Visual and Data Journalism as Tools for Fighting Climate Change

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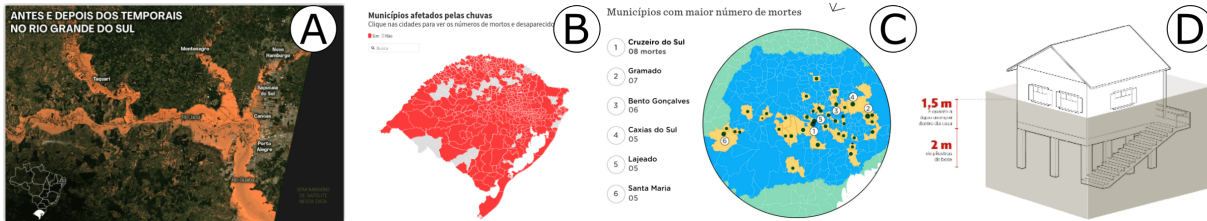Universidade Federal de Pernambuco

Figure 1: Data visualizations examples produced in the Brazilian Media about the catastrophe in Rio Grande do Sul.

ABSTRACT

This position paper discusses the role of data visualizations in journalism based on new areas of study such as visual journalism and data journalism, using examples from the coverage of the catastrophe that occurred in 2024 in Rio Grande do Sul, Brazil, affecting over 2 million people. This case served as a warning to the country about the importance of the climate change agenda and its consequences. The paper includes a literature review in the fields of journalism, data visualization, and psychology to explore the importance of data visualization in combating misinformation and in producing more reliable journalism as tool for fighting climate change.

Index Terms: Visual journalism, data journalism, climate change, visual communication.

1 INTRODUCTION

It is visible the importance of reporting the causes of natural disasters, especially in recent years, such as the flooding that occurred in Europe in 2021, which mainly affected Germany. Nature has been giving signs, and visual journalism along with data journalism is among the main responsible parties for informing on the subject.

The field of Visual Journalism was extensively studied by Abraham in 2002 [1], aiming to analyze how multimedia materials were being integrated into journalism. One of the author's findings was how the development of design and other tools were contributing to the increasingly frequent presence of graphics in newspapers and how these elements contribute to better information absorption. Moving through new techniques such as hyperlinks, born with the internet and influencing writing styles in digital journalism, and later in data journalism through data visualizations, where the reader controls their reading flow. This conceptualization clashed with traditional journalism, which privileges text over other elements, but such a stance has become outdated with the widespread adoption of data journalism in recent years.

Data journalism differs from traditional journalism by presenting not only investigation aided by data analysis tools and data visualizations, as Bradshaw explains in the Data Journalism Handbook [3]: "What makes data journalism different to the rest of journalism? Perhaps it is the new possibilities that open up when you combine the traditional 'nose for news' and ability to tell a com-

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pelling story, with the sheer scale and range of digital information now available" (2012). In this sense, this branch of journalism becomes one of the main agents for creating data visualizations about natural disasters for the general public. This not only contributes to studies like this on data visualization but also revolutionizes journalistic practice.

Within reports in data journalism outlets, visualizations serve to clearly and subjectively inform about the implications of those natural disasters, as well as their present and future impacts, using various types of visualizations, but mainly variations of maps for this purpose. The information ends up not being entirely objective despite dealing with numbers, since these representations often present more than one interpretation and more than one reading flow, contradicting Philipe Meyer [6] and his dream of making journalism more objective with the application of exact sciences in the book "Precision Journalism" (1973).

Therefore, this position paper presents examples of data visualizations used in the coverage of the 2024 catastrophe in Rio Grande do Sul, state in southern Brazil, which left thousands homeless and the country on alert, to illustrate the discussion about the use of these tools in data journalism for fighting climate change.

2 BACKGROUND

The data visualizations as a communication tool can be studied from various aspects. In this work, it will be examined from the perspective of its use with environmental data, persuasive power, how flow in narratives as visualization is also part of storytelling in journalism, and the importance of making data journalism increasingly feasible.

2.1 Visual Journalism

In the realm of communication, the image is treated as a primary area, given that it was used by prehistoric humans through drawings for communication purposes with those who would come later. In this sense, it is the primary mode for the receiver to understand information as well. Therefore, despite "Visual Journalism" being conceptualized from photography, it now also encompasses graphics to contribute to information analysis, with journalism integrating these elements along with text for the sake of comprehension and supporting arguments in a report as studied by Abraham [1].

2.2 Persuasion and communication

It is important to analyze how the use of visualization in reports aids not only in understanding the text but also directly influences the reader's opinion through graphic materials (whether interactive or not). Pandey et al. [7] study from the perspective of psychology
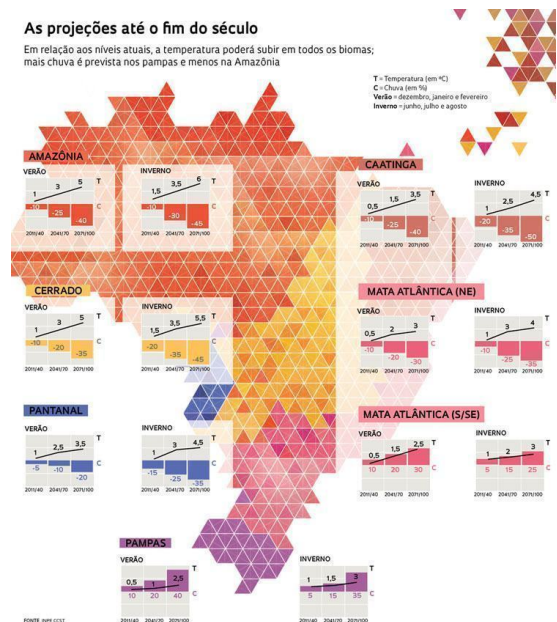
Figure 2: Projections of temperature and precipitation for all the extent of the Brazilian territory.

Figure 3: Comparison of climate changes 20th - 21st centuries

how visualizations have an active power of persuasion in communication; in this study, they highlight how exposing the reader to graphical information not only arouses greater interest and attention but also corrects possible misunderstandings left by the text. In this way, data visualization is of utmost importance in making information clearer for the reader.

2.3 Narrative Visualizations as risk communication

Visualizations can also serve to communicate risks, whether they are high or low. Fansher et al. [4] explore how various types of visualizations can fulfill different roles, such as anecdotes, static visualizations, interactive simulations, containing different types of information, and automatically aiming to convince the reader of something. In this sense, the use of visualization in risk contexts has great potential to inform the reader about the impacts and consequences of the situation, being more effective than a report consisting solely of text.

2.4 Data-driven news articles

Hao et al. [5] in their study map the most used visualizations in the world's largest journalism outlets such as New York Times, The Guardian, Financial Times, etc. The visualizations found most frequently were: Line Charts, Bar Charts, Tables, Small Multiples, Combined Charts, Maps, Tree Maps, and so forth. Just as each outlet has its own design standards, the theme of a report also influences the type of visualization chosen. Thus, data journalism involves not only journalists but also design professionals.

2.5 Storytelling on Data Journalism

Over time, storytelling in journalism has evolved, yet with the introduction of data visualizations, storytelling extends beyond text to include visualizations. Young et al. [9] analyze finalists in journalism awards between 2012-2015 for their study. A technique primarily used in interactive visualizations, storytelling involves coherent storytelling through sequences, where each sequence reveals a new insight to the reader until the story concludes. Thus, data visualization as a communication tool in data journalism enhances
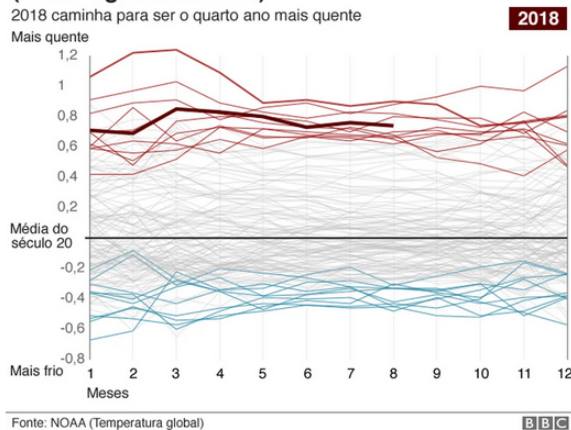
understanding and dissemination of information to the general public.

3 THE STATE OF VISUALIZATION IN THE BRAZILIAN JOURNALISM VEHICLES

This study present a sample of different types of visualizations used in the Brazilian media, including independent and mainstream outlets, during the latest major disaster in the country - the flooding of cities in Rio Grande do Sul.

The tragedy in Rio Grande do Sul, which occurred with floods and inundations affecting over 2 million people (the largest tragedy in the state's history), began in late April and extended into May 2024, highlighting to the country the importance of paying more attention to climatic events.

The most used visualizations in the coverage were maps, as well as bar charts, line charts, among others (see Fig.1), the examples are from: "Ambiental Media", "Aos fatos", "Nexo", "G1", "BBC" and "Folha de S.Paulo" and they serve to illustrate the causes and consequences of the floods, contributing to a graphical understanding that would not be the same with text alone and proving the importance of data visualizations to informe about climate disasters.

4 DISCUSSION

In this scenario, the presence of data visualizations in journalism faces two main challenges: literacy and misinformation.

4.1 Literacy

Despite the promise of data journalism to engage the reader, they can also be lost due to a lack of understanding of the data analysis and visualization. In this sense, one of the greatest challenges for this field is data literacy, defined by Ridsdale et al. [8] as "the ability to collect, manage, evaluate, and apply data in a critical manner" since there is no point in using well-crafted data visualizations if they do not fulfill their primary objective: informing the general public. Figures 2 and 3 showcase examples of visualizations that are potentially hard to interpret by the general public.

4.2 Misinformation

Another major challenge in the field is combating fake news and misinformation, which are increasingly prevalent due to the large amount of information circulating in society and the data that needs

to be processed. Thus, data journalism is committed to more reliable journalism and to combating the own wave of journalism in discrediting.

Social media, however, facilitates the spread of false news, which can jeopardize health, as happened during the Covid-19 pandemic. Thus, misleading visualizations in articles news can contribute to misinformation. The term is defined by Alexander et al. as graphical depictions of data that can influence a viewer's perception and judgment to provoke specific inferences and conclusions [2], in this case wrong conclusions.

5 CONCLUSIONS

In this previous study it was possible to see the importance of data visualizations in news articles and how the information it's different when complemented with visual presentations of data. With these examples it's clear the data visualization impact in the storytelling. Just by seeing them it's possible to know what's happening in Brazil's South and the consequences of the floods. That's the power of data visualizations, to inform with graphic tools: maps, column charts and gifs.

It is possible to observe the importance of data journalism in providing better and more reliable information, and the challenges as literacy and misinformation that need to be addressed not only by journalists, but also with the effort of the data visualization community to combat misinformation.

This work can be more explored comparing the quantitative difference of data visualizations in independent and massive vehicles media in Brazil and how this resumes the development of data visualization in articles news in the country.

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