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THE DISSEMINATION OF NEWS ABOUT CLIMATE CHANGE: AN ANALYSIS OF THE BRAZILIAN SCENARIO IN THE LAST 50 YEARS

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ABSTRACT

The understanding of scientific topics by society is considered complex and the different media play an important role when trying to transmit information. This study sought to contextualize how the communication of climate change occurred, considering the last 50 years and highlighting the Brazilian scenario, through an integrative literature review. Sixty-three articles were used, from which it became evident that the transmission of news by the media has always presented problems at different scales, having strong political influence and inclinations to the economic moment. The results also showed the high level of disinformation and misinformation, especially in digital media, worldwide. In Brazil, television remains the most used media, but in which little attention is perceived to scientific matters. Finally, the present research brings as a novelty to the state of the art, the indication of important questions to be answered and complemented in this area of study, such as the possibility of works to understand the public's relationship with the various media, with regard to the consumption, interpretation and appropriation of news.

Keywords: Communication. Journalism. Climate change. Education.

A DISSEMINAÇÃO DE NOTÍCIAS SOBRE MUDANÇAS CLIMÁTICAS: UMA ANÁLISE DO CENÁRIO BRASILEIRO NOS ÚLTIMOS 50 ANOS

RESUMO

A compreensão de temas científicos pela sociedade é tida como complexa e as diferentes mídias desempenham um importante papel ao tentar transmitir informações. Esse estudo buscou contextualizar como ocorreu a comunicação das mudanças climáticas, considerando os últimos 50 anos e com destaque ao cenário brasileiro, através de uma revisão integrativa da literatura. Foram utilizados 63 artigos, a partir dos quais evidenciou-se que a transmissão de notícias pela mídia sempre apresentou problemas em diferentes escalas, possuindo forte influência política e inclinações ao momento econômico. Os resultados também evidenciaram a alta desinformação e misinformação, principalmente na mídia digital, em nível mundial. No Brasil, a televisão permanece como a mídia mais utilizada, mas na qual percebe-se pouca atenção aos assuntos científicos. Por fim, a presente pesquisa traz como novidade ao estado da arte, a indicação de questões importantes a serem respondidas e complementadas nessa área de estudo, como a possibilidade de estudar a relação do público com as diferentes mídias, quanto ao consumo, interpretação e apropriação de notícias.

Palavras-chave: Comunicação. Jornalismo. Mudanças Climáticas. Educação.

INTRODUCTION

Climate change is frequently understood as a complex topic by the general public, and many people obtain information about it through the media (PAINTER; KRISTIANSEN; SCHÄFER, 2018; AREIA et al., 2019). Researches also show that there is a decline in the public that believe in climate change and the media may have a perceptual of responsibility for this panorama (SMITH, 2005).

Between the years 1970 and 2020, the climate issue has gained greater visibility in the media, as this topic encompasses socio-environmental and economic dimensions, generating greater interest in society (NUNES and ZAMPARONI, 2014). In this sense, the dissemination of reports by the

Intergovernmental Panel on Climate Change (IPCC) has also gained space and prominence in different media in recent years (BERGLEZ and AL-SAQAF, 2020).

Therefore, the media plays an important role in communicating critical information about climate change, affecting the public's perception of this issue (ASHLIN and LADLE, 2007; PASQUARÉ and OPPIZZI, 2012). Media can be recognized as one of the main sources of knowledge for the public (AREIA et al., 2019; CARVALHO, 2010).

The media acts like an agent of transformation, which can affect the social understanding of environmental problems (CARVALHO, 2010), explain and expose concepts, laws and diverse content, that can help the society take decisions based on this knowledge (AREIA et al., 2019).

It is important to emphasize that the mass media transit between scientific discourse, political discourse and the public sphere (MITTAL, 2012; IPING et al., 2019), playing a key role in risk perception (ALLAN; ADAM; CARTER, 2000), for example. In addition, they influence public opinion and the process of public policy formulation (MITTAL, 2012; GUARENGHI et al., 2018; PAINTER; KRISTIANSEN; SCHÄFER, 2018).

In this way, problems appear with the transmission of information, as the scientist is used to communicating in a certain format, with a specific level of detail and in a more technical language, which can be problematic for the understanding of the message (SOMERVILLE and HASSOL, 2011). At the same time, when the communication is not made by scientists, the journalistic media commonly confuses some climate concepts, not using adequate words or expressions to explain these concepts (SOMERVILLE and HASSOL, 2011; PASQUARÉ and OPPIZZI, 2012).

Several studies have introduced other problems around the concepts of climate change conveyed in the media, through different means of communication, such as newspapers, internet, movies or television (PASQUARÉ and OPPIZZI, 2012), which depend on different issues, such as economics and policy in each country (MANCINI, 2000). Likewise, Vu, Liu and Tran (2019) confirmed that the levels of development of each country, with regard to the political and social environment, have a significant influence on the media framing.

In addition to the above, the rise of the internet and, later, social media has profoundly changed the way the public, especially the younger ones, acquire and appropriate information, particularly in the scientific field (BRAINARD, 2015).

Considering the foregoing, the objective of the present work was to analyze the evolution of the communication of scientific themes, especially climate change, from an integrative review of the literature. For this, the last 50 years were considered as a temporal scale and the world scenario as a spatial scale, seeking to highlight the changes observed in the scenario of Brazilian scientific communication. Furthermore, we sought to highlight the media that publish environmental news, as well as the potential and problems associated with each one.

MATERIAL AND METHODS

The present research was carried out from an integrative literature review, which enabled a broad approach to climate change and the communication of scientific issues, using data from the theoretical and empirical literature (SOUZA; da SILVA; CARVALHO, 2010).

The scheme (Figure 1) presented the methodological steps realized during the integrative literature review.

The integrative review carried out in the study considered a period of 30 years in the search for academic documents, such as thesis and papers published from 1992 to 2022, providing a look at the evolution of the state of the art on the subject in the last 50 years.

The preceding documents were obtained from the database of Scielo, Scholar Google and Capes Periodicals, through the CAPES theses database, from postgraduate programs at Brazilian universities, as well as from journals indexed by Elsevier and Springer, allowing a survey of national and international research.

The investigation in the aforementioned databases was based on the selection of keywords, either jointly or separately, such as: “climate change”, “media”, “print media”, “broadcast media”, “digital media” and "social media", these terms were searched in Portuguese and English.

From this research, 145 documents were found, which underwent a thorough reading of their abstracts, methodology and conclusion, to meet the material selection criteria, shown in Figure 2, totaling a final volume of 63.

Figure 1 – Methodological scheme applied to execute the integrative literature review

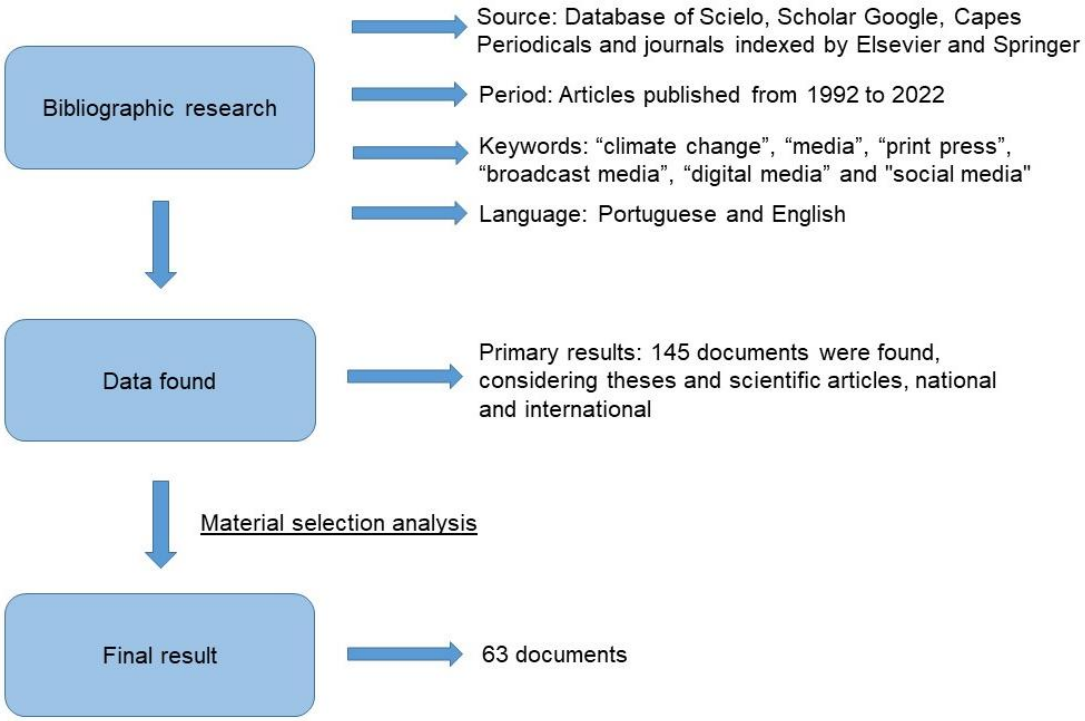

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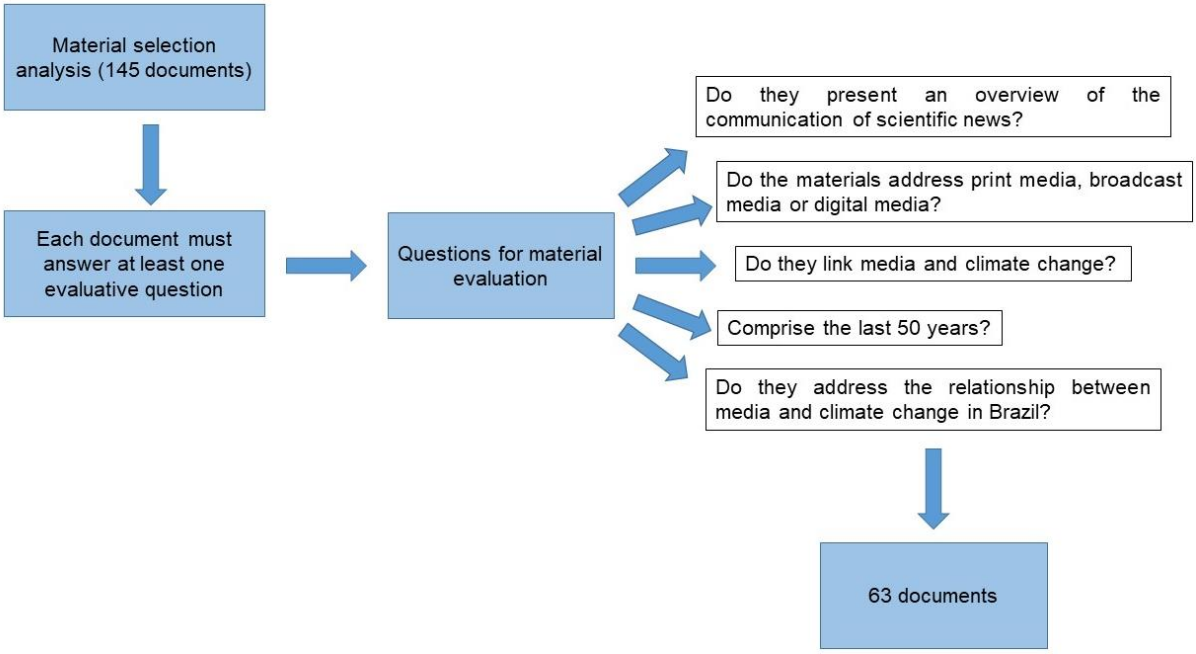
Figure 2 – Considerations for the evaluation of previously found material and obtaining the materials used in the results of this article



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Through the integrative review, it was possible to answer specific questions related to the objective of the research, such as:

a) What have been the changes in the way of communicating scientific news about climate change in the last 50 years?

b) How scientific topics, such as climate change, were and are they publicized?

c) Are there problems with the dissemination of scientific news?

d) How can different media help to make the population aware of scientific issues?

Finally, to arrive at the results, the materials found were evaluated according to the media division of Ganapathy (2021), which considers print media, broadcast media and digital media.

RESULTS AND DISCUSSIONS

63 documents were selected after a detailed evaluation of the materials found from the methodology described above. Some of the selected materials contemplated the theme in a broader way, while others approached a specific type of media. Thus, from the selected documents, it was possible to contemplate the objective of this research, discussing the questions presented in the methodology.

Then, a brief discussion of the different media is presented, as they gained space in social daily life, with regard to the dissemination of news about climate change and considering the division of Ganapathy (2021). Thus, to meet the proposed objective, as well as its specifications, the results were divided into two parts, in which the first makes a general approach to the types of media, while the second contextualizes the Brazilian scenario in the media, both relating to climate change.

The dissemination of news about climate change on media

The last 30 years were marked by the occurrence of conferences on climate change and the consequent increase in the number of publications on the topic, where scientific discourses gained greater prominence in the different media (DUNLAP and McCRIGHT, 2015; PAINTER et al., 2020).

Regarding climate scientists, from the 2000s onwards, there was a need to highlight events related to climate change, but mainly, to improve the way data were communicated to society (PAINTER et al., 2020).

The Intergovernmental Panel on Climate Change (IPCC) was, and still is, one of the first forms of communication in the technical-scientific field, as it informs policymakers about the global impacts caused by climate change (IPCC, 2021). The IPCC does not conduct scientific research, but presents the greatest scientific findings on the subject, providing reliable and relevant data (SOMERVILLE and HASSOL, 2011). The IPCC's first cycle of assessment reports began in 1990, highlighting the challenges and consequences of climate change at the global level and underlining the need for international cooperation. The IPCC is currently in its sixth reporting cycle, in 2022 (IPCC, 2021).

Given the importance of IPCC reports, one can also see the critical role of scientists in communicating their findings (SOMERVILLE and HASSOL, 2011). However, it is interesting to point out the difficulties encountered by the researchers, as the way they communicate is very different from the way the public is used to receiving the news. Scientists transmit their results in a technical way, in scientific journals, and the public, generally laymen to science, is not trained to understand them (SOMERVILLE and HASSOL, 2011). With this, the public often understands climate change only as an environmental issue, while it should be framed as a political and economic issue, which strongly interferes in societies and their development (SOMERVILLE and HASSOL, 2011). Therefore, it is necessary to improve the communication channel between the different sectors of society (NISBET and SCHEUFELE, 2009).

Given this scenario, the media appears as the main channel of communication between the different social sectors, as it is their role to present or evaluate information, disseminating it (JASNY; WAGGLE; FISHER, 2015; CARMICHAEL and BRULLE, 2016). The media is the most important source of information on various subjects for the public, including news about climate change (PASQUARÉ and OPPIZZI, 2012), this is because the teaching of this topic in school grades is recent in most countries or not yet official. Climate and environmental issues commonly appear in the media linked to visual appeals to mobilize the interest and engagement of the population, which ends up playing a different role in this process (NICHOLSON-COLE, 2005), by neglecting real images on the subject.

In this context, the role of the media in shaping public opinion on different social, political, economic and environmental issues is highlighted (SCHMIDT; IVANOVA; SCHÄFER, 2013). Latin American countries are considered some of the most vulnerable to climate change, facing multiple environmental problems (LOPÉZ et al., 2020), where the population receives information on these issues, mainly through the mass media (MERCADO, 2012).

It is understood that the media acts in the distribution of texts, images and sounds to a diverse audience through different media (McQUAIL, 2005). With this, the media presents itself as an agenda of production, reproduction and transformation, influencing the social construction of different issues (CARVALHO, 2010), including mediating the dissemination of information among different audiences, from the most lay to the most specialized, especially on scientific topics (AREIA et al., 2019).

Following the proposal by Ganapathy (2021), the media can be separated into three segments, namely: print media, which includes newspapers, magazines, books; broadcast media, which refers to radio, television and film, and digital media, which includes websites and the various social media platforms. At that point, an overview of the different types of media will be presented (according to Ganapathy, 2021), addressing the issues related to each one, as well as its importance.

Print Media

In print media, climate change is often portrayed as a controversy, as many newspapers present both sides of the issue as equally credible (SOMERVILLE and HASSOL, 2011), which can make the issue more confusing to the reader. In this sense, the lack of scientific journalism interferes negatively in the formulation of public policies (VU; LIU; TRAN 2019), generates a lack of coverage, less understanding on the part of the public that prefers the print media, in addition to promoting doubts about the theme and issues correlated (SOMERVILLE and HASSOL, 2011).

In addition, some framing made by journalists for the construction of news can influence the way the news is received by the public. In this case, Semetko and Valkenburg (2000) report the occurrence of five frames used by the media: conflict, (economic) consequences, responsibility, human interest and morality. In view of the above, it is observed that some of the journalistic coverage regarding climate change uses dramatization to attract public attention (PAQUARÉ and OPPIZZI, 2012).

In the big media (major magazines, newspapers, news) environmental news, especially those that include issues such as climate change and weather, compete with political, economic and social news, such as crimes and terrorism (KALHOEFER, 2017). As well as the different framings that the media can give about the news regarding climate change, the coverage and volume of information can also vary between countries, due to political and economic issues, for example.

In the United States of America, newspapers tend to report scientific uncertainties about the veracity of global warming and other climate issues, this discourse being dominant in some of the country's newspapers and, consequently, interfering in the way its citizens see climate issues (ZEHR, 2000). A study carried out in 2017 by Kalhoefer showed that, in the United States, about 1% of headlines are devoted to environmental issues. However, when the news appeals to an important local impact or even strong scenes of destruction, as in the case of extreme events, affecting families, for example, this information is boosted and replicated to the community (SHEPPARD et al., 2011).

Swedish journalism, according to the analysis of Olausson (2009), focuses on the framework of collective action, which is the most popular framework used by the print media in the country, which is reluctant to use uncertainty as the United States of America does. However, in developing countries, the dissemination of news about climate change can be even more complicated and in contrast to developed countries, as pointed out by Billett (2010) in his study on India, where environmental aspects are emphasized to the detriment of scientific data, promoting a nationalist and development-oriented position.

Regarding the print media, as well as all media, the use of images attaches great value to the news that accompanies it, being in itself a means of transmitting information and changing people's perception, inducing positive emotions and negative. It is noteworthy, therefore, that greater attention is needed to the use of images related to scientific topics, such as climate change, preferring real and motivating images that serve as an incentive to the public (NICHOLSON-COLE, 2005).

Broadcast media

Among the means of transmission, radio presents local, national and even international content, with a broad informative focus, including conversations with experts in various subjects, including scientists.

Radio appears, therefore, as a means of great reach, capable of conditioning the opinion of the great mass on certain subjects.

According to Hamilton (2014), public radio stations in the US, specifically in New Hampshire, are strongly inclined to present their listeners with scientific data, persuading them to trust science and accept the scientific consensus on climate change. At the same time, it is noted that there is a local preference for public radio's due to the communicative style they have, which is, this source of information is preferred because of the scientific position it adopts.

The positioning of radio stations as to whether they are conservative or non-conservative also influences the news that will be disseminated and the way they will be disseminated through this means of communication. Comparisons between the content expressed by the conservative and non-conservative media regarding the framing of climate change present significant divergences (NISBET 2009; FELDMAN et al., 2012).

Television, as another strong means of mass communication, also presents different framings on news related to climate change, in which the news tends to follow the same logic as radio, having channels that are more conservative and others less conservative. Mention is made of the study by Feldman and colleagues (2012), in which the Fox News network appears to be quite conservative in denying the impacts of anthropogenic climate change, as well as its secondary effects, compared to other American cable television channels (FELDMAN et al., 2012).

Television news is, for many people, the only source of information, especially regarding environmental questions, demonstrating the power that this broadcast media has in terms of the possibility of raising public awareness of environmental issues (COOPER, 2011). With regard to films, especially those that depict the impacts of climate change, Manzo (2017) states that they are an important form of communication and that they provide an impetus for public engagement on concerns frequently raised in various scientific studies. Some widely broadcast films that had great television repercussions have already promoted many analyzes and debates regarding scientific dissemination and communication on climate change. This is because science communication material plays a notable role in conveying scientific messages to the public.

It is interesting to cite the Al Gore documentary, "An Inconvenient Truth" that portrays climate change, as Jacobsen (2011) indicates that there was an increase in the number of people who believe in global warming and its complications in the period in which the documentary was in exhibition, demonstrating that this type of communication can have a positive effect on climate awareness. According to Kjeldsen (2013) the images used in this documentary, in particular, were essential for the notion of the impacts arising from climate change, functioning as a strong argument on the subject.

As for films, the 2022 Oscar nominee, in multiple award categories, Don't Look Up (McKAY, 2021), highlights the different ways of communicating a catastrophic threat to the planet, the way politicians act, the influence of digital media and the strong disinformation and misinformation of society (DAVIS and LEWANDOWSKY, 2022). Disinformation is characterized by the manipulation of information, while misinformation is the dissemination of false or erroneous information, but without the author knowing that this information does not correspond to the true (GERBINA, 2021).

In this case, films known as Hollywood Science blockbusters or science fiction are a genre that arouses interest and has a large reach and audience (MANZO, 2007). However, some concerns arise about how accurate the scientific message disseminated through this genre is (KIRBY, 2014). Regarding communication on climate change, Sengupta (2013) points out some films as those that directly address science and those that do so indirectly.

Still with regard to films, documentaries appear as another aspect of cinematographic content that attract a more specific audience interested in particular causes, while blockbusters captivate a wider and sometimes less informed audience (MANZO, 2017).

In view of the above, it is essential to emphasize that some research indicates that both print and broadcast media are sometimes primary sources of information for the population, stressing again their important communicative role (SAMPEI and AOYAGI-USUAI, 2009).

Digital media

Historically, communication channels such as newspapers, radio and television were important mediators of climate discourse, influencing discussions about the connection between climate change and other events, deciding what would be discussed and in what way. However, the media landscape

has changed radically with the emergence and growth of the internet and, therefore, social media. It all started in the 1990s, with the decline of publicity used in printed newspapers in many Western countries and the rupture in communication patterns caused by the internet. Faced with the situation, media organizations followed, which began their activities on digital platforms, but not as extensions of printed newspapers or television stations, but as their own websites or mobile applications (PAINTER; KRISTIANSEN; SCHÄFER, 2018).

Thus, with the advent of the internet, searches for information, including those of a scientific nature, began to be done through websites and other platforms, especially by the young audience, affecting traditional media, since the reach of the internet is incomparable (BRAINARD, 2015). Social media, in turn, appears as a consequence of digital media, standing out in the virtual environment, as it is a means in which it is possible to access news, comment and even engage in debates on different topics (ROXBURGH et al., 2019).

In this context, it should be clarified that the term social media encompasses several platforms, such as social networks, blogs and video and photo sharing sites, with strong emphasis on Facebook, Instagram and Twitter, which attract greater attention because they are used in political discussions and act as means of mobilization among young people (GANAPATHY, 2021). Twitter, in particular, has been standing out among social networks, as it allows its users to interact through short messages, generating around 500 million tweets daily (COSTOLO, 2012). This social network has become a source of observational data for social and natural scientists, given its potential for interaction between different people, who currently use it to post observations about everyday events (KIRILENKO; MOLODTSOVA; STEPCHENKOVA, 2015).

Given the above, digital media is seen as a potential way to improve the relationship between citizens and their representatives, bringing them closer (COLEMAN and BLUMLER, 2009). However, discussions on scientific topics, such as climate change, often occur through political, cultural or meteorological data, which intersect and generate controversy rather than promising discussions (GANAPATHY, 2021).

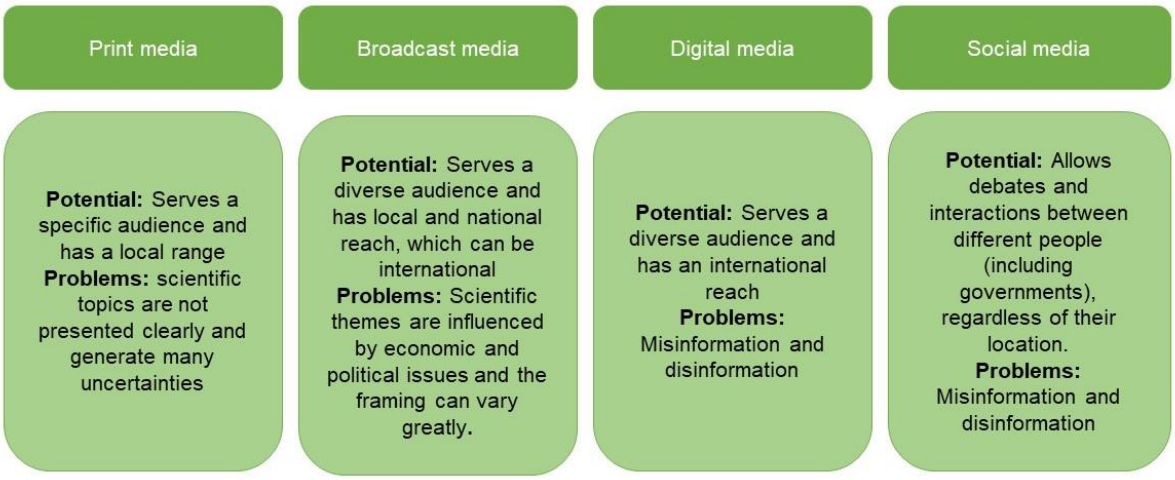
Among the characteristics of digital media, two are most striking and essential to influence the population and their actions, namely the possibility of expression and consumerism. In this sense, digital media allow the population to express their opinions on any subject and interact with other people, whether they have similar or contrary opinions. A second point, that of consumerism, refers to the possibility of people consuming different information, regardless of the veracity of the facts, and it may even be fake news spread by laypeople (GLADSTON and WING, 2019).

When it comes to digital media, and especially digital media, the term “fake news” appears and gains relevance. This term is not new when it comes to the media, but its use has been frequent and is related to the concepts of disinformation and misinformation. This is because, with social media, fake news had a new reach and its dissemination became faster and more comprehensive (GERBINA, 2021). It is important to mention that “misinformation” can be defined as incorrect information, which was accidentally transmitted in the wrong way, while “disinformation” triggers an intention to bring false information to the public (SCHEUFELE and KRAUSE, 2019).

In general, and despite the negative points presented, digital media are seen as a valuable source of data that support the debate of current issues, where all individuals, regardless of their origin and culture, can freely share their opinions (LOUREIRO and ALLÓ, 2020), also contributing to the creation of political and social bonds and associations (HESS and MAKI, 2019).

A summary of the main data found on the types of media in the general analysis presented is illustrated (Figure 3).

Figure 3 – Summary of key results across print media, broadcast media, digital media and social media, highlighting potential of communication and associated problems



Source – Own Authorship.

The Brazilian scenario

Latin American countries are highly dependent on their natural resources and have historical social inequalities, reasons for which they can already be considered vulnerable in the face of climate change. In addition, specific issues in each country aggravate this situation. In Brazil, demographic pressure associated with unplanned urban sprawl are factors cited in the Brazilian Panel on Climate Change-PBMC (2013).

Considering exports, the issue of climate change gains even more importance in the national territory, and as a result, the press has been dedicating more space and time to the subject, especially at times when important reports and studies on the subject are made available, such as the IPCC, the World Bank, the IPEA, among others (COSTA BUENO, 2013; OLIVEIRA; CARNEIRO; VECCHIA, 2017; RODAS and DI GIULIO, 2017).

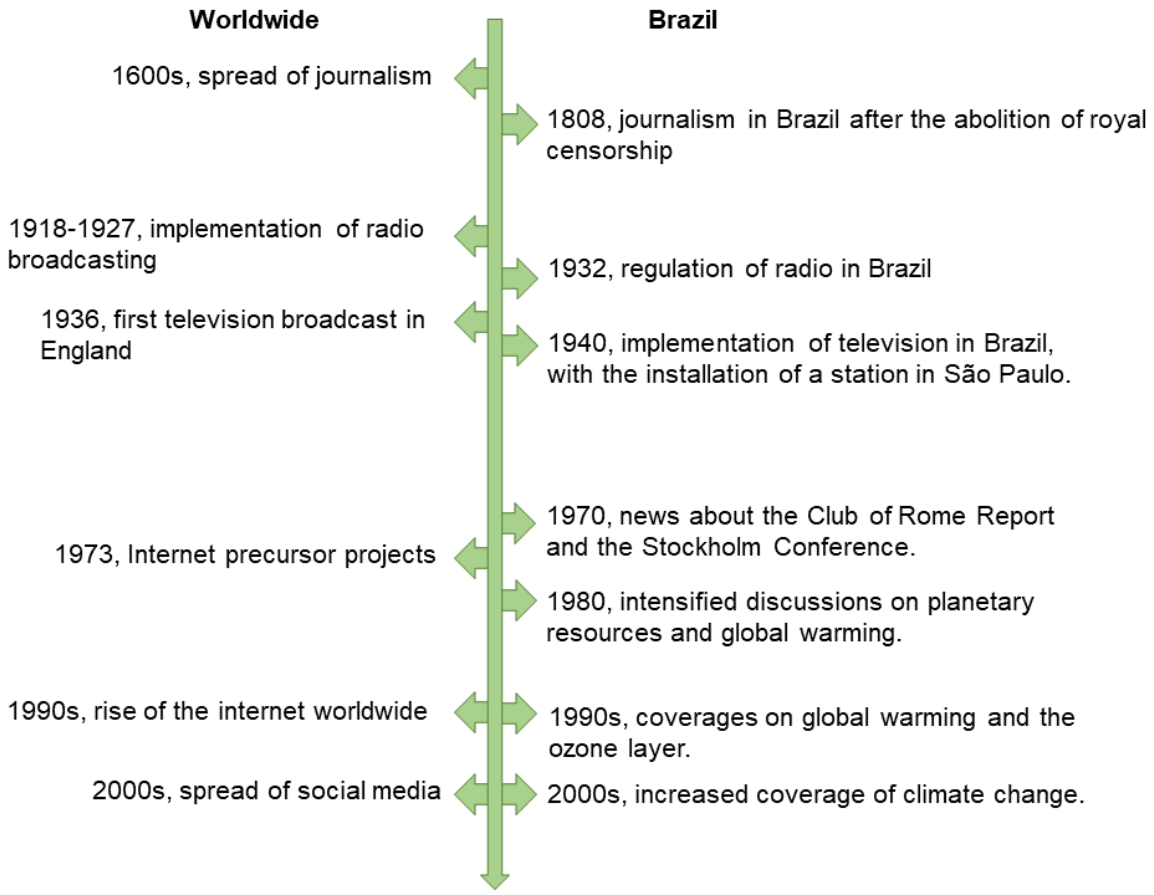
According to Gutierrez (2022), the Brazilian media remains focused on the consensus of economic development, ignoring the environmental debate for considering it alarmist rhetoric, contrary to the country's economic goals. The coverage of environmental issues by the Brazilian media began in the early 1970s, due to the international trend of monitoring and disseminating environmental and climate issues (CARVALHO and LOOSE, 2018).

Costa (2006) states that there was an intensification of journalistic coverage on environmental issues in the 1980s, with the attention given by the media to these issues being even more prominent at the end of this period, with the dissemination of satellite images demonstrating the fires in the Amazon (1987), as well as the promulgation of the new Brazilian Constitution (1988). At the same time, NGOs (Non-governmental organizations) began to gain more space in publications, especially on the international scene.

The 1990s maintained intense media coverage of environmental issues, with a high point during Rio-92 (1992) and the drought periods caused by El Niño, which culminated in large forest fires in Roraima (COSTA, 2006). From the 2000s onwards, different peaks were observed in which the media addressed environmental and climate issues more frequently, due to different events that unfolded in this period, among them the G8 Summit (2005), Hurricane Katrina (2005), the release of the film “An Inconvenient Truth” (2006) and the release of the 4th IPCC Assessment Report (2007) (GRUNDAMANN and SCOTT, 2012).

In view of the above, a timeline of the evolution of the media is presented (Figure 4), in Brazil and in the world, with emphasis on the dissemination of news about the environment in Brazil, according to studies by Miranda (2007), Costa (2006) and Painter, Kristiansen and Schäfer (2018).

Figure 4 – Timeline of the evolution of media throughout history, highlighting the Brazilian scenario and the dissemination of news about the environment in the Brazilian media



Source – Own Authorship.

Given the relevant role of the media, together with the expansion of the public debate on climate change, the last 20 years have been marked by the realization of different works in this field of study (OLIVEIRA; CARNEIRO; VECCHIA, 2017). According to Costa Bueno (2013 apud ALBUQUERQUE, 2012), the Brazilian media system focuses on television, where 77% of the population uses this means of communication daily as a source of information, thus being part of the country's culture. In second place is the internet, which is used by more than 50% of Brazilians daily to obtain information, a percentage that has been growing. Radio occupies the third place among the most used media by Brazilians, while newspapers have a much smaller circulation, representing only about 8% of the population, because this medium is intended for a small portion of society, considered elite (COSTA BUENO, 2013 apud ALBUQUERQUE, 2012).

Corroborating what has been pointed out, the study by Nunes (2009) analyzed the information on weather and climate published in the newspaper “O Estado de S. Paulo” (OESP) in 2008 on a daily basis, finding that OESP readers are mostly from the ruling classes (A, B and C) and that the themes and approaches of this journal are guided by their interests.

Considering the Brazilian TV programming, Ferreira (2009) evaluated some journalistic programs that deal with environmental themes, especially “Globo Repórter” and “Globo Ecologia”, as well as some films that focus on the same theme (such as “The day after tomorrow ” and “The inconvenient truth”), verifying that the media reproduces current capitalist precepts, so the coverage of environmental issues in these media is characterized by spectacularization, which aims to increase the audience and, therefore, favor the sponsored. Another study of the television media, among the few that exist, analysed the program “Fantástico” on TV Globo, noting that in this case, scientists were the most present sources of information, followed by government representatives, demonstrating the possibility of delving into environmental issues (SCALFI et al., 2013).

In general, the media, being dominantly linked to the current economic system, acts in the coverage of environmental issues in a shallow way (RODAS and Di GIULIO, 2017), emphasizing catastrophes (COSTA BUENO, 2013) in the information transmitted by the Brazilian media, postures that are adopted in the process of contemporary journalistic production regarding environmental journalism.

The study by Agência de Notícias dos Direitos da Infância (ANDI) identified that an insignificant number of journalistic materials dealt with basic environmental concepts and that less than 25% of the documents analyzed had scientific evidence to prove the problem at hand (COSTA BUENO, 2013).

The work of Rodas and Di Giulio (2017) regarding the dissemination of issues about climate change in the media, with regard to the newspaper “Folha de São Paulo”, between 2000 and 2014, confirmed a significant number of government sources, who associated the journalistic focus on political decisions related to climate change. In this same context, Oliveira (2011) infers that the Brazilian media are exclusively private, and this oligopoliticization of the media tends to have political implications due to the strong relations between corporate and political power in Brazil (FONSECA, 2010). Therefore, the media has deep political-economic relationships (FANTAZZINI, 2008).

Concerning the political issue, Costa Bueno (2013 apud ALBUQUERQUE, 2012) indicates that the Brazilian press has mainly a right-wing orientation. It should be noted, however, that the country has an alternative media with multiple initiatives for the production of independent information (OLIVEIRA, 2011).

Several studies indicate that media coverage of climate change in Brazil is mainly focused on international factors, with little emphasis on national inquiries, as a result, reports on the topic are dependent on international media (FIORAVANTI, 2007).

In view of the above, the media is not only a transmitter of messages, but also acts to foster beliefs, cultures and values, sometimes aiming to maintain the economic and political interests they represent (JUNIOR, 2014).

In this sense, the Brazilian media also has the potential to promote policies on climate change, where their implementation could contribute to mitigating the impacts of climate change (CARVALHO and LOOSE, 2018).

FINAL CONSIDERATIONS

The media were and are an important source of scientific information for society, constituting an essential tool for social development through the promotion of scientific knowledge and fostering the creation of environmental policies.

In this context, the last 30 years have been marked by rapid and strong changes in the media due to the emergence and expansion of the internet, as well as the consequent launch of social media in the 2000s. The way of communicating has become faster and more inclusive, allowing debates through social networks, between authorities and common people.

The news began to be transmitted in new ways and the relationship between society and media changed as each means of communication gained space in people's daily lives. Thus, print media, broadcast media and digital media have come to occupy a very particular place in society because of their characteristics, which concern them with different potentialities and problems.

The dissemination of scientific topics in turn, including climate change, demonstrated a pattern, which occurs in different countries and is reflected in the Brazilian scenario, where major environmental events, the launch of a new IPCC report, COP meetings or other climatic manifestations provide a greater volume of news. In this way, cycles are perceived, in which there are moments of greater and lesser dissemination of news about climate change, where scientific findings are directly linked to recent events, not being a directed transmission of academic data relevant to the public's knowledge.

It was therefore noted that the mode of dissemination of scientific topics, such as climate change, has been occurring in the same way throughout the described analysis period, with the difference that intense weather events are becoming more frequent and there are more meetings and ongoing climate agreements, generating greater media attention.

It should be noted that the dissemination of news related to climate change is more superficial and less explanatory in the print media, lacking clear and well-contextualized concepts, given the lack of more specialized scientific journalism.

It was noticed through the review that the vast majority of works on media and environmental issues, such as climate change, analyzed news and ways of communicating through print media. This fact seems a little controversial, considering that the Brazilian media system is centered on television as the main form of news dissemination.

The broadcast media, in turn, is characterized by the spectacularization or trivialization of scientific topics, even today, which generates an emotional and visual appeal, when on television, providing greater audience and more visibility. As a result, the reality of the scientific topic addressed ends up, sometimes, being distorted or generating some confusion for the public.

Despite the relevance of television in the Brazilian media scene, very few studies were found that analyzed the news published by this medium, representing an important gap in this theme. In addition, newspapers, television or radio channels have a political stance, which in most cases will interfere with the way scientific news is transmitted to the public, demonstrating the strong interference that political issues have on the dissemination of science topics.

When it comes to digital media, especially in social media, the issue of misinformation and disinformation are the most frequent problems, as they cause scientific doubts that go unanswered and are quickly disseminated, generating an endless cycle of uncertainties. In addition, there is little government control over this type of media and the dissemination of news, which brings more uncertainty about the development of this form of communication.

Since this media has been growing rapidly, with a high percentage of the Brazilian population using the internet to obtain information, research in this area should be implemented, in order to understand the profile of users, more specific problems (especially with regard to social media) and yet, ways to mitigate existing problems.

Despite all the problems presented, it is extremely important to emphasize the potential of each media, which involve different audiences, scope and dissemination speeds, acting as a tool in raising awareness of different scientific issues.

For this, trying to minimize the exposed problems, encouraging scientific journalism, generating less spectacularization of scientific topics and promoting the control of false information is the beginning, but not enough considering that these are not simple tasks. Even more important than what is proposed, is to enable the development of critical and scientific thinking by society.

At this point, education is focused, which does not necessarily need to be an education regarding the study of climate or climate change, but academic study, which in itself, allows the development of scientific skills, including critical thinking. Concurrently, the implementation of the theme in a transversal way in different journalistic subjects could also collaborate in the understanding of its relevance.

Moreover, to what has been mentioned, there are other interesting possibilities for studies on this topic, since carrying out practical work to understand the public's relationship with the various media (in terms of consumption, interpretation and appropriation of news) is important to know the extension of the problems and ways to minimize them, in addition to what is proposed here.

Understanding also the interference of education in the knowledge of climate concepts conveyed by the media and the social perception on the subject are shown as relevant and significant research considering that the climate is an essential factor in the development of different day-to-day activities.

In view of the above, the great novelty of this research was to contextualize how the communication of climate change has been occurring in the last 50 years, with emphasis on the Brazilian scenario, which allowed the unfolding of new questions and hypotheses.

Thus, the present study responded to the objective initially presented, as well as the subsequent questions, and also indicated possibilities for complementary studies to this area of study, which is still recent and underdeveloped with regard to the Brazilian context.

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