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Review Article

Post-Truth as a New Object for Information Science

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Abstract

Purpose: This paper presents the results of research on the information science evolution, its concepts and problems, highlighting how the recent post-truth phenomenon raises new questions to the area. The objectives are related to the identification and characterization of the post-truth phenomenon to demonstrate that it represents a new informational reality challenging the categories hitherto existing. The discussion on information science starts from the mapping of three major study models in the area: the physical, the cognitive, and the social. The first, which arose at the beginning of information science, focuses on the technical aspects of the transmission of records and on issues of information retrieval. The second focuses on the design of information systems based on the users' cognitive needs and search processes. The third focuses on the social and cultural dimensions of information, its relationship with the action of the subjects and the contexts in which these actions occur.

The discussion about the post-truth is presented in terms of its causes, characteristics and consequences. Its causes include scientific denialism, the human cognitive bias of confirmation, the disintermediation of information, the formation of the bubble effect as a result of the logic of the algorithms of social networks and search engines, and the hijacking of the idea of relativizing the truth produced by the philosophical movement of postmodernity. Regarding the characteristics of the phenomenon, the intentional and spontaneous forms of disinformation production stand out, through different platforms, mainly the instant messaging applications that work underground. Finally, in relation to the consequences, the strengthening of authoritarian regimes, the weakening of institutions and a greater submission of subjects are listed.

Method: The methodology used in this research is literature review and epistemological discussion. For information science, books, manuals and articles produced by authors from different countries were considered. Their objective was to present or map the field from its theoretical currents and paradigms. Thus, for the analysis, works that only made a history of information science or those presented it only from a single point of view or theoretical perspective were not considered. For the question of post-truth, mainly recent books were considered for the depth of discussions and general analyses of the phenomenon and exploring its causes, characteristics and consequences. Analyses that correlated post-truth with other contemporary phenomena were also considered. The works selected to compose the theoretical framework were analyzed from an epistemological viewpoint in order to compose an interpretive framework to meet

the proposed objectives.

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Findings: The result of the confrontation between the discussion of the conceptual framework of information science and the questions related to post-truth showed the need for information science to give centrality to the attribute of "truth" of information, in addition to those already studied, such as relevance, retrieval, relationship with knowledge. The phenomenon of post-truth has technical, human, and social dimensions. Information science has the tools and concepts to explore these dimensions.

Conclusion: Post-truth phenomenon presents itself as the major contemporary challenge for information science, requiring further investigation for understanding it, and developing strategies to deal with it.

Keywords: Epistemology of Information Science, Post-truth, Information Reality, Paradigms of Information Science, Theories of Information Science.

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پساحقیقت به منزله موضوع علم اطلاعات

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چکیده

هدف: این مقاله نتایج پژوهشی را درباره تحول علم اطلاعات، مفاهیم و مسائل آن گزارش می‌کند و نشان می‌دهد که پدیده جدید پساحقیقت پرسش‌های نوی را در عرصه این علم مطرح کرده است. به‌طور مشخص این مقاله به شناسایی و ترسیم ویژگی‌های پدیده پساحقیقت می‌پردازد تا نشان دهد این پدیده واقعیت نوی را که مقوله‌های پیشین را به چالش می‌کشد، درباره اطلاعات به نمایش می‌گذارد. سخن از علم اطلاعات با ترسیم سه مدل عمده مطالعه در این عرصه آغاز می‌شود: مادی، شناختی، و اجتماعی. در بحث از پساحقیقت، از سبب‌های پیدایش، ویژگی‌ها، و پیامدهای آن سخن می‌رود. سبب‌های پیدایش شامل نفی علم، تعصب‌ورزی انسان از تایید آنچه که با باورهایش در تعارض است، سلب نقش میانجی اطلاعات، شکل‌گیری اثرات حباب‌گونه در نتیجه منطق و الگوریتم‌های شبکه‌های اجتماعی و موتورهای جستجو، و ربایش ایده نسبی‌سازی حقیقت است که جنبش فلسفی پست‌مدرن به‌راه انداخته است. در خصوص ویژگی‌های این پدیده آنچه که در درجه نخست خود را می‌نمایاند شکل‌های عمدی و لحظه‌ای تولید اطلاعات گمراه‌کننده در بستر پلتفرم‌های گوناگون - عمدتاً نرم‌افزارهای پیام‌رسان است - که به‌صورت زیرزمینی کار می‌کنند. در ارتباط با پیامدها، از قوت گرفتن رژیم‌های اقتدارگرا، ضعیف‌شدن نهادها [ی مدنی] و تسلیم‌شدگی انسان‌ها سخن خواهد رفت.

روش: روش‌شناسی‌ای که در این پژوهش به‌کار گرفته شده مرور ادبیات و بحث معرفت‌شناختی است. در مورد علم اطلاعات، کتاب‌ها و مقاله‌های نویسندگان کشورهای گوناگون را بررسی‌ده‌ام. هدف آنها مشخصاً ترسیم نقشه علم اطلاعات در قالب جریان‌های نظری و پارادایم‌ها بود. از این رو، به‌منظور تحلیل، آثاری که تنها تاریخ علم اطلاعات را از یک دیدگاه نظری بررسی‌ده بودند، در مطالعه وارد نکردم. برای شناسایی پساحقیقت، عمدتاً کتاب‌های جدید را به‌خاطر عمق بحثشان از موضوع و تحلیل‌هاشان از این پدیده و شناسایی سبب‌های پیدایش، ویژگی‌ها، و پیامدهای آن بررسی کردم.

یافته‌ها: نتیجه برابرنه‌اندان بحث چارچوب مفهومی علم اطلاعات با مسائل مرتبط با پساحقیقت نشان داد که نیاز است علم اطلاعات

علاوه بر مباحثی نظیر ربط، بازیابی، و نسبت اطلاعات با دانش، موضوع «حقیقت» داشتن اطلاعات را در مرکز توجه قرار دهد. پدیدهٔ پساحقیقت ابعاد فنی، انسانی، و اجتماعی دارد. علم اطلاعات ابزارها و مفاهیم موردنیاز برای کشف این ابعاد را دارد. *Archive of SID*

نتیجه‌گیری: پدیده پساحقیقت خود را به صورت چالشی عمده برای علم اطلاعات عرض اندام می‌کند. از این رو به پژوهش بیشتر برای فهم آن و پرورش راهبرد برای طرف شدن با آن نیاز است.

کلیدواژه‌ها: معرفت‌شناسی علم اطلاعات؛ پساحقیقت؛ واقعیت اطلاعات؛ پارادایم‌های علم اطلاعات؛ نظریه‌های علم اطلاعات

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Different scientific disciplines study diverse phenomena and empirical realities. As the years go by, each science changes its concepts, its theories, its research methods. This occurs, in part, due to the evolution of scientific knowledge itself: theories are refuted, concepts are refined, methods are replaced by others. But, in part, it also occurs through changes, in reality, itself: the phenomena are changing, acquiring new aspects, new dimensions, and manifestations which until then were unpublished.

This reality applies to all scientific disciplines. It is also true to information science. It emerged in the 1960s and it was deeply related to the dynamics of the so-called "information explosion" that took place after World War II, with the exponential increase in science and technology production. The area was exclusively concerned with the scientific environment and the development of strategies for the information retrieval and the automation possibilities of its organization, but in the following years, it encompassed issues related to business, politics, and later social and cultural environments, among others.

However, in the last five years, since the issue of post-truth has gained political, economic and cultural relevance, significant changes in the empirical reality, that is, in the field of the information phenomena, related to the digital technologies, but not only, have fostered several challenges that put in check the existing categories of thought in the field of information science.

Among these changes, the pervasive information stands out, that is, the information as an entity and/or process that are present in all our activities, whether professional, business, cultural, educational, sports, medical, feeling etc., in an unprecedented way or scale, related to appliances or devices as different as computers, cell phones, houses, cars or objects, related inclusively with the emergence of the so-called internet of things (IOT). A model of understanding information as a phenomenon in which users would seek

information in informational systems (the so-called "counter paradigm", built on the idea that access or retrieval was the center of information activities and services) is proving inadequate for these new realities. The current informational dynamics are of growing complexity: more than searching and accessing, people want to produce, share, comment, and label information.

This is connected to a phenomenon known as big data, which is not only related to information production, on an increasingly gigantic scale, and the impact of this information on our lives, but to the by the ways in which information is produced. This phenomenon relates to the fact that, more and more, there are sets of data generated in an unintentional, and non-programmed way by people - what questions the information science conceptual models which supposed a subject sending a message to someone. Now, we have systems that capture our steps, our paths, our biometrical indicators, and they are turning all of this into data sets that are appropriated and used for different purposes: from security and convenience to surveillance, and political control, representing a challenge to the privacy of our data as well.

It is also worth mentioning the speed of information and the need for updating when measuring in minutes or seconds the gap in people's knowledge of a certain fact or subject that may be occurring in a local context or even in distant locations. The large volume of information that comes instantly to the subjects, in very different formats, languages, and media such as texts, images, sounds, moving images, and others deriving from them. Just to think of an example, relatively a few years ago families gathered together to watch television; today in a house with reasonable financial resources each person owns his or her smartphone and individually browses the Internet, watches movies with streaming services, plays music lists and much more in a very individualized consumption of information.

In the context of all this, there is a current informational phenomenon that has challenged information science: the post-truth. Linked to the phenomena presented so

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far, closely related to digital technologies, the post-truth expresses a set of new facts and processes, which are still being understood and mapped, and whose effective analysis and understanding require innovative theoretical, conceptual, and methodological tools in the field of information science.

The purpose of this paper is to present the outcomes of a research conducted for this end. These outcomes are presented below in three moments. Initially, a presentation is made on the three major models of information study present in information science on the evolution of the research issues and objects in information science. Next, the phenomenon of post-truth is presented: its causes, conformations, and consequences. The purpose of this discussion is to identify that the phenomenon has a technical dimension, a cognitive dimension and a socio-cultural dimension. It means, therefore, that the three models of study of information science are adequate for the study of the different dimensions of the phenomenon of post-truth. However, something more is still needed in information science, which is presented in the final topic of this article.

The evolutions of problems in information science

According to the most recent theories of information science (Hjørland, 2018a; Hjørland, 2018b; Bawden & Robinson, 2012), to study information is to study a tension between two hubs: the collective, social dimension on the one hand and the individual, personal dimension on the other. Each of us has a unique way of producing and consuming information. There is also a collective way of dealing with information, of attributing value, quality, importance to it, which is internalized by each one of us. These ways of dealing with information are partially unique, partially collective, and the challenge of information science is exactly to detect this, to determine what information is for a certain group, what is relevant, how the criteria of relevance, of pertinence, of accuracy, of actuality, are socially

constructed, among others. Certain information regimes end up defining what are the legitimate sources of information, those considered to be of higher quality. At the same time, the subjects' informational practices update these models and rules, as they make decisions, appropriate certain contents, reject others, influence other people.

However, this was not always the case. Although different scientific fields have studied issues related to information since before, the expression "information science" emerged in the 1960s. According to Saracevic (1999), the new scientific field was born with a strong conditioning on the development of information technologies and, also, the evolution of the information society. In this sense, "information" was understood in a very specific sense, as scientific and technological information, and its study was within the limitations of computer processing of the time that required the focus on efficiency at the expense of user-centred developments. To study the information was to understand and map the production, circulation, and use of scientific and technological information (and just the latter) to think of tools for its processing for ensuring greater speed, lower cost, greater accuracy in its transfer within the scientific community and from it to the government and military-strategic sectors (Coll-Vinent, 1984, Debons, Horne & Cronenweth, 1988; Linares Columbié, 2005). It was a very specific way of knowing (from a set of interests) and the delimitation of something very specific to be known - what was considered the object of study of information science. A current study perspective on the technical issues of information is developed by Floridi (2019) from a philosophical logic, with an emphasis on the extent to which technologies shape the subjects' experiences. At that time, a science of information control, developing techniques for its optimal processing in a context of competitiveness between countries through the development of their scientific information systems was developed (Davis & Shaw, 2001). The theoretical model of this approach, known as

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the "systems paradigm" or physical paradigm, assumes the study of information systems isolated from social life and users, basically based on quantitative measures of information retrieval performance (Bawden & Robinson, 2012). Such a model is the result of complementing two perspectives. The first is the mathematical theory of communication by Shannon and Weaver, which perceives communication as a process of sending messages from a sender to a receiver, with information science acting to optimize the transport of these messages through information processing and retrieval. The second is the systemic model derived from the tradition of studies initiated with the Cranfield Institute of Technology experiments in the 1950s and 1960s, in which information systems are evaluated in terms of their objective attributes and their performance in information retrieval (Hjørland, 2018a).

In the following decades, a cognitivist, user-centered perspective was developed in information science. This movement represented a shift of the same research rationale from governmental and military environments to the industrial and business sector, with demands for effective management, operation, and control (Debons, Horne, Cronenweth, 1988). The novelty, from a conceptual point of view, was the introduction of a perspective no longer oriented to the systems, but the users or clients (Hjørland, 2018a). Thus, the study of human cognitive processes and their modeling took place, intending to develop information systems that could replicate such processes, whereby the focus of the studies was on individuals as they related to information and the manifestation of their needs and the procedures for solving these needs (Gilchrist, 2009, Bawden & Robinson, 2012).

At the end of the 20th century, the construction of another perspective of information studies began, which was presented earlier in this topic. Linares Columbié (2005) highlights the newness of this movement as being another epistemology of information science from the study of society and culture. Capurro (2007) presents

what he called three paradigms: the physical, the cognitive and the social. This third approach has expressions in theories such as information regimes, domain analysis, altmetrics, and concepts like information practices and folksonomies, among others, focused on the socially constructed character of information and its entanglements with the political, economic, cultural, legal, technological, and other dimensions of the societies in which the informational phenomena exist and constitute themselves. Cronin (2008) speaks of a sociological turnaround in information science, following the cognitive turnaround of the 1980s. Bawden and Robinson (2012) indicate a socio-cognitive paradigm, inspired by Shera's social epistemology and Hjørland's domain analysis, which seeks to analyze a level of analysis broader than the individual (social groups, communities, countries) as well as other problems besides cognition (just a mentalist level of the informational phenomena), in a trend to articulate the individual and collective levels of information. Bawden and Robinson (2012) also point out that the epistemological position of critical theory, coming from the humanities and social sciences, should "have more impact on information science in the future" (Bawden & Robinson, 2012, p. 41). Hjørland (2018b) mentions recent visions oriented from a social and cultural perspective.

In its evolution over these six decades of existence, information science has accumulated considerable knowledge about informational phenomena. Among this knowledge is, in the first place, the perception that knowledge is not only a data accumulation process, of data insertion in the subjects' minds; it is a dialectical process, in which each subject allows the new knowledge to converse with those he already possesses - doubting some of it, refusing others, and still adopting others. Secondly, the understanding that subjects are not just mentalists, just "brains consuming knowledge" - subjects act in society, they study, work, vote, walk, and integrate at all times the knowledge they have at their disposal to these daily activities, frequent,

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throughout their existence. It is necessary to integrate the study of informational dynamics with the study of the other dynamics of our life.

Thirdly, it was discovered that informational processes are not only composed of actions of information search and retrieval. People also produce, disseminate, share, label information, and it is necessary to have theoretical models to study this whole range of actions. A fourth finding of the research is the notion that the informational processes are not only individual, idiosyncratic, but are also intersubjective, and it is necessary to develop strategies to study this dual movement (the individual and the social).

Moreover, to study information, it is not sufficient to understand what happens inside the systems, it is not enough to understand what happens with the application, or with the library, or an information service - the realities of the systems are interwoven by elements of the socio-historical, political, cultural, and legal contexts. To study information phenomena in their complexity it is necessary to insert the actions and processes that take place within the information systems within the social, cultural, economic and political contexts in which they exist. Finally, the main evidence from the informational studies allows us to conclude that information is not only a process of data transportation, it is not enough to determine where certain messages came from, the transformations they underwent, and where they arrived (as well as the instruments acting in this process). To study information is to analyze the extent to which the information is also a process of constituting culture, collective memory, and the individuals' identity.

This dynamic of knowledge and objects in information science has manifested itself in its different sub-areas (information management, information organization, users, metric studies, information society) generating an immense accrual of knowledge about the informational reality (Hjørland, 2018a; Bawden & Robinson, 2012).

Post-truth: characteristics of a contemporary informational phenomenon

According to Santaella (2019), the expression "post-truth" had already been used by Steve Tesich in 1992 to refer to questions about the Gulf War, and it appeared for the first time as a book title in Ralph Keyes' work published in 2004. However, it was indicated in 2016 as the word of the year by the Oxford Dictionary, referring to circumstances in which objective facts are less influential in the shaping of public opinion than an outcry to personal emotion and belief (Peters, Rider, Hyvönen & Besley, 2018). According to Kakutani (2019), the presidential election of the United States, won by Donald Trump, and the process of leaving the United Kingdom from the European Union, both of which occurred in 2016, were the phenomena that motivated the emergence of the expression "post-truth" in scientific literature.

There is much discussion about what is post-truth. There is a lot of confusion between the term and the expression "fake news", for example. They are related phenomena, but they are not alike. Some argue that the expression is meaningless because lies have always existed - as if post-truth were synonymous with lying. Lies have always existed, dissemination of false information is something that has always occurred, but there is a new fact, a new phenomenon, in what researchers from all over the world, from various areas, have been calling post-truth. The post-truth expression appeared to characterize the contemporary moment in which there is gigantic dissemination of false information, which are shaping people's decision making (when it comes to voting, deciding whether or not to adhere to economic blocs, taking care of health), in quantity and speed never seen before and, as well, in an anonymous, apocryphal way, without identification of authorship. But the novelty is that there is despise, a disdain, a lack of interest in the truthfulness of the information received and shared by people (Argemí, 2019).

People receive the information, often they know it is false, but they share it anyway,

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they do not care. This is the new phenomenon that the untruthfulness of information becomes banal, it becomes natural. There has never been such a possibility in history to check whether the information is false or true. But people don't do that, they don't check, they don't verify. This is the new fact that has challenged researchers in various scientific disciplines (Wilber, 2018).

What is called today "post-truth" refers to a conjuncture produced by several events or phenomena that have been happening for decades (or centuries, in some cases), but that related or interacted in a certain way only in recent years. As McIntyre puts it, the post-truth didn't appear before, it "waited" for the perfect storm that had other factors such as the extreme partisanship bias and the social networks 'silos' emerging in the early 2000 (McIntyre, 2018). Several authors (Kakutani, 2019, Frankfurt, 2019, O'Connor & Weatherall, 2019, Cosentino, 2020, Dalkir, & Katz, 2020) have dedicated themselves to studying the causes or factors leading to post-truth.

The first of these factors is scientific negationism: a phenomenon in which the science authority started to be questioned by ordinary people, in a process motivated by certain business and corporate groups' economic interests. The origin of this process took place in the 1950s, in the United States, when several scientific studies began to associate smoking with cancer. Business groups in the tobacco industry then created the Tobacco Industry Research Committee, with the objective of financing "scientists" who demonstrated the opposite, that there was no conclusive evidence of the evils caused by smoking. The main objective was not to invalidate scientists' conclusions at the time, but to sow doubt among the public, to generate confusion. In a classic study on the topic, Oreskes and Conway (2010) explain that, for this committee, the doubt was their product. The authors point out that, from then on, the strategy was used by several business and political actors regarding other themes such as the nuclear winter, acid rain, the hole in the ozone layer, and global warming (McIntyre, 2018).

The second factor is related to certain human cognitive features, which some call cognitive bias or cognitive dissonance. Humans tend to refuse facts that contradict their beliefs or ideas, that in which they believe, they are prone to seek psychic comfort. McIntyre (2018) points out three classic studies in social psychology conducted in the United States in the 1950s and 1960s, which have demonstrated this matter. Festinger's cognitive dissonance theory, according to which we seek harmony between our beliefs and actions, is the first of them. The second is Asch's theory of social conformity, which postulates that we tend to give in to social pressure for our yearning to be in harmony with others. The third is Watson's confirmation bias study, which identified our inclination to give more weight to information that confirms our pre-existing beliefs. The author also presents recent studies on the issue, expressed in two concepts: counterproductive effect (a phenomenon in which the presentation of true information to a person, conflicting with their beliefs in false facts, makes that person believe these facts with even more weight) and Dunning-Kruger effect (a phenomenon in which our lack of capacity to do something makes us overestimate our real skills). Such elements of cognitive bias make people prone to form their beliefs without taking reason and evidence into account.

The third factor usually pointed out as favoring the post-truth is the information disintermediation phenomenon. Traditionally, in the mass communication hegemonic times, the news was manufactured in restricted sources, relatively reliable in the sense that they had to follow practices based on strict codes of ethics, that is, a set of duties, principles, and norms adopted by a certain social group, in this case, journalism. Since the emergence of the Internet, digital culture, and social networks, new ways of publishing, sharing, and consuming information and news have emerged that are poorly submitted to regulations or editorial standards (Santaella, 2019).

Thus, there is a profusion of opinion-based content, often from people without any knowledge of the subject, which is also

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related to this process. Not that the mass media have always told only the truth, but they represented institutions, with the possibility of being accountable for their contents, different from what happens in today's digital environments where false contents, hearsays, and distortions are shared. Now, what you have are news, photos, without any valid link, that imitates institutional information, individualized pieces, isolated, without context, without date, without authorship (Magallón Rosa, 2019). This phenomenon is associated with some devaluation of institutions and experts, in what Keen (2008) called a "cult of amateurism".

There is a fourth phenomenon, directly associated with this, which is the growth of social networks and two related facts, the bubble effect and the underground dissemination of information (Ferrari, 2018). Social networks have become the privileged environment from which people receive news and information from the world. And they are built from algorithms that select what people probably want or what agrees with their point of view, in a phenomenon known as the "bubble effect". Another issue is the existence of social networks in which messages are triggered in mass directly to people's devices, without any possibility of monitoring or opposing them, in an "underground" rationale of information dissemination.

Finally, there is one last factor often pointed out, which is the questioning of the idea of truth promoted by the postmodern movement throughout the second half of the 20th century (Kakutani, 2019). The postmodernist movement developed throughout the 20th century as an artistic, cultural, and also philosophical movement. Among its characteristics is questioning the idea of the existence of absolute, unique truth, that is, there would be no correct answer about what each element of reality meant. The postmodern philosophers' argument that any statement of truth would be an authoritarian act, because it was always ideological, ending up as a criticism hijacked by political movements saying that everything would be

ideological and, therefore, there would be no "truth", just "alternative facts".

The post-truth phenomenon is effective from certain characteristics. Santaella (2019) presents three major sets of problems in which post-truth manifests itself: the deliberately false content, the misleading messages that are not necessarily false, and the memes that are neither true nor false but produce negative or incorrect impressions. It also points out other conditions for the phenomenon to occur, such as the fact that social networks cause more bubble effect than search engines, or the importance of popularity, where studies show that false information is more likely to be disseminated than true information. The totalitarian and impoverishing performance of the individuals' experience was also verified and characterized by Noble (2018).

Aparici and García Marín (2019) argue that post-truth manifests itself from eight features: the clickbait (insertion of sensationalist titles for users to access the content, with the purpose of generating traffic and getting benefits from advertising), the sponsored content (issuing advertising to look like informative content), satire (use of humor fictional contents aiming at people to take the information as correct), the partisan content (partial interpretations of the reality) disguised by the appearance of neutrality), conspiracy theories (based on stories that attempt, in a simple way, to explain complex realities as response to fear and uncertainty), pseudoscience (denial of scientifically proven facts through partial and interested interpretations), misinformation (mixture of real facts and false content, such as false attribution of authorship or image) and fake news (content entirely false and invented, deliberately manufactured and disseminated to deceive people with political and economic goals). Also Greifeneder, Jaffé, Newman, & Schwarz (2021) make a distinction between the concepts of disinformation, infodemics and post-truth.

Among the consequences of post-truth usually are the weakening of democracy, the growth of authoritarian political regimes, extremism, polarization, and the spread of the

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hate culture. Fukuyama (2019) understands the current age as a period of resentment and points to Trump's election as the greatest symbol of it, as it represents a general trend in international politics. According to the author, other contemporary leaders who may be included in this category are Vladimir Putin in Russia, Recep Tayyip Erdogan in Turkey, Viktor Orbán in Hungary, Jaroslaw Kaczynski in Poland and Rodrigo Duterte in the Philippines. Eatwell and Goodwin (2019) call this phenomenon the "national-populism," presenting a list of political leaders who use strategies to systematically disseminate false information. This list includes the same names mentioned by Fukuyama, but the authors include other important manifestations, such as Jair Bolsonaro's victory in Brazil's 2018 presidential elections. Geiselberg (2017) calls this phenomenon "the big setback", and Gómez de Águeda (2019), the "Orwell's world".

The aforementioned cases are all relevant, as they show electoral victories by people with authoritarian tendencies and, in this discussion, actors who despise truth (Casara, 2019). Trump is the most exemplary case, after all, he represents the country that is the largest economy and the greatest military power on the planet. Wilber (2018) and Pellicer Alapont (2017) even points out that Trump has made lying his political strategy. Among the dangerous consequences of the post-truth phenomenon lifetime, Kakutani (2018) takes up Hannah Arendt's arguments that the ideal subject for a totalitarian government is the one for whom the distinction between fact and fiction, true and false, no longer exists. For her, therefore, the ultimate danger of post-truth is the consolidation of populism and fundamentalism, which, through the destruction of the very idea of "truth", also destroy democracy and impose fear and hatred over the rational debate.

Wilber (2018) places post-truth within a change in the overall framework of contemporary societies' values. For him, there would have been a failure of the avant-garde project that began with the cultural revolutions in the 1960s, marked by the ideas

of plurality, relativism, postmodernism, diversity, inclusion, tolerance, human rights, equality of people. The author highlights the relativism of the notion of truth in post-modern thinking and the culture of narcissism ("what I want to be true becomes true") as mainly responsible for this project's crisis of legitimacy and the birth of what he calls the "culture of post-truth", marked by a return to ethnocentrism, a politics of identity actively and aggressively. And he points to the increase of the Internet and social networks as a driver of this process since their original promise of a unified and cooperative global humanity would have given way to online exchange anonymity with trends charged with aggressiveness, narcissism, hatred, and ethnocentric beliefs (sexism, racism, xenophobia, fanaticism, etc.).

Another way of looking at the problem is presented by Broncano (2019) from his proposal of a political epistemology, in which he articulates informational issues (information and knowledge as sources of energy of our time) to political issues (an understanding that everything that affects our lives, the price of the utility bill, pesticides in food, and inflation are the result of political decisions). Its objective is to analyze a society by seeing who, how, and what is known and, in parallel, who, how, and what is ignored. Thus, the political epistemology is the study of knowledge, its fair or unjust distribution in society, in a proposal inspired by Rawls' idea of the "basic structure" (the distribution of material and immaterial goods in a society) to think of a topography of knowledge and ignorance that organizes society.

Broncano places his informational (or knowledge) problem at political issues based on Habermas' ideal of deliberative democracy: a model in which citizens, using reason, exercise a communicative action of argumentation to, through debate, influence the directions of the political system. This would be the difference between a society (using reason for democratic deliberation) and a horde. In this sense, he detects that democracy should be based on "truth" and not simply on opinions and beliefs. This is where he places the post-truth problem,

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caused by the advance of polarization and isolation in the bubbles, the decrease in investigational journalism and the increase in sensationalism and the rationale of social networks in which the objective is to have fun and share and not the increase in knowledge about reality.

Conclusion: the information science in the post-truth age

The confrontation between the two reference frameworks presented above raises a question: what needs to be changed in information science so it is effectively-prepared to study post-truth? Throughout the existence of information science, three major study models can be identified: the technical, the cognitive and the sociocultural. When studying the causes, characteristics and consequences of the phenomenon of post-truth, it is possible to see that there are technical, cognitive and socio-cultural dimensions of the phenomenon. Thus, information science effectively has categories of analysis relevant to the study of the phenomenon.

Thinking about the different conceptual moments through which information science has gone through, it is evident that the conceptual apparatus formulated in its first decades of existence focused on the issues of retrieval, and automation provides little instrumental to properly understand the post-truth dynamics (Fuller, 2018). The same can be said of the cognitive perspective that was developed in the following two decades, centered on the individual's cognitive experience, on the search, and use strategies to overcome knowledge gaps. The most up-to-date perspectives, focused on the social structure of information, as well as on the effects of information in the different spheres or dimensions of human life, are more suited to contribute with elements to the post-truth understanding. It is important to emphasize, therefore, that post-truth is not synonymous with false information circulation, or even data processing, by people, to fill cognitive gaps. Post-truth is a culture, a mentality, an ethos, through which a contempt, a disdain

for truth is manifested, decisively impacting all modes of existence and processes that affect information. Information is used to sow doubts and increase distrust in institutions (Magallón Rosa, 2019).

One core element is still missing: assigning the effective centrality of the "truth" attribute to information. This attribute was, in a way, neglected by information science during its entire existence, precisely because it was not considered as a problem, as a relevant issue. Furner (2010, 2018) proposes what he calls a veritistic shift towards information science. His argument is that the concept of relevance, which has always been central to the area, is accompanied by the truth attribute of informational content in the scope of information systems. To this end, he argues that services and instruments for the treatment and dissemination of information include the positions and points of view of different groups, supported by theory of epistemic injustice (Fricker, 2007).

Another significant proposal is that of Seger et al (2020): epistemic security. This concept involves ensuring that we really know what we know, that we can identify unsubstantiated or untrue claims, and that our information systems are robust against epistemic threats such as fake news. The authors defend the need for this tool in cases where it is necessary to convince people to adopt behaviors that benefit both themselves and their communities, as well as in cases of pandemics and climate change.

Various surveys have shown that the flow of false information on various subjects is produced by groups organized and financed according to certain political or economic interests. But there is also spontaneous action on the part of ordinary people, who share false content without knowing that it is false or without imagining the serious consequences of these actions. (Naeem, & Bhatti, 2020).

In addition to understanding the phenomenon of post-truth, it is essential that information science develops instruments and services to combat its harmful effects, in partnership with other scientific disciplines that have also

studied the problem. Among the actions to be promoted, it is necessary to indicate critical competence in information, that is, actions to promote an information competence with standards that have been studied for decades (identification of the need for information, recognition of information sources), but appropriate to a scenario of high incidence of false information. This requires specific actions from the subjects, such as verifying the authenticity of the information sources, if the author really exists, checking the veracity before sharing, being able to identify possible interests behind the sharing of certain content, among others.

Another possible action is to work with checking services, to report false content and to certify content from trusted sources, through cooperative action with research institutes and centers. Information science

can also act in conjunction with legal efforts for accountability regarding the production and dissemination of false content, especially in cases where crimes are constituted, such as incitement to hatred and violence or the promotion of attacks on institutions democratic.

Thus, the phenomenon of post-truth represents a major challenge for information science. On the one hand, it represents new conditions for the production, organization, circulation and use of information, which need to be properly understood. On the other hand, it also demands new practices, services and products to combat the negative effects of the wide circulation of false information in the various spheres of human life, such as health, politics and the environment.

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