental disaster whose consequences will take, at least, a hundred years to reverse. Spread over six hundred kilometers and reaching Rio Doce, the mud was embodied by the river, covered hundreds of kilometers, crossed the State of Minas Gerais, reached the State of Espírito Santo, where it continued until reaching the Atlantic Ocean.

Five days after the collapse, seeking to give visibility to the tragedy, journalist Silvana Soares took the initiative to create a profile named @sosriodoce on Facebook. Two days later, through @sosriodoce, she started to instigate other users to use #sosriodoce aiming to generate a ⁵ (Soares, 2015). As we can see in Figure 1, at 4:03 am on November 13, 2015, @aminygusmao published on her Twitter: "We are already in the trends!! #SOSRioDoce" (TR1 Item 26-16-1).



Fig. 1: Image capture of the publication by AminyGusmão. Source: Gusmão, 2015. Available at: <https://twitter.com/aminygusmao/status/665137990528835584> [Accessed 27 April 2020].

That same day, @agenciamosca dedicated intensely, for about two hours uninterruptedly, to the production of small phrases indexed with #SOSRioDoce. For example: in TR 1, Item 26-21 "We Need Help" (Agência Mosca, 2015a); TR 1, Item 26- 34 "Very Sad" (Agência Mosca, 2015b); TR 1, Item 26-13 "We Cannot Be Ignored" (Agência Mosca, 2015c); TR 1, Item 26-26 "We Need Help" (Agência Mosca, 2015d); TR 1 Item 26-29 "We Want Water" (Agência Mosca, 2015e). The use of the *trending topic* in several publications on Twitter emphasized this user in three search results conducted in different months of 2017, which allowed us to conclude that @agenciamosca was the biggest multiplier of #SOSRioDoce. On November 18, 2015, the digital magazine HuffPost Brasil (TR 2-Item 10) published an article with data provided by DAPP/FGV that indicated the #SOSRioDoce as the most used hashtag in the network during the seven days following the disaster (HuffPost, 2015).

Among many publications, we identified other hashtags employed with #SOSRioDoce that asked for help, donations, and prayer: #doeágua, #doeáguamineral, #doeamoremlitros, #ore, #oremosporParis, #oremospormariana, #OrePorParis, #prayforparis, #PrayForWorld, #sosebentorodrigues, #sosES, #SOSEspiritoSanto, #sosgovernadorvaladares, #sosg, #sosMariana, #SOSMarianamg, #sosMG, #sosminas, #SOSMinasGerais, #SOSRegência, #SOSRioDoce, and #sosvaladares. The feeling of solidarity led to the distribution of water by different entities and people from civil society and stimulated the manifestation of artistic expressions in different ways. As we can see in Figure 2, Flavio Wetten created a drawing of hands in a prayer position between the words Rio Doce and Paris, merging two tragedies in a temporal context.



Fig. 2: Image capture of the publication by @duplacarioca. Source: Wetten, 2015. Available at: <https://www.instagram.com/p/-Eipi0D3N7/?igshid=sb3o1fgh6jQ> [Accessed 07 July 2019].

Indexed with the #SOSRioDoce, we find the poem Lira Itabirana (1984) by Carlos Drummond de Andrade (Figure 3).

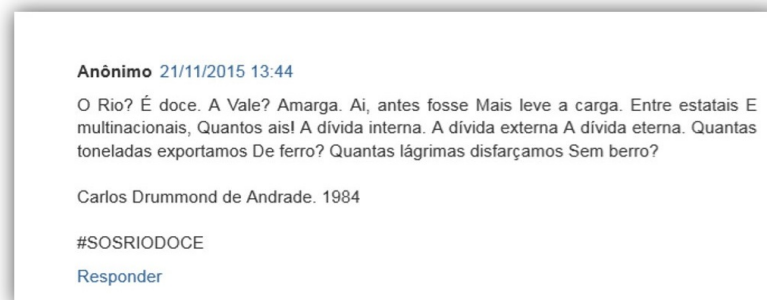


Fig. 3: Image capture of the publication made in Myrian Figueiredo's Blog by Anonymous. Source: Anonymous, 2015. Available at: <http://myriamfigueiredo.blogspot.com/2015/11/municipio-de-pirapora-e-ministerio.html> [Accessed 27 April 2020].

Figure 4 shows photographs also indexed with the #SOSRioDoce. The images portray the river before and after the disaster.



Fig. 4: Image captured from a Facebook post. It portrays the "Foz do Rio Doce em Regências (Linhares/ ES). Source: Bethânia Zanata, 2015. Available at: <https://www.facebook.com/photo.php?fbid=1027309667320246&set=a.653586234692593&type=1&theater> [Accessed 27 April 2020]

While the Government of the State of Minas Gerais worked on the identification of the areas impacted by the disaster, the networked shared digital memories were indexed with *hashtags* containing the names of the cities directly affected and the location of people in solidarity with those affected. This brought a small notion about the scope of the information concerning such disaster: #belohorizonte, #Brasil, #brasil, #EspíritoSanto, #ES, #ibituruna, #minasgerais, #Paris #pracaduquedecaxias, #riodejaneiro, #sãopaulo, #uberlandia, #vilavelha, #vitória.

Almost a year after the disaster, on September 27, 2016, a call was published on social networks with the following message: "#1ANODELAMAELUTA (Figure 5). The crime of the Rio Doce will never be forgotten! 10/31 to 11/02 March from Regência to Mariana. 11/03 to 11/05 Meeting of the Affected in Mariana. Fighting is organizing to conquer the rights" (MAB, 2016c). The publication was made by MAB - Movimento dos Atingidos por Barragens, a national organization whose origin dates back to the years of 1970.



Fig. 5: Image captured from the video published on Youtube on September 27, 2016. Source: MAB, 2016. Available at: <https://www.youtube.com/watch?v=x8lAs7sRrGs&feature=youtu.be> [Accessed 27 April 2020].

The march called through #1AnoDeLamaELuta made the anniversary of the disaster a moment to remember the tragedy and evaluate the resolutions taken until that moment. According to MAB's publication, several

entities would be present at the meeting, such as the Archdiocese of Mariana, the Network of popular male and female doctors, the National Council of Human Rights, the Federal Public Prosecution Office, and the Public Prosecution Office of the State of Minas Gerais (TR 1, Item 8).

On November 1, 2016, almost a month after the call and release of #1AnoDeLamaELuta, the user @criolo.official published a video produced by Greenpeace and Oloko Records showing the artist Criolo reciting a poem:

Naquela barragem da mente
Se escondia um perigo
O que os olhos não veem
O coração se afunda no lixo
Mente podre que esconde o sumiço
Do amor mais puro do mundo
Morre gente,
Morre planta,
Morre bicho.
Dentro de mim corria um rio,
Um tanto verdade
E outro tanto fingido (CRIOLO, 2016).

The poem, indexed with the *hashtag* #1AnoDeLamaELuta, was shared on several social networks.

On November 2, 2016, one day after the prominence of the poem throughout the internet, Mídia Ninja, a network of media activism, recorded another type of artistic manifestation. Figure 6 shows a scene from the intervention carried out by Levante da Juventude (Youth Uprising) in the city of Ipatinga (Minas Gerais, Brasil), which received the caption "March of #1AnoDeLamaELuta, which makes [made] the path of destruction of Samarco's mud" (@midianinja, TR 1, Item 13-3).



Fig. 6: Image captured from @midianinja's Instagram. The scene of an intervention held during the March of #1AnoDeLamaELuta, in Ipatinga/MG. Source: Ninja Media, 2016. Available at: <https://www.instagram.com/p/BMUhdWshQcc/?tagged=1anodelamaeluta> [Accessed 27 June 2020].

In November, during the march from Regência to Mariana, different public figures joined the movement. Figure 7 shows the mayor of Baixo Gandú, @netobarros_65, as one of these representatives. During a meeting held at the Mariana Arena, he posed for a photo holding a poster with the words "#1AnoDeLamaELuta Somos Tod@s Atingid@s".



Fig. 7: Image captured from publication by @netobarros_65 on Instagram. Image of Neto Barros, mayor of Baixo Gandú, which was one of the affected cities. Source: Neto Barros, 2016. Available at: <https://www.instagram.com/p/BMW2lpmhCBS/?tagged=1anodelamaeluta> [Accessed 27 April 2020].

We accessed people's testimonials, also indexed to the #1AnoDeLamaELuta, about the consequences of the disaster on their lives. In TR1, Item 2, we found the testimony of Sonia, a resident of Gesteira, who reported that her daughter began to have symptoms of diarrhea, body spots, and fever after the arrival of the mud. She also said that the residual waste was used to make the city's paving (MAB, 2016b). Other testimonies were dedicated to describing how the environment of Barra Longa was before the incident. In TR1-Item 3, Claudineia stated that "[the] name Barra Longa is because a long bar was formed between the rivers of Carmo and Gualacho". According to Mrs. Geralda, "[it] was beautiful, the Gualacho River, with clear water, met Carmo River that had very dark water" (MAB, 2016c, p.1). One year after the disaster, Figure 8 depicts how the water remained muddy.



Fig. 8: Image captured from a publication made by MAB Nacional. Source: Leandro Taques and Maxwell Vilela, 2016. Available at: https://www.dropbox.com/sh/sxiaf9pyrhqzyc8/AAAx4CEghPYL0WsAxy_2gr9za/Publica%C3%A7%C3%B5es%20%231AnoDeLamaELuta/TR%20%20%231AnoDeLamaELuta-%206set2017/3.pdf?dl=0 [Accessed 27 April 2020].

Concerning the recovery of the spaces hit by the mud in Barra Longa, the testimony of a merchant and property owner accused the inoperativeness in the restoration of the properties. According to her, her house was brought back without doors or windows. The district of Bento Rodrigues no longer exists but, looking at Figure 9, we know that before the disaster, probably in house number 63 of some street, passers-by came across a sign announcing "WE SELL ICE CREAM AND POPSICLE".



Fig. 9: Photograph of Bento Rodrigues published by @catracalivre on Instagram. Source: Matheus Castro, 2016. Available at: <https://www.instagram.com/p/BMcqHG6gE21/?tagged=1anodelamaeluta> [Accessed 27 April 2020].

These pieces of information are fragments of the social memory reconstitution of the Mariana disaster and, especially, the exercise of telling a story about the history of documents accessed and produced through two *hashtags* that index digital memories about the same event.

Among the things we did not tell, we highlight that we would not have access to the stories of Sonia, Claudinéia, and Mrs. Geralda if we had only carried out the TRs for December. Also, we would not know that the precursors of the researched *hashtags* were @SOSRioDoce, the first profile created to stimulate the use of #SOSRioDoce, and MAB Nacional, the precursor of the use of #1AnoDeLamaELuta. This happens because, in all samples, the presence of these two users was significantly reduced. The explanation for this may be linked to the ideas of Langville and Meyer (2006) about the reduction of the recommendation *status*. Perhaps, the pages of @SOSRioDoce and MAB Nacional, which are movements engaged in specific causes, have been interpreted as having little discernment since they have a constant positioning on certain themes. This may explain their reduction – or removal, in the case of MAB – in the search results, differently from @agenciamosca, which, despite manifesting, is a business profile that possibly publishes different kinds of content.

Consequently, even though the profile is a precursor to the use of a tag, this does not ensure its presence or the indication of its content through the search results.

8 Conclusions

The contents accessed and presented in this study express the diversity of information that can be extracted from digital memories present in the created collection and illustrate the potential that innate digital objects have as a historical source to future historians. Whether to study network mobilizations, forms of expression, and social organization or reconstitute a past event.

Besides offering date, time, location, characters, and images, the digital documents produced through the study are a product of the social memory about the disaster caused by the collapse of the Fundão Dam. The digital objects and methods used to access them lead the historian to the preparation of a digital social memory that also contains forgetfulness. These, in turn, are operated by different dimensions involved in the existence of these digital artifacts.

The initial methodological choices were reviewed and adapted during almost the entire course, requiring the creation of protocols, imputation of observational limits, and establishment of typifications. Although expected, we could only measure these adaptations through empiric research.

The replication of this study will certainly lead the researcher to other scenarios, actors, and contents, that is, to another story. And yet, by using #SOSRioDoce and #1AnoDeLamaELuta, he will also be accessing digital objects that endorse the context in which these tags were created. The use of *hashtags* to access information on the network is related to the search for actors and content that express on the same subject. This method can help historians that search for social memories related to specific themes.

We recognize the potential of abundant documentation on the Internet. However, considering especially the search engine employed, we face a restrictive and information-inducing environment that reinforces the

necessity to create search engines specific to the historian profession.

Finally, even though we have set up an accessible database, there is always the possibility of its deletion or disappearance. This makes the printed format an extra guarantee of the preservation of these documents, increasing the costs on behalf of a supposed extension of the possibility of preservation. It is also relevant to recognize that, although we accessed audiovisual records, we were not able to *download* these videos, which once again made us rely on the (im)permanence of access via links of publications.

References

Agência Mosca, 2015a, 13 November. Available at: <https://twitter.com/agenciamosca/status/665174950928601088>. Accessed: 19 May 2020.

Agência Mosca, 2015b, 13 November. Available at: <https://twitter.com/agenciamosca/status/665174439512928258>. Accessed: 3 Feb. 2019.

Agência Mosca, 2015c, 13 November. Available at: <https://twitter.com/agenciamosca/status/665176325183905793>. Accessed: 3 Feb. 2019.

Agência Mosca, 2015d, 13 November. Available at: <https://twitter.com/agenciamosca/status/665171670617989121>. Accessed: 19 May 2020.

Agência Mosca, 2015e, 13 November. Available at: <https://twitter.com/agenciamosca/status/665170916272418817>. Accessed: 3 Feb. 2019.

Alves, D., 2017. Humanidades-Digitais: conexões para um novo tempo. [online]. *Café História*, Jul. 2017. Available at: <https://www.cafehistoria.com.br/historia-e-humanidades-digitais/daniel-alves-humanidades-digitais/>. Accessed: June 7, 2020.

Bloch, M. L. B., 2002. *Apologia da história, ou, O ofício de historiador*. Rio De Janeiro: Jorge Zahar Editor.

Boyd, S., Gautney, H, Messina, C., Ritter, N., 2017. *Na oral history of the #hashtag*. [Interview granted to Lexi Pandell] *Wired*, 19 May 2017. Available at: <https://www.wired.com/2017/05/oral-history-hashtag/>. Accessed: 27 Apr. 2020.

Bruns, A., Stieglitz, S., 2012. Quantitative Approaches to Comparing Communication Patterns on Twitter. *Journal of Technology in Human Services*, 30(3-4), p.160-185.

Caleffi, P.-M., 2015. The hashtags, a new word or a new rule? *SKASE Journal of Theoretical Linguistics*, 12(2). Available at: http://www.skase.sk/Volumes/JTL28/pdf_doc/05.pdf. Accessed: 2 Sep. 2019.

Carlsen, S.R., 1996. What the \#\#\#? *Telecommunications Heritage Journal*, (28), p. 52-53.

Castells, M., 2013. *Redes de indignação e esperança: movimentos sociais na era da internet*. Rio De Janeiro: Zahar.

Certeau, M. De, 1982. *A escrita da história*. Rio de Janeiro: Forense Universitária.

Criolo, 2016, 1 November. Available at: https://www.instagram.com/p/BMR_nOUAKxd/?tagged=1anodelamaeluta. Accessed: 19 May. 2020.

Hartog, F., 2011. *Evidência da história: o que os historiadores veem*. Belo Horizonte: Authentica Editora.

HuffPost Brasil, 2015. Tragédia em Mariana desperta comoção nas redes sociais. *HuffPost* [online], 18 Nov. 2015. Available at: https://www.huffpostbrasil.com/fgv-dapp/tragedia-em-mariana-desperta-comocao-nas-redes-sociais_b_8594364.html. Accessed: 7 Jun. 2020.

Langville, A. N., Meyer, C. D., 2012. *Google's PageRank and beyond: the science of search engine rankings*. Princeton; Oxford: Princeton University Press.

Levy, P., 2010. *Cibercultura*. São Paulo: Ed. 34.

Lúcio, T. S., 2018. *Corpus Documental #SOSRioDoce e #1AnoDeLamaELuta*. Available at: <https://www.dropbox.com/sh/sxiaf9pyrhqzyc8/AACU-1W2o50EUXbVMx5mqWPsa?dl=0>. Accessed: 20 May 2020.

MAB - Movimento dos Antigos por Barragens, 2016a. *Rompimento de Barragem em Mariana provocou cenário adoeecedor*. Available at: <http://tragedianunciada.mabnacional.org.br/2016/11/11/rompimento-da-barragem-em-mariana-provocou-cenario-adoecedor/>. Accessed: 18 Feb. 2019.

MAB - Movimento dos Antigos por Barragens, 2016b. *Barra Longa: Reforma para inglês ver*. Available at: <http://tragedianunciada.mabnacional.org.br/2016/11/10/1-ano-de-lama-e-luta-barra-longa-reforma-para-ingles-ver/>. Accessed: 18 Feb. 2019.

MAB - Movimento dos Atingidos por Barragens, 2016c. *#1AnoDeLamaELuta*. Available at: <https://www.youtube.com/watch?v=x8lAs7sRrGs&feature=youtu.be>. Accessed: 7 Jun. 2020.

Minas Gerais, Secretaria de Estado de Desenvolvimento Regional, Política Urbana e Gestão Metropolitana, 2016. Política Urbana e Gestão Metropolitana. In: *Relatório: avaliação dos efeitos e desdobramentos do rompimento da Barragem de Fundão em Mariana-MG*. Belo Horizonte, Grupo da Força-Tarefa, Decreto no 46.892/2015.

Pimenta, R. M., 2016. Os Objetos Técnicos e seus papéis no horizonte das Humanidades Digitais: um caso para a Ciência da Informação. *Revista Conhecimento em Ação*, [online]. 1(2), p. 20-32. Available at: <https://revistas.ufrj.br/index.php/rca/article/view/20>. Accessed: 7 Jun. 2020.

Rosenweig, R., 2003. Scarcity or Abundance? Preserving the Past in a Digital Era. *American Historical Review*, 108(3), Jun. 2003. p. 735-762. Available at: <https://academic.oup.com/ahr/article-abstract/108/3/735/22504?redirectedFrom=fulltext>. Accessed: 27 Apr. 2020.

Salazar, E., 2017. Hashtags 2.0 - An Annotated History of the Hashtag and a Window to its Future. *Icono14*, 15(2). Available at: <https://dialnet.unirioja.es/descarga/articulo/6054356.pdf>. Accessed: 29 Nov. 2019.

Soares, 2015, 10 November. Available at: <https://pt-br.facebook.com/sosriodoce/>. Accessed: 19 May 2020.

Spirinelli, F. A digital turn? On the future of archives. *C2DH*, 2017. Available at: <https://www.c2dh.uni.lu/forum-z/digital-turn-future-archives>. Accessed: 27 Apr. 2020.

Tang, C., 2013. Acquiring, organizing, and providing access to digital content: The Singapore Memory Project Experience. *IFLA WLIC*, Jul. 2013. Available at: <http://library.ifla.org/214/1/198-tang-en.pdf>. Accessed: 27 Apr. 2020.

¹ Born-digital are sources originated from content created in digital format, for example, materials collected in cyberspace such as screenshots, photographs, digital art, navigation data, website content, programs, etc.

² Graduate Program in History, Politics and Cultural Property (Fundação Getúlio Vargas/Contemporary Research and Documentation Center).

³ Incognito browsing prevents the recording of certain information received in the browser. This does not mean that this information cannot be traced in other ways.

⁴ Mulpix, Imgrum, Picstoc and SocImage are Instagram's API's application programming interfaces. These are tools that use Instagram's system data to provide search results.

⁵ A form of protesting through Twitter, in which the goal is to highlight a hashtag and, consequently, the theme that permeates it.