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Technological Skills and New Professional Profiles: Present Challenges for Journalism

Competencias tecnológicas y nuevos perfiles profesionales: desafíos del periodismo actual

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ABSTRACT

The paper aims at understanding the intersections between technology and the professional practices in some of the new trends in journalism that are using the new tools: multimedia journalism, immersive journalism and data journalism. The great dilemma facing journalism when training new professionals –especially the youngest– is not anymore the training in new technologies anymore. The main concern lies in taking advantage of their skills to create a new computational model while keeping the essence of journalism. There is a twofold objective: answering questions about which tools are being used to produce pieces of news, and which kind of knowledge is needed in the present century. Based on the review of reports from professional organizations and institutes, it was developed an exploratory research to 25 European and American journalists was developed. We have selected three cases of study. They allowed us to conclude that the technology matrix is going to remain and that change and digital process is not turning back and demands to evolve and adapt to new dynamics of work in multidisciplinary teams where the debate between journalists and technologists must be ongoing. Different approaches nourish the double way of skills and competences in the profiles of the current technological journalist, which professionals perceive as a demand in the present ecosystem.

RESUMEN

Este trabajo pretende conocer cómo se producen las intersecciones de la tecnología con la práctica profesional en algunas de las corrientes periodísticas que más emplean las nuevas herramientas: el periodismo multimedia, el periodismo inmersivo y el periodismo de datos. El gran dilema del periodismo en la preparación de los profesionales (especialmente jóvenes) no pasa tanto por la incorporación de tecnologías y herramientas como por mejorar sus competencias y habilidades con un perfil que aproveche las oportunidades del modelo computacional manteniendo la esencia periodística. El objetivo es doble: responder a las preguntas sobre qué herramientas emplean los profesionales para elaborar piezas periodísticas con estas técnicas y qué conocimientos y habilidades tecnológicas no eran precisas para el periodismo del siglo XX pero sí en el del siglo XXI. Partiendo de la revisión de informes de las organizaciones profesionales o institutos de relevancia internacional se diseñó una investigación exploratoria sobre el trabajo de 25 periodistas europeos y americanos, y se eligieron tres casos de estudio que permiten concluir que la matriz tecnológica no solo no desaparecerá, sino que puede incrementarse porque el proceso de cambio y tecnologización no tiene marcha atrás y exige evolucionar y adaptarse a nuevas dinámicas de trabajo en equipos multidisciplinares donde el diálogo entre periodistas y tecnólogos debe ser fluido. Diferentes perspectivas alimentan la doble vía de las competencias y habilidades en los perfiles del actual periodista tecnólogo que los profesionales perciben que demanda el ecosistema actual.

KEYWORDS | PALABRAS CLAVE

Cyberjournalism, cybermedia, digital communication, multimedia, digital journalism, press, media production, technology.
Ciberperiodismo, cibermedios, comunicación digital, multimedia, periodismo digital, prensa, producción mediática, tecnología.

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1. Introduction

This exploratory study reflects on the concern about the technological side of communication processes, which has been a constant since ancient times, from the first in-depth reflection on the issue by Plato to the electronic age, in which McLuhan analyses the role of technology in the communicative transfer (Núñez-Ladeveze, 2016).

The interest in this issue continues because contemporary journalism and technology are closely linked, in a complex and diverse way (Anderson, Bell, & Shirky, 2012; Lewis & Westlund, 2015). The change in news production allowed by technology has been assessed in the third millennium by Pavlik (2000), Boczkowski (2004), Deuze (2007), Stavelin (2013) or Rodgers (2015). The results of the transformations in the practices of journalism in this century are collected in research on the new newsroom models (Domingo & Paterson, 2011: Hermida, 2013; Reich, 2013), which agree in stressing the technological dimension of the new journalist profiles.

Digital technology is present in every dimension of current journalism and is shown in four different sides: when there is a low dependence on technologies in the production process (Human-centric journalism); when technology clearly facilitates the work (Technology-supported journalism); when journalists depend on technologies to produce contents (Technology-Infused journalism); and when technologies manage the news creation (Technology-oriented journalism) (Lewis& Westlund, 2016). The dimensions of technological journalism, in any of its approaches, indicate that the management of devices for the production and the journalistic work in the Internet of things requires a more technological journalist than the professional of the industrial era, in the 20th century.

1.1. The technological dimension of journalism

The transformations of journalism in recent years have entailed a more computational profile, which moves it closer to a multidisciplinary field where information and computation skills are required in various degrees of intensity (Codina, 2016). The search for information and verification, which compose the essential elements of journalism, is affected by this computational dimension, which shows a gap between journalists who are able to practice this journalism with a sound technological preparation, and those journalists who do not have it and find themselves in a transition phase. The technological dimension, which foreseeably will become more important in future journalism, offers, in present intersections, various journalistic trends. The values of journalism throughout history, such as truthfulness, accuracy and impartiality (Schudson, 2003), as well as the social and service roles of journalism that feed a pluralistic society (Kunelius, 2007) are still alive. Production systems, however, have changed, as well as the result of their manifestations in communication processes. Current practices are preferably arranged, as movements or specializations, in multimedia journalism, data journalism, immersive journalism and transmedia journalism. Technology instills society and culture, causing hybridizations that distinguish the current partnership human-machine (Hamilton, 2016), and strengthening the case for the need to recognize technologies as a defining element of the digital society.

The great dilemma facing journalism is not so much the incorporation of technologies to the professional practice as a set of tools, but the preparation of professionals with a more technological profile, with competences and skills to take advantage of the opportunities of the computational model, in which the software has taken the lead (Manovich, 2013), and in which dimensions that define the journalistic quality from a professional perspective remain stable: relevance, comprehensiveness, diversity, impartiality and accuracy (Kümpel & Springer, 2015). Training in journalism must have a "double route" that both enhances the knowledge of the essential elements of journalism and combines them with technology training. The focus of present journalism is on technology, but also on the quality of contents (Masip, 2016; Deuze, 2017).

1.2. Scientific literature to understand the context

Today´s technologies have made possible the empowerment of citizens (Jenkins, 2006) and have forced journalists to be better trained in technologies (Lewis & Westlund, 2016). The new required insights for news professionals range from the management of content systems (Rodgers, 2015) to algorithms (Diakopoulos, 2015), audience research (Tandoc, 2014), and big data and data processing (Bruns, 2016). Thus the four sides of the technological specificity needed by journalists are configured (Powers, 2012), to work on various devices and channels of the present media ecosystem.

Organizations and entities focus their attention on the challenge of ICT for media outlets and professionals since the late 20th century. The first report by the UNESCO in 1989 on Communication and Information warned of the change in the industry (the in-depth political, economic and technological transformations), as well as the

document on the information 1997-1998. It was, however, the 1998 report on Communication by Lofty Maherzi (The media and the challenge of the new technologies), which drew global attention to the new defiances. A revolution in working methods was then predicted (Maherzi, 1998), with new dimensions for communication professionals, especially journalists.

Journalism, which has been linked since its emergence to technological innovation (Salaverría, 2010), is immersed in a far-reaching conversion (Casero, 2012). The technologies used by the media in production and dissemination processes, both traditional and digital natives (Cebrián-Herreros, 2009), have stepped up the range of professionals (Scolari, Micó, Navarro, & Pardo, 2008), who are increasingly using these tools that have become a kind of "lingua franca" for the work in the field of information and communication in the Network Society.

Journalists have played an active role in the dissemination of digital technologies (Geiß, Jackob, & Quiring, 2013), yet the truth is that before disseminating their duties they had to take up the challenge of knowing and using them as soon as possible to improve production and dissemination processes for information.

The working environment at companies, engaged in the renovation to compete and be updated with technologies, pushed professionals to quickly incorporate digital tools because they made work easy and showed their potential to improve journalistic practice (García-Avilés, 2007). Although professionals sometimes look down on new technologies, they have assessed the opportunities offered by these tools and have finally recognised their usefulness.

> Digital technology is present in every dimension of current journalism and is shown in four different sides: when there is a low dependence on technologies in the production process (Human-centric journalism); when technology clearly facilitates the work (Technology-supported journalism); when journalists depend on technologies to produce contents (Technology-Infused journalism); and when technologies manage the news creation (Technology-oriented journalism). The dimensions of technological journalism, in any of its approaches, indicate that the management of devices for the production and the journalistic work in the Internet of things requires a more technological journalist than the professional of the industrial era, in the 20th century.

The effects and consequences of these technologies are the main topics of many research works, which analyse the new dimensions fostered by technology in the production of journalistic pieces for the media in the Network Society. Multimediality (Deuze, 2004), interactivity (Scolari, 2008), new audiences (Carpentier, Schrøder, & Hallett, 2014) and new ways of participation (Masip & al., 2015), customization (Thurman, 2011), memory and documentation (Guallar, 2011; Guallar & al., 2012), or mobility and new devices (Westlund, 2014), deserve particular attention. At the beginning of the present decade, many authors warned of the change in the models of journalism (Trench & Quinn, 2003) within a new labour framework with alternative production methods (Fish & Srinivasan, 2012), and others recently confirmed the dominant trends of the technological profile (Newman, 2016; Gómez-Calderón & al., 2017). The interest on the technological impact has increased in the last three years, after the call of the technological dimension made by Lev Manovich, when he warned of the prominence of the software (2013) as central command of technology-mediated communication. From then on, different works on age gaps when consuming communication from mobile devices appeared (Weis, 2013) on skills to produce news for these devices (Barum, 2016), on new techniques in social media (Tifentale & Manovich, 2014) and the need for emerging checking practices (Brandtzaeg, Lüders, Spangenberg, Rath-Wiggins, & Følstad, 2015) as well as their techniques (Bradshaw, 2015).

2. Material and methods

Based on the review of scientific production to contextualize the connection between the practice of journalism and technology, especially from the Internet, we wanted to understand how intersections between technology and the professional practice occur in some trends in journalism that use the most technological tools: multimedia journalism, immersive journalism, and data journalism. The goal has been to answer questions about the tools used by professionals when producing pieces of news with these techniques, what technological knowledge is required and those technological skills which were not needed for journalism in the 20th century but are demanded in the 21st century. The methodological approach is based on the case study and exploratory studies to emphasize the need to understand the cases in a comprehensive manner instead of dissecting them in decontextualized segments (Creswell, 2007; Yin, 2009). The case study, which emerged in the field of social science as a technique to understand various problems in their social context, and which is based on methods that provide insight into one or more cases in depth (Eisenhardt, 1989), allow us to understand the evolution towards a more technological profile of the journalist that works in the current media, with renewed narratives, the main innovation trends in the field in recent years and the reasons why.

We also take over exploratory studies that help to increase familiarity with relatively unknown phenomena, to gather information for a more comprehensive research and to set priorities for further research (Dankhe, 1986). Exploratory studies, which are more versatile in terms of the method than descriptive and explanatory ones, are considered appropriate for this research, designed to remain open to the unexpected and to find previously unidentified perspectives, being interviews and focus groups the main instruments. The data shown are drawn from research that follows up regular projects conducted by journalists that work in the digital edition of various news media, both traditional and digital natives, in the USA and Europe during the past five years. The list of the 25 journalists below, chosen randomly to follow their statements and texts on technological change, professional profiles and the future of journalism, consists of professionals that held different positions in content development and management of network initiatives (traditional and digital natives). Both genres are included, as well as European and American professionals that are often involved in events on technology and journalism (notably, Spain, USA, and UK) (Table 1).

Table 1. List of selected journalists

Journalist	Media in which they work during the period of study
Al Shaw	ProPublica (www.propublica.org). USA
Elisabetta Tola	Wired Italia (www.wired.it). Italy
Mar Cabra	International Consortium of Investigative Journalists, ICIJ (www.icij.org). Le Monde (www.lemonde.fr). El Confidencial (www.elconfidencial.com). USA, France, Spain
Daniel Graso	El Confidencial (www.elconfidencial.com). Spain
Salvador Pérez Crespo	Technology Observatory at Telefónica (http://en.blogthinkbig.com). Senior Telecommunications Engineer. Professor. Spain
Adolfo Antón Bravo	Medialab_Prado (http://medialab-prado.es). Spain
Nonny de la Peña	Newswek. Immersive Journalism (www.immersivejournalism.com). USA
Verónica Ramírez	El Mundo (www.elmundo.es), La Sexta (www.lasexta.com) and Technology Review (www.technologyreview.com). Spain
Karma Peiró	TVE. Nació Digital (www.naciodigital.cat). Spain
Millán Berzosa	Google News Lab (https://newslab.withgoogle.com). Spain and Portugal
Kaeti Hinck	Washington Post (www.washingtonpost.com). USA
Xaquín González	The New York Times (www.nytimes.com) and The Guardian (www.theguardian.com). UK
Helega Bengtsson	The Guardian (www.theguardian.com). UK
Marta Ley	El Mundo (www.elmundo.es). Spain
Antonio Cucho	Ojo Público (http://ojo-publico.com). Peru
Nicola Huges	The Times (www.thetimes.co.uk). Spain
Marty Baron	The Boston Globe (www.bostonglobe.com), The Washington Post (www.washingtonpost.com). USA
Ray Soto	Gannett Digital. USA Today (http://marketing.usatoday.com) (www.usatoday.com). USA
Stacy-Marie Ishmael	Financial Times (www.ft.com). UK
Susan B. Glasser	Politico (www.politico.com). USA
Joy Robins	Quartz (https://qz.com). USA
Trei Brundett	Vox Media (www.voxmedia.com). USA
Gideon Lichfield	Quartz (https://qz.com). USA
Drake Martinet	Vice Media (www.vice.com). USA
Dean Baquet	The New York Times (www.nytimes.com). USA

The list above indicates the media in which these professionals worked, as well as researchers and professors with applied experience over the study period. An analysis of the interviews conducted

in the last five years has been carried out, including conferences in which the above mentioned participated, as well as those speeches available under open access, so that needed tools, knowledge and skills for daily work can be identified. Two pieces by the author were selected to analyse text, video, multimedia and interaction elements. Three out of the 25 journalists were selected for the case studies, applying narrative and research techniques criteria (immersive, data, multimedia and automation):

- Nonny De-la-Peña, one of the most relevant professionals in immersive journalism.
- Xaquín González, journalist and infographic designer at "The Guardian", with experience in "The New York Times», "National Geographic" and Spanish media, for his expertise in multimedia and data visualization.
- Mar Cabra, one of the best known investigative journalists. Not only has she published the "Panama Papers" and the "Falciani List", but she is also a member of the ICIJ.

The study was completed, following Krueger (1991), with a mini focus group. The starting point were the previous interviews with these experts and professionals and an open survey entitled "Working framework to outline competences and skills needed for current journalists", whose questions were divided into three large blocks to obtain data on: basic knowledge on the functioning of present societies (know-how); abilities (command) of current techniques and tools (sum of key knowledge and abilities, skills); and attitudes in journalism (curiosity, analytical skills, reflective and critical perception and honesty). In the dimensions of the journalist´s technological profile, for instance, the survey and debate focused on aspects such as: technological fluency, specific tasks for journalists and communicators –profiles–, digital skills for data checking, accuracy and deepening in real time and through multimedia techniques: management of an audience, communities and impact data; and ongoing learning combining on-site and virtual initiatives. The data collected are intended to understand the way junior journalists work for new media and the required technological skills. The group is especially valuable to explore the ways in which these people create meaning and to understand a particular issue (Lunt & Livingstone, 1996; Krueger, 1991): technological skills in the professional exercise of certain journalism trends.

3. Analysis and results

3.1. Technology matrix

The evolution of the Network Society, with new forms of communication that characterize and define the technological context in which we operate, led to a general conviction among the main players in the media ecosystem on the need for changes in journalism to remain relevant in the 21st century (Picard, 2010). Media companies and journalism are facing critical challenges in the digital society with renewed products.

In the new digital environment, journalists are required to have competences in technologies to perform their duties, mainly search engines, content production, and dissemination. Journalists are asked to evolve, from a polyvalent profile (Scolari & al, 2008; Hamilton, 2016) to have RRSS development and management (Flores-Vivar, 2009; Hermida, 2016; Jensen, 2016,) management skills of their own business (Casero & al, 2013; Örnebring & Ferrer-Conill, 2016) or proficiency in cutting-edge technological tools to build renewed narratives (Peñafiel, 2015; Paulussen, 2016) in the innovations produced in newsrooms and the revolution of the mobile communication (Westlund, 2016). Different replies were received from the sector, according to reports on journalism from associations (in Spain, the Madrid Press Association, with its Annual Report on the Practice of Journalism) and from editors, mainly the WAN-IFRA (World Press Trend). Both mainly collect reticence by senior media professionals reluctant to changes, as well as the embrace to technological changes, driven from the very beginning by the youngest in general terms (World Editors Forum, 2016)[1], and having unequal effects depending on the country both for journalism and democracy (Franco, 2009).

The best evidence of sensitivity with the explosion of technological innovation, online video, mobile communication and distribution in different platforms (Newman, 2016) is the unanimous recognition by professionals from the main media of the importance of the literacy in new technologies, which are allies of journalists in their daily work, as well as the need to constantly update on how to take advantage of the tools coming onto the market. That is the view of Nonny De-la-Peña, Xaquín González and Mar Cabra, also shared by, among others, senior journalists accountable for some of the world´s leading newspapers, as Marty Baron, editor of "The Washington Post" (Those are tools that were never available to newspapers before, and if we're smart about it we can deploy them in a highly effective manner), said to Rob Hastings, from "The Independent", in February 2016), and Dean Baquet, editor of "The New York Times" ("we have to move even faster because the world is shifting so quickly", said in an interview with Ken Doctor, from Niemanlab.org, in 2016).

The technology matrix, surrounding professional profiles of journalists in the Network Society, has created a renewed dimension that affects the essence of the profession, which includes the search and inquiry, paperwork, the creation and display of messages, and the dissemination and management. Journalists are required to have a sound humanistic training, talent and technological skills.

3.2. Dual route

Journalists[2] agree that their education should take a dual route where the essence remains – the elements of journalism as a technique of social communication and as the profession of journalism (Kovach & Rosenstiel, 2001), with a sound humanistic and communication training, as well as a proper training in technologies that include from "touching the code" to network structure, information architecture, manipulating data and programming. The dual route should act as the dual route theory of reading (Jobard, Crivelho, & Tzourio-Mazoyer, 2003)[3], if we establish a simile of the process linked to understanding the brain and learning, in such a way that they make a connection that gives meaning to the various professional profiles, which from a basic versatility lead to specialisations.

The analysed professional perspectives do not even question that the historical foundations of journalism will change, although it is agreed that the historical background (social, political, economic, and technological) has shaped some journalism´s dimensions. They agree in understanding technologies as allies for the practice of journalism, with the complexities and problems they create, and as needed tools to explore renewed formats, narratives, pieces of news and communication products for the digital society.

Some journalists (Nonny De la Peña, Xaquín González and Mar Cabra, among others, who are between 25-30 and 45-50 years old, and who represent different profiles of visualization, immersive and data and investigative journalism), use techniques that combine the traditional processing of news with current technologies and emerging techniques, with distinct profiles and that have acquired a certain strength in the current model of content production for the media ecosystem of the Network Society. It is, as they agree in clarifying in their presentations and seminars, the beginning of new paths for a journalism, present journalism, turning its eyes towards the conquest of the future.

The tools for the search process have a technology matrix, especially those linked to online checking, and there is almost always a need for understanding how to structure what was achieved and how to query a database –to understand at least their elements to collaborate with engineers and to create more complex projects–. The use of collaborative tools has, therefore, become a need in current newsrooms and the display and edition demands challenges for teams, which must develop new narrative categories to integrate differential aspects of the narrative, production, and visual edition, with the same relevance than visual elements (González, 2016)[4].

The search for newsworthy stories and their creation requires, in many cases, knowledge of the advantages of Google and Facebook algorithms as traffic sources and, above all, the appointment of integrated teams in which various profiles (engineers, designers, statisticians, photographs, videographers, audience editors), bring different perspectives for a final product with high-dose of added value for the news content the user receives. And although different techniques are used, work must also be done with material from the real word (Nonny De-la-Peña, 2015)[5], to offer non-fiction stories.

To open new paths and make a difference in journalism, identifying all kind of technological tools is essential to collect a large amount of data, process them and make them understandable. The availability of data implies a basic requirement that empowers the journalist, so there is a need to use techniques and tools up to now unusual in newsrooms (Cabra, 2016)[6]. Journalists at the forefront in the use of current technologies agree: the message with added value crosses borders of the inverted pyramid, and its search, production, and dissemination imply not only current technologies but also competences and skills to work in teams with different profiles that provide renewed dimensions to nonfiction stories. From their perspective, the various profiles must go over a new path with competences and skills resulted from the hybridization of technological and humanistic dimensions.

4. Discussion and conclusions

Technology feeds and defines current professional profiles. Since the disappearance of those journalists that only produced text with their typewriter, who remained well into the second half of the 20th century, when the newsrooms computerization came up, and they became digital (Baer & Greenberger, 1987), the technological dimension has had an impact, to a greater or lesser extent, in the profiles of journalists that work in digital newsrooms, integrated at different levels but in a digitisation process of news (Boczkowski, 2004). This trend has been

intensified in the third millennium, especially since the boom of full connectivity, social web, mobile communication, big data, the Internet of things and immersive technologies, among others. From the image of the "romantic journalist" with pencil and notebook, only a few concrete examples remain, as innovation in newsrooms, both traditional and digital natives, has changed profiles and working techniques (Paulussen, 2016; Westlund, 2016), which are now washed with digital tools.

The various professional profiles perceived by journalists at the moment, beyond concrete tools, have two central vectors. First, the essential elements of journalism, the set of precepts that have been built up over time and forged in communication processes throughout history, always under a humanistic and social perspective, more or less pronounced depending on the context. Second, the technological dimension, where it is not so much a question of knowing this or that tool, but understanding the rationale, entering different territories and having the knowledge for the individual work and the dialogue with interdisciplinary teams, which produce large proportion of the most complex pieces disseminated by current cyber media and that circulate on the flows of the present media ecosystem.

The technology matrix will not only not disappear, but may increase, as the process of change and technologization cannot turn back. Therefore, to adapt and evolve is essential: "Journalists, being more or less technologists, need to have the knowledge to cooperate with other technological profiles, which every day have more to say to tell what happens in society. Programmers, systems technicians, software developers... belong to the new teams, and all of them have to enter into dialogue. If journalists do not understand what interlocutors are talking about, their role in teams will be residual".

As noted by Xaquín González, "the narrative in journalism, ever-more visual, requires the establishment of interdisciplinary groups applying visualization techniques, so there is a need for developers, designers, statisticians, visualizers, and cartographers involved that understand each other and work in journalism". Therefore, we must address the need to train journalists for a changing environment in which current technologies set transformation, which requires journalists to understand technologies and their approach and singularities but without overlooking the pillars of journalism. Besides, journalists should know the argot used in technology: "journalists may know more or less of programming, but if they do not know the argot, they suffer from rejection in those teams created to produce pieces of news that require the cooperation of various specialists". (De-la-Peña, Cabra, & González.) That is why, professionals insist, "journalists need to know the history of technology to understand how systems work. If they do not have that view, they feel out of the working group". The challenge is that the reporter acquires knowledge and has an updated training. What professionals who have certainly served as a basis for this research and as a sample for a great number of reports from professional organizations and institutes monitored in the Observatory of New Media (World Editors Forum; Informe Anual de la Profesión Periodística; Reuters Institute, among others) claim, is that the technology matrix will not only not disappear, but may increase, as the process of change and technologization cannot turn back. Therefore, to adapt and evolve is essential: "Journalists, being more or less technologists, need to have the knowledge to cooperate with other technological profiles, which every day have more to say to tell what happens in society. Programmers, systems technicians, software developers... belong to the new teams, and all of them have to enter into dialogue. If journalists do not understand what interlocutors are talking about, their role in teams will be residual". This adaptation process of journalists towards a world that, until quite recently, was not their own, is complex but enriching, as it brings journalists added value. Therefore, these professionals must understand that the change is in how and not in what. Different approaches nourish the double way of skills and competences in the profiles of the current technological journalist, which professionals perceive as a demand in the present ecosystem.

Notes

[1] References are extracted from the reports Trends in Newsrooms 2014, 2015 and 2016, and recent documents by the WAN-IFRA.
[2] The statement is extracted from the analysed texts from the 25 selected journalists and the interviews of three chosen cases.
[3] The dual route theory establishes a framework to describe what happens in the brain when reading aloud.
[4] Contribution made by Xaquín González in 2016 in an interview by the authors of the text.
[5] The statement is extracted from the explanations of Nonny De-la-Peña on her report on Syria, using virtual reality techniques.
[6] Mar Cabra explained the knowledge of tools that allow for the collection of a large amount of data in order to make them understandable in the IV Spain´s Data Journalism Conference, in Madrid.

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