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MULTIMEDIA – SPECIALIZATION IN INTERACTIVE TECHNOLOGIES AND DIGITAL GAMES

SUPPORTING NARRATIVES IN NEWS STORIES THROUGH VISUALIZATION

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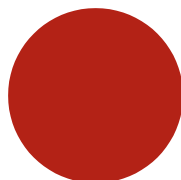
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Resumo

O uso de histórias para transmitir mensagens tem sido uma constante desde os primórdios dos tempos, o que prova a importância do *storytelling*. Uma técnica particularmente interessante para contar histórias é o uso de narrativas visuais (NV). Utilizando elementos visuais como complemento da narrativa, podemos enriquecer uma história “tradicional” e facilitar a sua leitura e compreensão. Ao longo deste projeto, comprometemo-nos a estudar o campo das narrativas visuais a um nível académico, jornalístico e artístico, bem como a tentar compreender como nos podemos servir de elementos visuais, com particular destaque para o multimédia, para atrair o leitor e manter o interesse do mesmo em histórias que se prolonguem ao longo de vários meses ou anos. Servindo-nos de uma metodologia de investigação mista, após completarmos a investigação bibliográfica, realizamos entrevistas a cinco jornalistas, tendo mais tarde complementado este estudo com um inquérito feito a leitores sobre a temática das NV. De acordo com os entrevistados, o futuro do jornalismo digital prende-se com a utilização do *long-form*, multimédia e interatividade, lado a lado com narrativas visuais para contar uma história. Contudo, nunca dispensando a utilização do texto, uma vez que é parte essencial das NV. Não obstante, é necessário encontrar opções cativantes que ajudem a combater o cada vez menor tempo de atenção do leitor. Tendo em mente que atenção não pode ser vista como sinónimo de compreensão, é necessário repensar a noção que temos de boas formas de transmitir informação e lembrar que as opções mais simples são geralmente as mais eficazes. A realização de um inquérito a leitores permitiu aprofundar a questão da transmissão de informação auxiliada por elementos visuais. Os resultados mostraram que a *timeline* permanece como o formato ideal de NV e que as pessoas preferem divisões claras de informação, em lugar de formatos mais compactos, como o wordcloud e fotomosaico. Tornou-se claro que as NV em jornalismo são vistas como uma vantagem pela maioria de estudiosos, leitores e profissionais da área. Com base nas informações recolhidas, criou-se uma primeira versão de um protótipo não funcional para contar uma história ao longo de seis meses, que, mais tarde, foi testado em *focus group* com cinco estudantes de Mestrado. Ao aplicarmos o conceito da pirâmide deitada de Canavilhas para contar histórias online, oferecemos ao leitor um maior controlo da história e abrimos a possibilidade de leitura da informação a partir de mais do que um eixo, facilitando a captação e manutenção do seu foco. Aplicamos ainda o conceito de *curiosity gap*, dando ao leitor apenas a informação

necessária a uma primeira vista, esperando incitar nele a vontade de explorar mais a fundo o protótipo. Uma segunda versão foi posteriormente criada e testada com leitores por meio de um segundo inquérito, de modo a percebermos quais as limitações que ainda possuía. Os resultados finais demonstraram que, apesar de ainda existir espaço para melhorias, o protótipo desenvolvido não só é um método eficaz de transmissão de informação, como também é preferido pela grande maioria das pessoas inquiridas, relativamente à leitura tradicional de notícias.

Palavras-chave: Visualização; Notícias; Multimédia; Jornalismo Digital

Abstract

The human being has been using stories to pass on messages since the dawn of time, which proves the importance of storytelling. A particularly interesting technique for telling stories is the use of visual narratives (VN). By making use of visual elements to complement the narrative, we can enrich a “traditional” story and make it easier to read and comprehend. Throughout this project, we have done our best to study the field of visual narratives on an academic, journalistic and artistic level, as well as trying to understand how we can use visual elements, with particular emphasis on multimedia, to attract the reader and maintain their interest in stories that span over several months or years. Using a mixed method methodology, after completing the bibliographic research, we conducted interviews with five journalists, having later complemented this study with a survey made to readers on the subject of VN. According to the interviewees, the future of digital journalism’s storytelling is linked to the use of the long-form, multimedia and interactivity, side by side with visual narratives. However, since text is an essential part of a VN, one must never forget to use it, as a visual narrative cannot exist without it. Nevertheless, it is necessary to find captivating options that help to combat the reader's diminishing attention span. Bearing in mind that attention cannot be seen as synonymous with comprehension, it is necessary to rethink our notion of proper ways to convey information and remember that the simplest options are usually the most effective. A narrative visualization survey done to readers allowed us to deepen the issue of information transmission aided by visual elements. The results showed that the timeline remains as the ideal VN format and that people prefer clear divisions of information over more compact formats, such as the wordcloud and photomosaic. It became clear that VN in journalism are seen as an advantage by most scholars, readers and professionals of the field. Based on the gathered information, a first version of a non-functional prototype was created to tell a story over six months, which was later tested in a focus group with five Master's degree students. By applying Canavilhas’ Tumbled Pyramid concept to online storytelling, we offer the reader greater control over the story and open up the possibility of reading information from more than one axis, thus facilitating the capture and maintenance of their focus. We also applied the concept of curiosity gap, providing the reader with nothing but the necessary information at first glance, hoping to incite them to further explore the prototype. A second version was later created and tested with readers through a second survey, in order to understand the limitations it still had. The final results showed that, although there is still room for improvement, the developed prototype

is not only an effective method of transmitting information, but it is also preferred by the vast majority of surveyed people over traditional news reading.

Key-words: Visualization; News; Multimedia; Digital Journalism

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1. Introduction

These days, content makers can no longer approach content creation in an antiquated fashion, and must begin to rely on technologies that will allow them to deliver meaningful stories that are exciting both aesthetically and narratively (Einav & Lipson, 2018). However, these are old news, as in 2016 Jason Ohler already predicted that new technologies would give rise to an innovative way of approaching narratives - “I know only one thing about the technologies that await us in the future: we will find ways to tell stories with them” (Ohler, 2013).

Narrative visualization in Journalism has been around for a few years now, however, it is mandatory to know how to properly use it to tell stories in the most complete and yet simpler way. In this chapter, we will try to explain what this investigation might represent for the particular case of journalism and its future, and why visualization could play an important role on it.

1.1 Motivation

For years, it has been our strong belief that visualization is the election tool to convey a message. It has, in fact, been linked to the very first communication methods. Take the case of pictographs, hieroglyphs or even smoke signs. However, one must not forget how important the invention of writing was.

This project came up as a combination of those two areas, giving us the opportunity to explore and improve different ways of communicating with the world, through the shared use of visual and written techniques, and to better comprehend the impact of said communication. Storytelling¹ is in constant development and it is our responsibility to evolve alongside it. Its benefits have long been recognized, and its ability to explain concepts, build emotional connections, and aid in information retention have been studied in a variety of fields, including journalism, education, and others (Figueiras, 2014). Our attention span has been decreasing more

¹ Storytelling – “The activity of writing, telling, or reading stories” (Cambridge University Press, n.d.).

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and more over the years and so, it is important to find new and interesting ways of conveying information. That is to say, one should never forget how powerful visual elements can be while telling a story. They give sense to the narrative in ways that text could never do on its own. Being able to combine both text and visuals, in a proper way, would prove to be a strong weapon against misinformation, since properly constructed pieces of visual news would attract more readers.

1.2 Goals

This work is developed in the context of the Text2Story project (Text2Story, n.d.) and, due to that, it shares some of the same goals and concerns, namely the wish to enrich narratives with visual elements. With this in mind, we share another common trait: the desire to improve online news' comprehension for readers, through the proper and creative usage of the said visual elements.

Following the works of Joana Maria Lima Valente (Valente, 2021) and Mariana Filipa da Costa (da Costa, 2021) that served as main inspirations, this investigation intends, above all, to determine how visual elements can be used to better understand news stories. After understanding it, we plan to use interactive and dynamic visual elements to connect different pieces of "small" news (e.g., Russia invading Ukraine or the creation of covid-19's first vaccine) in order to tell the story of a much bigger one (e.g., the Russia – Ukraine War or covid-19).

Besides that, we aim to study the impact of these visual elements in the understanding of those said news, if applied to journalism. It is our strong belief that this could be useful both for readers and journalists who are looking to read and write, respectively, stories that are much more appealing to the eye, extra-complete and quicker to understand and absorb. In other words, we aim to study different ways to immerse the reader in a story, almost making them feel like they are part of it, thus uncomplicating complex topics.

In addition, the goal is to find a way to fight the ever-decreasing attention span of people, specifically youngsters, when it comes to the amount of time they spend reading news stories and trying to make sense of them. In our opinion, the use of visualization tools in journalistic storytelling could help fight this problem.

1.3 Methodology

This investigation began with the reading of visualization-related papers, alongside trustful websites that would, somehow, relate to the matter, some of them being more linked to visualization as a whole, while others, more connected to the studied topic, would relate to the

use of it in journalism. Above all, we intended to understand the level of usefulness that visualization tools have when used in Journalism and what composes a good visual narrative².

We also required some professional opinions on the subject. After gathering and ordering all the important information from the papers, we prepared a set of questions, mostly open-ended ones, related to the role visual elements play in news stories and interviewed five journalists who were able to give us more insight on that topic. It was a particularly important phase of the investigation, since it provided us with professional points-of-view that we would not be able to get if we were limited to surveys to readers.

It is our belief that this extra layer of opinions was able to make the investigation richer. It made clear that visual narratives in journalism are far from reaching their true potential and use, at least in Portugal. Although the interviews' covered topics could be applied to journalism in general, the interviewees were, in fact, Portuguese, working in their home country, therefore being more linked to how things work in the Portuguese context.

Alongside the surveys to the Text2Story team and to readers, the next steps of the investigation, these interviews can be seen as part of the discovery phase of the Double Diamond Process of Design. As stated in it, this is the time where we try to validate our hypotheses or solutions for the problem-study.

We then proceeded to the design and implementation of the non-functional prototype, which would later be tested in a focus group, in order to have the perspectives of possible users. Afterwards, some modifications have been made, creating version 2.0 so that we could test it one more time with readers, before finally draw conclusions from all the investigation's phases.

1.4 Dissertation Structure

The structure of this Dissertation goes as follows: In Chapter 2, we explored the topic of visual narratives on a “molecular” level. We learned how to create them, how they work and how we can apply them to journalism. We also looked for a way to make them more creative, eye-catching and appealing, namely by looking for design and cinema visual-narrative-related projects. In Chapter 3, we identified the problem and proposed a possible solution. In Chapter 4, we conducted interviews with journalists and a first set of surveys with readers. In Chapter 5, based on the analysis of the gathered results, we created a first version of the prototype. In Chapter 6, that said prototype was put to test in a focus group with four Master's and one Bachelor's degree students. After suffering a reformulation, a second version of the prototype was created and, based on that, a new survey was sent to readers. That would later give us the insight to understand what further improvements could, eventually, be applied if we ever got to create a third and final version. Finally, in Chapter 7, we presented the conclusions, followed by an overview of the main contributions to our investigation and by future implications on the project.

² Visual Narrative – “(...) a visual that essentially and explicitly narrates a story” (Pimenta & Poovaiah, 2010).

2. Exploring Visual Narratives

The importance of journalism on a well-functioning society is undeniable. Journalists are the ones who are responsible for both celebrating and denouncing what the country, and the world, is doing to their people. But what happens when journalistic articles stop being captivating enough? What effects could that have on society as a whole and how can journalists battle against that frightening trend?

In this chapter we will go through the study of three different, yet interconnected, subjects: traditional text-formatted journalism, the powerful impact of visual elements in storytelling and how the said visual elements could be used to improve journalistic news articles. By the end of the chapter some conclusions regarding these will be drawn, with the goal of setting the pace for the clarification and solving of the problem, to be presented in chapter three.

2.1 Methodology

For the study of the previously mentioned topics, we first started with the reading of research papers concerning the topics of journalism, storytelling, visual elements and news visualization. That allowed us to explore the academic background to support this investigation and then move on to a more practical approach of the topic, thus leading us to search for design-narrative-visualization-related works and other artistic perspectives on the topic. We also looked for good, and in some cases, out-of-the-box visual narrative representations used in journalism, in order to understand to which extent could the professionals actually apply some ideas. By the end of this chapter, we were able to collect information from three important fields: the academic, the artistic and the journalistic ones.

The academic gave us the foundations to properly establish problems and their solutions. The artistic allowed us to understand how to get to people by creating something visually appealing enough. Finally, the journalistic one made it possible to take some notes on what the journalistic potential for creating visually appealing stories is.

2.2 The Traditional News Format

In the 15th century, Johannes Gutenberg further explored a concept initially developed in China: the “Printing Press” (History.com Editors, 2019). This revolutionized journalism, since it made it possible to reproduce text in large quantities. However, times have changed and the internet brought another huge revolution. With it, came also the chance for journalism to adapt itself. In the next pages, we will show a few examples of how it is currently done in a digital-fast-paced world and how we could improve it.

2.2.1 The Inverted Pyramid Scheme

In most cases, journalists, and mass media as a whole, will tell a story according to specific principles and following a particular order. The Inverted Pyramid scheme, explained in Figure 1 by School Journalism (SchoolJournalism, 2021) is one of the most used techniques in written journalism, although some media writers are critical regarding it (Purdue University, n.d.) (Scanlan, 2003). It implies that news pieces should start by responding to six questions – one “H question” and the ones known as the “Five W’s” – “How?”, “Who?”, “What?”, “When?”, “Where?” and “Why?”, respectively. That is to say the most important facts must appear in the beginning of the article, as an effective lead paragraph explains the imperative details of who did what, when, where, and why on a basic level (Purdue University, n.d.; Scanlan, 2003). Finally, all the additional information follows those initial elements.

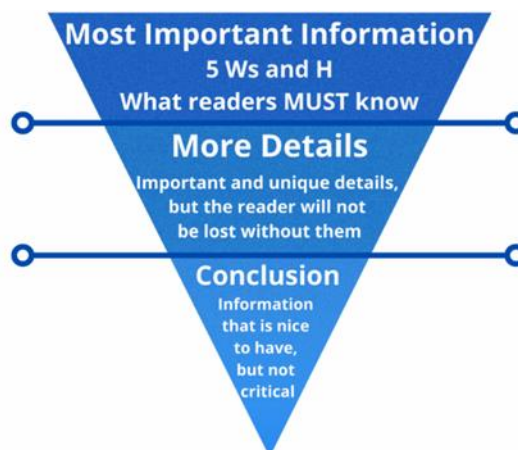


Figure 1: The Inverted Pyramid (SchoolJournalism, 2021).

What this format tells us is that it is important to consider writing news according to the level of importance of the reported information, as stated by Amy Schade (Schade, 2018), from the Nielsen Norman Group and illustrated in Figure 2.

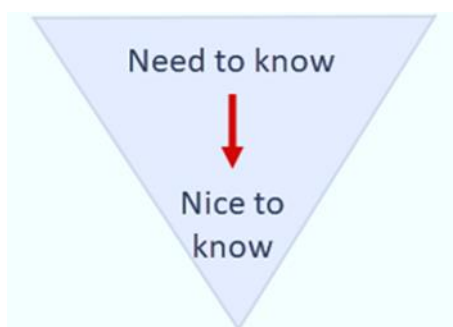


Figure 2: The Inverted Pyramid Flow of Information (Schade, 2018).

Another reason why the inverted pyramid scheme is still so widely used, even though it has been originally designed for transmitting stories over the telegraph, is because of the ever increasing need to deliver news with more and more speed (Johnston, 2007; SchoolJournalism, 2021). In other words, by using it, users may immediately create a mental model and a broad knowledge of the topic, which makes it simpler to understand the specifics that follow (Schade, 2018), thus making the process of writing news faster.

2.2.2 Alternatives to the Inverted Pyramid Scheme

2.2.2.1 Chronology

However, it does not mean a journalist can't tell a story using other techniques. In fact, it may be useful to do it sometimes. One good example is Chronology (The Missouri Group, 1985). As Sternberg suggests, "its (chronology) value turns not on the concordance formed in ordering but on the motivation(s) for this concordant ordering, from lucidity down" (Sternberg, 1990).

In this style, which is similar to the standard formula for telling fairy tales, one must go through some obstacles before bringing the story to a resolution worth waiting for (The Missouri Group, 1985). A political discussion in the parliament over the approval or denial of abortion, for example, could be a viable candidate for a news piece told in this format. Over the course of the meeting, there will be tension and controversy between its supporters and its opponents, but, in the end, there will have to be a final decision on what to do - this is an example of one story that could be better understood if not told under the inverted pyramid style. Same goes for football matches. Although they can be written following the classic format, it is not the only option and, depending on the case, it may not even be the best one.

2.2.2.2 News Narrative

News Narrative can also be a good choice. If a journalist chooses to use this format, they will mix the Chronology style with the Inverted Pyramid (The Missouri Group, 1985). The news piece starts with the Lead from the classic format (which corresponds to answering to the six previously mentioned questions), followed by some brief paragraphs that summarize the important information. The writer will then finish by transitioning back to the beginning, in order to tell the story in chronological order (The Missouri Group, 1985). This particular storytelling format is useful when the narrative is the focus and not the news itself (The Missouri Group, 1985) – focusing on an event that had happened during a football match, like a pitch invasion, instead of the actual football match is a good example of when to use a News Narrative style.

2.2.3 Key Differences between Telling Stories on TV, Radio and Paper

2.2.3.1 Broadcast News

One must also keep in mind that written news must obviously be different from its broadcast counterparts. Broadcast copy must be simpler than print copy and deliver the substance of the narrative in a limited period of time in order to capture attention – in other words, a straightforward and simple language allows for greater comprehension and, therefore, should be applied (Ramsey et al., 2004). Some fundamental tenets of broadcast writing include: writing scripts in a conversational tone, as if the writer were speaking to a friend; keeping the announcer in mind when writing so that they do not stumble over sentences or mispronounced terms; and, above all, bearing in mind that one must communicate ideas clearly so that listeners comprehend what is being said (Ramsey et al., 2004).

2.2.3.2 Radio & Television Dynamics

Because of the specific characteristics of radio, it becomes necessary to create mental pictures with our voice and to make use of sound effects (that being the journalists' voices or just captured natural sounds), in order to make the news perfectly understandable. When talking of television news, that is not the case, since the journalists are able to show the audience exactly what they are saying, therefore, not much description is needed. Otherwise, it would become too repetitive and tiring for the viewers. As professor Irving Fang states, “television imposes even greater demands on the writer because the spoken text must be combined with extemporaneous commentary and recorded material, adding another dimension to smooth delivery” (Fang, 1991).

However, there is another slight but significant distinction. Because TV news stories rely so much on imagery, they may not be as newsworthy (whether or not they are “worthy of being published as news” (Caple, 2018)) as they should be. In other words, they may not possess as much news value - the generally used criteria to evaluate newsworthiness (Bednarek & Caple,

2016) – as it would be expected. After all, as long as they make a powerful visual impact on the audience, they will be able to capture their attention and since visual attractiveness can be considered as a news value, the sheer availability of film or its "dramatic elements", for instance, is likely to boost the likelihood of a story being featured (Cagle, 2018). Radio, on the other hand, must rely on the journalist's ability to provide a clear and detailed account of events, frequently covering stories that provide more opportunity to explain the issue to listeners and, as a result, rely more on narrative.

Based on the readings of Fang, Cagle, Ramsey, Smith and Whitaker, alongside information from two New York's Film Academy articles (Kantilaftis, 2014; New York Film Academy, 2018) and one from Be On Air - The National Broadcast & Multimedia School (Working in Radio vs. TV, 2022), we have compiled a table (Table 1), that summarizes broadcast news' differences and similarities. Writing for radio, for example, implies describing more than writing for television (Fang, 1991). However, in spite of their differences, radio and television news share similarities as well, namely concerning their various restrictions, one of which being that the listener or viewer does not have the option of returning to anything that was missed or looked confusing - instead, the listener or spectator must absorb information as it is provided or risk missing out on the story (Ramsey et al., 2004). Likewise, since today's viewers live in a world that is becoming increasingly fast-paced and some individuals do other things while listening to the radio or watching television, it might explain why television viewers and radio listeners have shorter attention spans than readers (Ramsey et al., 2004). Broadcast content must, therefore, be crafted to capture their attention when the TV or radio is utilized as background sound (Ramsey et al., 2004).

BROADCAST NEWS (RADIO AND TV) SIMILARITIES	
The listener or viewer does not have the option of returning to anything that was missed or looked confusing - they must absorb information as it is provided or risk missing out on the story.	
Broadcast content must be crafted to capture their attention when the TV or radio is utilized as background sound.	
It must make use of a straightforward and simple language, which will allow for greater comprehension – ideas need to be communicated clearly.	
BROADCAST NEWS (RADIO AND TV) DIFFERENCES	
RADIO	TELEVISION

It's necessary to create mental pictures with the journalists' voice and to make use of sound effects - writing for radio implies describing more than writing for television.	The journalists are able to show the audience what they are saying, therefore, not much description is needed – news avoid becoming too repetitive and tiring for the viewers.
Radio must rely on the journalist's ability to provide a clear and detailed account of events, frequently covering stories that provide more opportunity to explain the issue to listeners and, as a result, rely more on narrative.	Because TV news stories rely so much on imagery, they may not be as newsworthy nor possess as much news value as they should - as long as they make a powerful visual impact on the audience, they will be able to capture their attention. “Dramatic elements”, for instance, are likely to boost the likelihood of a story being featured.

Table 1: Broadcast News: Differences and Similarities, based on (Be On Air, 2022; Caple, 2018; Fang, 1991; Kantilaftis, 2014; New York Film Academy, 2018; Ramsey et al., 2004).

According to the Missouri Group members (The Missouri Group, 1985) and Paul Bradshaw’s (Bradshaw, 2011) own creation, the Inverted Pyramid of Data Journalism, we have compiled a table of journalistic approaches to tell stories (Table 2) as well. Data Driven Journalism, as stated by Mirko Lorenz (Lorenz, 2010) is also explained briefly in here. The two data journalism related approaches will be further explored later.

JOURNALISTIC APPROACHES	SHORT DESCRIPTION	SPECIFICS OF EACH STYLE
Data-driven Journalism (DDJ)	It explains new insights and clarifies facts while telling complex stories on the basis of large amounts of retrieved data.	Data-driven journalism helps journalists to tell complex stories through engaging information graphics. It is the aggregation of data that distinguishes it as a data journalism effort.
The Inverted Pyramid	News are written according to the level of importance of the reported information - the most important facts must appear in the beginning of the article.	It responds to six question words – “How?”, “Who?”, “What?”, “When?”, “Where?” and “Why?”. It has been the go-to option for years: it’s useful for news and specifically breaking news.

<p>Chronology</p>	<p>Stories that have some tensions or controversy and force one to go through some obstacles before bringing the story to a resolution worth waiting for.</p>	<p>Used to tell stories that share similarities to how fairy tales are told We do not necessarily need to start at the beginning – instead, a key moment should be chosen and used in the lead to engage readers.</p>
<p>News Narrative</p>	<p>The news piece starts with the Lead from the classic format, followed by some brief paragraphs that summarize the important information and finishes by transitioning back to the beginning, in order to tell the story in chronological order.</p>	<p>A mix between the classic format (inverted pyramid) and chronology. This particular storytelling format is useful when the narrative is the focus and not the news itself.</p>
<p>The Inverted Pyramid Of Data Journalism</p>	<p>Different from its classic counterpart, the Inverted Pyramid of Data Journalism starts with a big amount of information that gets increasingly concentrated as we dig down until we reach the point of conveying the results.</p>	<p>It entails combining all information with: sources, data and documents; cleaning, comparing and contrasting data; discovering relevant information and evidence; communicating the context, and ultimately publishing it.</p>

Table 2: Compilation of Different Journalistic Approaches to Tell Stories, according to Paul Bradshaw (Bradshaw, 2011), Mirko Lorenz (Lorenz, 2010) and The Missouri Group (The Missouri Group, 1985).

2.3 The Study of Visual Narratives in Journalism

In Section 2.2 we broke through the different aspects of traditional news formats, namely how they work and why they should not be the future of journalism. Now it is time to show some of the alternatives.

2.3.1 The Importance of Interactivity

Ricardo Granada, a Portuguese journalist at Record, refers that Hypertext is probably one of the most well documented characteristics of online journalism and can very well serve as one of the basis of the internet (Granada, 2016). Brought up by the first time by Vannevar Bush in 1945,

in his article “As We May Think” (Bush, 1945), it states that the human mind functions on an idea-association-basis (Granada, 2016). He theorized that communication would evolve way past the telegram, a tool that he considered, by that time, to be hugely innovative. Years before the internet appeared, Vannevar Bush already talked about interaction between instruments and readers/viewers/listeners in (Bush, 1945), saying we create and absorb thing through our senses - “(...) the tactile when we touch keys, the oral when we speak or listen, the visual when we read. Is it not possible that some day the path may be established more directly?” (Bush, 1945).

In the beginning of the 2000’s, Bongers went further than Bush, talking specifically about interaction between a human-being and a system. The author referred to this as a two-way process: control and feedback, in which “the interaction takes place through an interface (or instrument) which translates real world actions into signals in the virtual domain of the system” (Bongers, 2000).

There is actually a model of how human-machine interaction processes itself (Figure 3). By Bonger’s definition, in the model, humans shall be represented by round forms and machines by squared ones (Bongers, 2000). He takes on Vannevar Bush’s concepts of interaction through senses and memory and creates what he calls the “interaction- “loop””. In more detail, the system is activated by the user inputs. Once the machine has processed the information, it will display a result than will then be seen, listened, read or all simultaneously by a human-being. This will, in turn, provoke a reaction on the user, activating the system once again, surrendering both to the said interaction- ‘loop’ (Bongers, 2000).

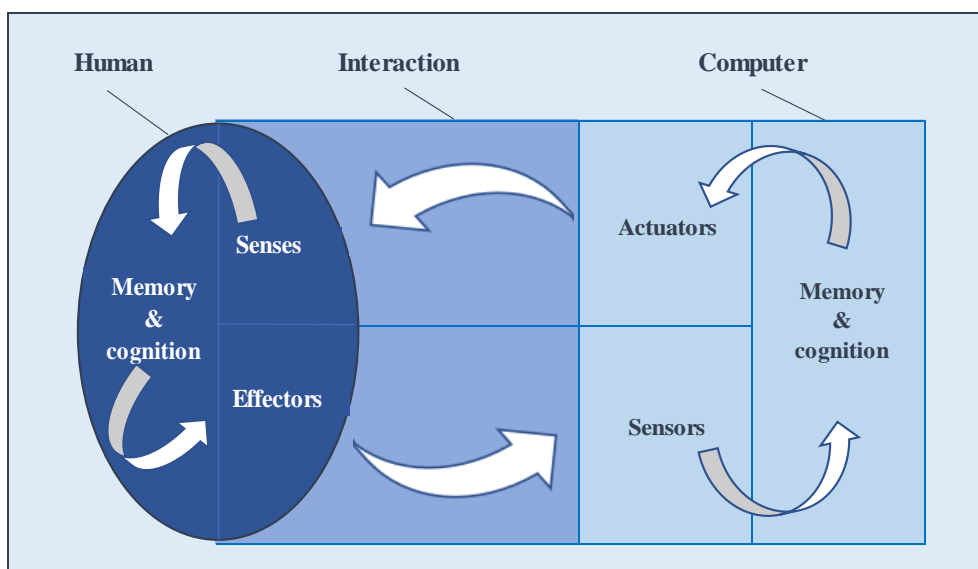


Figure 3: Human-Machine Interaction Process, adapted from (Bongers, 2000).

According to Canavilhas, this interaction and the hypertextuality present on digital journalism allows the users to create their own reading-path, according to their specific interests (Canavilhas, 2006). Moreover, it speeds up the reading process, altering the classical notion of

text, thus creating new reading formats (Canavilhas, 2006). If, on the one hand, the traditional method used by the press only allows for a hierarchized-reading-structure, chosen by the journalist in the moment of writing the news article, the digital one, in turn, demands a more active presence of the reader (Granada, 2016). As stated by Canavilhas, “hypertextuality (...) breaks the limits of space and time that have, till the moment being, an “essential brand” of the journalistic practice in all its pre-telematic supports” (Canavilhas, 2006).

2.3.2 The Tumbled Pyramid

The Inverted Pyramid format has been the go-to method by default when it comes to writing news articles. However, the transition to web journalism has been indicating, for a few years now, that this may not be the best approach anymore (Canavilhas, 2006), which lead Canavilhas to coin a new concept, “A Pirâmide Deitada”, which literally translates to “The Tumbled Pyramid” (Figure 4). While in the Inverted Pyramid format the events tend to be shown according to their level of importance, Canavilhas states that, on web journalism, the variable of reference must be both the quantity and variety of information. The news shall then develop from a less-information-level to successive deeper, varied and more developed-levels of the analysed theme (Canavilhas, 2006), as shown in Figure 5.

While it shares similarities to the inverted pyramid, such as the possibility to abandon the reading at any time without losing focus from the story core, it also has some particularities, namely the fact that, in the Tumbled Pyramid, one can choose to either follow just one reading axis or to navigate freely within the news article (Canavilhas, 2006). Although there is still a clear definition of the information levels, the text is not organized based on its informative importance, but rather on an attempt of giving the reader enough reading clues (Canavilhas, 2006).

Canavilhas goes even further than that, proposing 4 reading levels: Base Unit, or lead, which will answer to the questions of What, When, Who and Where. The Explanation Level, in charge of answering to Why and How, thus completing the essential information regarding the aborded topic. The Contextualization Level, where more information shall be offered on multimedia format. And finally, the Exploitation Level, responsible for linking the news to the archive publication or to external files (Canavilhas, 2006). The opinions of Machado and Palacios seem to support Canavilhas opinion that the digital, and multimedia in specific, opens different possibilities, as they state that “(...) in the most varied (multi)media formats, one has the possibility of making available online all the information previously produced and stored, through digital archives, with sophisticated indexing and retrieval information systems” (Machado & Palacios, 2003).

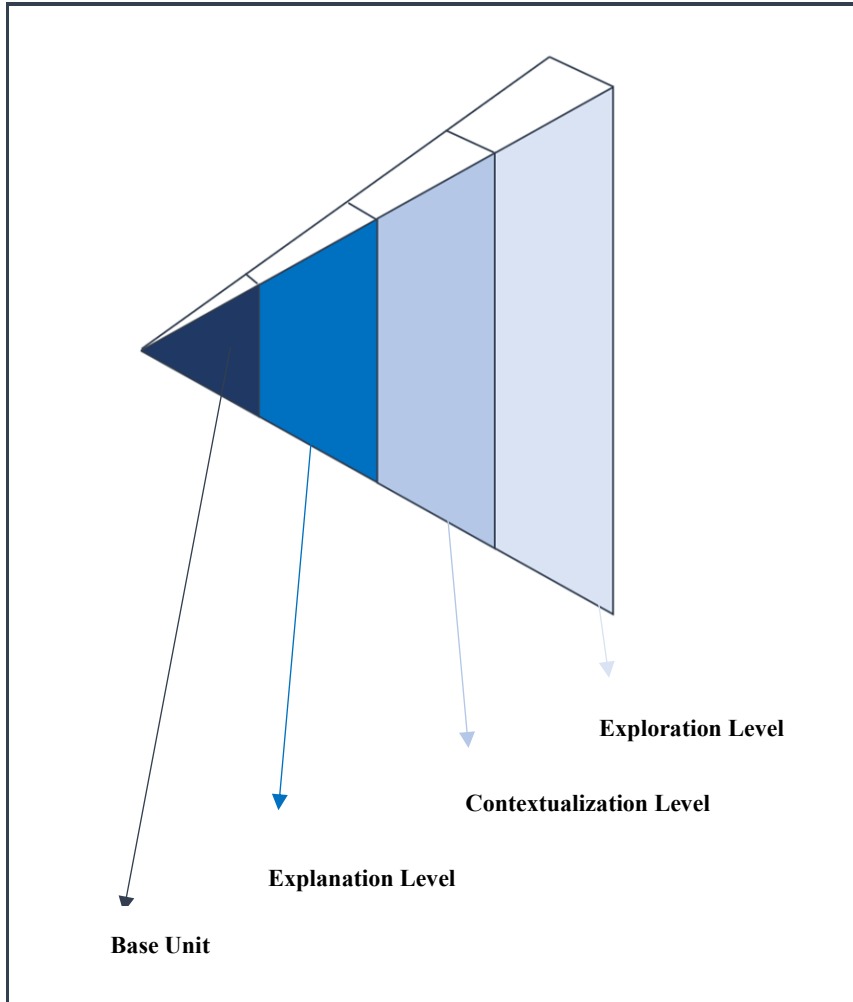


Figure 4: Canavilhas' Tumbled Pyramid (Canavilhas, 2006).

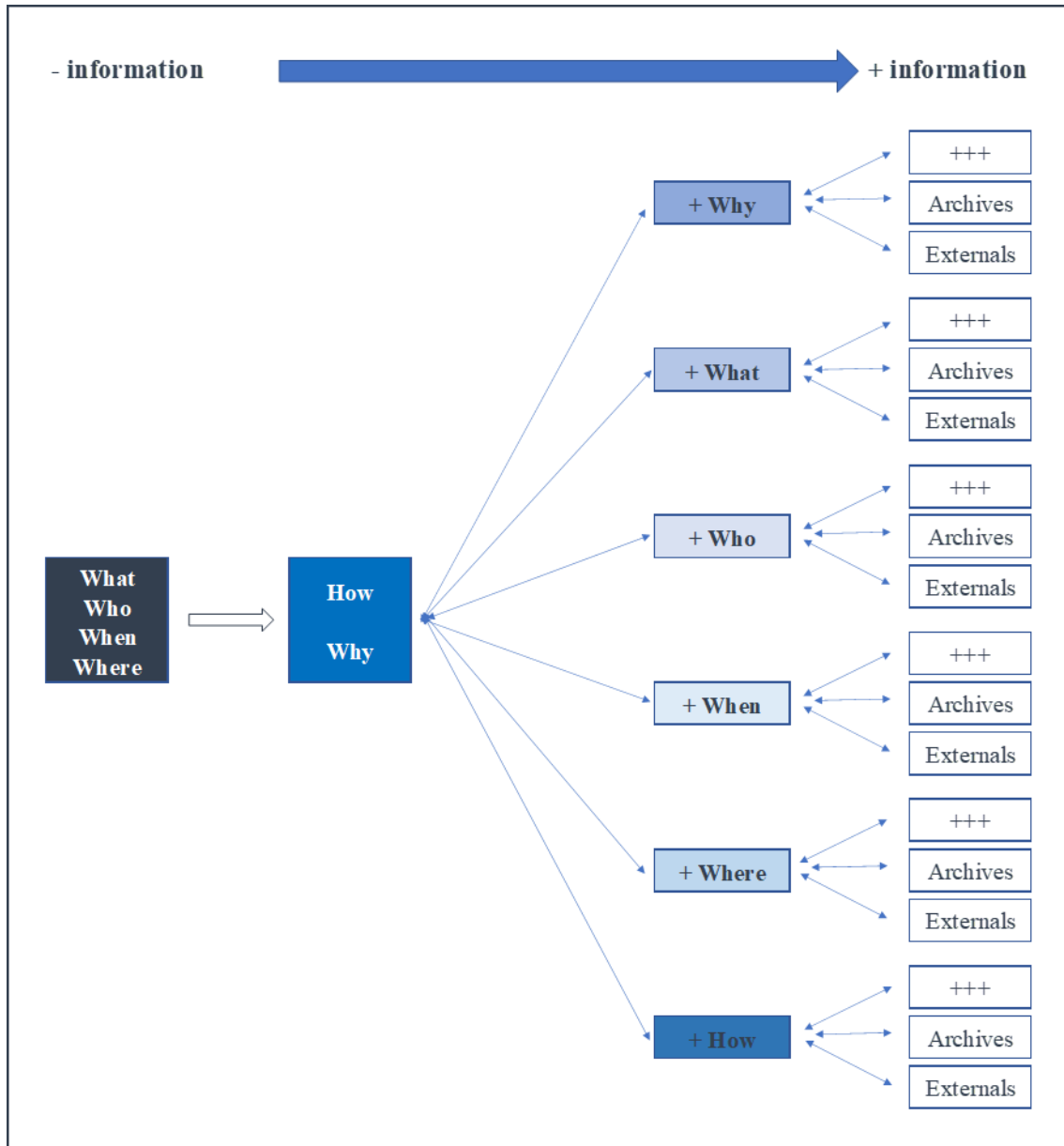


Figure 5: Detailed Explanation on Canavilhas' Tumbled Pyramid (Canavilhas, 2006).

The same authors propose the “Word Tree” (Figure 7), a graphical version of the traditional “keyword-in-context” method that enables rapid querying and exploration of bodies of text (Viégas & Wattenberg, n.d., 2008). It is a simple and easily understandable visual narrative representation. More focused on text, than on image, but nonetheless a useful technique to deploy engaging visual narratives. In the example given, one can see how Martin Luther King’s famous speech worked from top to bottom. It shows the user how the hierarchy was formed and what the key elements were.

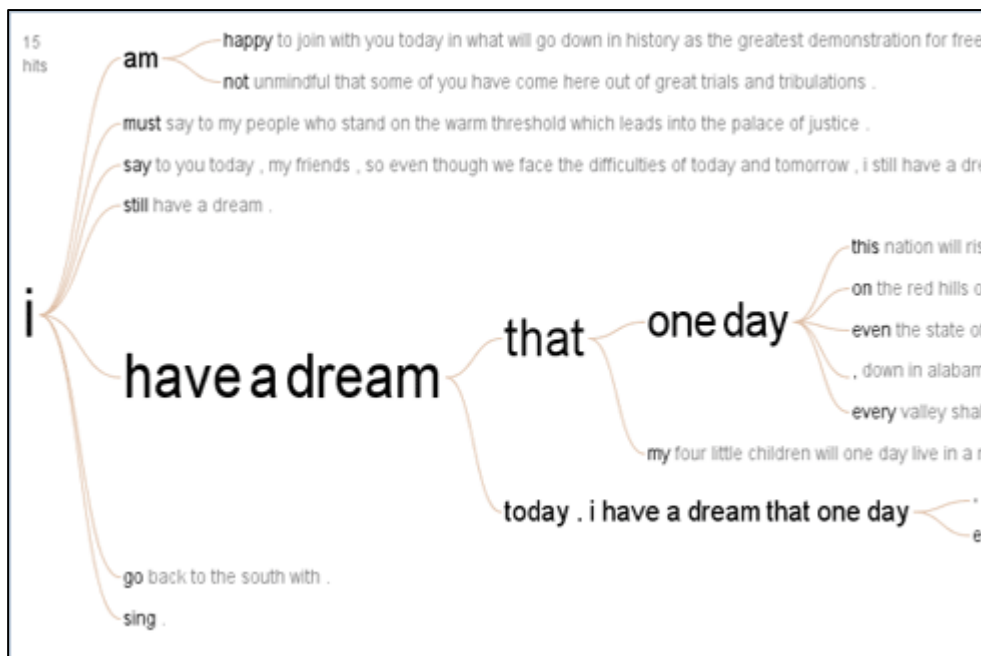


Figure 7: Word Tree (Viégas & Wattenberg, n.d.).

2.3.4 Data-Driven Journalism

Infographics, and especially interactive infographics, which are increasingly being used in online journalism and are visualization-related, can be a powerful tool for representing and communicating complex information, particularly in data-driven journalism (Zeiller & Zwinger, 2016). Mirko Lorenz (Lorenz, 2010), both a journalist and an information architect, defines data-driven journalism as a workflow in which data serves as the foundation for analysis, visualization, and, most importantly, storytelling. The potential for data-driven journalism to grow is enormous (Zeiller & Zwinger, 2016).

In an innovative and unique way, data-driven journalism, explained in Figure 8 by Cornish (Cornish, 2019), based on the works of Mirko Lorenz (Lorenz, n.d.), explains new insights and clarifies facts while telling complex stories on the basis of large amounts of retrieved data – in other words, it collects, evaluates, interprets, and presents large amounts of data (Gray et al., 2012; Matzat, 2016; Zeiller & Zwinger, 2016). Data-driven journalism can, therefore, help a journalist

to tell a complex story through engaging information graphics (Gray et al., 2012; Weber & Rall, 2013; Zeiller & Zwinger, 2016). In fact, according to Harry L. Trentelman, Henk J. van Waarde, Jaap Eising and M. Kanat Camlibel, informativity is a very important concept for data-driven analysis and control, therefore making a great symbiosis between the data-driven approach and journalism (Camlibel et al., 2020).

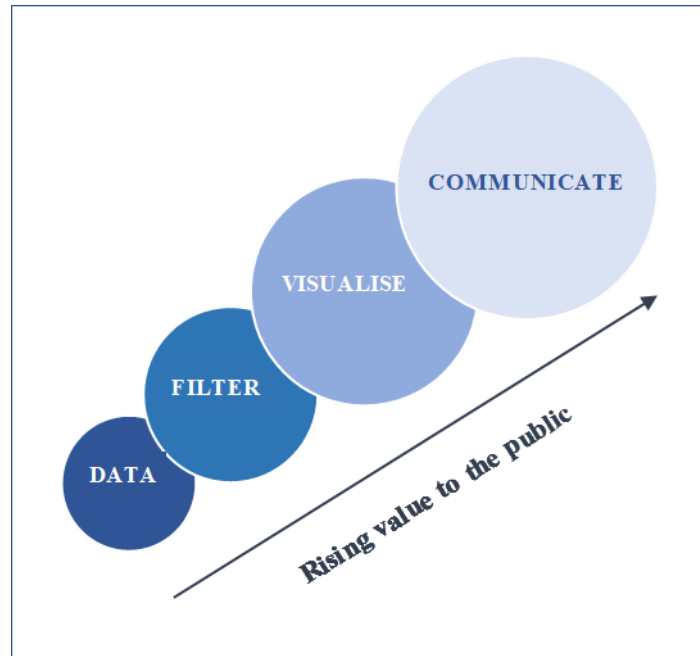


Figure 8: How Data-Driven Journalism Works, adapted from (Cornish, 2019).

In that sense, it is our belief that Journalism could benefit from the using of these means of communicating messages, particularly due to the fact that in an experimentation made by Abel, Ordóñez and Stoitchkov, the results showed that data journalism in communities still has to be improved (Cuenca et al., 2019).

2.3.5 The Inverted Pyramid of Data Journalism

Going back to the Data Journalism topic, it is important to mention another possibly changing concept introduced in 2011 by Paul Bradshaw, a consultant data journalist in the BBC England data unit, international speaker on online journalism and course leader of the MA in Data Journalism and the MA in Multiplatform and Mobile Journalism at Birmingham City University, (Birmingham School of Media, n.d.; DataJournalism.com, n.d.) - "The Inverted Pyramid of Data Journalism" (Figure 9) – named this way, partially, because it starts with a big amount of information that gets increasingly concentrated as we dig down until we reach the point of conveying the results (Bradshaw, 2011).

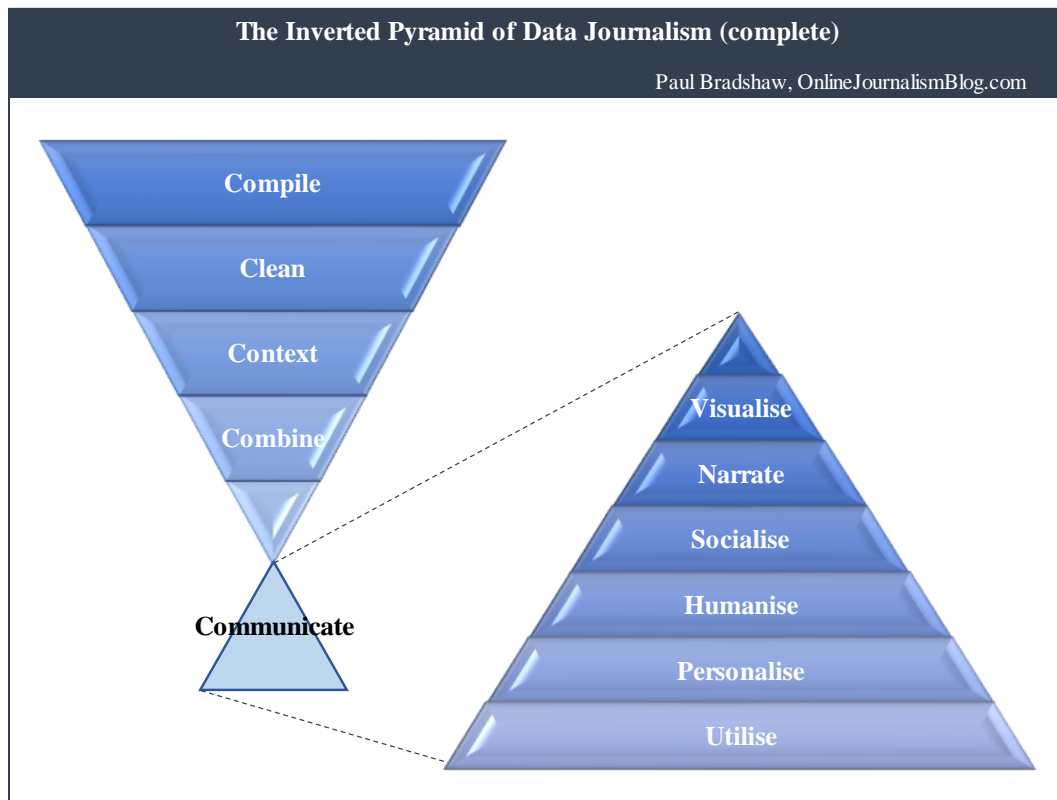


Figure 9: Paul Bradshaw's Inverted Pyramid of Data Journalism (Bradshaw, 2011).

According to Bradshaw, data journalism starts in one of two ways: we either have a question that needs data, or we have a dataset that needs to be questioned - whichever it is, the aggregation of data is what distinguishes it as a data journalism effort (Bradshaw, 2011). It entails combining all information with: sources, data and documents; cleaning, comparing and contrasting data; discovering relevant information and evidence; communicating the context, and ultimately publishing it (Cuenca et al., 2019).

2.4 Storytelling

According to Hyvärinen, the use of narratives in social research can be divided in three distinct, although not necessarily consecutive, moments. Initially, narratives were employed as factual resources; secondly, the study of narrative as texts with a particular form began; finally, the third stage entailed moving beyond the study of a single narrative text to the study of narratives and storytelling as polymorphous phenomena in context (Hyvärinen, 2008). Regardless of how it started, there are no doubts concerning its importance on a daily-basis, particularly the one of storytelling.

Storytelling occupies a very specific and ever-growing powerful position in society's daily interaction. However, that fact is not new to mankind. In fact, human-beings have utilized stories

to entertain, educate, and establish moral ideals since the beginning of time (Figueiras, 2014). This should come as proof of storytelling's importance, since even though the world has evolved and suffered constant changes over the last centuries, we keep telling stories on a daily basis. Nevertheless, that does not come without a reason: after all, in comparison to other methods of delivering information, stories win not only because of their ability to aid in information assimilation and retention, but also because they are more appealing (Figueiras, 2014). The struggle lies in finding the proper way to do it.

Making use of storytelling techniques like the use of emojis (a loanword from Japanese, originated from the 'picture' + moji 'letter, character.' (Oxford Languages, 2015)); timelines; interactive maps and, of course, infographics, among many others, to pass on a message, helps the readers to visualize, and, consequently, understand the whole plot more easily. In other words, ideas presented in visual and graphical forms are easier to understand and remember than those presented as words (Husain & Parveen, 2021). Take the case of emojis and its rise both in popularity and importance regarding communicating messages - they have clearly become an integral linguistic unit used to express meanings in the majority of internet communities (Gülşen, 2016).

For more than a decade, teachers and graduate students in the University of Houston College of Education's Learning, Design, and Technology Program have been investigating the use of digital storytelling to enhance both teaching and learning (Robin, 2016), which proves its importance in today's world. Social networks have also been playing a huge role when it comes to changing how human-beings tell stories. Snapchat and Instagram storytellers, for example, follow specific themed patterns when it comes to narrative structures, employing seven different methods to communicate their stories and build a narrative: images, texts, videos, emojis, doodles, instant information and filters (Amâncio, 2017). According to Fisher's Narrative Paradigm, human beings are storytellers by nature, which explains the popularity of the "Stories" feature, as well as the established categories based on narrative features and the utilization of semiotic assets to make more sense of the stories shared by users (Amâncio, 2017; Fisher, 2009).

These are all entailed in the data visualization spectre, defined by Cambridge Dictionary (Data Visualization, n.d.) as "the act of representing information as a picture, diagram or chart, or a picture that represents information in this way" and can, indeed, be an effective narrative tool, especially when the story includes a lot of data (Kosara & MacKinlay, 2013). All things considered, while it is certainly true that storytelling, from a traditional journalistic perspective, contain specific characteristics, one can also affirm that it is not impossible to give it a more visual approach.

2.4.1 Using Emojis to Tell Stories

In fact, a growing number of stories are being enhanced by narratives that include complex visual elements (Zeiller & Zwinger, 2016). To state an example, interactive infographics, in

particular, can be a powerful tool to represent and communicate intricate information (Zeiller & Zwinger, 2016). It is, however, mandatory to know exactly how and when to use these visual elements, since some emojis, for example, may have an ambiguous meaning, if not used in the right context. According to Kauffman, emojis fail the “duck test”, an experiment which says that, if it looks like a duck, and quacks like a duck, then it is probably a duck. In spite of that, emoji interpretations may be so perplexing that a "duck" emoji might imply anything other than a duck (Kauffman, 2018). Nevertheless, if used properly, visual elements can be a powerful tool when trying to convey a message. After all, an image is worth a thousand words.

One strong example of that came in 2015, when the Oxford Dictionary chose as “The Word of the Year” not a word, but an emoji (plural: emoji or emojis) - a little digital image or icon used to represent a concept or feeling in electronic communication – Face with Tears of Joy (Oxford Languages, 2015). It was picked as the 'word' that best embodied the “ethos, atmosphere, and preoccupations of 2015”, according to Oxford. This circumstance not only skyrocketed emojis' use and popularity (Oxford Languages, 2015), but also demonstrates unequivocally that there is a growing desire for new visual forms of writing (Onursoy, 2018).

Picking 😄 as the “Word of the Year” represented a turning tables event that not only opened the eyes of the world to a new way of comprehending communication, but also showed that we are, in fact, moving towards a more visual way of communicating with each other. Emojis are no longer the domain of texting teenagers; instead, they have been embraced as a nuanced form of expression capable of crossing language barriers, with celebrities and brands using it widely in addition to everyone else (Oxford Languages, 2015).

2.5 A Creative Approach to Narrative Visualization

Narrative Visualization is a vast field that is not restrained to Journalism. In fact, it can be applied to most creative areas too. In this section we will break through some of those applications and how some of their features could be used to improve journalism as well.

2.5.1 Visual Narratives in Cinema

Movies like *Inception*, *Interstellar*, *Shutter Island*, *Memento*, *Fight Club* or even *Tenet*, the “younger” of this list, are other great examples of how we could benefit from the use of pictures, (and timelines in particular) to understand a message (that being the film itself, in this case). With no discredit to all the others, Christopher Nolan (director of four of the six mentioned films), has proven to be a mastermind when it comes to telling completely mind-blowing stories that require the crowd’s constant attention to details due to his incessant time shifts, multiple narratives, and complex action, which elicit both suspense and spectacle in the audience (Rapold, 2020). As Dody Dorn, an Academy Award-nominated editor of “*Memento*” says, the absence of knowledge and

point of view gained by narrating a story out of chronological order helps us to empathize with the main character of a narrative (Rapold, 2020).

There are now numerous theories trying to explain both the entire plot and specific parts of Nolan's movies, but the exact nature of them remains, in most cases, open to interpretation. However, one thing is certain: one can watch these motion-pictures over and over again and remain confused or at least with some doubts regarding how the actual story moves from one point to another, since they keep mixing Past, Present and Future without following the expected course of events (Figure 10).



Figure 10: Christopher Nolan's Movies Timeline according to Behzad Nohoseini (Nohoseini, 2019).

The premise of "Memento" bears a striking resemblance to the forward-and-backward concept of "Tenet," not to mention the layered storytelling of "Inception" and "The Prestige." All of these films necessitate meticulous calibrating. It's all about withholding just enough information to keep things interesting (Rapold, 2020).

The same goes for the Netflix German series *Dark*, a time-travel, nuclear physics, and even Christian mysticism story that is both complex and rewarding (Crouch, 2019; Ware, 2019). The fact that our cell phones are always at hand, offering distraction, is one of our time's animal-brain conveniences, but also one of its moral difficulties (Crouch, 2019). In the case of *Dark*, this is particularly important, since, if one looks down for a second while watching it, they will most certainly get lost (Crouch, 2019). The plot's complexity, filled with secrets and betrayals unravel over many timelines, spanning from 1921 to a post-apocalyptic future in 2052 (Crouch, 2019).

As entertaining as these ever-shifting frills can be at times, they may, simultaneously, come up as confusing for the viewer. While this is certainly not the path to follow when it comes to telling journalistic news stories, it shows how important the use of timelines can be for establishing connections and understanding a message.

Before, one has discussed the possibility of timelines being used to better understand the plot of a movie. Now we are going to show a real-life example of how that could be done. "Movie Narrative Charts" (Munroe, n.d.) (Figure 11) is a creative work of Randall Munroe. It is an interesting twist to the classical horizontal timeline, since it actually uses both axes to illustrate

how characters interact with each other in the story. The horizontal axis represents time, while the vertical one allows us to understand the convergence of characters when it happens.

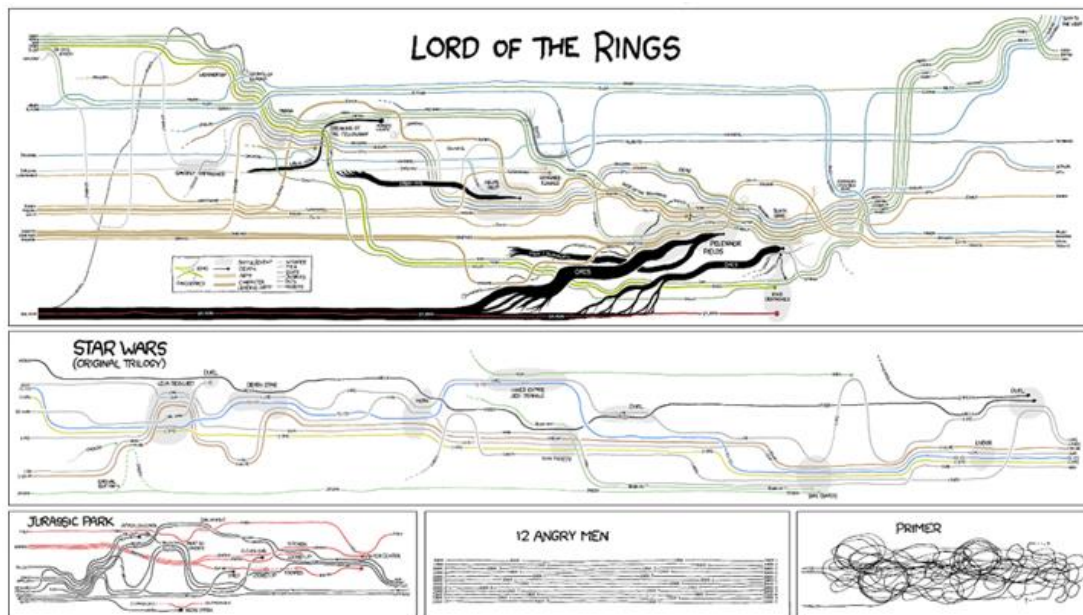


Figure 11: Movie Narrative Charts for several known movies, according to Randall Munroe (Munroe, n.d.).

2.5.2 Digital Design & Programming as Creative Ways to Tell Stories

Visual Narratives are not only a domain of journalists nor scholars. In fact, they can be used in artistic fields as well. One that has a particularly rich collection of visuals applied to storytelling is Digital Design and Programming. If we are to talk about applying interaction, in particular, to visual narratives, there are no better examples than the ones created by professionals of these fields. Take the case of Dave Bird and his creative projects, that revolve mostly around promoting people's interaction through creativity exercises, most of the times, ending up with them sharing parts of the same story. In other words, his works promote shared storytelling through different creative ways.

Among others, one good example of Dave Birss's creative storytelling exercises by means of digital tools is the "Story Dice" (Birss, 2020) (Figure 12). In it, one gets no words, only 5 or 9, depending on which game mode we choose, apparently disconnected pictures between each other. It is up to the reader to connect them and create a story

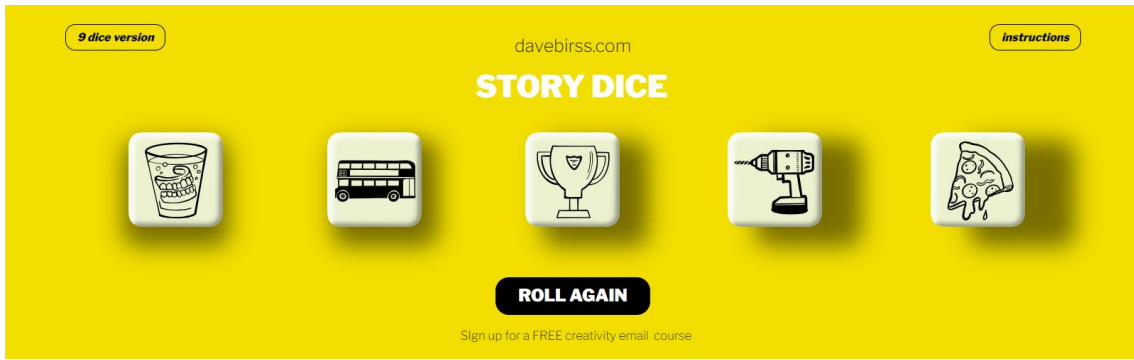


Figure 12: Story Dice (Birss, 2020).

A slightly different example is “Just Boil it” (Birss, n.d.) (Figure 13). Simply put, it is a timer that helps us to peek the inside of an egg. However, on a deeper level it ends up being a creative timeline that walks us through the different boiling stages of an egg.

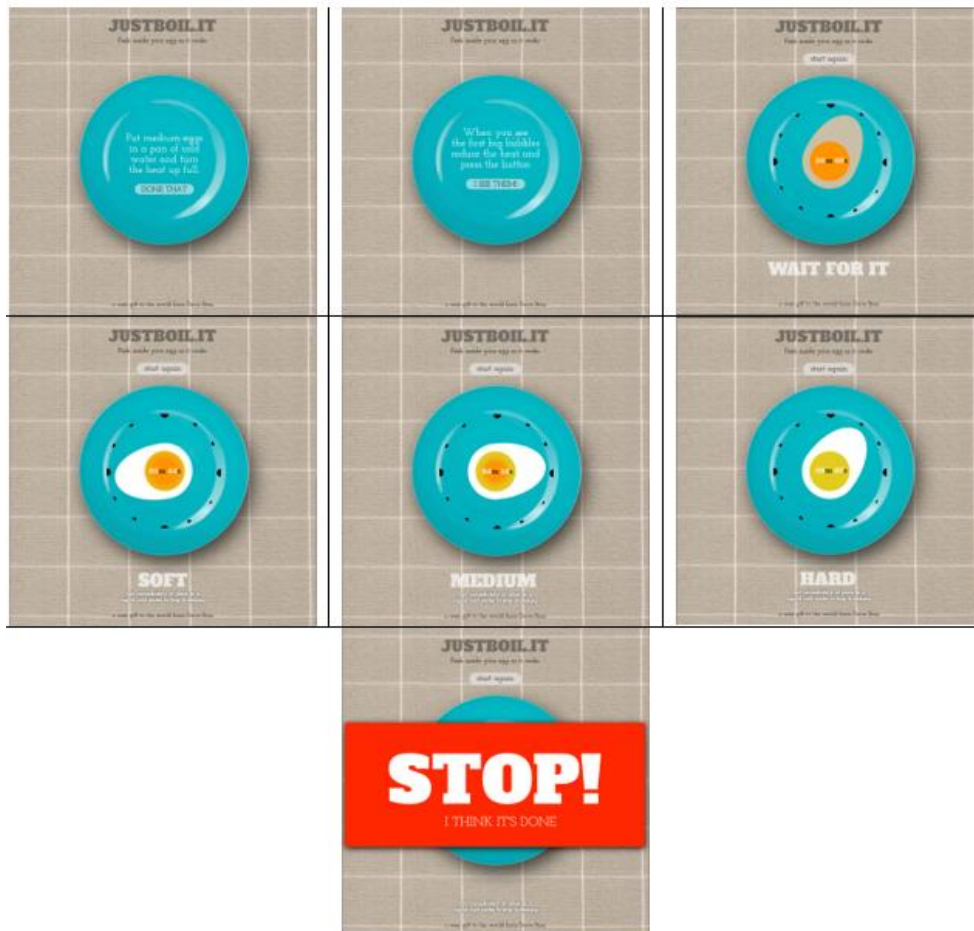


Figure 13: Just Boil.it (Birss, n.d.).

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Another creative deserving of mention is Guilherme Garcia. He is the creator of “Romance Languages” (Figure 14), a dynamic network programmed in R, that represents, interactively, the relationship between Romance Languages (Garcia, n.d.-a). This allows us to move freely in the network, changing its look by dragging specific languages to wherever we want, while at the same time provides us with knowledge regarding languages’ family trees.

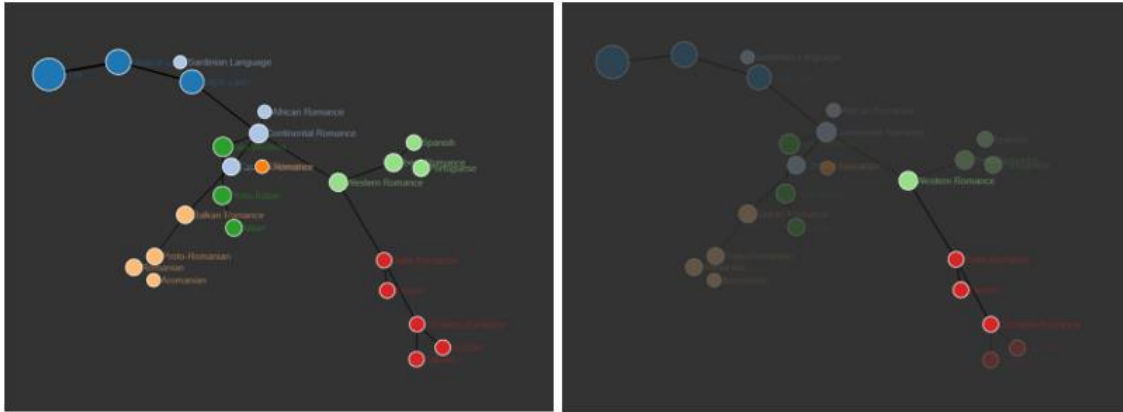


Figure 14: Romance Languages, a Dynamic Network in D3 (Garcia, n.d.-a).

Through programming in R, he was also able to create a wordcloud from *Os Lusíadas* (“The Lusíads”) (Figure 15), one of the most well-known Portuguese epic tales, written by Luís Vaz de Camões in 1572. The wordcloud (Garcia, n.d.-b) has a certain degree of interaction, allowing us to understand the frequency of each word in the story.



Figure 15: Wordcloud of "Os Lusíadas" programmed in R (Garcia, n.d.-b).

“Skin to Skin” (Hint.fm, n.d.-a) (Figure 16), a project included in a much bigger one, named Touch, from Hint.fm, is also an interactive visual narrative per say. It works as a heat map of the human body, that, based on more than 33.000 answers, and covering 707 points on male and female bodies, “provides a collective portrait of desire”, by showing “the collective perception of erogenous zones” (Hint.fm, n.d.-a). In other words, it reveals “a map of sensual desire with multiple focal points and islands of excitement” (Hint.fm, n.d.-a). It acts like a visual narrative, detailing erogenous zones of the body through different layers, namely “being touched” and “touching” someone. The colours, ranging from dark blue, to an almost white tone, allow us to understand what these two concepts actually represent. It uses both interaction and colour as the main tools to illustrate the narrative.



Figure 16: Skin to Skin (Hint.fm, n.d.-a).

From the same authors, we have “Wind Map” (Hint.fm, n.d.-b) (Figure 17), a visual live representation of how the wind is acting in the United States of America. We can move through different places of the map, zoom in and, above all, see the wind currents moving. It is an interesting and interactive way of using the map feature to tell a story.

Now, for actual stories per say, more similar to journalistic ones, there are other very creative and interesting inventions. “The Boat” (Figure 18), based on the story by Nam Le and adapted by Matt Huynh, is “an interactive graphic novel about escape after the Vietnam War” (Le & Huynh, 2015). By combining sound, text, images, interaction and animations, it takes us on a journey

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through the seas, on an interesting twist to the already adopted digital written journalism format, the long-form³.

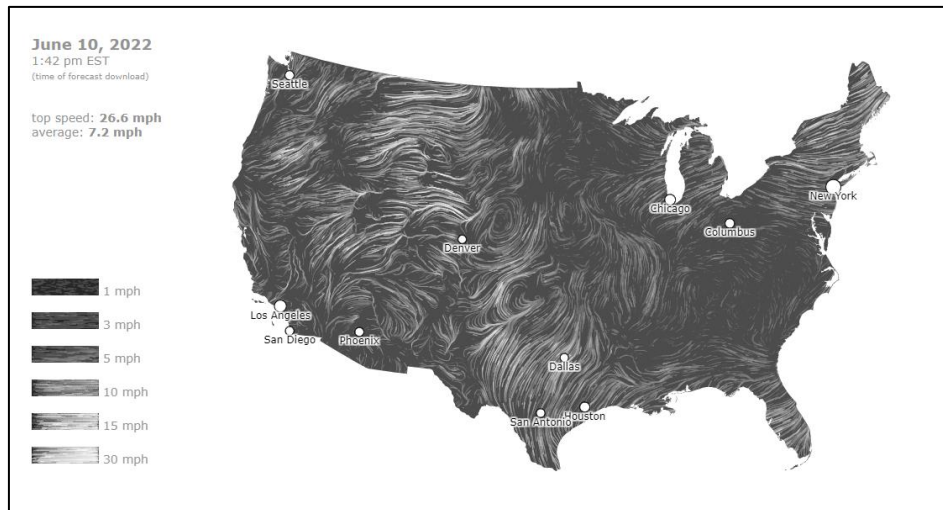


Figure 17: Wind Map (Hint.fm, n.d.-b).

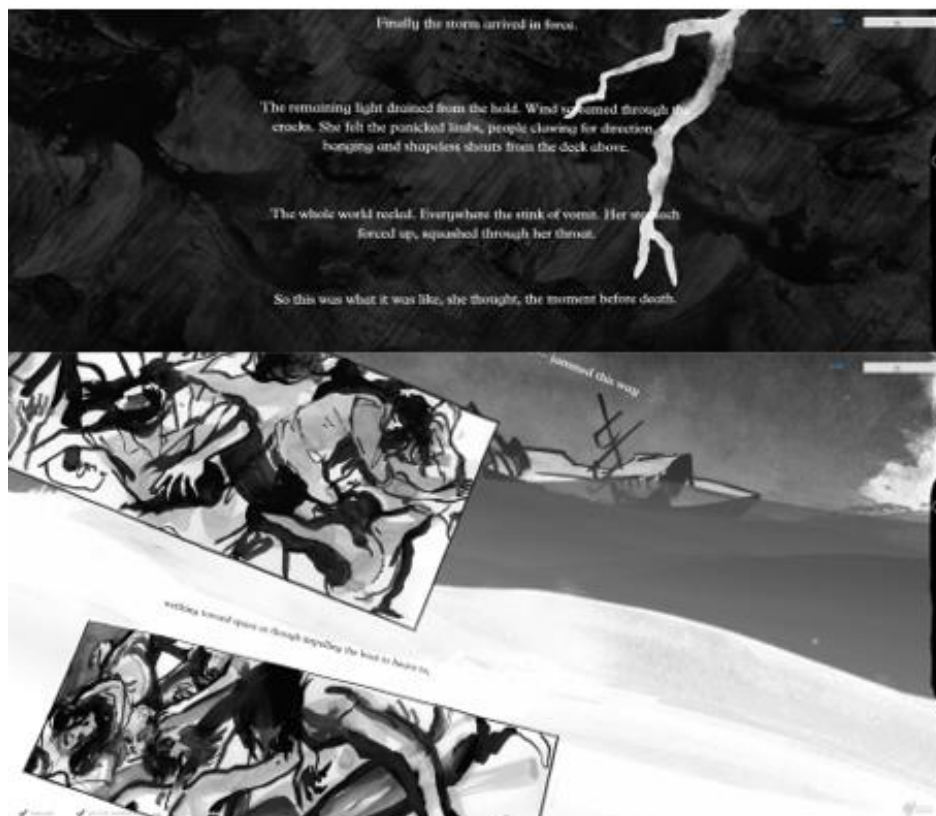


Figure 18: The Boat (Le & Huynh, 2015).

³ Long-form Journalism – “Written articles of considerable length (...) published online or in print” (Krieken, 2019).

Following a similar format, we have “Orsi & Jan” (Csaba K et al., n.d.) (Figure 19), a website that started off as both a creative and fancy wedding *e-vite*, but was quickly made available for everyone on the internet, due to all the compliments it received. Instead of having an automatic movement effect, like the previous example, these drawings produce movement between each other as we scroll down the page. In here, we are in charge of when the screen changes, remembering a flipbook animation done vertically.

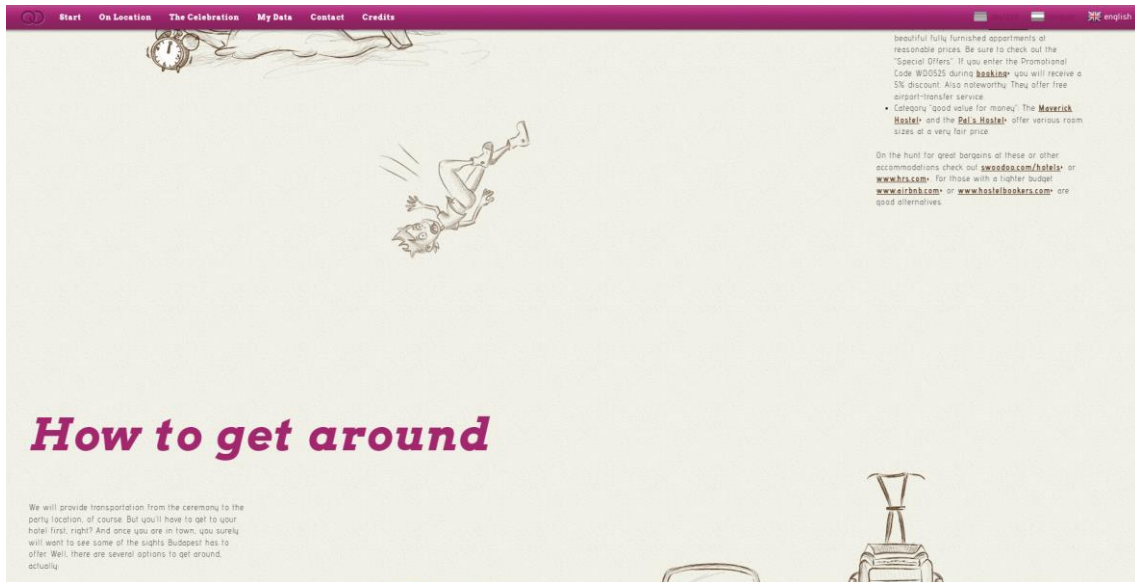


Figure 19: Orsi & Jan (Csaba K et al., n.d.).

“Hobo Lobo of Hamelin” (Živadinović, 2014) (Figure 20), however, is a similar, yet different narrative style. Completed by Stevan Živadinović in 2014, after having started it in 2011, it is a reimagining of the old fairy tale The Pied Piper of Hamelin, with the main character Hobo Lobo, a wolf, assuming the Pied Piper's role (Živadinović, 2014). It is a story told in the style of a graphic novel, with images, text and a certain degree of interaction, as we are the ones in charge of sliding the pages. As such, just like in a comic book, or graphic novel, we do it horizontally.

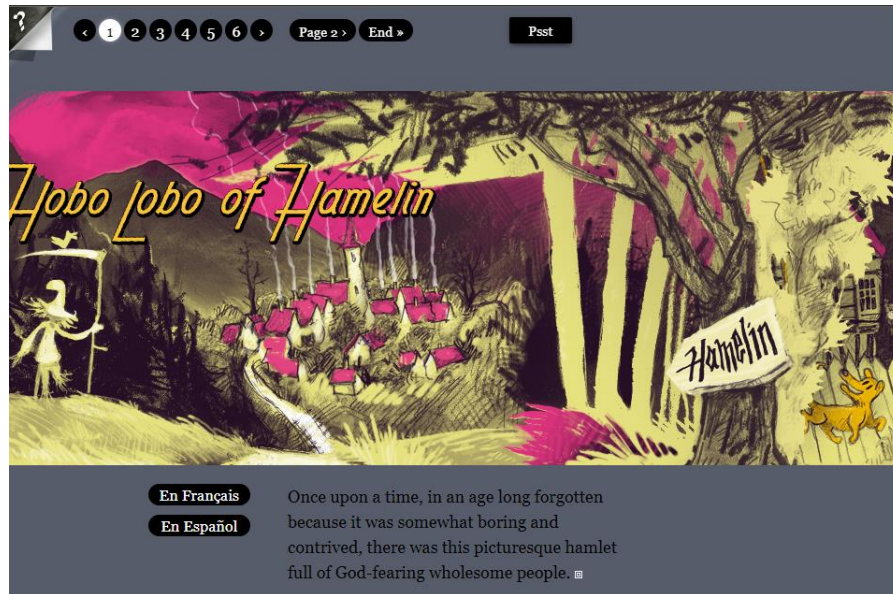


Figure 20: The Hobo Lobo of Hamelin (Živadinović, 2014).

“The Wiley Neighborhood – Then and Now” (Reindl, 2019) (Figure 21) is the work of Christian Reindl. Created in 2019, this before-and-after interactive photo gallery “leads the user along various characteristic landmarks of Neu-Ulm’s history-rich neighborhood” (Reindl, 2019). A twist to the normal timelines we are used to see, but, nonetheless, a timeline.



Figure 21: The Wiley Neighborhood – Then and Now (Reindl, 2019).

Finally, “My Data” (Alandete et al., 2021), a major project that collected works of several students of the Information Design class from the Interaction Design Program, at George Brown College School of Design. Over the course of this project, during winter 2021, two themes, among others, have been explored: “Me and My Language” (Umanskaya, 2021) (Figure 22) and “The Map of My Brain” (Yoo, 2021) (Figure 23).

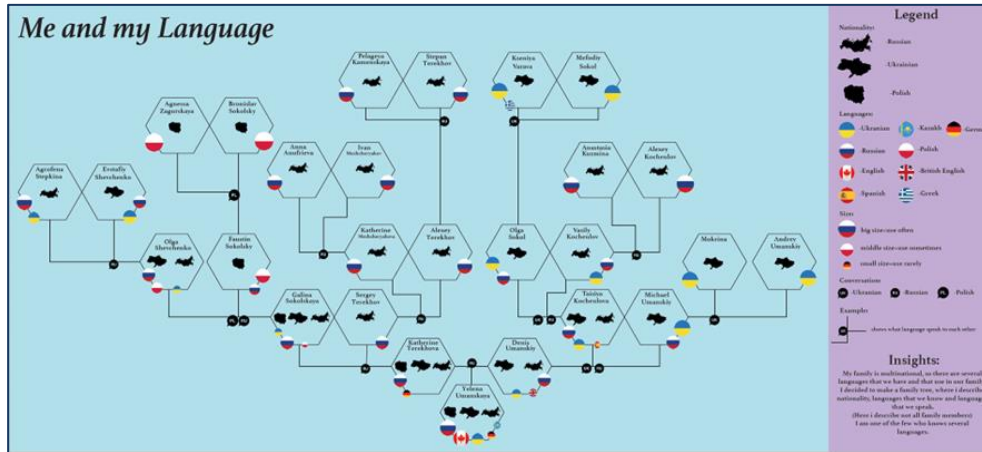


Figure 22: My Data's "Me and My Language" (Umanskaya, 2021).

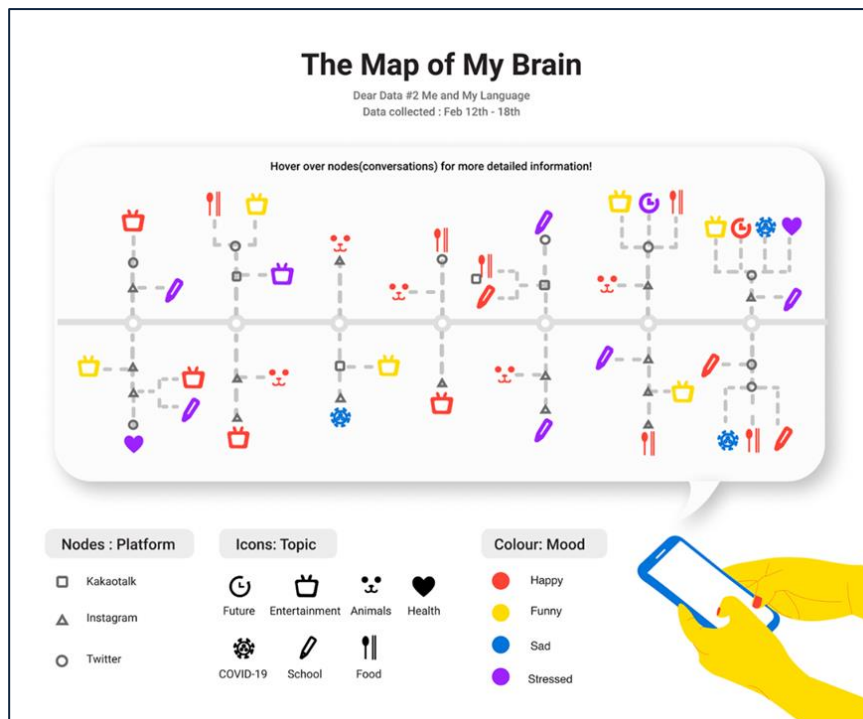


Figure 23: My Data's "The Map of My Brain" (Yoo, 2021).

The goal was, in the words of the students, “to explore the beauty and the poetry of information and data, by considering its meaning and the stories it tells” (Alandete et al., 2021). They did it, both creating interactive and static representations. According to Giorgia Lupi and Stefanie Posavec, “everything can be mapped, counted and measured” (Lupi & Posavec, 2016) and so did these students. Throughout the project, the soon-to-be-designers mapped, counted and measured their daily routines and were able to learn more about themselves as individuals and as a society (Alandete et al., 2021) – the so called “Data Humanism” (Lupi, 2017).

2.6 Narrative Visualization

The traditional journalistic text-only-format is long gone. More and more, digital newspapers start trying to enrich their news articles with a certain degree of interaction and multimedia. Although the long-form has already become a must-have for digital journalism all over the world, there are still improvements to be made. While they already use image and, in some cases, video or even animated transitions, there is always room for improvements. On the next two sub-sections, we are going to see some creative and innovative approaches to journalistic news articles, giving us some insight on why text-only news might no longer be the ideal format.

2.6.1 Digital Newspapers Innovative Way of Telling Stories

It is no secret to anyone that The New York Times (NYT) is a reference at creating visual narratives. It has been doing it for quite a few years now, and one can easily check this by doing a quick search on their website. However, the reason why it is worthy of mention as an alternative to the traditionally presented journalistic news narratives, is because of their, more often than not, different approach to it. While most digital newspapers would try to create infographics, for example, The NYT comes up with other very interesting options. “Tracking the Oath Keepers Who Attacked the Capitol” (Cooper et al., 2021) (Figure 24) is one of them.

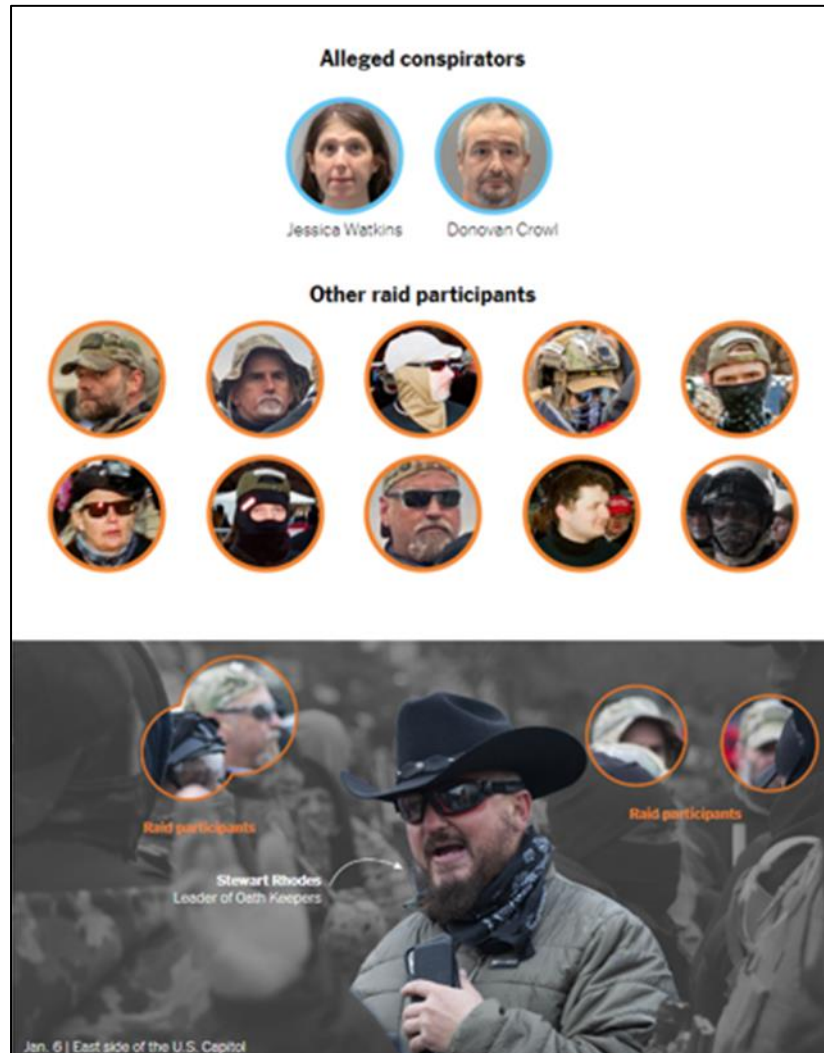


Figure 24: Tracking the Oath Keepers Who Attacked the Capitol (Cooper et al., 2021).

Using a feature that reminds the smartphone face recognition, they were able to tell a story with text and images, but not in the usual format. Like static images usually used in journalism, so do these act as connectors to the text. However, they also allow for a different degree of interaction and understanding of the article, therefore grabbing people’s attention more easily.

“Tracking Omicron and Other Coronavirus Variants” (Corum & Zimmer, 2022) (Figure 25) is another example of their great journalistic and artistic work. It acts as an interactive map, that allows us to know where the Coronavirus has been detected. It may not seem very useful at the moment of this investigation, but if one goes back to mid-2021, they might change their opinion. In fact, the article has been updated multiple times since its first version, accompanying the spread of the virus across the world. One particularly interesting feature is the one of the mutations. If we scroll down the page, after seeing the map, we will find information about the different mutations, accompanied by an image of how the newly-mutated virus look like. In “Tracking

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Coronavirus Vaccinations Around the World” (Holder, 2022) (Figure 26), one can see, among other things, the number of countries that are using each vaccine. It is a different application of the map feature, but that still produces very interesting results.

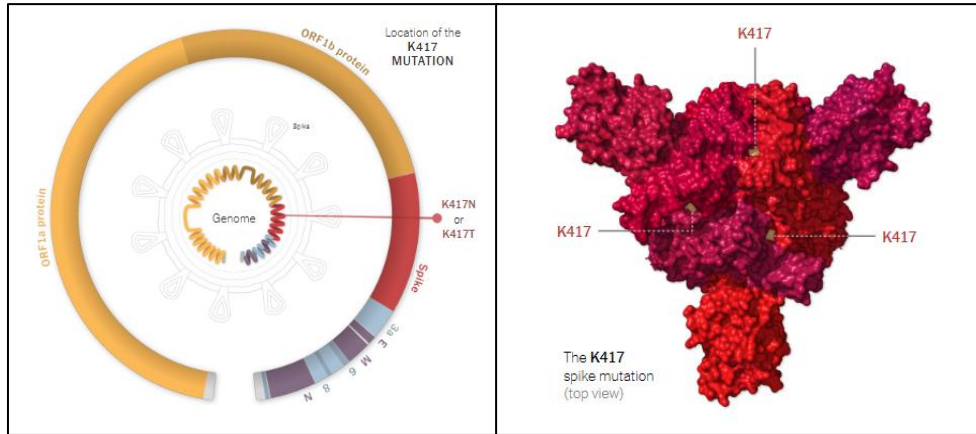


Figure 25: Tracking Omicron and Other Coronavirus Variants – K417 Mutation (Corum & Zimmer, 2022).



Figure 26: Tracking Coronavirus Vaccinations Around the World (Holder, 2022).

“Four Years of Trump Headlines” (Serkez & Wezerek, 2021) (Figure 27) shows us an interactive and different look over wordclouds. As the words keep falling, we are able to select some of the biggest headlines of Donald Trump’s administration, since he was elected President of The United States of America, and know when it happened.

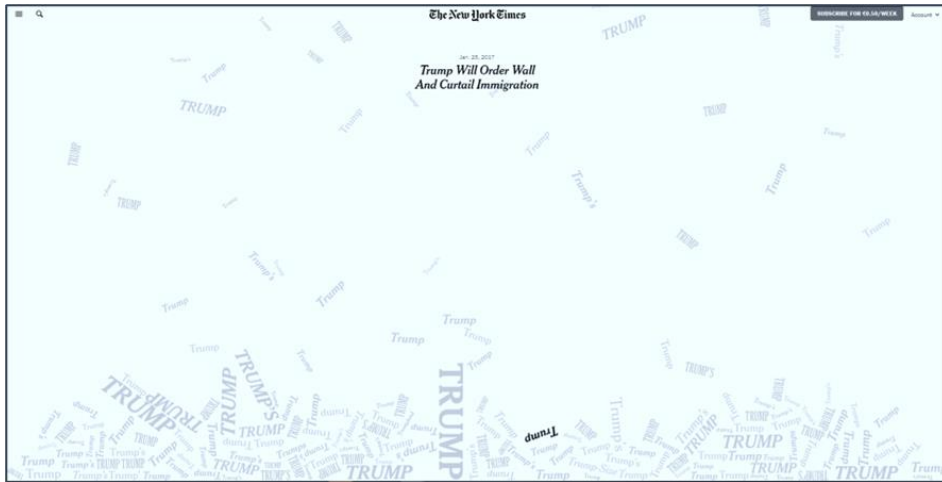


Figure 27: Four Years of Trump Headlines (Serkez & Wezerek, 2021).

The Portuguese newspaper “Público” is also known for producing some very interesting visual narratives. A recent example is the one of a reportage about the 48th anniversary of the Carnation Revolution. Named “Uma caixa de fotografias com a Revolução lá dentro” (A box of photographs with the Revolution inside) (Bourgard et al., 2022). It is a visual narration of how a common citizen passed by a journalist and ended up capturing moments of the Revolution never seen until now. By making use of the long-form, something that digital newspapers have already gotten used to, Público added animations (Figure 28), text, video and, of course, the pictures of who they consider to be an “accidental reporter”, Félix do Nascimento Esteves.



Figure 28: Animated Transition in "Uma caixa de fotografias com a Revolução lá dentro" (Bourgard et al., 2022).

The same newspaper created an infographic for their legislative elections (Público, 2022) (Figure 29). A simple infographic that shows us, in an easily understandable, and therefore user-friendly way, how the parliamentary seats looked once the elections were finished. Besides allowing us to see how many people each party was able to elect, we can see which party got the majority of votes in each district of the country, thus showing how powerful and useful colour can be.

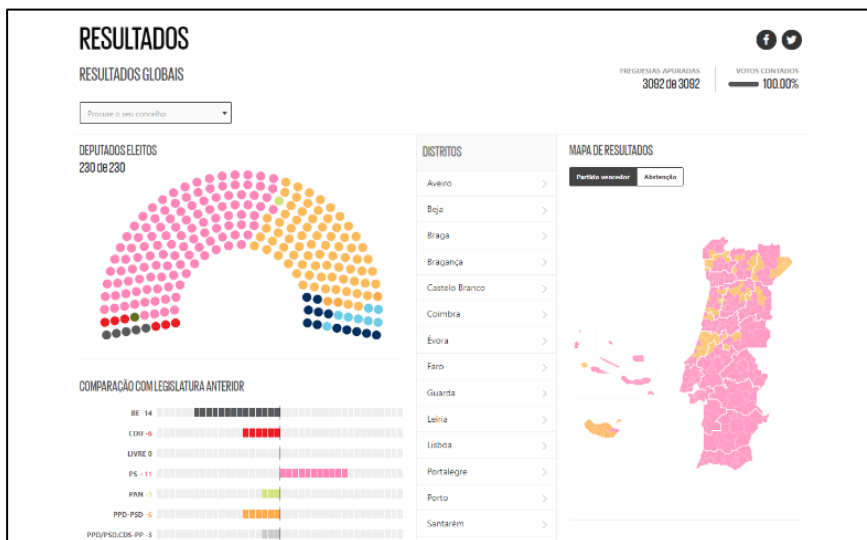


Figure 29: Portugal's 2022 Legislative Elections - Parties Seats on the Assembly (Público, 2022).

Another very interesting approach is the Washington Post’s article “Scaling Everest” (Berkowitz et al., 2016) (Figure 30), a report on the climbing of Mount Everest, the world’s highest mountain. Once we open the article, we get faced with a small description, (the lead), followed by a call for action – “Scroll along the icy path to experience South Col, the most popular route to the top of Everest. Start your journey” (Berkowitz et al., 2016). By combining text, audio and images, we are able to “scale” the Everest, as if we were there, while at the same time knowing where you stand exactly, in terms of height. One can almost say that the Washington Post tried to create a vertical timeline using the other basis-axis: space. The rule is the same, but we are actually seeing the progress of the story across space, instead of time – one can almost call it a “*spaceline*”.

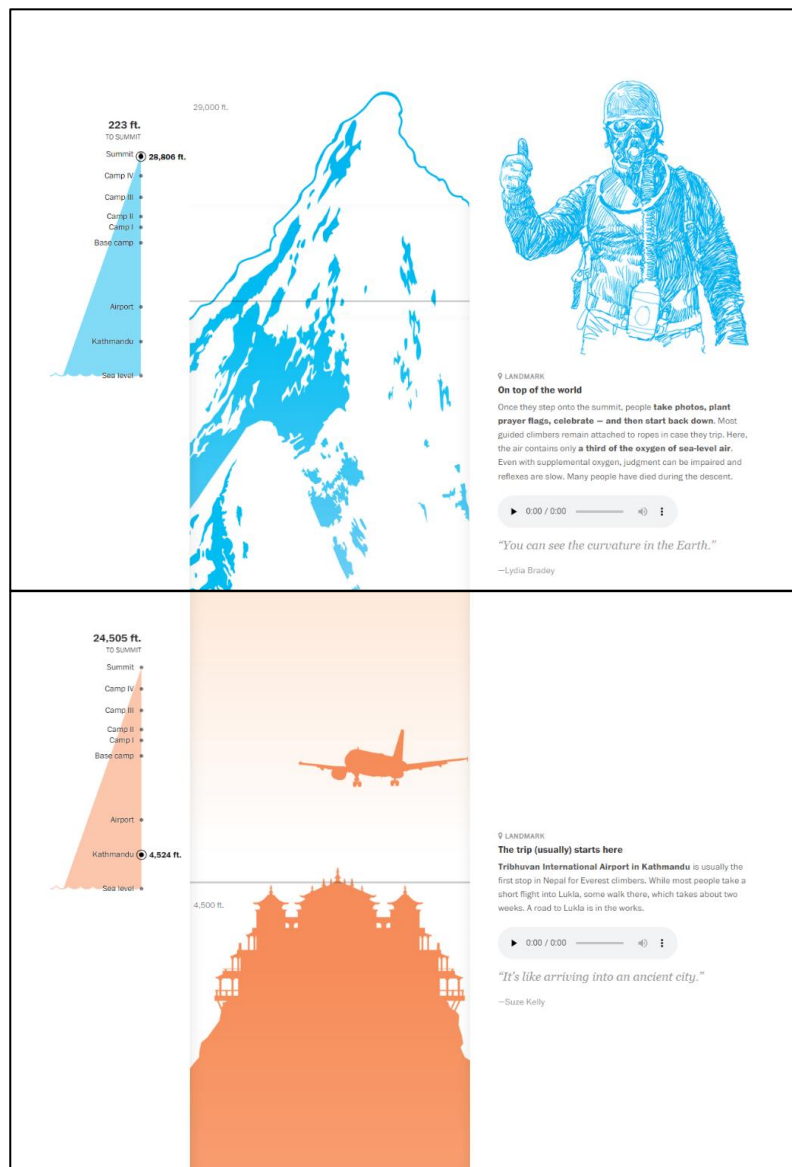


Figure 30: The Washington's Post "Scaling Everest" (Berkowitz et al., 2016).

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The next one is a graphic novel's vertical approach made by a Norwegian digital newspaper to their country's 2013 elections. "Eventyret om Soria Moria-regjeringen" (The story of Soria Moria's government) (Byermoen et al., 2013) (Figure 31) is an interesting twist to the long-form journalistic format. Given that VG betted more on imagery than text, it actually has more the appearance of a story than a journalistic article, hence the graphic novel's reference. They also used animated transitions to mark the story's progress as the reader scrolled down, which made it look very different and stimulating from other more traditional options.



Figure 31: "Eventyret om Soria Moria-regjeringen" (The story of Soria Moria's government) (Byermoen et al., 2013).

Finally, “The Seven Digital Deadly Sins” (Dao et al., 2014) (Figure 32), a shared production of the British newspaper “The Guardian” and the “National Film Board of Canada”. A sort of interactive grid that gives an interesting twist to the classic seven deadly sins, over the course of video, image and text.

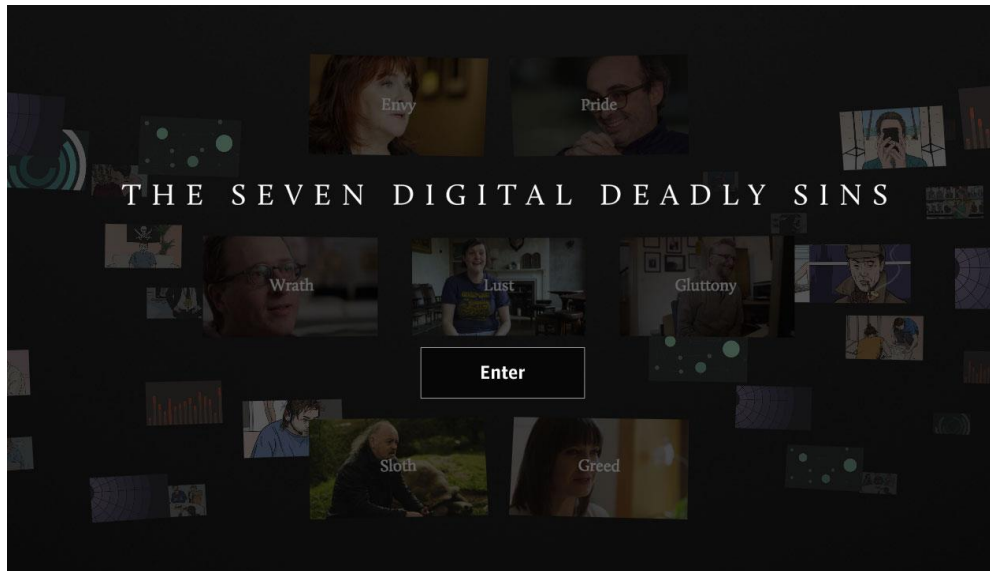


Figure 32: The Seven Digital Deadly Sins (Dao et al., 2014).

2.6.2 The BBC News Labs

Founded in 2012, BBC News Labs presents itself as “an innovation incubator charged with driving innovation for BBC News” (BBC News Labs, 2021b). Composed by a diverse team with backgrounds in broadcast and digital journalism, software development, broadcast technology, project management, design and user experience, they act as a bridge between BBC’s journalists and their Research & Development department (BBC News Labs, 2021b). In a few words, instead of following the traditional textual format, these labs have the important task of coming up with ideas for innovative creative approaches to produce journalistic content – something they refer to as “structured journalism”, a “structured approach to reporting the facts and constructing journalistic narratives” in a flexible way (BBC News Labs, 2021b). Their goal is to “empower journalists with better ways of working with information” (BBC News Labs, 2021b).

To state a few examples, let us start by showing “360 Video & VR - Immersive News” (Figure 33). By using 360 video and virtual reality (VR), the BBC News Labs intends to study the value of these tools to their audience, by actually getting them immerse in the experience, letting them know firsthand how it looks like (BBC News Labs, 2021a).



Figure 33: 360 Video & VR - Immersive News (BBC News Labs, 2021a).

This explanation allows us to move on to a new concept: “Immersion⁴”. Side by side with interaction, immersion might be the future of news narratives and storytelling, in particular. As it had been said before, our attention span is decreasing, therefore, it is mandatory to find new and innovative ways of passing on messages by telling stories capable of grabbing people’s attention. Immersion could a good weapon when it comes to that.

Going back to the BBC News Labs, we have “Climate Bot” (Figure 34), a series of short explanations regarding climate change and its impact on the world delivered over several days (BBC News Labs, 2021c). After concluding that people tend to lose interest way before reaching the end of long articles, the Labs’ team put in motion a plan to “demystify complex news” in a more effective way (BBC News Labs, 2021c), thus giving birth to Climate Bot.

The results were mixed. On the one hand, few users actually kept using the tool after the first time, since it would require them to subscribe in order to get daily updates. However, from the ones who actually subscribed, there were some who, from time to time, would ignore “a day’s sendout if they didn’t find a topic interesting” (BBC News Labs, 2021c). However, “where users engaged, they tended to finish that day’s conversational journey of 6-8 clicks” (BBC News Labs, 2021c), thus proving that the Climate Bot could work, if directed at a specific target.

⁴ Immersion – “The fact of becoming completely involved in something” (Cambridge University Press, n.d.-b).



Figure 34: Climate Bot (BBC News Labs, 2021c).

Another example is “Graphical Storytelling” (BBC News Labs, 2021d) (Figure 35), a more comic-lookalike approach to important health stories, so they can reach out to younger audiences more easily. According to the researchers, “younger audiences are interested in stories with great public service value, such as issues around mental health, but might be less interested in the text-heavy format many of these stories take online” (BBC News Labs, 2021d). This led to the creation of the Graphical Storytelling project, as means of getting to this younger audience in a way that was both eye-catching and accessible.



Figure 35: Graphical Storytelling (BBC News Labs, 2021d).

Although experimental, Mariana Costa believes these initiatives share the “potential for real-life impact” (da Costa, 2021). According to her, the previously presented projects, among others developed by the BBC News Labs, are useful alternatives to display information in an appealing way. Moreover, they can end up becoming the standard in news rooms, given a few years, so, “(...) just as we must understand how news visualization took place in the past, we must also be aware of signals that indicate a change in the paradigm of journalistic content production” (da Costa, 2021).

2.6.3 Text2Story Projects

Since this is, after all, a dissertation project, one needs to mention the visual dissertation projects that served as inspiration to this investigation. Those were the ones of Mariana Filipa da Costa – Narrative Visualization of News Stories (da Costa, 2021) (Figure 36) – and Joana Maria Lima Valente - Text2Icons: using AI to tell a story with icons (Valente, 2021) (Figure 37).

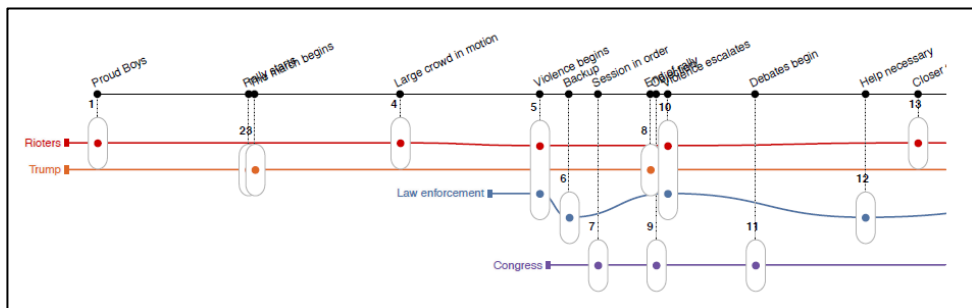


Figure 36: Narrative Visualization of News Stories (da Costa, 2021).

In the example above, the aim was to use multiple timelines at the same time to better understand and connect events, therefore, creating a more visual approach to how related events unfold, connect and give birth to each other. We could move along the different timelines, providing the necessary level of interaction that has been mentioned before.



Figure 37: Text2Icons: using AI to tell a story with icons (Valente, 2021).

Regarding Text2Icons, although its ambiguity could pose a threat to the clarification of the message, it is undeniably an interesting representation. In her research proposal, “Visual Storytelling in Emoji Communication”, Yujin Cho, a graduate student of English Language and Literature at Sogang University, states that there is a scarcity of study on the status of emoji as a communication tool, particularly in visual storytelling (Cho, 2017), which makes it hard to know how to properly use emojis to tell complex stories. However, if one found how to do it, accompanying news pieces’ titles with emojis would, in our opinion, make people more eager to read news articles due to the visual element that immediately grabs their attention.

In the case of Narrative Visualization of News Stories, we come face-to-face with a different scenario. While this project proves to be an excellent tool when it comes to establish links between different pieces of news and, therefore, contributes to a better understanding of the complete story, instead of just small “chapters” of it, it lacks the extremely visual part and almost immediate eye-catching attractiveness of Text2Icons.

If, on the one-hand, with Narrative Visualization of News Stories, the journalist and the reader would be able to link news more easily, as well as understand how each of them leads to the others, and that way making it easier to “see the whole picture”, on the other hand having such simple timelines could end up only attracting readers who were already interested in that subject, as we will later discuss in section 4.2. Of course, the usual written titles could be eye-catching too, but they are not even close to having the power of visual elements when it comes to grabbing the attention of readers, as (Kana, 2019) tells us.

In a nutshell, both readers and journalists can harness the power of timelines to more easily understand and link pieces of related news. Simultaneously, using more colourful and stronger visual elements, such as emojis, may allow journalists to attract new, and particularly younger readers initially not as apparently interested as others may be in a specific subject.

2.7 Summary

In short, there seems to be no perfect way to tell a story since it will always depend on how one wants to do it – the chosen medium, the need to pass on the message quickly vs keeping the audience more focused and attentive, the person creating the story, etc. However, one thing is certain: visual elements, as we tried to show in this chapter, prove to be extremely beneficial when it comes to both understanding and passing on a message, regardless of which field they are applied to. Therefore, we believe they could also be useful if applied to journalism’s news stories, as they already are, at a certain level.

Although digital newspapers already do it, more often than not in a good way, there is definitely space for improvements, as the research on journalistically “different” visual narratives showed. One could eventually apply some of those ideas to generic journalism or even take on a few design-related-ideas and, given the right context, apply them to certain journalistic stories.

3. The Need for Visually Eye-Catching Written News

With the audio-visual media ever growing strength over the last years and in order to keep pace with society's technological evolution, journalists, and journalism itself, had to change their method of telling stories. However, they still struggle with finding the proper way to get to people, particularly youngsters. Moreover, when the topic is complex and has a lot of information, finding the right way to decomplex it for readers is not always an easy task. In this chapter we will break through this problem and its possible solutions. We will present our approach to it, going through the different steps of the investigation: understanding it, exploring it, and presenting possible solutions.

3.1 Identifying the Problem

Digitization in the media industry and other sectors has created numerous issues for journalists (Börzsei, 2013), thus leading them to either become completely digital, or hybrid, maintaining, at the same time, both their original format and a digital one as well. Digital newspapers, in particular, are now able to make use of storytelling and visual elements in ways that their paper counterparts never could – timelines, infographics, editorial cartoons, videos and even *memes* - all of these can be dynamic and interactive, unlike the previously used static pictures in newspapers. However, they may not be using them enough yet, since consumers' attention spans, particularly those of the younger generation, are dangerously falling (Börzsei, 2013). For this reason, it is urgent to find ways to decrease that said attention gap. Although it may not be easy, this could be done by trying to simplify news stories, making them more accessible to different types of readers. The answer to that, in turn, might lie in creating visually richer stories and by inducing visual literary habits in the reader.

3.2 Visual Literacy as a Pathway to a Solution

Visual literacy is defined as the interpretation of a message provided by an image, which necessitates the use of a visual thinking process (Burmark, 2002). These visuals are mostly presented through the mediums of sketching, signage, maps, photography, graphs, graphic design, and comic books and illustrations. Communicating with the help of these specific visual forms, or, in other words, trying to pass on a message while combining text and visual elements, improves viewers' or readers' comprehension of the supplied information by deconstructing with their visual communication skills (Thibault & Walbert, 2006). When words are supplemented by visual representations, most typically artwork, the reading process is easier to grasp and comprehend through visual literacy in picture books (Kana, 2019). Although young adults frequently ignore this medium of visual literacy, the importance of picture books is not confined to a younger audience (Kana, 2019).

Given that visual literacy is related to the interpretation of images and that it has been proven that images, among other visual elements, can help to better understand the information, improving readers' visual literacy seems to be a possible way to make information more accessible to everyone. In other words, writing news stories with the help of visual elements is a good way to transform complex topics into simpler ones, thus leading information to become both easily understandable by more people, regardless of their academic level, and more attractive. Moreover, being able to make information more visually interesting could prove to be useful when trying to tell bigger and more complex stories, since they take more time to absorb and, thus, imply keeping the readers' attention for a longer period of time.

The balance of key design aspects of visual and text forms a relationship in transmitting the desired narrative and meaning from the imagination of the writer or illustrator (Kana, 2019). With young adults' awareness, visual literacy not only aids in understanding, interpreting, and decoding information, but also in forming a relationship between the writer and/or illustrator and the reader (Kana, 2019). Young adult readers create an emotional connection to the story based on their personal experiences through being able to contextualize the illustrated narratives (Kana, 2019).

3.3 Possible Solution

It is our belief that readers would benefit from improving their level of visual literacy, possibly by providing them tools that would allow them to find, relate, understand, and consume information more easily. Visual elements, as said before, can be used to decrease attention-grabbing gaps in traditional journalism and news pieces. In other words, not only do they make it easier to capture the reader and viewer's attention, but also allow for a much richer and complete mode of consuming information, when compared to the traditional one.

When referring to big and complex news stories, that might take up several days, months or even years to reach its climax, and, eventually, its final chapter, it might be hard to compile all

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the necessary information to tell the complete narrative if one has to go through all the news articles individually. At the very least, even if it proves to be easier than expected, it will most certainly be a tiring and time-consuming activity, thus getting a lot of people to give up even before trying.

In order to battle against this, we suggest the creation of a tool in which it will be possible to aggregate all those small chapters of the same story in a single visual representation, making it easier for readers to comprehend the story, as one already knows that visual elements both attract people more easily than text, and help to better understand a story's plot. On top of that, we purpose that some background information on the narrative is included in the said tool, as a way to try to facilitate the reader's interpretation of the story. On a more technical approach, we believe it would help to improve the readers' visual literacy capability.

With that in mind, as a hypothesis, we state that multimedia and interactivity, when used in written journalism, can be the way to create simultaneously captivating and more easily understandable news stories in digital journalism. In order to help to confirm if our proposition is true or not, our research questions, hereby identified as "Q-number", go as follows:

Q1: Does the combination of visual elements and text make news easier to comprehend?

Q2: Are multimedia and interaction the pathways for grabbing people's attention in the 21st century?

Q3: Given the fact that we now spend more time using our phones than computers, hence being more familiar with verticality, would people prefer to see a vertically or horizontally oriented visual narrative?

4. A Study on Journalistic Visual Narratives

In the previous chapters we explored the impact of visual narratives on the understanding of complex topics and how they could improve journalism as a whole. We also laid down a few problems-study and possible solutions to them. In this chapter we proceeded to trying to validate our solutions and understand how we could turn those ideas into a reality, by trying to make sense of what both readers and journalists wanted to see represented in a visual narrative.

4.1 Methodology

During the course of this investigation, we have adopted a mixed-methods approach, as we have relied on both qualitative (interviews) and quantitative (surveys) data to draw our conclusions. With the interviews, we wished to understand what makes a good visual narrative and, consequently, how to make written journalism more appealing to readers through means of visualization. We then tried to apply the knowledge gathered during the interview stage to create visual narrative representations, which went on to be tested in the surveys, allowing us the draw more specific conclusions regarding certain visualization techniques and representations.

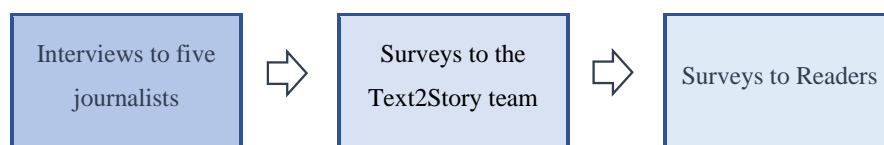


Figure 38: Investigation Process Pre-Prototype’s Development.

Above (Figure 38), one can find a brief description of the process involved in this chapter, with a second part of it having been done after developing the prototype, hence being described in the beginning of Chapter 6. A total of four semi-structured interviews have been conducted to journalists through videocalls, with three of them being individual, on a one-to-one format, and a fourth one that included two journalists at the same time. Each interview lasted for about 1 hour, with the interview with two journalists being the exception, with a duration of approximately 1 hour and 30 minutes. At the time, the interviewees, three men and two women, were professionals in the field of Journalism, although with different journalistic backgrounds, for at least three years. As semi-structured interviews, the questions had been partially prepared prior to the meeting with each of the journalists. With some minor changes between each interview, due to the fact that over the course of time we were getting more insight on the explored topics, the list of questions remained mostly the same and aimed to explore three main topics: the use of visual narratives in journalism nowadays, visual narratives' specifics and the visual aspect of news. These questions can all be found in [Appendix A](#).

Once the interview stage had been concluded, a thematic analysis⁵ was conducted, thus dividing and organising the collected information in specific themes, making them easier to find in case of an eventual future research. In order to do so, we had to question ourselves about what the central point of our data and our position regarding that was, as well as what other subtopics reinforced or complemented the central idea of our interviews. With that in mind, we drew conclusions from the interviews' analysis. Although not all journalists' opinions regarding the theme were the same, there was a clear pattern in most answers, as they would all fall under similar categories, even when they did not agree on something. With that in mind, we tried to convert the results into codes, as well as group and sub-group them into appropriate themes, according to our thoughts and analysis of their answers. As such, we have extracted a total of eight themes:

- Essentials To Creating Accurate Journalistic Visual Narratives (mentioned by four journalists);
- What Makes Up a Journalistic Visual Narrative (mentioned by four journalists);
- Different Ways of Representing Stories Through Visualization (mentioned by four journalists);
- Defining a Visual Identity (mentioned by four journalists);
- The Role of Multimedia & Interactivity (mentioned by five journalists);
- The Dangers of Visual Pollution (mentioned by three journalists);
- Inclusion & Accessibility (mentioned by five journalists);
- Visual Narrative Representations Nowadays (mentioned by four journalists).

Original quotes from the journalists, translated by us, have been made available in [Appendix A](#).

⁵ Thematic Analysis - A practical data analysis approach, used by qualitative researchers to identify, analyse, interpret and report patterns (Braun et al., 2017; Kiger & Varpio, 2020).

If, on the one hand, we tried not to establish any connection with pre-existent visual narrative models and form a link between a certain topic and visualization technique (e.g., war with a timeline), it is also true that the questions, being semi-structured by nature, have made this path harder to follow, leading, sometimes, to a more specific perspective on certain highly noticeable topics at the time, instead of the more general one we were looking for. However, in spite of the difficulties, and some minor issues, we were able to get to the necessary conclusions nevertheless, those being, above all: a clear preference for the usage of timelines, regardless of the story-topic; a dominance of text and image, above all other elements, even though we are living in the digital/multimedia age; a preference for horizontal, instead of vertical, visual narrative representations; and, last but not least, a preference for an intersection between text and other elements, (such as storylines do), instead of merely having a story told with text.

After that, we moved on to creating different visual representations based on what the journalists had recommended us. Finally, we set up surveys destined to the Text2Story team. This first set of surveys was supposed to help us test, validate and improve the questions that would later be sent to the readers, but, due to some restraints, we were unable to draw significant conclusions from those first ones. The goal of the surveys was to understand which visual representations worked, and which did not. As an extra, we intended to understand what their opinion on the use of visual narratives in journalism was. By the end, we conducted an analysis to each of the surveys and, finally, drew conclusions from the shared information gathered from the journalists', Text2Story team's and reader's perspectives.

4.2 The Journalists' Take on Visual Narratives

In this section, we will show the analysis and consequent results of the interviews made to the journalists.

4.2.1 Analysing the Results

On a first stage of the discovery phase of the Double Diamond Process, it was important to question journalists about the elements they consider essential on a visual narrative. Going deeper in the subject, a few main topics were approached through the questions: the use of visual narratives in journalism nowadays; visual narrative specifics; and the visual aspect of news. Each of these topics has eventually given birth to some others, as stated in Section 4.1.

Despite being true that journalists already use visual narratives to a certain level, these interviews have also made clear that there is still room for improvement. In fact, the journalists have reinforced several times that their profession needs to find new ways of looking at news stories, in order to keep on adapting to this increasingly digital world. This could be done by

exploring visualization techniques and all their different applications. In the following subsections, we will learn more about that.

4.2.1.1 Essentials to Creating Accurate Journalistic Visual Narratives

According to the interviewees, of which all of the following quotes have been translated from Portuguese by us, there are numerous ways of making use of the visual to tell a story. However, above all, one thing is clear: before actually creating a visual narrative, we should always have a clear idea of the message we want to pass.

“A visual narrative cannot lack the information you want to convey and the clarity with which you want to do it.”

That is the first step to get things right. Without it, there is a high probability that we will not be able to tell people not only HOW, WHERE, WHEN, WHY and WHAT happened, but also WHO was involved in it. There might be ways to explain some of them, but it is unlikely that one manages to “check all the boxes”, thus failing to deliver a proper news story. In other words, for a visual narrative to work, a detailed plan must first be put into motion – defining a crystal-clear goal is the key for a successful visual narrative.

“The bottom line is always to help get the message across, make it more effective and help the reader understand what you are saying more easily.”

As it had been said before, there is no rule for creating a visual narrative. Nevertheless, following certain guidelines is recommended. One of these is the set-up of important events and characters in the beginning of the narrative.

“It is essential to define, always at the beginning, key events and select characters with various interventions throughout the story, as well as understand how they intervene. Then the choice is more subjective, each newspaper takes the themes differently and decides how much noise they want to add to the narrative.”

If one wishes to validate their choices to the reader, then they can show them the exact percentage of how much of the story a specific point actually occupies, although it is optional. Regarding adding elements in general, it is important to mention that no one, but us is in charge of choosing the amount of noise our narrative will have, sometimes “us” meaning newspapers. It must be a thorough work, since, occasionally, if done too fast, it is easy to miss some important parts.

“You have a narrative by default, which will always be an editorial choice. Regarding extras, additional information, it is always your choice to decide if you want to include them or not (...) you choose the amount of noise you want in your narrative.”

After that, it's up to the storyteller to decide how to move from one point to another. Journalistically speaking, this can be seen on the way different newspapers (regardless of being digital or not) present the news. Although the aborded topics are the same, each newspaper has its own values and guidelines, thus consenting different creative processes, which will in turn

allow the audience to have diverse perspectives of a similarly equal theme. Different people have different ways of telling the same story and some of them do it better than others.

“Having multiple sources helps give credibility to your choices and context to events. My way of telling a story is not the same as your way of telling a story.”

One must also know how to choose the visual elements that will be used to tell the story. On the one hand, trying to use all at once may result in the loss of the visual narrative’s efficacy. However, on the other hand, using the wrong visual elements, or using them poorly, can lead the readers to abandon the narrative as well. Taking the case of an image, for example, there is a very thin line separating what is informative and, therefore, necessary, and what is just pure sensationalism.

“The line that separates the aesthetic/appealing from the sensational is sometimes a little thin, you have to be careful”.

Due to that, plenty of times, choosing an image is not an easy task for journalists. It is important to be eye-catching, aesthetical and call for attention, because that’s part of the reason why we are using images to tell or complement a story, but it is also vital that we know how to choose them, in order not to hurt any susceptibilities.

“An impactful image that has to do with the theme is essential.”

“You have to know how to properly choose the images you use. Although they should be used to grab people’s attention, there are also things that shouldn’t be presented (...) it’s not worth it”.

“It’s very complicated to define what to show and what not to show, but there has to be a limit (...) Some people are more sensitive than others and may feel uncomfortable with certain things”.

Sometimes, in particular topics like the war, we are forced to show stronger and more shocking images or videos, because that is the only way to actually show people what is happening. However, generally speaking, we should be more restrained when choosing them. Having that in mind, the next step is to realize how to actually do it.

The information must be clear and accurate, there is no time to have people questioning whether or not they are understanding the message we want to pass. We cannot leave space for doubts – keep the information simple and direct, yet aesthetical at the same time.

“As a general rule, the more stuff you have, the harder it will be for someone to understand what you mean.”

In fact, as the journalists stated, the majority of visual narratives are just as good as they are straightforward. If we are creating one, we must know how to get our audience’s attention through visualization, without battering them with unnecessary information, visual clues and even colours. A proper journalistic visual narrative will only live up to its role as long as it is able to balance the use of all these elements simultaneously. “Appealing, yet simple” is the key sentence here.

4.2.1.2 What Makes Up a Journalistic Visual Narratives

There is a general consensus that not all stories are deserving of a visual narrative – they just don't fit in. It is important to know how to identify one that is. Generally speaking, those are the ones which look more complex, due to a high number of participants and/or events, or address less-known topics for the majority of people. Narratives that have been going-on for a long period of time also occupy a major position when it comes to choosing a story that can be told visually. As a rule, stories with numerous layers, instead of direct ones will make up a good visual narrative. Simultaneously, the visual representation will prove to be a great alternative to typically long-form written news, which would probably have people abandon it before getting to the end.

“Visual Narratives make sense in things that involve a lot of information, you can't do that much with topics that have only one or two news. In the case of more direct news, where the title tells you everything, you have no more content to go for”.

For example, the birth of a child on its own does not meet the requirements to be transformed into a visual narrative. However, if that child is of royal descent, that is a completely different story... To state an example, it might be important to tell people in what situations could this child, from here on named George, become king. It might be a direct succession; perchance dependent on someone, or even more than one person, abdicating the crown; it may happen in case of a sudden death... among many others. Of course one could explain George's ascension to the throne only with text, but, as many studies have previously confirmed and the journalists reaffirmed, topics as extensive and branched as this one, are better understood if explained with the help of visual and multimedia elements, such as graphics, icons, videos, etc.

“Regardless of what you are working with, you have to select what is really important and what seems more complicated. If it seems complicated, let's put a graphic here, let's try to explain this to people, let's deconstruct it”.

These are the type of news where one should apply visual narratives. Nonetheless, it is important to refer to which ones we should not, or actually cannot do it – those being direct news, the ones we can almost understand everything that is to know about it only by reading the title and/or a few lines of text. These types of news present no deeper-need for comprehension or research, therefore, there is no way of exploring them any further. We just get everything we need immediately.

On top of that, we should always bear in mind that our visual narrative will have to have text. We may have multimedia elements on the side, background, top or bottom, appearing and disappearing, but those are all optional, in the sense that we do not and should not use all of them. On the other hand, text, as little as it may be, is something that our visual narrative cannot lack of.

“I think visual narratives are much more effective when they are a complement to something or when they are explanatory. Trying to use them isolated may result in a loss of effectiveness in conveying what is requested”.

“Your visual narrative will always have text. You can have multimedia elements on the side, but you will always have text”.

Finally, since we are talking about journalistic visual narratives, being a newsworthy subject is also important. Although one could argue that visual narratives can also be created for issues that have no news-value, the focus of this investigation, and this particular topic, lies on understanding both how to create and what makes up a journalistic visual narrative. That being said, there is no point in going deeper on the matter of non-news-valued news.

4.2.1.3 Different Ways of Representing Stories Through Visualization

It has already been said multiple times before that visual narratives must be both appealing to the eye and simultaneously simple.

“You should always bet on simplicity.”

“The public ends up being very selective (...) if they need to explore a lot, they won't see it.”

However, that does not mean we should create basic representations.

“Poorly worked representations end up being too simple and not attracting attention. Largely worked ones (...) always have some more captivating detail.”

In other words, giving birth to a simple visual narrative is not synonym to doing it fast or not putting enough effort into it. Actually, the journalists recalled that although it needs to be simple, it must also be thoughtfully planned and designed. When we entail our work with simple, yet beautiful details, we are able to call the attention of more and more people.

“The idea of a concept like this is that someone spends some time exploring and informing themselves and no one is going to do it if it's not graphically and aesthetically appealing.”

When asked about whether a visual narrative would work out better if done horizontally or vertically, the journalists were divided. While some were quick to assume the “verticality” side, even recalling how our digital reading-habits usually work, (from top to bottom, always sliding down), others were not so prone to it. In the following paragraph, both positions will be broken down.

On the one hand, the digital has made us used to sliding pages from top to bottom, which means that trying to almost convert the digital reading experience into a paper book one would feel weird. People would probably find something odd about it, regardless of realizing what it was or not – verticality is already intuitive for online readers.

“We are very much in the habit of reading and scrolling down the pages, it's an intuitive thing”.

Actually, most of them do it daily, when sliding through social media. We keep scrolling until we find something that we want to see and/or read and it does not get us tired. Not for a while, at least.

“That's what happens on social networks (...) you scroll from top to bottom and don't get tired; you only stop at what really interests you.”

Notwithstanding, if we are using the “stories” feature, which works horizontally, we are much more likely to get weary of it and even close the app.

To sum up, according to a journalist, sliding it horizontally would give us the sensation of a never-ending story – it gets bulkier, which will eventually get people tired. But, if we are doing it vertically, people will be able to see both the beginning and the end of it right away, which will be more appealing. In Journalism, this goes by the name of “long-form”, which one journalist believes to be the future of his profession.

“Websites will lose relevance with just text. The long-form allows the use of multimedia elements, (...) it is the future of journalism.”

This allows for a better use of multimedia elements, therefore backing up his position, since websites will, in the near future, lose their relevance if they keep betting on traditional formats.

However, that is not all we have to say about verticality’s advantages. In fact, it has another powerful feature on its side, the fact of how much easier it is to actually move from one point to another, when compared to horizontal models. Even if we try to make the information simpler with the help of a visual narrative, a complex topic will never stop being complex. It will just get easier to understand. For that reason, people will tend to go back to check on what they had read before, that is how they make the connection between now and then. This is, indeed, much more complicated if we have to keep switching pages, like we would have to on a horizontal-ever-changing representation. Verticality avoids, or at least helps, the reader not to get lost.

“You can always see the beginning and the end, it's easier to go back without getting lost. While if you go horizontally, in book format, it gives you the feeling that it never ends, (...) it gets much duller in my opinion.”

On the other hand, if time is our constant, the basis for the story, then things get questionable again. Some journalists defend that our notion of the passage of time comes horizontally, and, therefore, if we are trying to tell a story based on its events through time, we should represent it that way.

“Timelines in general work best horizontally. They can work vertically in certain cases, but I think they works better horizontally because of our notion of how time moves.”

Others, however, are bold enough to say that it is possible to give a twist to our normal point of view and still make it work... Sometimes, even greater than what it would if one followed the usual path, since we end up following the previously referred verticality scrolling pattern.

“You can tell a story over time vertically with no problem. (...) A timeline from top to bottom, (...) graphic part on one side and text on the other”.

Some say a vertical chronology would be a better option due to all the things explained in previous paragraphs. In other words, even if we tend to think of time horizontally, there are already a lot of vertical representations of it, which are living proof that it actually works. Others opt to say it depends on the number of things we have to represent; how big the story is. Depending on that, it could either work better if done horizontally or vertically. The public is very selective, so we need to study our target and understand how and what they want to see.

Finally, there are those who defend it is nothing but a matter of creative perspective. Just like an architect designs what for them is a beautiful building, but for others could be a visual disaster, so does a timeline-creator. And, truth be told, visual narrative creators as a whole.

All-in-all, there are two conclusions to be drawn from here: the best ways to draw a visual narrative are either to do it vertically or, if doing it horizontally, to always keep the same background, even if the elements on it keep transitioning between themselves – that way we should be able to avoid the “never-ending-story” effect.

4.2.1.4 Defining a Visual Identity

When creating a visual narrative, it is important not only to know every detail of it – a story is only as good as its storyteller – but also what is the best way to actually show it to the reader. On a macro level, that can take on a lot of different forms, ranging from timelines, to hierarchies and networks.

“Each narrative has its own way of being treated and explored (...) it all depends on the theme you are working on.”

“The goal is to figure out the best way to get the message across and help the reader understand the story more easily.”

On a micro level, we need to define which elements will compose the visual representation. Once again, the number of options available is vast. To state some basic examples, those can be arrows, that allow us to move back and forth in the story, like pages of a book, if done horizontally, or, if done vertically, act as an elevator. Arrows can also be used to establish connections between characters, places and/or events, although it is recommended to do it carefully. Otherwise, they can get confusing...

“Balls would be flashy, (...) arrows are always very confusing (...) at a certain point when the story develops a lot, you create arrows after arrows and it gets very confusing”.

We can also use circles or rectangles, that show important images or descriptions. If we decide to create a timeline, for instance, circles could be used to point out where in the timeline we are exactly. A Venn Diagram⁶ (Figure 39) is also a good way of telling simple stories that interconnect with each other at some point. To state an example, the marriage of citizen A with citizen B could give birth to C, their new life together, symbolized by the intersection of the two circles

⁶ Venn Diagram – “A diagram representing mathematical or logical sets pictorially as circles or closed curves within an enclosing rectangle (the universal set), common elements of the sets being represented by intersections of the circles” (Merriam-Webster, n.d.-e).

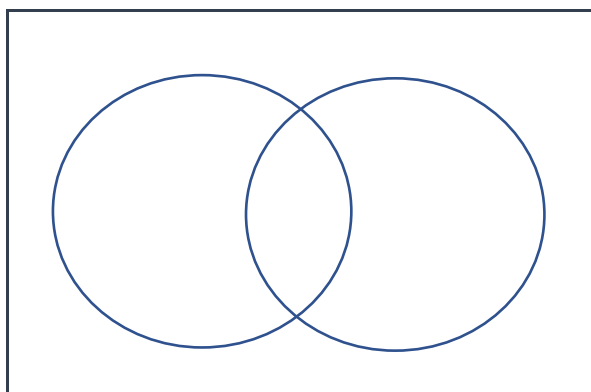


Figure 39: Venn Diagram.

“The intersection of two events to form a third is the simplest and most direct way that comes to my mind to tell a story.”

This is to talk about geometric shapes and generic ideas. Once we pick a story, we can get a bit more creative than that. For instance, if the goal is to represent a football team’s progress in a championship, we may use emojis to show it. Some footballs, boots, a field, shirts of various colours and, of course, a cup, alongside few lines of text, should be enough to inform us of their progress in a very simple and visual way. It is also a great element if we have people from different nationalities trying to understand the story. They might not comprehend what is written or recorded, but they can get the general idea by looking at the emojis.

“Emojis complementing explanatory video or audio could be useful (...) if you are deaf or speak another language and do not know what they are saying, you can understand what is happening, at least on a basic level, only based on emojis.”

However, emojis can be ambiguous and not all stories are as easy to fill in with them as the example previously presented. At the same time, if the tone of the story is serious, representing it with emojis might not be the best option. Unless, of course, we want to lighten up the theme or tell it to a younger audience. After all, they allow us to break the distance barrier and get to people’s hearts. Anyhow, one must be careful when using them.

“I think emojis would help make things lighter.”

“I love emojis, I think it helps to break the distance barrier. On the other hand, some can be a little ambiguous and you don't interpret them the same way I do.”

For entertainment purposes, emojis are certainly useful and even their ambiguity can act as a weapon to grab people’s attention, since it can force them to think. For informative purposes, in opposition, it may not have the same effect. Entertainment tends to be funnier, and, because of that, people are usually more open to challenges, so taking time to think does not feel as tiring. On the other hand, trying to decode a hidden meaning on a text, when we are just trying to get informed, might actually push us away.

“Overall, using emojis requires more attention from the reader (...), the more the reader has to try, the worse. The message is all the more effective, the easier it is to understand.”

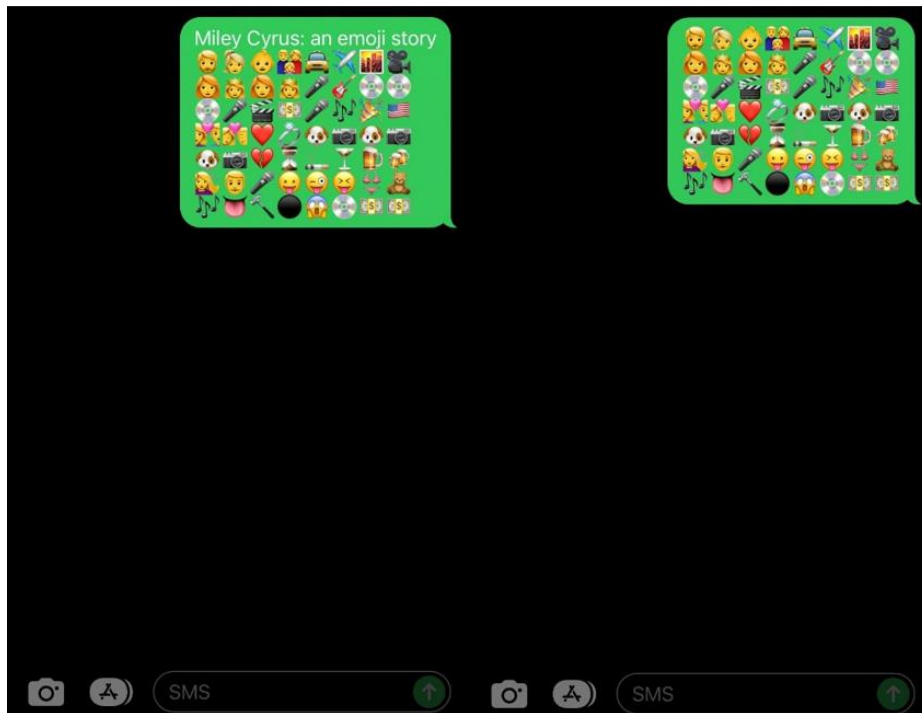


Figure 40: Emojis with Context (Left) vs Emojis without Context (Right), adapted from (@knightheroo, 2013).

In Figure 40 we can see an example of it. Unless we have some context, we will probably not understand the story at all (Figure 40 - right). If, on the other hand, we have some kind of text accompanying it, we will still have some trouble understanding the message, but we will, at least, understand it partially (Figure 40 - left). However, it remains ambiguous. A visual narrative must not ask for a lot of effort from the reader, which makes using emojis in an informative way a slippery subject.

“Emojis in terms of information are a swampy terrain (...) if you want to make an allusion, even if it is subliminal, you can't leave room for doubt.”

For a visual narrative to be successful, the message must be clearly understandable. Making it ambiguous will not have the desired effect, therefore, if we wish to use emojis, there are only two options (Figure 41). The first one is picking up a story that will be easily represented by them, without creating any doubts, as long as we know the context (Figure 41 - left). In it, unlike in Figure 39, we are able to understand everything because it is a simple story, with simple elements. As long as we know the context, the message is clear. Without context, we would probably be able to understand most of it, but have a few doubts anyhow.



Figure 41: Simple Story, Easily Represented Only by Emojis (Left), Adapted From (Danesi, 2017) Vs Hybrid Story, A Combination of Emojis and Text (Right), Adapted From (Dries, 2013).

The second option is to create a hybrid story (Figure 41 - right). In other words, emojis will be accompanied by other elements, such as text. As the journalists stated, mixing emojis with video and/or text, for example, will improve its understanding, since we can easily fill in the gaps that the emojis on their own would have created.

Even so, there is another underlying issue related to the use of emojis. To some stories, we will not find specific emojis. For example, if we wish to talk about the War on Ukraine, we will easily find tanks, soldiers, flags and even missiles, but trying to find something to represent Volodymyr Zelensky or Vladimir Putin will end up being pointless, since there is no actual representation of each of them on the emoji's language.

“For covid, you don't have the corona emoji, just a virus. You also don't have emojis for Putin or Zelensky (...) I think you would always have to have text, audio or video accompanying the emojis to clarify them”.

There is, however, a way to get around that problem, which lies in substituting emojis for more complex drawings, like the ones done by a digital or visual designer. It gives us clear and enough direct information, on an aesthetical way, and it is something that some Portuguese lifestyle magazines have been doing for quite a while.

“In areas such as lifestyle, graphics are already something that is done a lot in Portugal (...) they can be applied to everything, they are not limiting (...) in terms of design they are incredible”.

It certainly requires more time and work, which is not always easy to achieve, since the newspapers have no enough budget or people to do so, but it ends up being a great option. All-in-all, it is of general consensus that this would be the perfect alternative to emojis, if one had the resources.

“The use of graphics works better than emojis, the message goes through perfectly (...) the person looks at the central pages and gets to know the information clearly”.

4.2.1.5 The Role of Multimedia and Interactivity

While visual narratives can be static and still work perfectly – one good example of that is having infographics or pictures in newspapers – it was easy to have everyone agreeing that, if we are making it digital, then we should make use of all the available resources it provides with.

“For a digital newspaper, I would tell you to bet on interactivity and multimedia (...) it doesn't mean that everything has to be super interactive (...) it depends on the theme. It can be static and still be effective.”

Animating transitions with fade-ins⁷ and fade-outs⁸ is one example, but bear in mind that we would need to let some elements get in and out of the narrative, while others, being closely linked to unchangeable things, would need to stay on the screen. If we are talking about the war on Ukraine, for instance, while we would apply fade-ins and fade-outs to visits of political leaders, we would, instead only apply fade-ins to bombings. They need to stay there, since those events were both changeable to the country and also not likely to change a lot in the next chapters of its story. Across time or space, those kinds of things could get more transparent or opaque, depending on its current level of destruction or construction.

“Animations hook people.”

“Things can gain transparency and opacity as time passes, depending on their degree of importance and the change they create or not in the narrative.”

Nonetheless, perhaps a more interesting resource is the use of sound. According to one journalist, in the vast majority of Portuguese journalism, the sound is not valued and used enough.

“In the vast majority of Portuguese journalism, the use of sound is still undervalued.”

Instead, they prefer to use video, a mean that is able to integrate both the audio and the visual. To tell the truth, video, if well done, is usually the one feature that is able to get to the targets' hearts almost every time, precisely because it makes a perfectly balanced combination of audio,

⁷ Fade-in – “A gradual increase in a motion-picture or television image's visibility at the beginning of a sequence” (Merriam-Webster, n.d.-a).

⁸ Fade-out – “A gradual decrease in a motion-picture or television image's visibility at the end of a sequence”(Merriam-Webster, n.d.-b).

pictures and, sometimes, text. It is a light and eye-catching way of informing people and even getting them to search more about a specific topic. The digital counterpart of the Portuguese newspaper “Público” does it quite well on its Instagram account. Short videos, no longer than 30 seconds to 1 minute, that explain events without getting dull. That way, the newspaper is able to inform even people who usually avoid reading. It is how information adapts to the digital age and to the ever-decreasing attention span.

“I think nowadays, video appeals to a lot of people and the shorter it is, the more people will want to watch it.”

It can also be a great alternative to an isolated image, that might sometimes not be explanatory enough. If we have a video with few text or someone talking and breaking down the subject step-by-step, we will be able, or at least closer to breaking the barrier of information and doubt completely.

“People avoid reading a lot and sometimes an image may not be so explanatory (...) if you have a short video with a person reading or clarifying certain issues, you can attract more people. Even for those who are not interested, it can be flashy.”

Nonetheless, since everything has its own place and time to be used, in some cases, replacing video with sound could prove to be a great idea. For example, if a narrative requires us to use lots of colours or pictures, adding video on top of that would only make it bulkier and confusing - people would either get lost, tired or both. Sound, on the other hand, could be a powerful weapon, since it would help the reader to get back on track, like a tour guide – people would feel immerse in the narrative, almost as if they were living the story themselves. Sound can be a powerful ally, as long as we find a way to use it as a weapon, instead of a distraction.

“Sound allows the reader to feel immersed in what they are reading.”

“It can act as a distraction, but it can also be a way to absorb people a lot more (...) it's a balance that is difficult to achieve.”

“Obviously it depends on the work you're doing, but the use of sound doesn't shock me (...) because it takes people there (...) they understand what you're feeling in a certain place and moment.”

Nevertheless, bear in mind that, just like video or image, sound also requires we to have a bit of sensibility. On a narrative about war, for example, it might not be wise to use screams and shouts, since some readers could end up feeling unsettled. We do not want to pester people with it, we want to make them informatively-richer.

Nowadays, people will not open a news-related-website and start reading the articles from top to bottom, covering every detail. Not anymore. People trust that audio-visual resources will be there for them. They believe text will not be the only way to tell the story they are looking for.

“Nowadays we have to bet on this type of tools (...) most people who go to websites won't be reading the articles in depth, people don't have much patience (...) a more interactive thing grabs their attention.”

It needs to have some level of multimedia, to establish some kind of interaction with the reader. That is how we get to them and that is why, if we are creating a visual narrative, we should not forget that interaction is now a part of our daily-life. Making our visual narrative, somehow, interactive, is the first step to grab the reader's attention and get them to see, read and search for more.

"You are at a time when interactivity is part of your life and, therefore, (...) if you manage to bet on interactivity, it is half the battle for the reader to be stuck there watching, reading and wanting to discover."

Whether it allows us to see pictures of an event when we place the mouse on top of it in the timeline or, for example, moving alongside the refugees who ran from Ukraine, accompanying their path in the map, the truth is it will always work. As long as it is interactive, people will want to explore the story. It almost feels like we create a symbiotic need between the reader, which benefits from getting informed, and the visual narrative, that sees itself rising up to its value and fulfilling its duty.

In spite of that, we have to be cognizant of its limits. If it is true that interactivity can be a powerful ally for a storyteller, it is also factual that everything needs to find a proper balance in order to work. We do not want to get our story completely interactive, with numerous buttons or arrows. That would only make it more confusing. What we want and need is to set up a story in our mind, find the perfect dose of interaction, mix it with the right amount of information and, finally, add some multimedia elements to our own taste, in order to make it tempting enough to be clicked on.

"There has to be a balance, but it's been proven that people waste time when they find multimedia news articles."

Regarding hyperlinks, and having "news within news", they say, if one has to do it, then it should not be mandatory. In more detail, we would, as an instance, click on a part of our visual narrative and, by means of a fading effect or animation, or, in other words, interaction, the option to open a link to some complementary information, like a news article, would show up. We would give them the choice to either stay on the main narrative or look for data that would complement it as whole and/or parts of it.

"For example, having an image with an explanatory title by itself (...) if you clicked on the image you could choose to go to the article and improve your knowledge, or stay in the narrative. You don't lose focus (...) the person only opens what they want."

"I think parallel narratives can be a very interesting option, but there should always be a main narrative defined by whoever is creating it."

That it is the only way to use hyperlinks without losing focus from the message the readers are trying to absorb. The chosen visual representation must have a core, a main central narrative, per say. Only when and if we have that, we can establish connections to "other worlds". Hyperlinks that are automatic or forced in some way, would only get us to lose people's attention.

“You have to choose which is the main visual narrative that will help you to tell the story and which is the tool that will best help you to do it. It can happen that you actually win from time to time when you add other elements, but you can also lose focus”.

“News within other news (...) the reader can say he is tired, lose the focus of the main narrative and switch off.”

Another option would be to use some kind of filter, similar to the ones that online shopping stores have.

“You can have all the information in the main narrative and I, as a user, could have an option to filter it like on clothing websites, so there is no noise (...) if I filter and say that I only want to see information about the characters, you can click on them and know where they were involved, you can tell the story from them”.

We would have a main narrative as default, but, as an instance, if we wanted, we could filter it to see just the elements related to character number five or event number three. We would have a subsequent narrative that would allow us to understand, in depth, how a certain thing influenced the main story. This could be done across time and/or space, the two axis we have available to tell the story. Understanding what should occupy the main narrative and what should be optional is, however, a matter of choice. As it has been said before, we choose the amount of noise we want to add to the core story.

4.2.1.6 The Dangers of Visual Pollution

This is an interesting topic and the reason why it is so, is due to the fact that while visual pollution is a risk, it is, arguably, the most important one we have to take when thinking of creating visual narratives. Because of this, it does not come as a surprise that all the journalists who have mentioned it agreed that the addition of visual elements must be done surgically.

“There can be no visual pollution, you have to be able to understand at first sight what you are seeing.”

It is, indeed, truly important to have visual elements in a visual narrative, (hence its name), however, as the journalists stated, one must have in mind that the readers cannot and must not lose their focus. If too many elements are added, we risk the very core of the visual narrative’s purpose: to simplify the comprehension of a rather complex topic.

“If you put in too many colors or too much information, it can get confusing and you end up losing it.”

In other words, at least on a first impression, the visual narrative must maintain a simple layout, with just enough elements. That is how we assure that the reader can understand the message at first glance, instead of getting lost in the process. Another important feature that should follow the same rule is colour – too much colour becomes a distraction, but not enough makes the visual narrative dull.

Not only do the actual visual elements enter the discussion, but also how and when to present them. Now this is where things get dubious... While one journalist defended that the ideal visual narrative should not suffer a “screen change” – the events should all appear in the same physical space - in order not to lose the reader’s attention, the majority believed adding hyperlinks or being able to move between different screens through buttons or arrows would prove to be a useful feature. To support this last opinion, one journalist actually recalled how important it is to rely on the reader’s visual memory.

“I think everything should appear in the same window, (...) you lose focus if you need to keep moving back and forth”.

“Having all the information in a single image is excessive and ends up losing interest, because people absorb nothing (...) I think that visual memory should be put to good use in here (...) to guarantee it, you must have one or two details that catch the eye, instead of trying to get the person to memorize everything.”

In spite of having different opinions regarding how a visual narrative should look like, all journalists mentioned that we should define just a few important things to showcase on the screen.

“We cannot lose sight of what we want to convey to people.”

The only difference lies, as said before, on one of them believing that all the information, no matter how little and simply represented, should be seen at first sight and the other believing it should mostly be faded. This could be done, for example, by actually opening a new window, recurring to an automatic transition or even arrows/buttons that would allow us to move back and forth in the story. Adding too much information and/or colour to visual narratives can make them get confusing and even tiring, which will eventually, if not immediately, lead to the reader’s interest decadence. As cliché as it may sound, less is, indeed, more.

“With too many arrows you also end up losing (...) it gets very confusing; the person doesn't know exactly what you want to show with that.”

“As cliché as this may seem, less is more, it is a fact (...) if you give people too much information, you may end up not being able to achieve the objective you wanted, which is to convey to the person what happened, how it happened, where, when and by whom”.

4.2.1.7 Inclusion & Accessibility

Due to its delicate nature, this is arguably the topic that generated more controversy during the interviews. While on the one hand the goal must always be to make it as accessible as possible to everyone, on the other hand, the truth is, that is not easy to do. If we manage to create something simple, yet beautiful, it might still be too complex for older people, for example. On the flip side, if we make it too simple for older people, we may end up losing the rest of the readers, since it will not be eye-catching enough.

So, how do we do it? How do we make our digital visual narrative inclusive? – the most common answer is “we usually do not”. It is a complex question, indeed, but it is a fact that

everything has its own limits. The vast majority of people using social media, as well as digital tools as a whole, are youngsters and middle-aged men and women – the so-called “working age population”⁹ – therefore, as one journalist recalled, if all digital newspapers were to focus on older people, then none of them would create, for example, any infographics or interactive maps.

“The issue of older people is complicated, because if all digital journalists were thinking about older people, no one would make visual narratives (...) most people who use social networks, digital tools are the younger ones, it’s called active adult population.”

The majority of older citizens do not know what it means to read news online, since they still buy newspapers in newsstands. Remnants of an old, slow-paced life that got stuck to them and found a way to travel to the present-days. Certainly not a bad thing, since they help kiosks and their owners to survive in times where they are, mostly, outdated, but, for that same reason, definitely not where our focus should be, when thinking of digital visual narratives. Besides, making it accessible to older people is not our only challenge. In fact, we still need to convince them to use the internet, which will not come as an easy task, if we take into account how hard it is for them to make the transition to the digital world.

Case in point, if we want our digital visual narrative to work, we should put our effort in getting to people who are actually used to reading online news. They will be our main users and, since kids nowadays are already born with a lot of digital stimuli, we have to keep pace with them and be able to deliver something that will actually be interesting. That can only happen if we make them our target.

“These days, youngsters are born with a lot of stimuli, so we have to make sure that we continue to be able to keep up with them and respond to them.”

“I don’t know if it’s really appealing to have a very simple representation, it’s not super captivating to the point where I go and see it and send it to someone.”

However, not making older people our focus, does not mean we cannot try to make it usable by them. There are some things that could help every age-group, like making it as intuitive as possible.

“The more intuitive it is, the easier it is to reach and keep the older audience, because it is not enough to arrive, you have to conquer (...) and the older audience is more difficult to conquer.”

Another one is having just one window or at least as few as possible, instead of opening tab after tab, after tab, via hyperlink, for example. It is harder for older people to move back and forth, but it also gets dull and tiring for youngsters if it goes on for a long time.

“To be more inclusive, you can put more visual elements that are easy to understand, (...) not opening too many things also helps.”

The visual elements should be easily seen and understandable, thus making it accessible and captivating mostly to our target, but also to other possible readers – making them user-friendly.

⁹ Working age population – “The working age population is defined as those aged 15 to 64. This indicator measures the share of the working age population in total population” (OECD, 2022).

“It must be user friendly, straightforward (...) to look and immediately understand how and what to explore.”

4.2.1.8 Visual Narrative Representations Nowadays

When asked about the perfect visual narrative by default, the journalists shared the same opinion. For the majority of them, the theme is what defines the narrative to use, which makes it a difficult question to answer.

“There is no such thing as a visual narrative par excellence, it always depends on the theme.”

Regardless of which one it is we select, our first worry must be in telling the story with efficiency and, as a consequence, grabbing the reader’s attention. This must be our main focus.

“The concern should be effectiveness and trying to capture and create a connection with the reader.”

As stated before, there are numerous ways of telling a story through visualization and we can even try to mix some of them, if the story shall ask for it. Having timelines within timelines is a good example. On a basic level, it is a timeline. The inner timelines are only a side part of the story, that we are able to consult if we truly want. However, one could also argue it is a hierarchy.

“It’s funny that you can see not only over time, but also be able to enter each of the events and be able to explore them”.

“The temporal context is very interesting, but that of the actors as well, because you can see when someone shows up and the influence they have on each event.”

“It’s almost as if the events are explained to each other in layers, instead of having the more classic format of a succession of events over time (...) you are more focused on understanding the how and why, than the actual process. chronological order (...) is interesting”.

One representation deserving of mention is the wordcloud (Figure 42), a specific kind of hierarchy that shows the reader smaller and bigger words, all together. The hierarchy in work can be variable. It can range from bigger to smaller words, according to their degree of importance, or the number of characters involved in a certain event. As long as there is a certain hierarchic degree, how we do it is mostly an editorial choice.



Figure 42: Wordclouds (Wijaya, 2020).

The reason why it is important to mention the wordcloud is not because it is the best option available, but precisely because it is not. As one journalist stated, there are still some magazines doing them really well. However, even if they do a good work with it, does it make sense to keep betting on this format, when there are already so many other formats that do similar things in a better way? With the vast amount of software and tools that we have at the moment, is it still adapted to our current life?

“Visão and Sábado do wordclouds very well (...) it works and you understand them, but the question is: is it still up-to-date? With so much good stuff out there, with so many tools and softwares, I don't know if it makes sense.”

Maybe it is a thing from the past and we should let more interactive and visual representations take on the mantle. As its name says, it is a word cloud, it is too dense. With a few words it could work, but if we had a 100, for example, it would become harder for people to find the piece of information they want. It is another example that could work better on an entertainment format, when people are up for the challenge of finding specific words like in a treasure-hunt, but not on an informative, fast-absorbing need context.

“I never really liked this example, it's like the name implies, it's a cloud of words, it's too dense. (...) with 10 words it can work, but with 100 or 200 it becomes very difficult to find what we want.”

On the other hand, if the wordcloud seems to be outdated, the timeline format is a classic that never seems to lose its charm. All journalists agreed that it is the preferred representation of many newspapers and, therefore, the one we see the most. It is perfect for more prolonged themes, like covid-19. There have been a lot of events since it first started in November 2019. To tell a story this long, picking up the one format that chooses time as its basis, seems to be the wise choice. However, we can also use shorter timelines for a weekly event, like a music festival. As long as we have enough elements to build the story, it will work nonetheless.

“Timelines “sell more” (...) they help especially on topics such as covid and war, for example, which are longer.”

On top of that, there is the fact that even if we choose to make it interactive, we could apply simpler and more direct interactions, such as moving from one point to another in the timeline. This would be easily understandable by most people, making it user-friendly to everyone.

An application of the timeline concept to a slightly different ground could be creating a model that is able to show the before and after of a certain event. To state a simple idea, we could easily do it with detailing how a house had been built. Step-by-step, people could see the passage of time, with or without, having the timeline reference in it.

“One image next to the other with a slash in the middle, which you can drag to see the passage of time. I think it's easy, you don't ask for too much attention to understand how it works (...) you don't have many windows to open and close, you don't lose the person to the other side.”

The photomosaic¹⁰ is another interesting example. In a few words, a group of photos than compose a bigger picture. If we put a few text on top of each small image, we would have the necessary clues to understand why the bigger picture was formed. It may seem a bit rudimental, when compared to other options, but it is undeniable that in some contexts, it could work.

“You can put several images, several news to make the general image and you keep clicking to see each news (...) it's interesting, but it has to have an order too, almost like a timeline that is not quite a timeline.”

All we need is to know how to choose proper images and making them interactive – this last part could be done, for example, by having them get bigger for us to read the captions, once we placed our mouse on top of a photography. RTP (Rádio e Televisão de Portugal), a Portuguese Radio and Television network, used to present “the picture of the day”. For this, they would look for something strikingly beautiful or spectacular, that would represent the last 24 hours, and had a few lines of text (no more than three or four). If the image was eye-catching enough, it would get people to open it and move to a news article to know more. Besides that, we need to have in mind that this image needs to be placed on a strategic place, if we want people to see it. It works, as long as we have striking themes, like prizes-winnings, political leaders’ meetings and even war. As one journalist recalled, everything is impacting when we are talking about war.

“You have to know how to choose an impactful photo, (...) visually spectacular photos that captivate people.”

“You have to know where to play with photography, it has to be in a prominent place, but, at the same time, it must not drown out everything else.”

“We know that people most of the time don't go to see the news, they see the homepage, they see the headlines and above all they see the image (...) it's what draws the most attention.”

When it comes to using the networks format, a journalist refers, depending on the theme, it could be interesting to have that model, subsequently “forcing” people to really get immerse in

¹⁰ Photomosaic – “An image composed of many smaller photographs” (Merriam-Webster, n.d.-c).

the narrative, since they would need to move between the story and truly interact with it in order to understand the relations between events and/or characters.

“I think they work better with denser issues, which require their exploration (...) but you can't have too much information either, if you have too much within a hierarchy you end up getting lost.”

Unless it is a simple narrative, this model is clearly dependent on interaction in order to work, however interesting it may be to know how something or someone influences other characters and/or parts of the story.

“If it is not static, it can work very well (...) it requires interactivity, exploration of the narrative by the reader, instead of a more direct interpretation”.

The same rule applies to the hierarchy format. Although with simpler stories it could be static, if we had a lot of elements, we would need to make people open one information block after another, regardless of how stimulating exploring all its layers might be. In conclusion, these would both work better on the internet. Timelines, on the flip side, could work both on an interactive context and on a static one, therefore being used on paper and digital news, making them the visual narrative by default. Nevertheless, once again, it is important to mention that one will only know what the perfect representation is, once they learn everything there is to know about the story.

4.2.2 Discussion

Generally speaking, according to the information gathered from the interviews, journalists support the use of visual elements when writing a news story, although denoting that not all stories are visual-narrative-material. Usually, the ones that look longer and/or more complex are the best candidates for being told under visual narratives. This, in turn, not only makes the traditional text-formatted news more eye-catching and easier to capture the reader's attention, but they also help to “transform” some rather complex topics into simpler ones. As all of the interviewees made it clear, simplicity is the key.

However, one must bear in mind that creating something too simple may end up complicating things even more – if it's not eye-catching, people will probably not bother looking at it and, if that is the case, then we are just adding an unusable feature to an already elaborated story. We must never lose focus of the message we want to pass. Therefore, as they also reinstated, is it important to know exactly what we want to do, for whom and why. Once we have a clear goal of our persona, and the message we want to deliver, the visual narrative should work like a charm.

We should also bet on multimedia and interactivity, as nowadays most people will not bother reading news top to bottom, and therefore knowing how to make use of those features is the perfect way to grab a reader's attention. However, never forget that there needs to be a balance and that every narrative has its own way of being explored. Although we can choose the amount

of noise we add to the visual narrative, we should also remember that, as said before, sometimes less is more. Moreover, text is always a must-have, regardless of which other elements we choose to use. In spite of that, using videos and audio can be a good decision if we want to grab someone's attention. Even though they could be potentially distracting, they could also be powerful weapons used to "absorb people into the narrative". Once again, it is always a matter of balance.

Regarding the use of emojis, the journalists took a steady position. Although they can be eye-catching, there is a high risk of seeing them become ambiguous, something that, in informative fields, is not desired. If we really want to use them, we need to find a way to turn them easily understandable. That could be done by mixing them with text, video and/or even audio. While they certainly have some advantages, such as allowing foreign people to understand more or less the message one wants to pass, it is still dangerous to use them care free. One alternative is to substitute them by graphic drawings, made by designers, more complex and specific in nature, in order to avoid emojis' ambiguity.

There is no go-to visual representation by default, as it always depends on the theme. In spite of that, timelines seem to take the lead when it comes to the most used visual representations. However, they have also tackled other visual representations as well, such as the wordcloud and the photomosaic. Providing the vast amount of software and tools that we have in 2022, the first one is, mostly, outdated, in the opinion of the journalists. As for the second, it could work, as long as we know how to pick the images. They need to be impacting enough, while at the same time avoiding sensationalism. People deserve to be respected and, therefore, there must be limits. However, as in all visual representations, we should also avoid visual pollution in photomosaics, as making it too crowded, and, thus, confusing, would probably end-up having we lose our reader's attention. For this reason, this may not be the best option.

Hierarchies and networks between events and/or characters are also a great option, as we can see the different layers of the story and the influence each party plays on it. This comes in line with using visual memory to "see past the first slide". In other words, if we feel like our visual narrative is getting too crowded, we could, eventually, split it into different horizontal slides, as long as we do not make it too long. However, some journalists advise a vertical format would work out better, as we are already used to the long-form online reading format.

There is also a general consensus regarding a duality: on the one hand, the majority of journalists agree that visual narratives should be accessible and easily comprehended by everyone. On the other hand, they advise that it may not be possible to create digitally beautiful visual narratives if one is worried with delivering it to the general audience. If a visual narrative is supposed to be used in digital news, then we should design something for a younger to middle-aged crowd, since they will be our main users. Notwithstanding, we can try to make it as user-friendly as possible, thus eventually making it accessible to other people, even if they are not our target.

On a first thought, we remembered Microsoft Words, when referring to their Inclusive Design principle – "Solve for one, extend to many. Everyone has abilities, and limits to those

abilities. Designing for people with permanent disabilities actually results in designs that benefit people universally. Constraints are a beautiful thing” (Microsoft, n.d.) – it was our belief that this should be the adopted mindset, however, the journalists made it clear that in order for visualization to truly work as planned, the focus must be on delivering it to digital readers. Every other person that we are able to grab will be a bonus, not the nexus of it. In other words, when creating visual narratives, it is important to remember that they should be as accessible as possible, without making them too simple and dull, and drifting too far away from our target in the process.

4.2.3 Summary

Generally speaking, three main conclusions were drawn from the interviews. First, not all news stories can be told in a visual narrative perspective, only longer and more complex ones, with lots of different topics being brought to the reader’s attention at the same time – in these cases, making use of visualization should be beneficial for the readers, as it simplifies what used to be complex. Second, although there is not a visual narrative representation by default, as each story has its own way of being represented, timelines seem to occupy the podium as they are still the favourite of most people. Finally, be careful with “visual pollution” – adding too many visual elements could lead to the reader’s loss of the content. However, making them too simple could also provoke the same result. One needs to find balance between simplicity and complexity. The same goes for multimedia and interactivity. While they can, indeed, play a huge role in making our narrative more appealing, they can also be distractive if we do not find a proper way to balance their usage. It is important to retain that one must build simple, yet creative and eye-catching, visual narratives. Otherwise, they will not work as well as we wished they did. It is more than clear that visual narratives can help to both tell and explain a story, as long as they respect these requisites.

4.3 The Reader’s Take on Visual Narratives

Once the interviews were finished and all the conclusions drawn, we started creating visual representations of how a visual narrative for two different case-studies could be represented: “The Russia-Ukraine War” and “Rendeiro”. A total of 10 representations were created. In [Appendix B](#), it is possible to check on the developed visual representations. After having the visual representations ready, we prepared a set of questions, more close-ended and focused on the referred visual representations this time, instead of visual narratives as a whole. However, some technical issues were addressed as well, that will later be discussed in more detail in section 4.5. In the current section, we will show the analysis and consequent results of the surveys made to readers. We will also show some visual representations that were specifically created for these surveys, based on the journalists’ suggestions and our own readings.

4.3.1 Questioning Readers – Survey R

In here, we will analyse the aborded questions in survey R. Each of the questions will be addressed to as “R + number”, with R symbolising that this survey has been directed to readers, and the number representing the order of each question. The questions have been divided in different themes, regarding: “Demography” (questions R1 to R4), “Reading News” (questions R5 to R13), “The Case-Study Russia-Ukraine War” (questions R14 to R17), “The Case-Study Rendeiro” (questions R18 to R21), “Generic Case-Studies” (questions R22 to R26). The survey cointaining these questions, in their original language (Portuguese), can be consulted in [Appendix C.1](#).

In “Demography” we gathered all the background information of our participants necessary to build a profile. We got to know their age group, gender, academic level and occupation at the moment of the survey. This survey was sent-out to different groups of people, both inside and outside the University of Porto (UP), in order to get a more generic sample of the population.

In “Reading News”, we tried to learn more about their reading habits, but also on their opinions regarding the current use of visual narratives in newspapers. Finally, we aimed to understand their perception on the role that both visual narratives and visual elements can play in the comprehension of a news story.

After question R13, we changed our question-style to a more visual approach, thus starting to ask about their opinion on specific visual representations regarding two well-known case-studies for the Portuguese public (which is also the surveyed one): the Russia-Ukraine War (R14 to R17) and the case of João Rendeiro, sometimes only referred to as Rendeiro (R18 to R21), an ex-Portuguese-banker who fell into disgrace due to criminal charges while administrating the bank he worked for.

The majority of questions regarding one case acted as a mirror to the other, as they were mostly the same, only changing the visual representations, that were made available for both telling the story under a hierarchical format and under a timeline. The idea was to present people with two different case-studies and see if the choices matched in some way, thus representing a generic opinion, or not.

Finally, in questions R22 to R26, we presented all the previously shown models, but without case-studies-attachments. In other words, we wanted to know which of the visual representations people thought worked the best, concerning hierarchies and timelines. We also tried to understand which of these two formats was preferred and the answer left no doubts: it is definitely the timeline format.

The survey encompassed different types of questions, depending on the information we were trying to obtain. Nonetheless, with the exception of the last one (R26), an optional open-ended question that allowed people to leave comments or suggestions, all the others were quantitative, with the vast majority being of multiple choice. However, we also added some questions that asked the surveyed people to order different options, according to their preference, from one to

seven, one being “The Worst” and seven being “The Best”. Apart from that, we also asked people to rate certain elements from one to five, according to their level of importance, one being “None” and five being “Essential”. Both these last two examples have been done more than one time, although with other amounts of options as well, not only seven and five, respectively.

If, on the one hand, the interviews gave us some insight on how to build proper visual narrative’s representations, the survey, on the other hand, served two different purposes: first, it helped us to understand if the visual representations we had created actually worked or not; second, it helped to clarify the generic public’s opinion on the use of visual narratives in journalism. This topic will be deepened in the next sub-section.

We collected a total of 155 responses, from two surveys, one that was conducted within the Univeristy of Porto, and one outside of it. However, there was no distinction in the questions, as we were only trying to get more responses, so we opted to connect the two of them in this analysis. The survey, being the same for both groups, can be consulted in [Appendix C.1](#).

4.3.1.1 General Information

By analysing the Demographic data, we conclude most of the participants (59%) are between 18 and 24 years old (R1), with the male public having given the majority of the answers (55%), according to R2. It is also possible to check that most people also have a Bachelor’s degree (50%), followed by 28% with a Master’s degree, which makes sense, considering the age gap that gave the majority of answers. As of professional occupation (R4), this comes in line with the previous responses as well, as the most given answer was “Student/Researcher” (63%). All things considered, one can say the target of this survey were youngsters, particularly men, with superior studies.

4.3.1.2 News Reading

Entering the field of news reading, we conclude, by analysing the results of R5 (Figure 43), that almost half of the participants read online news “several times per day” (45%), with the vast majority of the population accessing them through social networks (42%), as stated in R6 (Figure 44). Once again, the results for this last one were expectable, given the fact that most of our answers were given by youngsters. On the flip side, having almost 50% of the population reading news several times per day, while keeping in mind that most of the surveyed are youngsters, indicates that our surveyed mostly possess good reading habits.

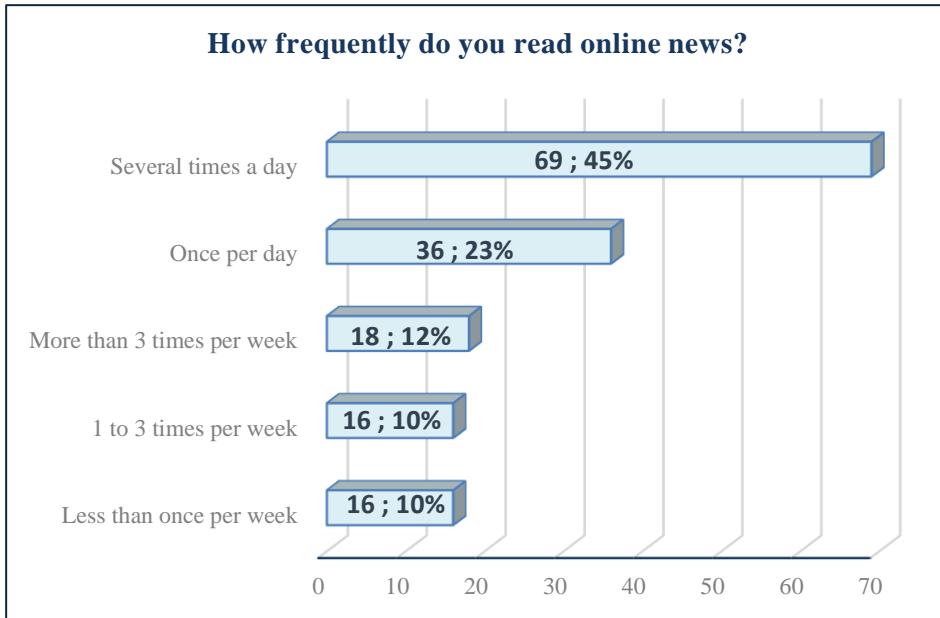


Figure 43: Frequency of Online News Reading (R5).

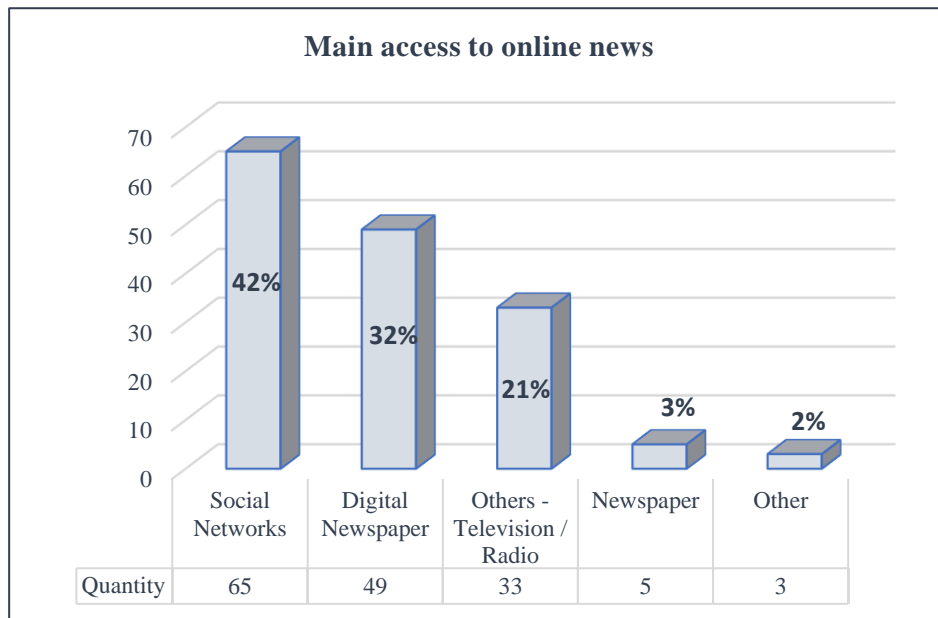


Figure 44: Main Access to Online News (R6).

When it comes to ordering news-story-types in accordance to the usefulness that visual narratives might have to explain them (R7), the results were clear (Figure 45). From one to seven, one being “Less Useful” and seven being “More Useful”, Tabloids are the less useful type of story

to which to apply visual narratives. Generic News are also not a good option, which could be explained by people not knowing exactly what this means and, therefore, where to place it.

Culture/Art, on the other hand, seems to be the one that requires more explanation, occupying the 1st position, regarding types of stories that can benefit the most from the usage of visual narratives. Science and Health, Technology and Sports come, in this order, as the other story types that require the most explanation.

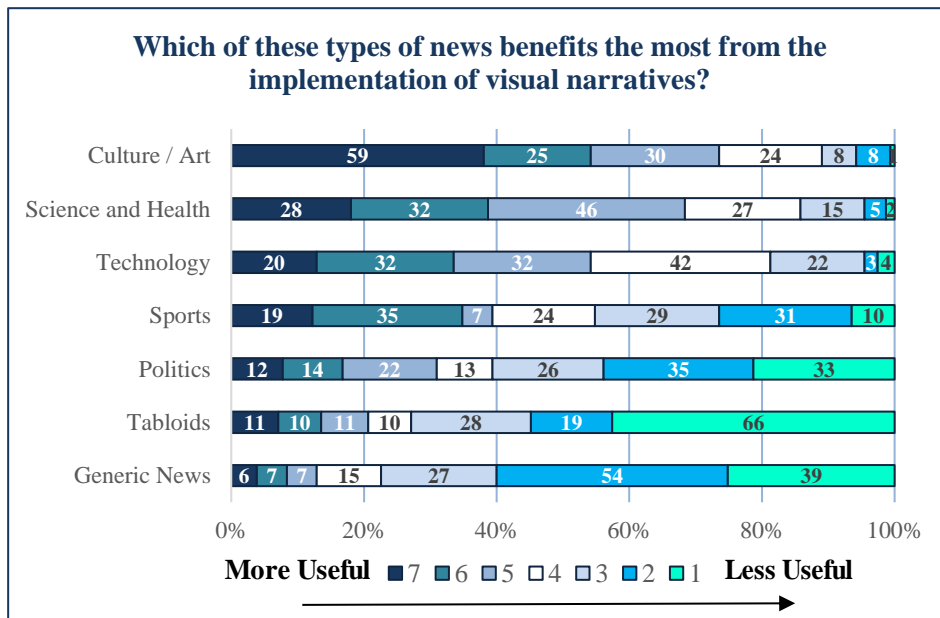


Figure 45: Benefits of Implementing Visual Narratives in Each Type of News (R7).

In order to get a more detailed analysis of these type of graphics, we used the double-entry tables in [Appendix C.2](#). All these analysis are composed of two parts: one individual analysis, in which we go through every percentage in each level, per category and one that separates the positive and negative votes. This will all be clearer as we go through them. As such, in more detail, by analysing Table 15 in [Appendix C.2](#), one can conclude that Culture/Art got most of its votes on level 7 (“More Useful”), while Tabloids got the opposite, with most of its votes ranging in the “Less Useful” spectre (level 1). These are clearly the extremes in each side of the spectre.

Looking now at Table 16, and assuming levels 1 to 3 as “Less Useful” ones and 5 to 7 as “More Useful”, Culture/Art gets, once again, the majority, making it consensually the topic that requires the most visual explanation. Although Generic News wins as the least voted from levels 1 to 3, we recall, once more, that given the fact that Tabloids come right after and have won in the other analysis, this could be explained by people not knowing exactly what “Generic News” means and, therefore, where to place it. All in all, one thing becomes clear: Culture/Art news are

the type that could benefit the most from visual narratives' usage, while Tabloids do not require visual narratives' aid.

When it comes to captivating the reader (R8), surprisingly, Text is still the one that gets more votes, which supports Mariana Costa's theory that visualization may still not be able to supplant text as the main source of information in a news article (Costa, 2021). However, Image comes right after, as shown in Figure 46. Regarding the least important one, most people consider it to be Audio, which creates an interesting duality with the idea stated by one journalist that this can be a powerful resource. On the other hand, journalism's failure in supporting and using audio in their articles, although it can be a powerful feature, may as well be the reason why people cannot see its value. Since they are not used to it, they cannot see it posing as a strength. Colour is also not seen as a strong suit.

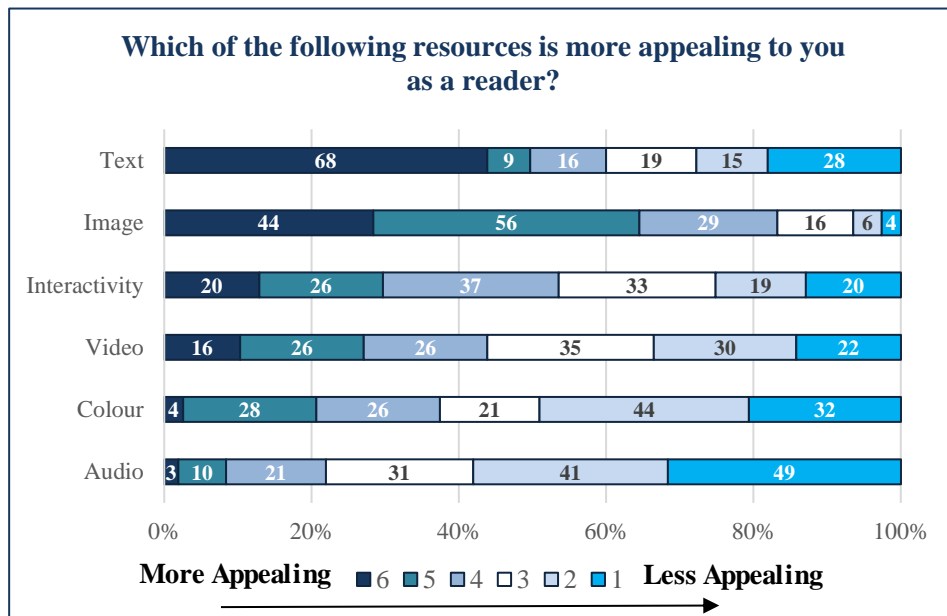


Figure 46: Appeal of Each Resource for the Reader (R8).

If analysed individually (Table 17, Appendix C.2), Text got a high number of votes on the highest possible level. It is the most striking difference when compared to the other ones. In sum, text got a significant number of votes on level 6, when comparing to the other levels of voting in its category. Audio, on the other hand, comes as the most voted on level 1.

Given the positive and negative voting spectre (Table 18, Appendix C.2), levels 4 to 6 and 1 to 3, respectively, Text is no longer the winning element. In fact, Image surpasses it for almost 4%, which may indicate that, even though some people do not consider it to be the best option, generally speaking, Images are seen as the most appealing feature in a visual narrative. In other words, and given the nature of these type of graphics, in our opinion, the positive and negative voting spectre plays a bigger role in the analysis of them, thus making Images the most appealing

feature, generally speaking. Regardless of that, both types of analysis will keep being made to similar questions, in order to see if they sustain, or not, each other. Audio, on the other hand, remains as the main discarded option, reinforcing the idea that people do not see its value.

Things start to get dubious once we get to question R9 (Figure 47). When asked about the frequency to which they see visual narratives being used in journalism to explain complex topics, levels 2 (“A Few Times”) and 3 (“Some times”) get similar percentages. More specifically, 2 and 3 get 29% and 32%, respectively. While 3 appears to be the most given answer, it is not a significant difference. Could this be a sign that visual narratives are so less frequently used, that people cannot even classify the number of times they see them? Question R10 seems to indicate so, since when asked if journalism should start using them more, 87% of the surveyed said “Yes”.

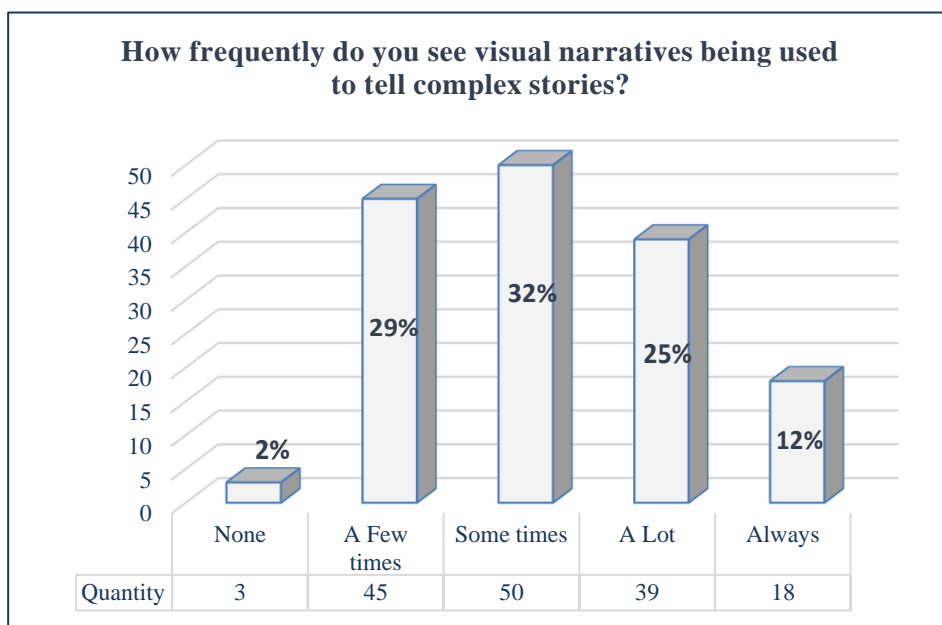


Figure 47: Frequency to Which Visual Narratives are Used in Journalism (R9).

Question R11 provided some interesting results (Figure 48). When asked about how much easier visual narratives make it to comprehend news stories, 50% of the surveyed said “A Lot”, (level 4 out of 5) with the second most voted option being the highest one, “Essential”, with 35%. This leads us to think that people see a lot of value in using visual narratives in news stories.

Question R12 made it possible to evaluate, from 1 till 5, 1 being “None” and 5 being “Essential”, the importance that the reader attributes to each of the elements that may compose a visual narrative (Figure 49). The choice was clear when it came to the most important one, since “Events” got 56,1% “Essential” category votes (Table 19, [Appendix C.2](#)). This seems to indicate that the best way to tell a story through the use of visual narratives must be by adopting events as its basis, instead of characters, locations or dates, for example.

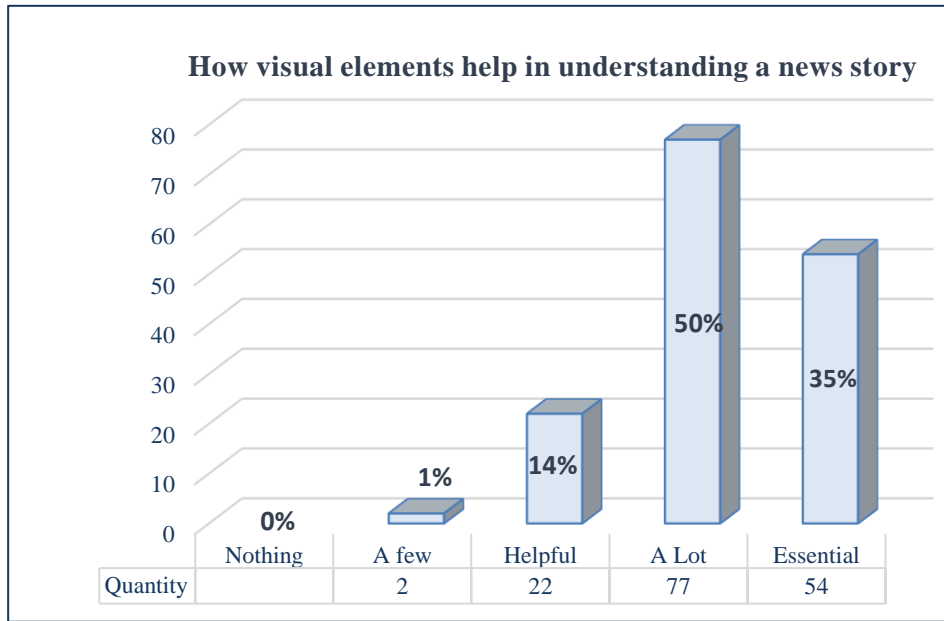


Figure 48: Visual Elements' Level of Help in Understanding a News Story (R11).

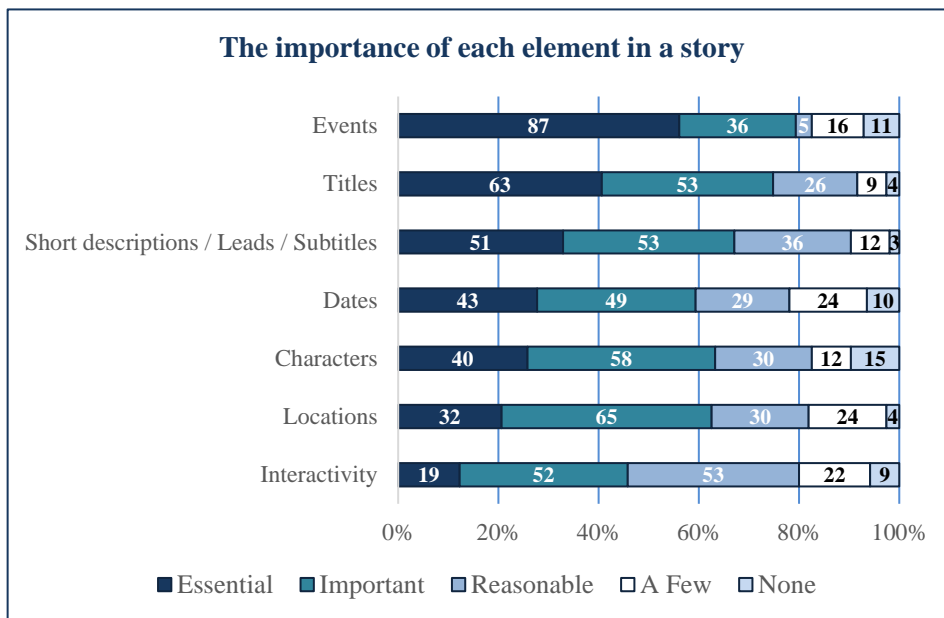


Figure 49: Importance of Each Element in a Story (R12).

Finally, if we think about each element's place on both the positive and negative spectre (Table 20, Appendix C.2), it is safe to say that apart from Interactivity, everything seems to get a considerable amount of positive feedback. In fact, even Interactivity is far from being seen as a bad option, as most of its votes lie on the positive spectre. "Events" fall on the positive spectre with the highest percentage, reinforcing what has been previously stated. An interesting fact is that "Dates" gets the second lowest positive percentage and the most negative voting. However, the negative and positive spectre are apart from each other for a significant difference, which may imply that, although is it not the best option, it is not a bad one as a whole. Even more interestingly, "Titles" shows up as the second most positive, while "Short descriptions / Leads / Subtitles" poses as the third most positive, which comes to reinforce the importance that people still attribute to the use of text in visual narratives.

We believe every element must have its level of importance, that can be different, depending on the context and the story, however, it became clear for us that regardless of all that, both Events and textual elements must be part of the visual narrative's core. Maybe one way of doing it would be to represent events through textual elements.

When it came to the choosing the ideal visual representation (R13), 97% chose the classic timeline format over the temporal hierarchy one, reinforcing the journalist's perspective of how the timeline is still the go-to model by default.

4.3.1.3 Russia – Ukraine War

Entering the domain of specific case-studies' visual representations, we prepared a set of questions, ranging from R14 to R17, which have offered us some perspectives on people's opinions over the previously created representations for the Russia-Ukraine War model.

When it came to choosing one of the four timeline models presented in question R14, the results were clear (Figure 50). The surveyed have obviously discarded two options, the *Before and After* model (21%) and the *Horizontal Timeline* (18%). The two most voted representations were the *Geographical Timeline* (35%) and the *Vertical Timeline* (26%).

Given the context of the results, one could theorize that, if in a different scenario, the *Geographical Timeline*, being so case-specific in nature, would not get as many votes as the *Vertical* one, thus making this last one the best timeline representation of the four. Nonetheless, the results of the next questions should help us get some clarification on the matter.

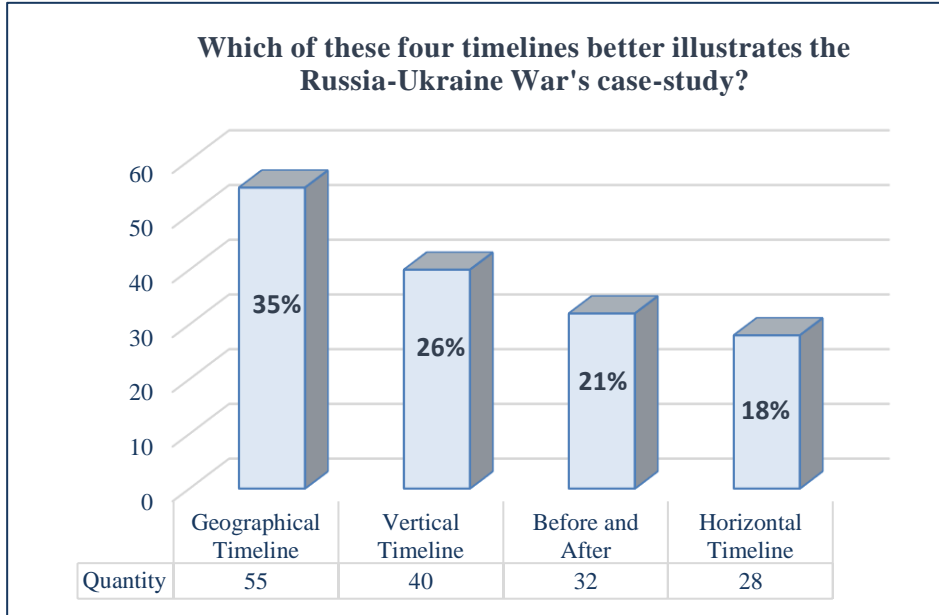


Figure 50: Different Timeline Representations of The Russia-Ukraine War Case-Study (R14).

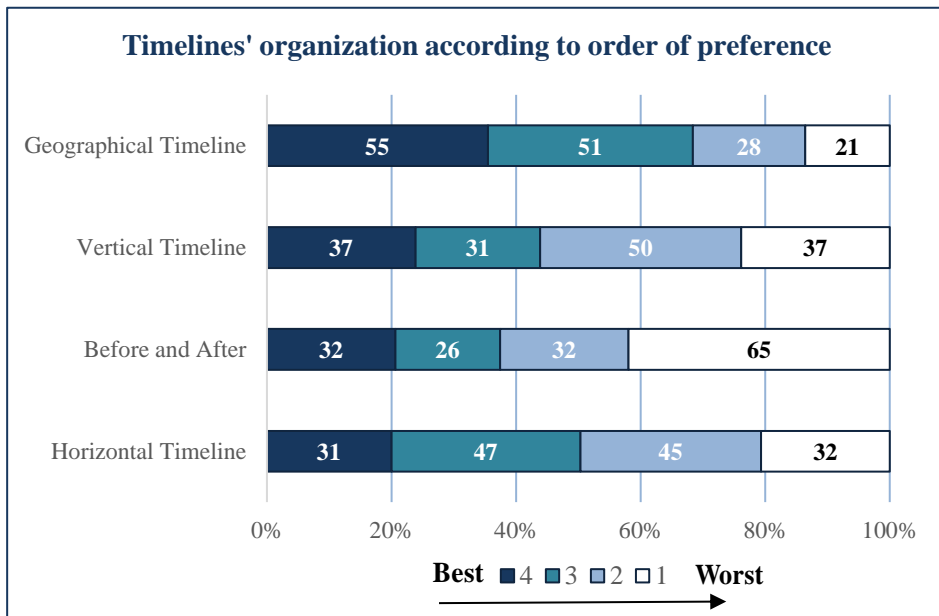


Figure 51: Timelines Used to Illustrate The Russia-Ukraine War According To Level Of Preference (R15).

Question R15 asked the surveyed to order, from one to four, one being the “Worst” and four the “Best”, and according to their preferences, the previously seen representations (Figure 51). The *Before and After* model got the worst individual percentage of all (Table 21, Appendix C.2), 42% in Level 1, while the *Geographical Timeline* was the most voted on the highest positive limit, with 35% on Level 4. On the one hand, in terms of percentages, the *Geographical Timeline* seems to be the preferred one. On the other hand, it once again raises the question: given its case-specific-nature, could the results vary if the timelines were to illustrate a different scenario?

Maybe the positive vs negative voting table (Table 22, Appendix C.2) can help us clarify those hypotheses. Interestingly enough, while the *Horizontal Timeline* got the worst percentage on R14, it actually seems that the *Before and After* model is the least preferred, as it is clearly seen as a bad choice by the vast majority of people. Interestingly enough, the *Horizontal Timeline* is unable to fall under a specific category, as it received mixed feelings from people. While it falls on the positive spectre, is it not a significant difference. This could indicate one of two things: either this format is outdated and, therefore, we are now facing a transition from “older” opinions to more up-to-date ones or, given the context specific scenario of the War, the people who would normally choose this representation model opted for the *Geographical Timeline*. It is certainly something that will be clarified in the final set of questions. *Vertical Timeline*, on the other hand, seems to be perceived as a bad option by the majority of people. *Geographical Timeline* gets more than the double positive votes when compared to negative ones. However, once again, this could all be related to the specific case-study.

Question R16 presented the surveyed with two choices, to either use one of the previously shown timelines to represent the Russian-Ukrainian War topic, or to do it by using a hierarchical representation, to which we gave the name of *Matrioskas*. The results were clear, as 78% chose to use timelines. However, one interesting thing happened when referring to the *Matrioskas*’ model.

During the making of the said visual representation, the original idea revolved around mixing one typically Russian element, *Matrioskas*, with telling the story from a Ukrainian perspective, showcasing different emotions on the *Matrioskas* as the events were favourable to Ukraine or not. In other words, showing us the story told from a Ukrainian perspective, as if the narrator was there is person, therefore creating a duality between the two countries. We intended to put the reader at the centre of the narration of events (the interior of the *matrioska*), from a Ukrainian (western) perspective. However, it got mixed and interesting responses by the surveyed people, thus making it clear that this is not a good visual representation, as the journalists said that the best ones shall leave no room for doubt.

To state some examples in the comments, hereby translated by us:

“Although I find the suggestion of the Matrioskas interesting, I fear the reader will lose focus. These are somewhat complex case studies, which require attention, and the details can harm, despite beautifying the work produced. I believe that geographic or temporal chronology, as well as the microscope could be the most beneficial options for the journalist's work”.

“Assuming that the sizes of the Matrioskas are proportional to the importance of the event in the timeline”.

“I think that a drawing (any iconography that is not of bad taste, like wearing Russian matrioskas full of Ukraine on the belly), can be more pleasant and noticeable than a schema like wordcloud depending on the design and organization of the information”.

R17 came to confirm what had been concluded in R16, showing that 85% of people would opt to represent this case-study with timelines, instead of hierarchies.

4.3.1.4 Rendeiro

As it had been said before, with the exception of R16 and R20, the questions presented in each one of the case-studies were created with the purpose of mimicking each other, thus making their answers possible to compare. However, in opposition to its counterpart, this was a much easier case-study to analyse, given the fewer options it had.

In R18, the readers were asked to choose the best timeline to represent the story (Figure 52). *Draw the Story* surpassed the other two examples with a striking 70%. *Photomosaic* is clearly the one to discard, since it got the least voting and question R19 seems to clarify that (Figure 53).

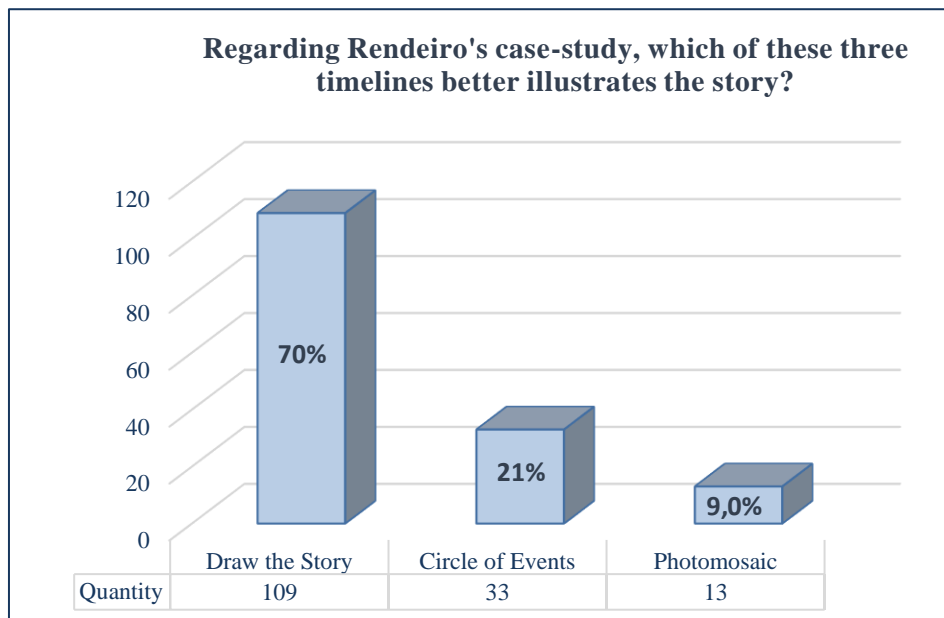


Figure 52: Different Timelines to Illustrate "Rendeiro's" Case-Study (R18).

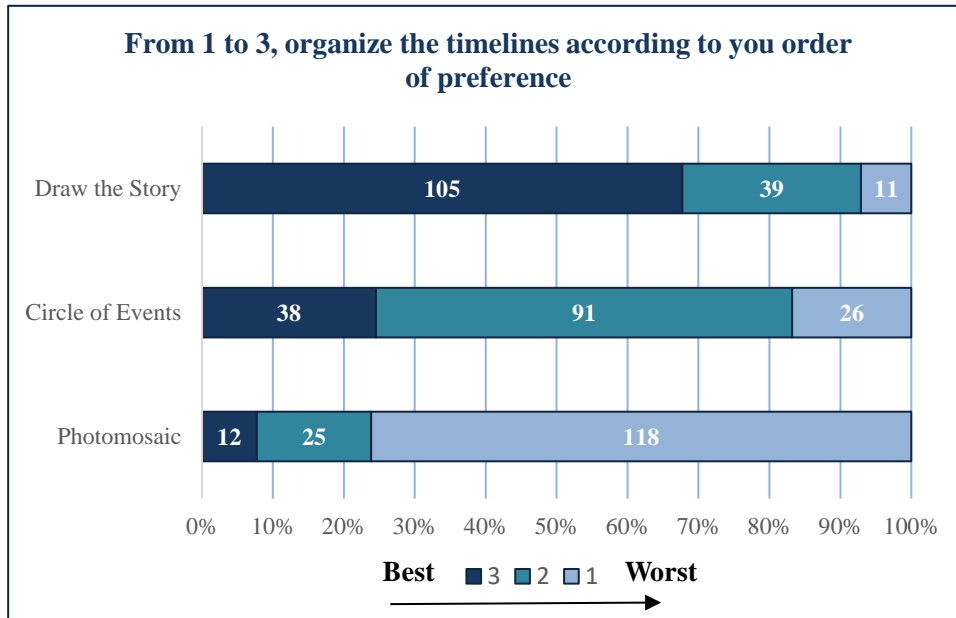


Figure 53: Timelines Used to Illustrate Rendeiro’s Case-Study According to Level of Preference (R19).

When asked to order it from one to three, one being the “Worst”, and three being the “Best”, 76,1% elected *Photomosaic* as the worst option. This huge percentage could be explained by an anonymous comment left in the survey, hereby translated by us, which stated that the high number of photos could end up leading the user to lose their focus.

“Perhaps with the Photomosaic you would end up having to expend too much time...”

The other two results previously gathered in R18 were also reinforced in this question, as *Draw the Story* got 67,7% of the “Best” votes and *Circle of Events* got the majority of “Middle” votes (58,7%), as it can be seen in Table 23, [Appendix C.2](#).

The reason why it is an interesting choice is because this is, after all, a horizontal timeline, and in the previous case-study that fell on the positive spectre for just a few tenths, leaving some room for doubts regarding its worth. This could imply that maybe horizontal timelines can still work, as long as we make them more appealing. Questions R22 and R23 will clarify that topic. Notwithstanding, it is also very interesting to note that, given a circular timeline and a horizontal one, people opt for the last, confirming a preference for horizontality.

In question R20 we presented two hierarchical representations, the already well-known *Wordcloud* and a creation of our own, the *Microscope*. The *Microscope* would work exactly like a real one does, since it is an allusion to the real-life tool’s name. First, we would have the themes divided into different groups. One could then pick them up individually and use the microscope to zoom in and out of it, therefore getting more or less information on the subject, depending on the percentage of zoom we decided to use. However interactive this may be, most people went for the *Wordcloud* (54%), confirming the journalist’s statement that we should not create something very simple, but we must also definitely never create something too complex.

Sometimes, having less is actually having more. Question R21 asked the readers what they preferred to use in this case-study, whether timelines or hierarchies. The answer was clear, with timelines reaching 74%, therefore reinforcing the position obtained in R16, but specially in R13.

4.3.1.5 Generic Representations

Question R22 put together all the timeline models presented before (Figure 54), regardless of them being used for one case-study, or the other, and asked people which one would be the best to apply to every possible scenario. *Photomosaic*, *Circle of Events* and the *Before and After* models are clearly the less useful. Two horizontal timeline models actually got the lead, which makes it clear that one should bet on creating horizontal timelines, instead of any other formats. Question R23 clarifies that *Circle of Events*, *Photomosaic* and the *Before and After* are the weakest timeline representations (Figure 55).

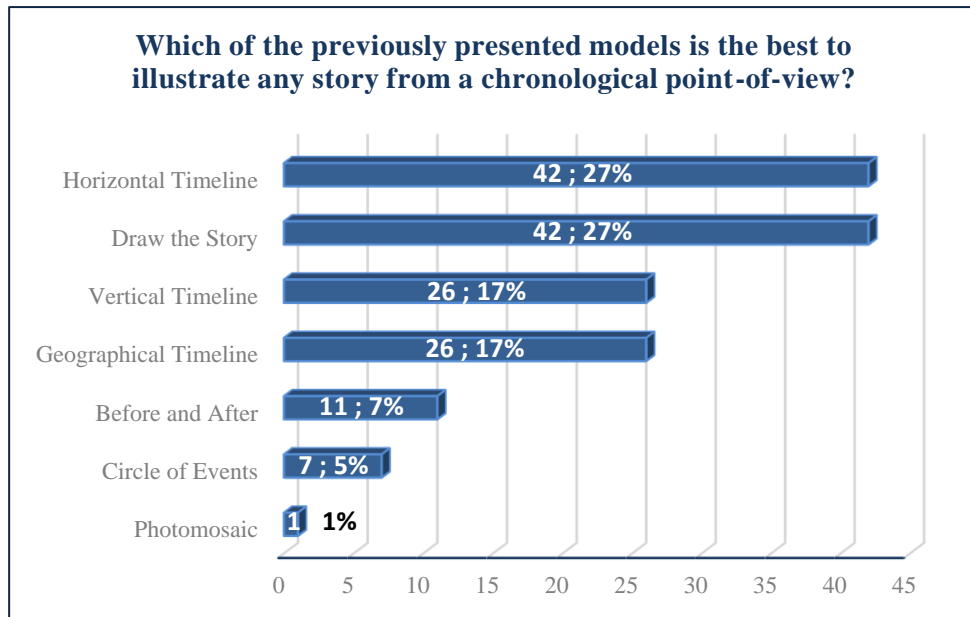


Figure 54: Chronological Models Ranked from Worst to Best (R22).

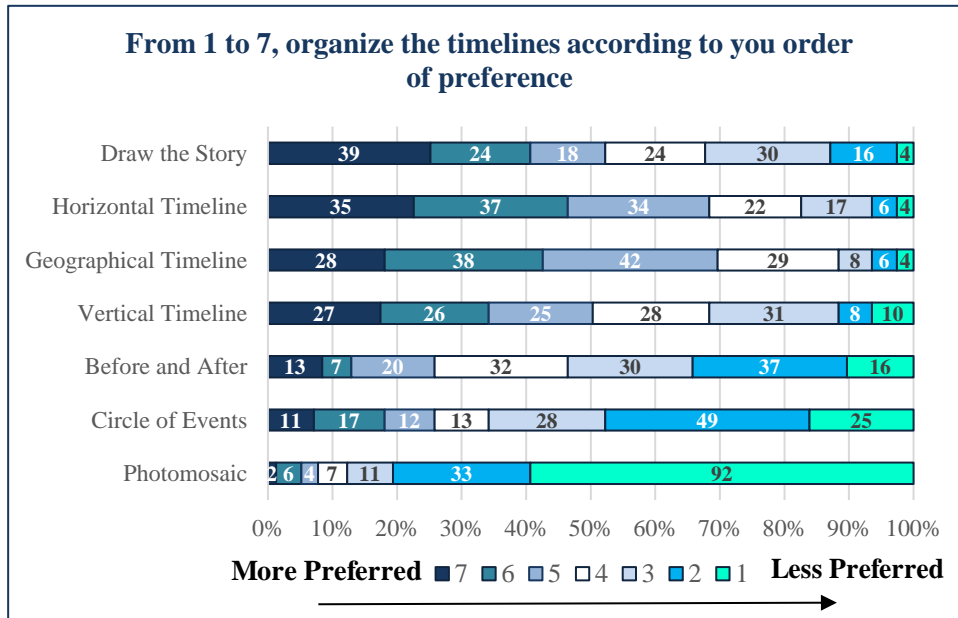


Figure 55: All Range of Timelines According to Level of Preference (R23).

Geographical Timeline shows some really strong suits, which may imply that, even though it is not the preferred chronological representation by default, it could be used in a lot of different contexts, not only in a war scenario. On an individual perspective (Table 24, Appendix C.2), the remaining options seem to be harder to analyse, but one can see, once again, a preference for horizontal formats. Given that, as stated for a journalist, we tend to think of time horizontally, could this be related to people’s resilience to changes? Or is it just that they are actually easier to comprehend? We believe the positive-negative spectre analysis (Table 25, Appendix C.2) will clarify it. Once again, the *Photomosaic* got left behind as the least favourite one, clearly showing that it is not a good option. *Circle of Events* and the *Before and After* models are also shown as not so good choices, as seen in the individual analysis.

On the other hand, *Draw the Story* and *Vertical Timeline* got roughly the same number of positive votes, with *Draw the Story* surpassing it for 0,3%. While they may not be the favourite and, thus, the best options, these results indicate that they could still be seen as good options. Even though they may not always be the best option, one could theorize they would play minimally well in almost every scenario. However, with *Horizontal* and *Geographical Timelines* things get confusing once again, since they are apart for just 0,2%, with *Geographical Timeline* taking the lead. Could this “almost tie” mean that the map feature could be applied to other contexts? It certainly has some great qualities, but so do *Draw the Story*, *Horizontal Timeline* and *Vertical Timeline*, so one can imply that, among the options presented, there is probably no best timeline representation by default. There are, however, four good options that could work, depending on the context. Nonetheless, there is clearly a bigger inclination towards horizontal formats. On another note, even though we asked people to note make connections to specific contexts, the models used were the same, thus possibly inducing people to make a connection

between the war topic and the *Geographic Timeline*. If that is the case, then *Horizontal Timeline* should be considered the winning option. Question R24 asked the readers what of the previously presented hierarchical models would work the best if applied to any scenario (Figure 56). From the examples given, 41% chose the *Wordcloud* as the best representation, 33% went for *Matrioskas* and 26% supported the *Microscope* model.

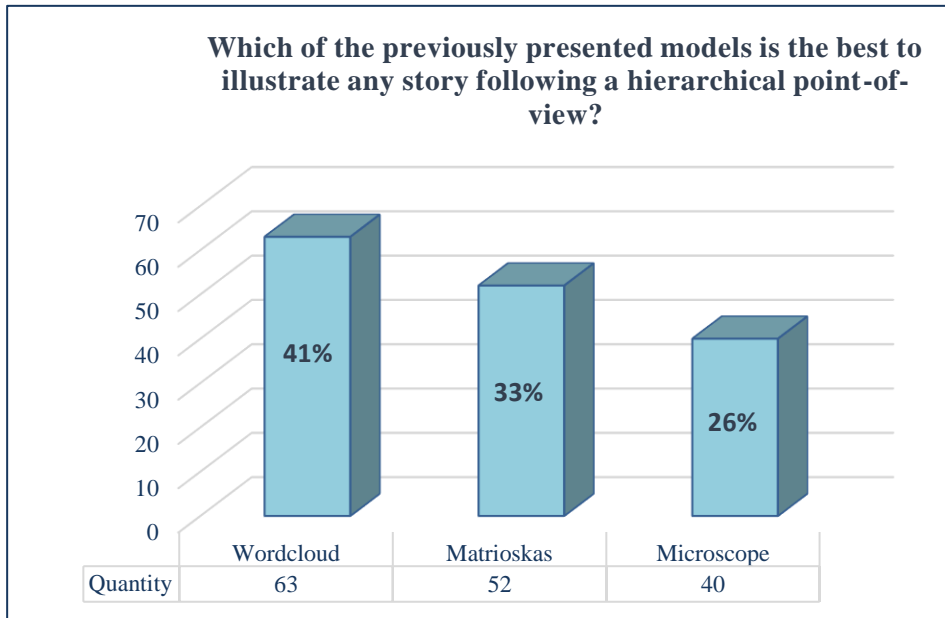


Figure 56: Hierarchical Models Ranked from Worst to Best (R24).

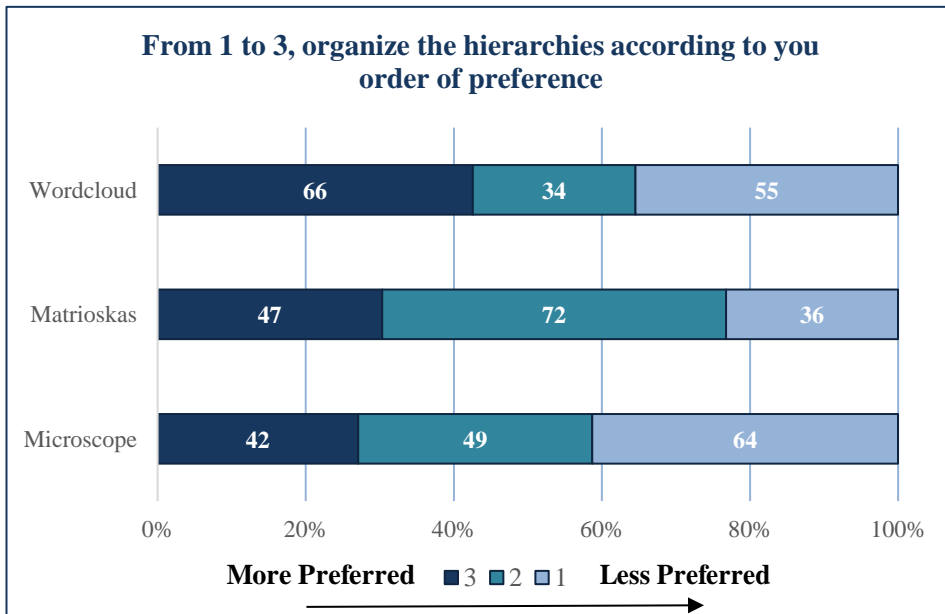


Figure 57: All Range of Hierarchical Models According to Level of Preference (R25).

In R25 we were able to confirm these results (Figure 57). While having the *Wordcloud* as the strongest candidate is not so strange, since we had already gotten that idea in question R20, having *Matrioskas* occupying the second place is a bit surprising. Given the specific nature of the model, we did not expect it to get as many supporters as it did in this stage of the investigation. An individual analysis can be found in Table 26, [Appendix C.2](#). The positive-negative spectre analysis would show us exactly the same results, although with different percentages, so we do not think it is relevant. All in all, from the hierarchical presented models, the *Wordcloud* is still the preferred one.

4.3.2 Discussion

Given that the majority of participants (59%) is between 18 and 24 years old, it came as a surprise that almost half of the surveyed people read online news “Several Times per Day” (45%). This may indicate that Portuguese youngsters are not as misinformed or information-careless as most people think they are. When checking the data from Digital News Report Portugal 2022 (OberCom, 2022), we have observed that, from the Portuguese who use the internet, the interest in news is as low as the age of the person. More specifically, 17,2% of the ones who are below 35 state that they have no interest in news, when, in turn, only 8,5% of the above 35 say the same. However, in spite of being true that as we grow older our interest in news increases, the results from the Digital News Report Portugal 2022 also show that only a small percentage of youngsters are not interested, which may validate our hypothesis above. On the other hand, according to the results from our survey, most of their contact with news is done through social networks, which may require some clarification regarding the news-worthiness of the read topics. However, that is not our focus. On top of that, according to Digital News Report 2022 (Reuters Institute for the Study of Journalism, 2022), the overall Portuguese interest in news has decreased since 2021, meaning that every age group is now less interested than they used to be. In our opinion, this reinforces how important visual narratives can be to captivate the reader.

The surveyed believe that Tabloids do not need visual narratives in order for people to understand the message they want to pass. Generic News seem to be near this category as well, but that may be because people do not know exactly what Generic News might mean. In opposition, Culture/Art presents itself as the topic that would require more explanation and, therefore, would fit visual narratives the best. From the one which would benefit the most from visual narratives, to the one which would benefit the least, this trend is followed by Science and Health, Technology, Sports, Politics and, finally, Tabloids and Generic News.

An interesting thing happened, as Text came up as the second most captivating feature of a visual narrative. In spite of Images occupying the first place, it is still noteworthy how a tool that is mostly visual seems to rely so much more on text, than on other multimedia elements to grab the reader’s attention. This reinforces the idea of a journalist who said that visual narratives can have multiple elements, but they can never be devoid of text. On top of that, while it is true that

Images get the leading positive opinion as a whole, if we consider it to be the analysis of levels 1, 2 and 3 all together out of 6, Text still got the majority of votes in level 1, which reinforces, once again, its value. Audio, on the other hand, seems to be the less valued feature, not only individually, but also on a general level. Could the failure in seeing its value be related to the fact that, as one journalist stated, audio is still not used enough in written journalism?

Regarding frequency of visual narratives to help explain complex topics, the results seem to indicate that they are not yet being used enough. However, people definitely want that to change and recognize the value they may possess if done properly. Following the same line of thought, the results show that “Events” are considered the most important component of visual narratives, when compared to “Characters”, “Short Descriptions / Leads / Subtitles”, “Dates”, “Locations”, “Titles” and “Interactivity”, thus leading us to theorize that the best way to tell a story must be through its events. Nonetheless, “Text” and “Short Descriptions / Leads / Subtitles” get the second and third place, respectively, reinforcing the importance attributed to textual features in visual narratives.

When entering the field of specific visual representations, the participants once again chose to use timelines, particularly supporting *Horizontal* and *Geographical Timelines* as chronological ways of representing the Russia – Ukraine’s War story. For Rendeiro’s case, *Draw the Story* got a high number of votes, reinforcing the horizontal likeliness. It also became clear that most people would not use the *Photomosaic*, maybe because it is not so straightforward in terms of direct reading of the narrative. However, in terms of hierarchical representations for Rendeiro’s case, namely the *Microscope* and the *Wordcloud*, people actually went for this last example, which represents an interesting choice, as most wordclouds are not so interactive by nature, when compared to the other one. In fact, the *Microscope*, on the other hand, would require lots of interaction from the reader. At first, this seemed to be a strong suit, since the journalists referred that interactivity is needed in today’s journalism, if one wants to grab the reader’s attention. However, the results showed something different. Apparently, this may be too much, thus leading us to confirm that, as the journalists stated, interactivity can be a powerful feature, but only if used carefully. As they recall, sometimes less is more. When asked if both case-studies would be better represented by hierarchies or timelines, people chose the chronological representation, once more showing that timelines seem to be the choice by default.

Now, without case-study attachments, *Photomosaic* and *Circle of Events* proved to be the less useful chronological ones. The results also indicate that the *Before and After* model is not a fan-favourite. Out of the seven representations, *Draw the Story* and *Vertical Timeline* get similar results, as the two second best options, leading us to think that people still prefer more “traditional” formats, as the *Horizontal* and *Geographical* ones. In fact, they are the two most preferred ones. Although *Geographical Timeline* takes the lead, is it only for 0,2%, which makes us theorize that, provided no actual visual representations of different scenarios, people would opt for the *Horizontal* one.

Regarding the three hierarchical representations, without case-study attachments, *Wordcloud* was the most voted, followed by the *Matrioskas* model. Given the specific nature of this last model, what could be the reason for these results? Maybe the strong visual aspect caught the attention of more people than we had initially expected it to. Regardless of what it was, it is definitely an interesting result. However interesting this may be, it will not be relevant for the next stage, as there is a clear preference for the timeline format *a priori*, with the majority of readers choosing it over hierarchical formats. This leads us to believe that the prototype should, indeed, be some kind of timeline. Nevertheless, we now know which models could be better choices.

Some formats actually ended up generating more doubts than certainties, which made it clear that they could not follow to the next phase, as a proper visual narrative shall leave no room for doubts. However, others had clearly been valued by the readers and, even if some seem to be slightly better than the rest, it is not a significant difference in most cases. In sum, it all leads to believe that there is no best option by default, as each narrative requires a different approach, just like the journalists told us. In fact, in one of the comments left in the survey, hereby translated by us, it has actually been said that the visual organization of news, as a whole, made them easier to understand.

“Interactive news organized and sequenced by chronological date, or images, are very appealing and easily understandable”.

However, this has all been referenced without referring to a specific representation, which confirms our hypothesis that, depending on the context and story-type, each one of the previously presented models could work. However, this analysis seems to indicate that, generally speaking, without case-study attachments, the best timeline representation is a horizontal one.

4.4 Constraints

The original plan would have the Text2Story team, a group of specialists in narrative visualization, answering to a similar survey before the readers. The goal was to provide us meaningful suggestions and to help filter some of the visual representations (i.g. instead of four, we would only present two options to readers). However, not everything went out as planned, and we ended up having only 8 answers from a total of 31 members, which was not enough to create a statistical sample and, subsequently, draw specific observations from the population's distribution. That, in turn, had made us proceed with the early survey, containing the original options, to the readers. Given that it was not the initial plan, this ended up creating a breach in the strategy, which resulted in having more options to analyse by the end, instead of having had them filtered in an early phase.

It also made it more difficult to decide if the results obtained in the Text2Story survey could be used or not, since, after all, they were not enough to represent a significant sample of the

population. Nevertheless, the adopted strategy was to focus only on the analysis of results from questions that implied ordering options according to their preference. All the other were discarded, since it would not be wise to consider opinions gathered from multiple choice “direct” questions with just 8 out of 31 people answering. We also opted for conducting only a positive-negative spectre analysis, as we have considered it to be the best option, given the few answers we got. For the reasons hereby explained, while the Reader’s survey has, in fact, been done after the Text2Story one, it has actually been analysed first, in order to make it easier to draw proper conclusions through comparison, therefore making it into sub-section 4.3, instead of 4.5.

The time restraint did not help as well. Since we did not have a lot of time to prepare the surveys after having the Text2Story restraint, they ended up being too broad when approaching certain topics, as some readers referred in the optional “Suggestion/Commentary” box. According to some of the surveyed people, the images used in the survey could also have been better chosen, as they depend on our goal, the message we want to pass and the visual model used.

“Very specific images are being used in the representation. For example, "for a chronology in general" it is strange to include a geographical timeline since most chronologies do not involve a geographical component (...)”.

“Several of the answers depend on the objective (in addition to the hierarchy/chronology duality). For example: emphasis on a certain element, triggering a specific emotion; know everything from the start or discover it along the way...”

This comes in line with what we have said in the previous chapter, regarding the preference of some readers being, unintentionally, influenced by the story we have decided to illustrate, even when we wanted to get a more general approach on option-choosing.

On a final note, given the visual-narrative-culture that the Portuguese digital newspaper “Público” seems to have, we believe it would have been interesting to get at least one interview with a journalist who was working there at the moment of the investigation. However, finding journalists to answer our questions was not always easy, so one can only be thankful for the interviews we were able to get. After all, they gave us important and interesting insight on the visual narrative’s topic nonetheless.

4.5 Text2Story Team’s Take on Visual Narratives

Below, we present the analysis of the results from the Text2Story Survey (Survey T) that we have considered to be relevant, given the restraints explained in 4.5. Each of the questions will be addressed to as “T + number”, with T symbolising that this survey has been directed to the Text2Story team members, and the number representing the order of each question. It can be consulted in [Appendix C.3](#).

4.5.1 Analysis

Probably due to the fact that we had so few answers, but the Text2Story team actually ended up considering most of the types of news as neutral. However, by analysing the results in Figure 58, one could identify a tendency for “Tabloids” as the type that least requires visual narrative’s aid. On the other hand, “Politics”, seems to be the one which, in their opinion, needs visual elements the most to be well explained and, consequently, understood, as one can see in more detail in Table 27, [Appendix C.4](#). Interestingly enough, in opposition to the main survey, “Culture / Art” is not the topic that requires the most explaining.

Regarding different elements appeal, it mostly comes in line with the opinions of the readers, as Image is described as being the most appealing (Figure 59), while Audio falls on the opposite side of the spectre. Just like its readers’ counterpart, so do the results of this survey attribute a huge importance to Text (Table 28, [Appendix C.4](#)).

Regarding the importance of each element (Figure 60), although is it hard to draw conclusions about the remaining options, it is clear that “Events”, just like in Survey R, must serve as a basis for a visual narrative (Table 29, [Appendix C.4](#)).

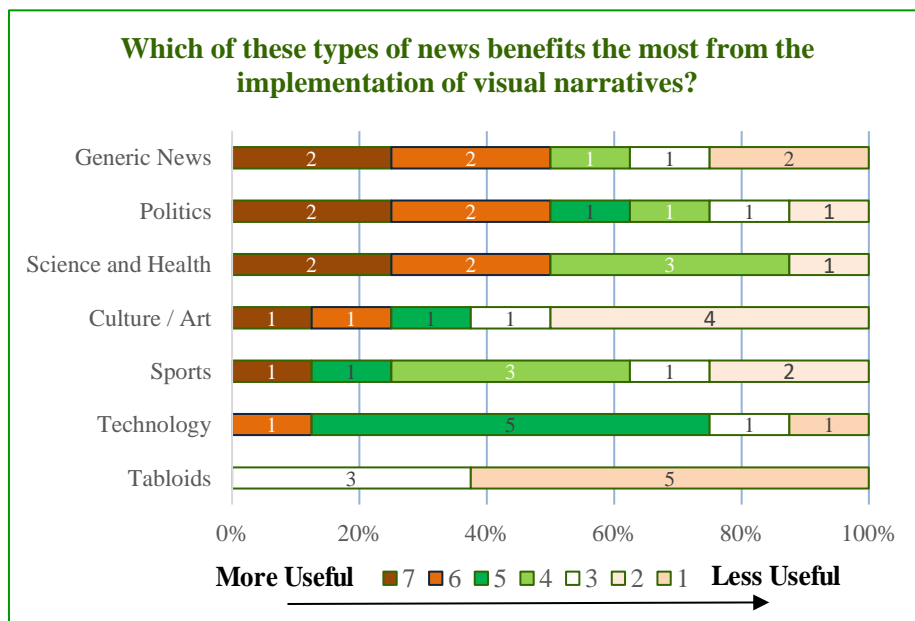


Figure 58: Text2Story Opinions Regarding Types of News That Benefit the Most from the Use of Visual Narratives (T9).

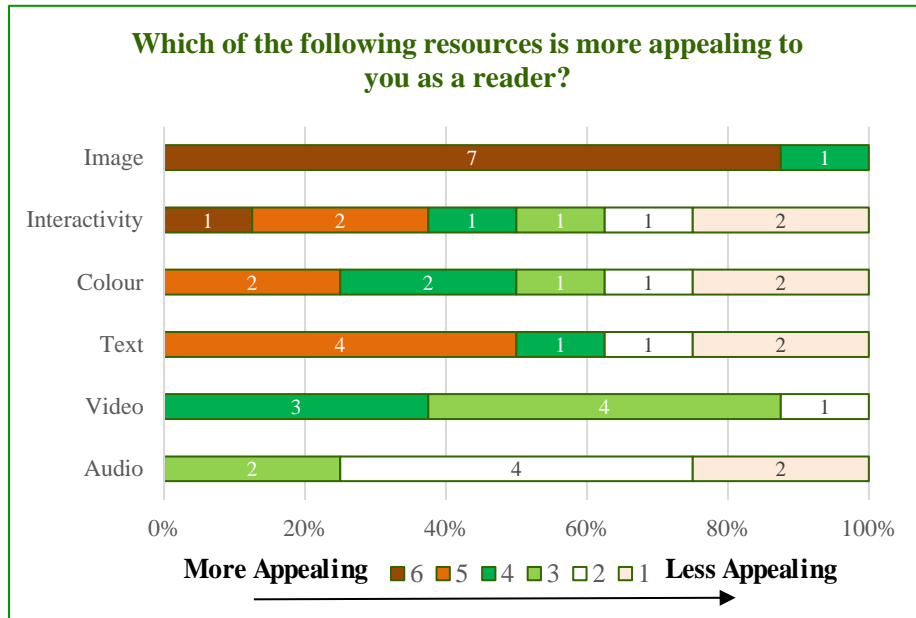


Figure 59: Text2Story Opinions on Most Appealing Resources for Readers (T10).

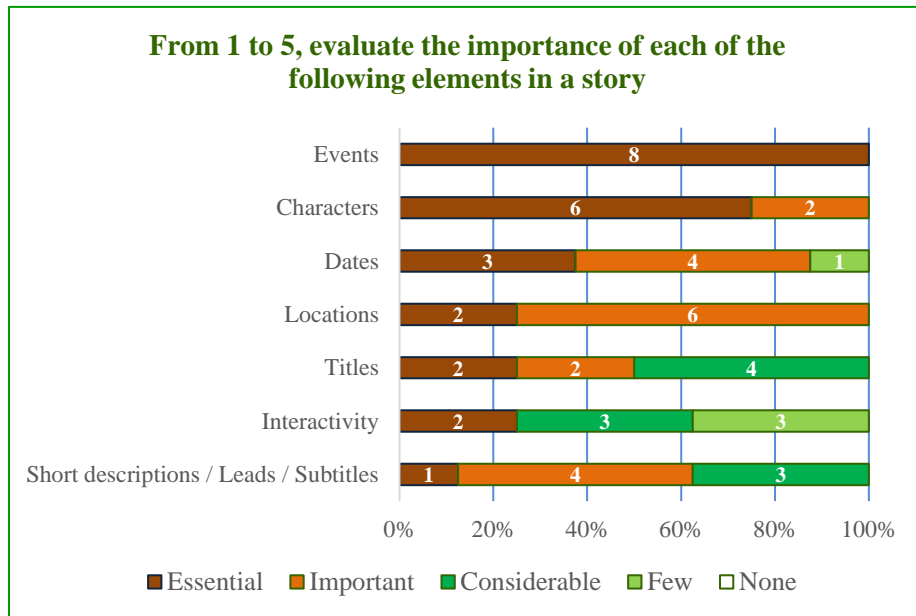


Figure 60: Text2Story Opinions on the Importance of Each Element in a Story (T14).

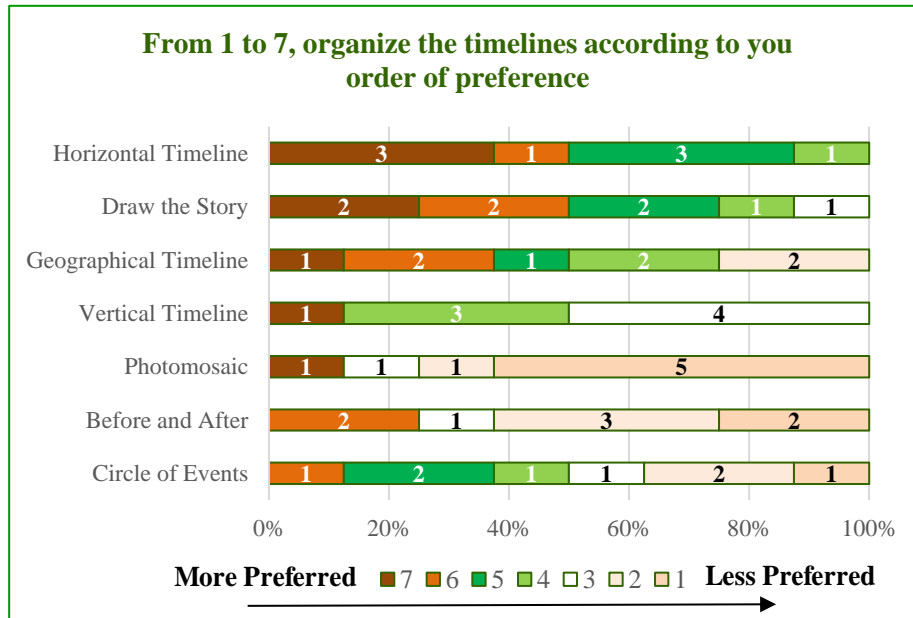


Figure 61: Text2Story Opinions Regarding Chronological Representations, Ranked from Worst to Best (T25).

Generally speaking, the eight prefer timelines. Regarding types of timelines (Figure 61), on the positive-negative spectre, they have considered the *Photomosaic* as the worst option, while *Horizontal Timeline* has been recalled as the best, followed by *Draw the Story*. This comes in line with the previously drawn conclusions, since it becomes, once again, clear, that people prefer horizontal timelines, as one can check in more detail in Table 30, [Appendix C.4](#).

4.5.2 Summary

Although the Text2Story survey did not have a lot of answers, the ones we had received (eight) were able to confirm some of the previously gathered results and drawn conclusions. From those, we can state as the most important the fact that the team also opted not only for timelines, but for horizontal timelines. More specifically, *Horizontal Timeline* got first place, although, given the few votes, we cannot consider it as a major difference from the second.

On top of that, it allowed us to confirm the importance of events as a foundation for a visual narrative, as well as text and image’s relevance when creating a visual narrative. Audio, on the other hand, got discarded once again.

Finally, it became clear that, in opposition to what happened in the readers’ survey, the Text2Story team does not see Culture / Art as a “visual-narrative-deserving theme”. Instead, for them, “Politics” should be the adopted topic, when one wishes to make proper use of visual elements and visual narratives. However, given the few answers we got, it is not same to assume that the whole 31 members would agree with it, so we believe this result should not be considered.

4.6 Discussion

In this chapter, we were able to get insight from three different sources: journalists, readers and the Text2Story team. After gathering and analysing all the different results, a few things come out as most important, in order to develop a prototype that is able to answer to the population's needs.

First of all, one must know how to choose a proper story, as not all of them can be represented through visual narratives. According to the majority of the surveyed people, if one actually wants to make complicated things look simpler, we should go for "Culture/Art" topics. However, Science and Health, Technology and Sports could pose as interesting themes to decomplexify as well.

Once the story has been found, and the lack in its comprehension identified, it is time to know how to visually represent it. If there is one thing that this investigation has shown us, is that timelines, and horizontal ones in particular, are still the best way of doing it. Although every story is different, and therefore requires a different approach, the model that will fit in most of the scenarios will be the *Horizontal Timeline*. This does not need to be devoid of special features, like colour or interactivity, for example, but one must also bear in mind that however beautiful it may be, because having eye-catching features is important, it is also worth mentioning that we need to know how to keep it simple at the same time. In other words, finding the proper balance between these two elements is important.

Once we have our story and a model to represent it, it is time to find out how to actually do it; what our basis will be. In most cases, the best path to follow is to tell it on an event-basis, privileging image and text, as this last one is still of much importance for a visual narrative's proper comprehension. Interaction and multimedia elements can be used and could actually represent a powerful tool, but we need to know how to dose them, as we might end up losing people's attention if we are not careful. Being able to create something that one can see as a whole and then explore as they wish, instead of having our narrative separated in different pages, for example, is also important for the same reasons. After all, as it had been said multiple times during this paper, "a proper visual narrative shall leave no room for doubts"; it needs to be clear and direct, while being simple and eye-catching at the same time. The challenge lies in finding the right way to combine all of these features.

Given the age gap of the majority of the surveyed population, we can assume that our target lies in young people, currently studying or having recently concluded a Bachelor's or Master's degree. Both journalists and readers seem to identify a lack in Portuguese journalistic visual narratives' usage. In the next chapter we will attempt to show a tool that is able to visually explain different topics, while keeping them both simple and eye-catching, as those have been two of our goals since the beginning of this investigation.

5. Prototype's First Version

Having gathered information from both professionals in the field of journalism and news readers, we now have a clearer idea of how online written journalism can make use of visualization to improve itself. In this chapter we will get into more detail regarding this issue, namely by exploring the first version of a non-functional prototype developed by us, intended to be used as a visualization tool to tell journalistic news stories over of a maximum of six months.

5.1 Overview

From November 2021 to July 2022, we had been collecting, analysing and comparing information from various sources. For this specific chapter, it is particularly important to take into consideration the perspectives of both the five interviewed journalists and surveyed readers (155). While they possessed different opinions on certain topics, like the utilization of certain resources, there were others in which they agreed on, leading us to believe that those would be the must-have features for a well-done prototype. More specifically, we are talking about creating a timeline, as it is seen as the best model for visually representing a narrative, while making use of images and text.

Notwithstanding, in order to try to grasp the best of both worlds when it comes to the remaining features of the prototype, one tried to add parts of what most of the journalists considered good ideas and the population saw as not the best, but not the worst either. Those were video and interactivity. Besides that, we implemented the horizontal feature into the developed timeline, as desired by most readers. It ended up in the creation of a horizontal timeline prototype made for desktop on Figma. Finally, in order to study how useful it could be if applied to real-news-stories, we selected a theme known by the majority of people and inserted information regarding that story in the gaps. That allowed us to show people how it would work and analyse the results.

5.2 Version 1.0

Being a visual tool by itself, the prototype (Figure 62) tries to encapsulate a strong visual sensation in the user, mainly in the character-event visual association (Figure 63), as we tried to associate characters with the events in which they were involved. Moreover, we tried to make use of textual features in titles and short descriptions.

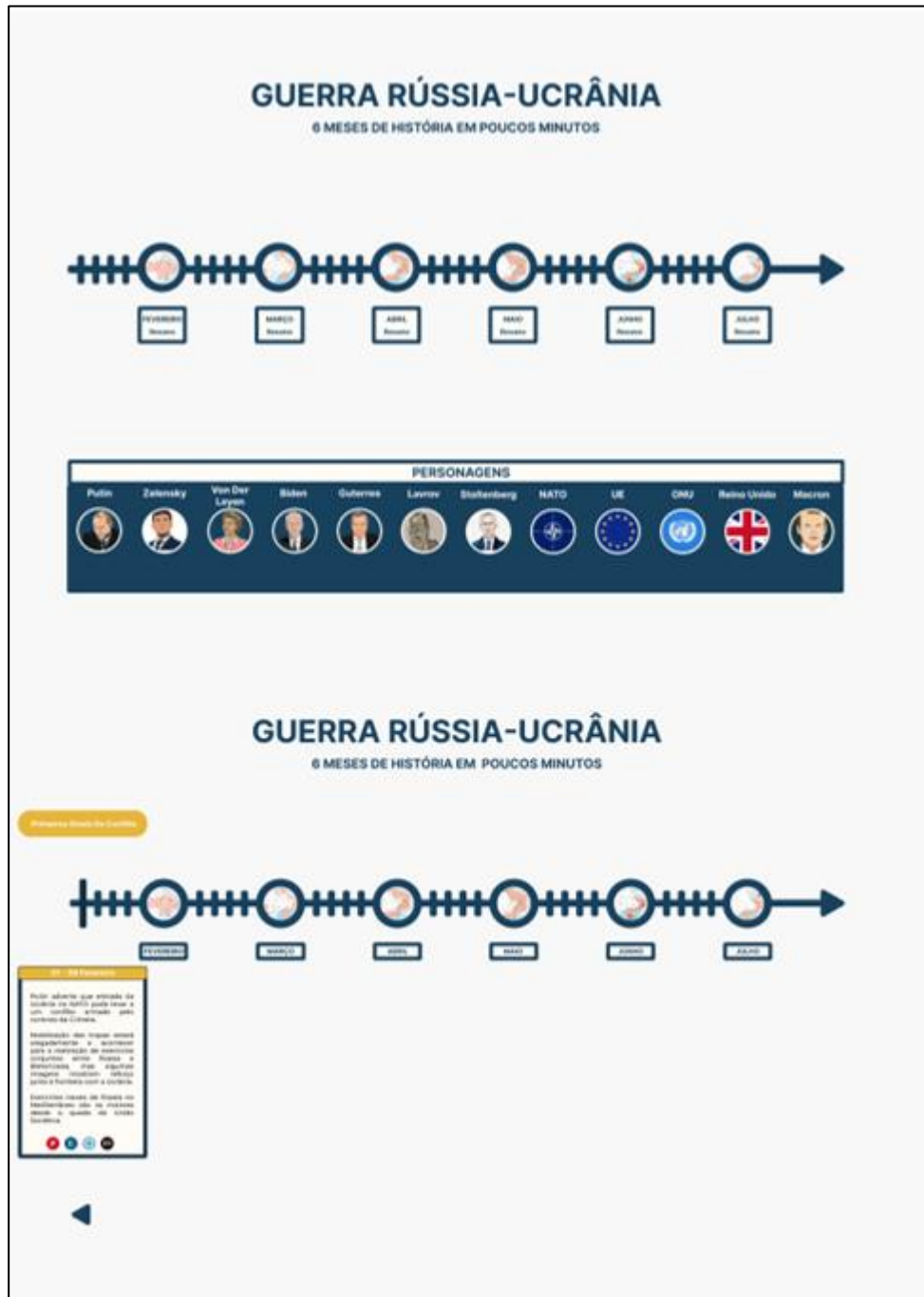


Figure 62: Prototype's Homepage (top) and Consulted Event (bottom).

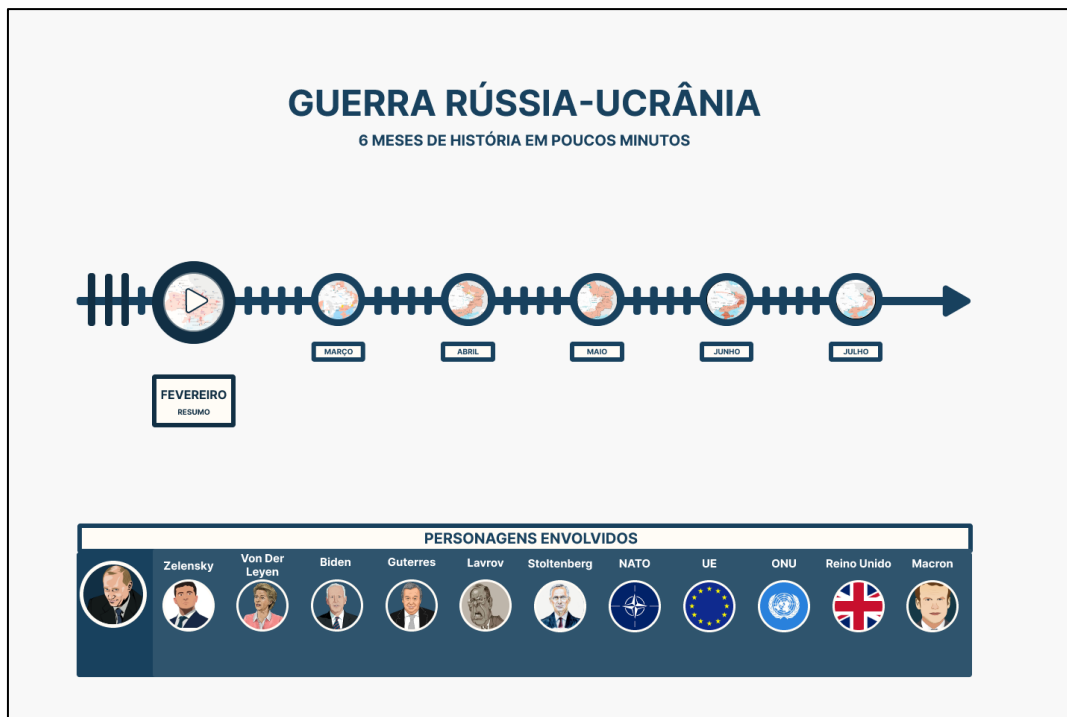


Figure 63: Character-Event Association Represented by the Enlarged Features.

When we open the prototype, we first see a normal timeline, composed by six circles, 24 vertical dashes and six rectangles, which indicate the name of each month. In other words, it is a six-month timeline, with four smaller divisions inside each of those six bigger ones. We chose to use variations of blue, yellow and white tones. More specifically, the ones represented by the RGB¹¹ codes in Figure 64.

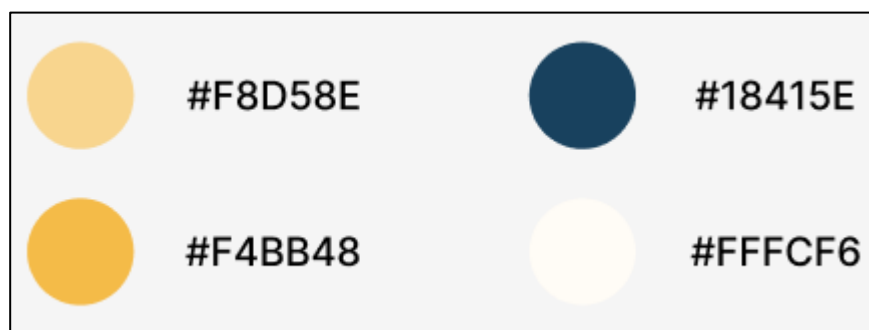


Figure 64: Prototype's Color Palette.

¹¹ RGB – “The color model of three-color video displays using red, green, and blue light” (Merriam-Webster, n.d.-d).

5.3 Brief Walk-through the Prototype's Features

Each of the vertical dashes represents a major event in the timeline, which in turn corresponds to a week in real life. On the other hand, each of the circles represents a 30 second to 1-minute monthly video summary. The prototype's interactive features' divisions go as follows:

- Four vertical dashes per month, or, in other words, one dash per week of the month.
- When reading about a particular event, four circular buttons to represent the four digital newspapers' sources in which one can find more information about the event.
- A total of six circles and, consequently, six date rectangles in the prototype, or one of each per month, thus symbolizing the six months of the storyline.
- Twelve characters that were involved in the story.

When hovering on top of any of these buttons, one can see them growing, as a way to let us know that we now have something else to consult. This new information can be reached by clicking on the hovered button. There are four main possible interactions:

- Selecting a weekly event, when hovering and clicking on one of the four monthly dashes;
- Selecting a digital newspaper, when, while consulting an event, hovering and then clicking on one of the four digital newspapers' circular buttons;
- Selecting a character, when hovering and clicking on one of the twelve characters;
- Selecting the monthly summary video, when hovering and clicking on one of the bigger circular buttons.

In more detail, once the reader clicks on the circles, they turn into playable 30 to 60 seconds videos that are meant to sum up the whole month. The reader can choose to play them or not. Based on the interviews we have conducted, we believe adding short videos could be useful, as long as we do not overload the reader/viewer with too many and they do not occupy a lot of time. One difference between dashes and circles is that, in the dashes, the date rectangle will only show up, as well as the title, when we click on them. Circles, on the other hand, possess dates, (which are the same as titles, given that they are months), all the time, not only when they are hovered or clicked on.

The goal of this prototype was to be intuitive, simple and interactive and interesting enough to captivate the reader's attention. For that reason, we chose not to overload them with too much information *a priori*. Instead, we offered the option of getting more information in different digital newspapers, while, at the same time, providing them with the necessary background to understand the story in our "main" narrative, allowing that both people who seek for a higher level of knowledge and people who just want to be informed on the basics are able to understand the story.

As they were merely expository, all the titles, photographs and descriptions of events were adapted and, in some cases, used exactly as they were in some Portuguese digital newspapers. In more detail, we are talking about “Expresso”, “Público”, Observador” and “Diário de Notícias”.

5.3.1 Curiosity-Comprehension Paradox

On a more technical approach, in order to design a useful prototype, we tried to apply the concepts of both the “Attention-Comprehension Gap” (Figure 65) and “The Information Gap Theory of Curiosity” (Figure 66) while building it. The Attention-Comprehension Gap states that in a well-designed artifact, the gap between drawing a person's attention and the individual's ability to absorb concepts is tiny to non-existent. In other words, it corresponds to the difference between the capacity of a communiqué to draw an individual's attention to information and the reader's ability to absorb that information (Melonçon, n.d.). That is to say, the greater the gap, the more probable it is that the reader will not understand the material.

In “The Attention-Comprehension Gap: A Framework for Rethinking Information Design” (Melonçon & St. Amant, 2015), Melonçon and St. Amant recall that attention does not equal comprehension. In fact, they present us with a great example of it: as we are visiting a foreign country, whose language we do not speak, an “impressive and aesthetically stunning sign” (Melonçon & St. Amant, 2015) catches our attention and, being immerse in its impressiveness, we spend several minutes observing it. The sign has, indeed, caught our attention perfectly, but there is a problem... “(...) In effect, you don't comprehend the message it is meant to convey. In this way, the purpose of gaining your attention— to better convey content to you—has failed. Thus, attention does not equal comprehension” (Melonçon & St. Amant, 2015).

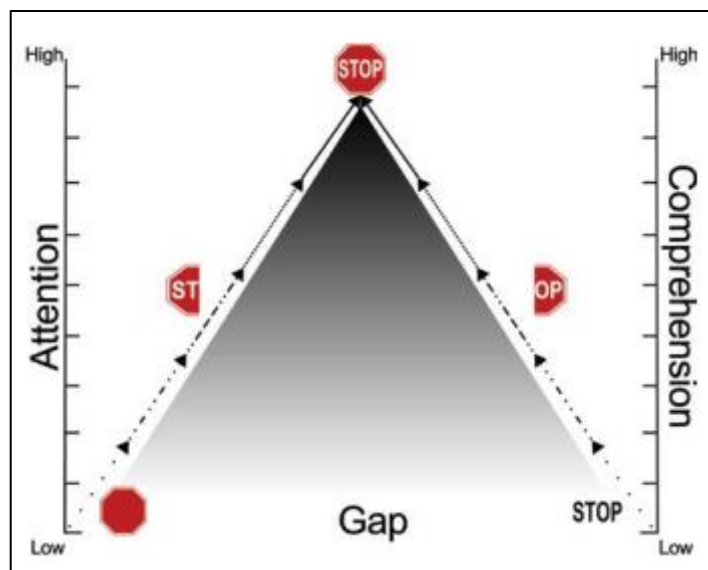


Figure 65: The Attention-Comprehension Gap (Melonçon & St. Amant, 2015).

Another good example is the one of the stop sign. As seen in the figure above, the Attention-Comprehension Gap is greatest when the sign is separated from the text. The Attention-Comprehension Gap closes as we progress up the scale and the stop sign takes on the familiar shape (Melonçon & St. Amant, 2015). That is to prove two things: first, how useful text can still be in understanding a message, confirming the previously gathered results; second, how important it is to know that we cannot only focus on creating something strikingly eye-catching, like a big red octagon. Sure, people will look at it, but will they actually understand what it means?

According to the authors, a proper way to successfully develop artifacts that are able to get both attention and comprehension from the reader, is to recognize how to balance both, and that is precisely what we are trying to do here. The goal is to measure both an item's attention-grabbing characteristics and its comprehensibility in order to discover and then close the Attention-Comprehension Gap (Melonçon & St. Amant, 2015).

Finally, “The Information Gap Theory of Curiosity”. Coined by George Loewenstein in 1994, this theory suggests that curiosity occurs when there is a gap between what we know and what we desire to know (Loewenstein, 1994).

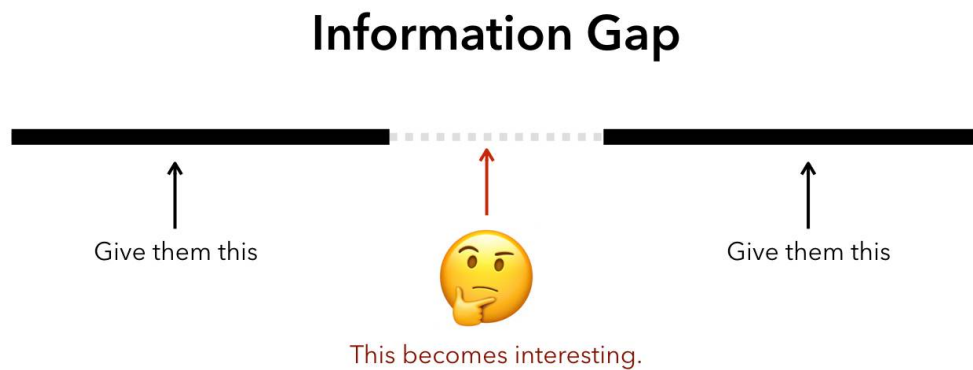


Figure 66: The Information Gap Theory of Curiosity (Byrdseed, n.d.).

In other words, this curiosity gap causes an unpleasant sensation of uncertainty, which motivates people to act and discover the missing knowledge. According to Loewenstein, its primary function is to facilitate learning as we get curious when we lack the knowledge about something we wish to know. That being said, one can assume that curiosity can be a powerful motivator when it comes to getting people’s attention, particularly when it comes to telling stories. Take the case of Nolan’s movies, for example, as stated before, and their way of giving us just enough information to get us hooked, but not enough to understand the whole story before reaching the end of the film. In the prototype, we tried to apply this concept by giving people summaries or topics of news information, without making them too dull or long. In fact, we tried to make them as short as possible, while keeping the original message. After that, we offered them

the possibility of getting to know more by clicking on each of the digital newspapers' buttons. If one is able to strike curiosity on the reader, or, in other words, to grab their attention, they will want to know more. At the same time, we need to know how to do it without breaking the comprehension of the story, which can only be achieved by balancing the usage of each element in the visual narrative.

5.4 Prototype Implementation

To illustrate how the prototype could be used to improve news' understanding regarding large topics in real-life context, we decided to adopt a subject that is known to everyone: The Russia-Ukraine War. To do so, we picked up our prototype and filled in the gaps with events that we have considered to be representative and important enough to understand the case-study. This process could be repeated to adapt to any kind of news story, as long as one knows how to properly select and filter the needed information across the six months' timeframe. As the journalists stated in their interviews, on a certain level, this will always be a subjective process, as what is considered important by person *A*, could be additional information for person *B*, and vice versa. That is why it is important to have professionals, well-informed on the story, doing the filtering. One needs to know how to select news-valued information.

The second step is to look for what is seen as the most viewed and shared events in social networks, by different digital newspapers. In this specific prototype, we chose to use four different sources: "Diário de Notícias", "Expresso", "Observador" and "Público". By observing what the major events seemed to be in these four well-respected Portuguese newspapers, we were able to present an hypothesis to how this story could be approached, if represented in our visual narrative model. While we believe that the process of selecting and filtering important information must follow these steps in order to try to be as accurate as possible, once again, it is important to reinforce the perspective of the journalists: one story can be told in many different ways and, knowing how to do it, will always be an editorial choice. Therefore, the represented events and their connection is only a suggestion of how it could be done, instead of a mandatory and unique storyline. In other words, it is not mandatory to utilize these specific events to tell the same story. It is up to us to choose how to tell it.

6. Testing and Redesigning the Prototype

In this chapter, after having created the prototype's first version, we have conducted a focus group, that lead to the complete reformulation of the prototype, hence giving birth to version 2.0. That, in turn, made it possible to survey readers and understand what their opinion was on our new version. The gathered results allowed to draw conclusions and suggest possible future improvements. In the scheme below (Figure 67), it's possible to find a quick description of all the steps involved in this chapter, which started with picking up the finished prototype's first version.

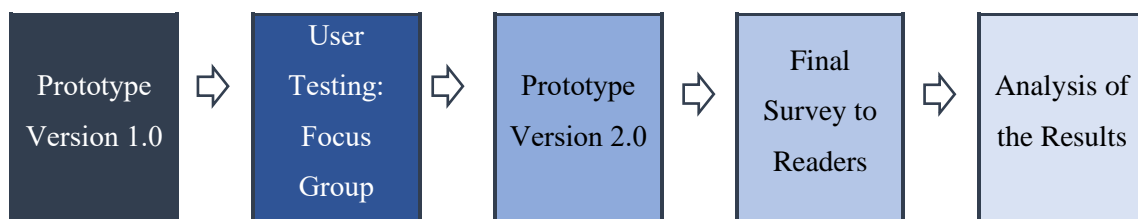


Figure 67: Investigation Processes Post-Prototype's Development.

6.1 Focus Group

Once version 1.0 of the prototype has been created, we proceeded to test it with a small group of people that fell under our target. In more detail, we have conducted a focus group with four Master's and one Bachelor's degree students, aged between 21 and 24 years old, with backgrounds on Civil Engineering, Economics, Journalism, Marketing and New Communication Technologies, respectively. Two of them were men and three were women.

The goal was to get some insight of eventual users regarding each of the prototype's functionalities. With this focus group, we were able to understand both the prototype's strengths and weaknesses, as well as whether or not it was able to fulfill both its goals and the readers'

Testing and Redesigning the Prototype

needs. We allowed the group to explore the prototype and discuss about it and, by the end, we have addressed some important questions. Generally speaking, they thought that the prototype was rather complex and required some sort of explanation in order to be used, proving that it needed to be restructured. On the other hand, they also said that, after exploring it for some time, people would, eventually, find it easy to understand. However, their level of understanding of the narrative has improved after exploring the prototype, therefore leading us to believe that its core functionalities were working properly. Nevertheless, it was not intuitive enough at first.

Regarding the used colors, there was a consensus that they were working properly, keeping a good balance and contrast between each of the visual elements. They kept the reading fluid, without having to put an extra effort on their eyes to focus on specific parts of the prototype. However, the vertical dashes, sharing the same colour with the horizontal bar, were believed not to have enough emphasis, thus not emphasising that they should be clickable. Something different, while within a similar topic, happened with some boxes, as they have been criticized for leading the user to think that they were buttons, when they were actually titles. The hover function was not clear enough for the users, as well as the hyperlinks for digital newspapers' news. Besides that, there was also a suggestion of changing the "growing" effect when hovering on a button to a colour changing effect, as it would allow for less disturbance in the prototype.

When asked to compare it with similar tools and state what they could see as a strength and a weakness in this prototype, they were quick to say that it worked well as it was a simple and informative. The weekly division, alongside the summary video were seen as strengths, with the video being particularly praised for its ability to grab their attention. The association between characters and each piece of news also proved to be useful. However, one more suggestion fell under the characters' part. In this first version only the name of the characters was accompanying their photographs. That was not seen as enough, as people may not be able recognize some of them with such few data, which lead the group to suggest adding a short biography.

Finally, the vast amount of white space left on the screen was seen as a weakness. The group recommended that the descriptions of events should occupy a bigger space, in order to fill in the void. This suggestion ended up solving another issue, related to the size of the text used to describe events, as it was considered too small because of the short amount of space it made use of. These all lead to a complete reformulation of the prototype, hence version's 2.0 development.

6.2 Version 2.0

After conducting a focus group and analysing their suggestions, we worked on creating a second version of the prototype. In it, we tried to keep what was previously seen as a strength, while at the same time reformulating it in order to meet the focus group's suggestions. It can be consulted and tested in [Appendix E](#).

In this second version, there was no white space left, since the news' descriptions filled it in. Since the contrast between the vertical dashes and the horizontal bar generated some confusion on the focus group members, the new timeline was also restructured. It was now converted fully into circles, separated by some space, instead of having vertical rectangles united by a horizontal line. This new appearance should make it clearer for the user that each event exists separately and is clickable. The titles have been restructured as well in order not to look like buttons any longer. A "READ MORE" caption was also added under the digital newspaper's buttons hyperlinks in order to make them and their functionalities clearer, while at the same time giving readers the urge to deepen on the subject, shall they want to do so. The colour palette was mostly maintained, since the previously used colours were working properly. The buttons now change colours when hovered, instead of changing their size. Moreover, he decided to include a search bar, in order to make specific topics easier to find. It is important to remember that, since the prototype is a non-functional one, this search bar is merely representative.

The characters' bar was now vertical, in order to use the full capacity of the screen, instead of only using horizontal features. Their character's pictures were now accompanied by both their name and their role, alongside a short biography, as suggested in the focus group. We ended up applying Canavilhas' Tumbled Pyramid concept (Canavilhas, 2006), as we made it possible for the reader to start his reading from any axis, often "jumping" from one place to another, namely characters and events, without having to go back to the very beginning. Although the timeline remained horizontal, as most readers wished for in Survey R, we manage to include, at the same time, some vertical features, such as the characters' vertical side bar. This was our attempt to combine the suggestions of the journalists, regarding the use of verticality, the suggestions of the readers, of using horizontality, and Canavilhas' Tumbled Pyramid concept (Canavilhas, 2006). Nevertheless, we kept the main narrative horizontal, with events as its basis, as both surveys R and T have suggested.

Finally, a brief explanation of the prototype's functionalities was added to the home page, thus making it easier for the user to use it. A second page, with a narrative background, was also added in case the user needed to know what lead to the events that they were exploring in the prototype. However, as suggested by the journalists, we made it in a way that we do not need to change screens, like changing between pages on a book, in order not to make it dull or confusing. Instead, we just created an interactive button that quickly allows the user to change between the home and the background page in a simple way. Once again, given that all the used information was the same as in version 1.0, only restructured, and due to its merely expositive character, all the titles, photographs and descriptions of events were adapted and, in some cases, used exactly as they were in some Portuguese digital newspapers. In more detail, we are talking about "Expresso", "Público", "Observador" and "Diário de Notícias".

6.2.1 Prototype's User Guide

In order to facilitate the prototype's exploration, we have prepared three tables that briefly summarize each of the prototype's features. The first (Table 3) and the second (Table 4) refers to each of the bars and pages' functionalities, respectively, while the third one (Table 5) refers to the meaning of each button possessing interactive functionalities.

BARS	FUNCTIONALITIES
VERTICAL SIDE BAR	It contains the characters and allows the user to explore their own story briefly and the impact they have in the main narrative.
SEARCH BAR	By typing specific words, the user will get events, or characters' pages, in which those words are mentioned – it's the quickest method to get results.
TIMELINE BAR	This is where the main narrative is. Separated in four monthly events and a final monthly summary, the timeline contains the main narrative's information

Table 3: Prototype's Different Bars and Their Functionalities.

PAGES	FUNCTIONALITIES
HOME & BACKGROUND PAGE	The first contains information about the prototype's functionalities and how to use them, while the second gives the user insight on what lead to the narrative.
VIDEO (MONTHLY) PAGE	It allows the user to see a 30 to 60 seconds video, which summarizes the month's major events. There is one of these per month in the prototype.
EVENT (WEEKLY) PAGE	Brief descriptions and pictures of each event, alongside the possibility of consulting digital newspapers' mentions of the events. There are 24 of these.
CHARACTER PAGE	In here, one can learn more about the character and the role they play in the narrative's development. There are 12 of these.

Table 4: Prototype's Different Pages and Their Functionalities.

INTERACTIONS	MEANING
“KNOW MORE”	When hovering over a character’s image, the user will notice a change in colour, accompanied by the sentence “Know More”. By clicking on it, the user will be redirected to the character’s own page.
“SUMMARY”	When hovering over a month’s circle, the user will notice a change in colour, accompanied by the word “Summary”. By clicking on it, the user will be redirected to that month’s summary video page.
PLAY	Once in the monthly video’s page, the user will have to press “play” to start the 30 to 60 second summary video.
THE “MOVEMENT” BUTTONS	When an event, summary video or character’s page is open, on the main screen’s bottom left, there will be three buttons. From right to left, they allow the user, respectively, to move backward, go back home and move forward.

Table 5: Prototype's Different Interactive Functions.

Apart from the above-mentioned functionalities, it is also worthy to mention the colour change feature everytime we hover on a weekly or monthly event, as well as on characters. Besides that, characters are outlined with a different colour everytime one of their pages is opened.

6.3 Inquiring readers about the prototype’s functionalities

Once all the changes have been made and version 2.0 was ready to use, we created a new survey (Survey F), sent, once again, to both readers of the University of Porto and general readers. We gave people an A-B Test¹², asking them to choose from one option or the other, regarding some aspects of version 2.0. With this close-ended questions we intended to understand what their opinion on the current prototype’s functionalities were and how it could be improved. The survey can be found in [Appendix D1](#).

Apart from that, they were also asked whether they preferred to learn of a story through digital news articles or through the visual narrative our prototype was conducting. The answers were, generally, pointing that the prototype was the best option (92,2%), proving that it was able to reach its goal. A final question asked readers to evaluate, from a set of six different ways of telling a news story, which one worked out better for them. With this we were able to get some

¹² A-B Test – “Also called split testing or bucket testing—compares the performance of a control (A) version against a variant (B) version to see which one appeals more to viewers” (Oracle Portugal, n.d.).

insight on what people prefer to see and read, therefore getting information for possible improvements of the prototype.

6.3.1 Analysing the results

In here, we will analyse the aborded questions in survey F. Each of the questions will be addressed to as “F + number”, with F symbolising that this survey has been the final one, and the number representing the order of each question. We gathered a total of 167 answers, with the majority of respondents being male (56%) and between 18 to 24 years old (37%), with a Master’s degree (44%). Most people (59%) considered the home page guide on how to use the prototype as “Extremely Important” (Figure 68).

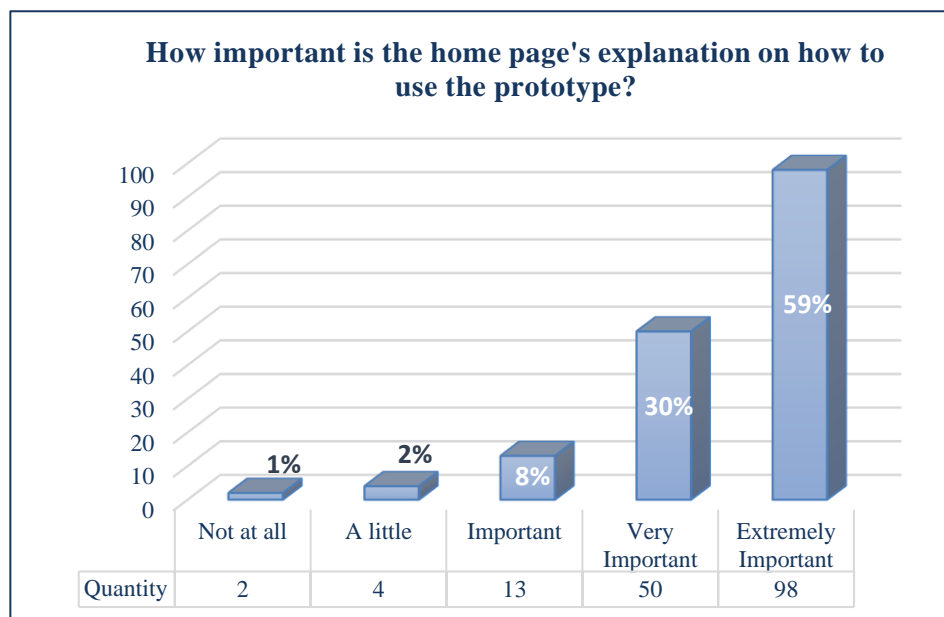


Figure 68: Importance of the Prototype's User-Guide in the Home Page (F4).

Regarding the second page, offering background information on the narrative, while it has been seen as a positive feature, most people (43%) voted for “Very Important”, indicating that although it is important, it is not as important as the main page (Figure 69).

People were also questioned about whether or not the size of the circular buttons was adequate. While most people (70%) saw the size of the monthly summary video buttons as good, only 49,7% agreed that the smaller weekly buttons have the needed dimensions. While it cannot be seen as a significant difference, it still splits opinions, which may indicative that the current option is not the best one, thus requiring the events’ buttons to be bigger.

Regarding color’s usage, 65% agreed that both the name and role of each character should share a color between themselves, but that should be different from the one used in the text.

Exactly the same amount of people voted that an equal rule should be followed when consulting an event, meaning that the title and date should have a different color from the rest of the text.

In this survey, 83% agreed that having noted text to highlight important character’s participations, dates and/or places in the story is a must-have. Apart from that, 96% of the readers consented that having the option of consulting the prototype both in Portuguese and English would be a plus and 78% prefer to have a photo-gallery instead of just one photo accompanying the description of each event. There is also a clear preference for using real-live photos to represent characters (78%), instead of cartoons or drawings, like we did. People also chose to give a different number to each event (66%), instead of reinitializing the countage every month.

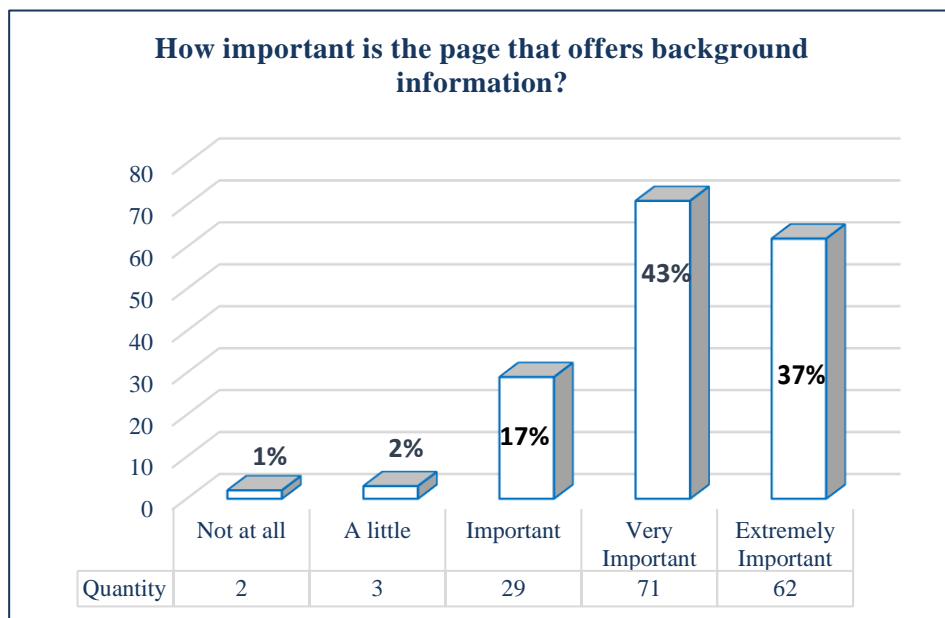


Figure 69: Importance of the Background Information Page (F5).

From one to five, one being “Not at All” and five “Extremely Important”, 44% believe it is “Very Important” to have the option of consulting additional information in digital newspapers apart from the one already available in the prototype (Figure 70). From one to five, one being “Useless” and five “Extremely Important”, 51% said it is “Very Important” to have, in the prototype, the option of consulting additional information about places and/or characters involved in the story (Figure 71).

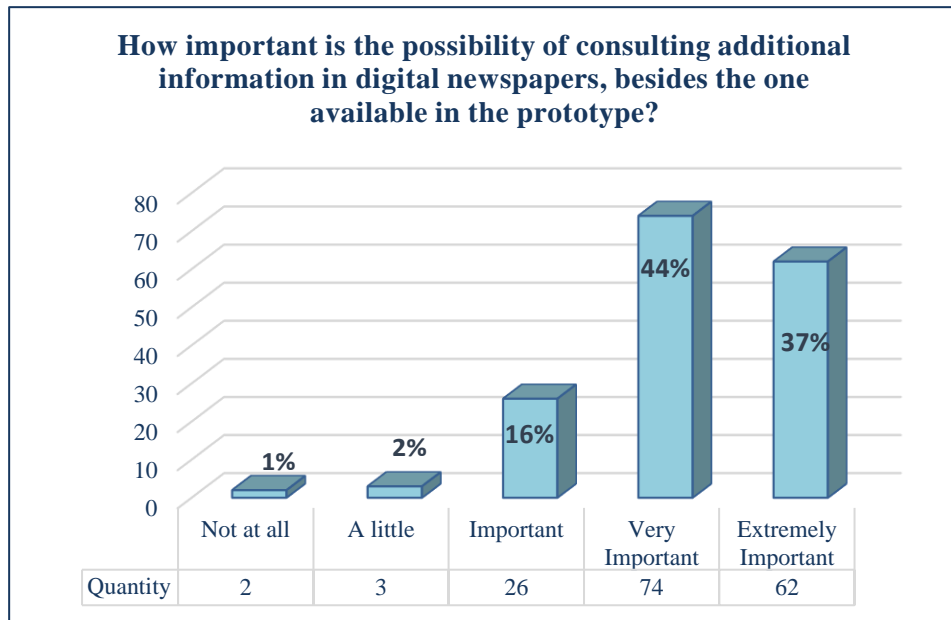


Figure 70: Importance of Consulting External Information on Digital Newspapers (F13).

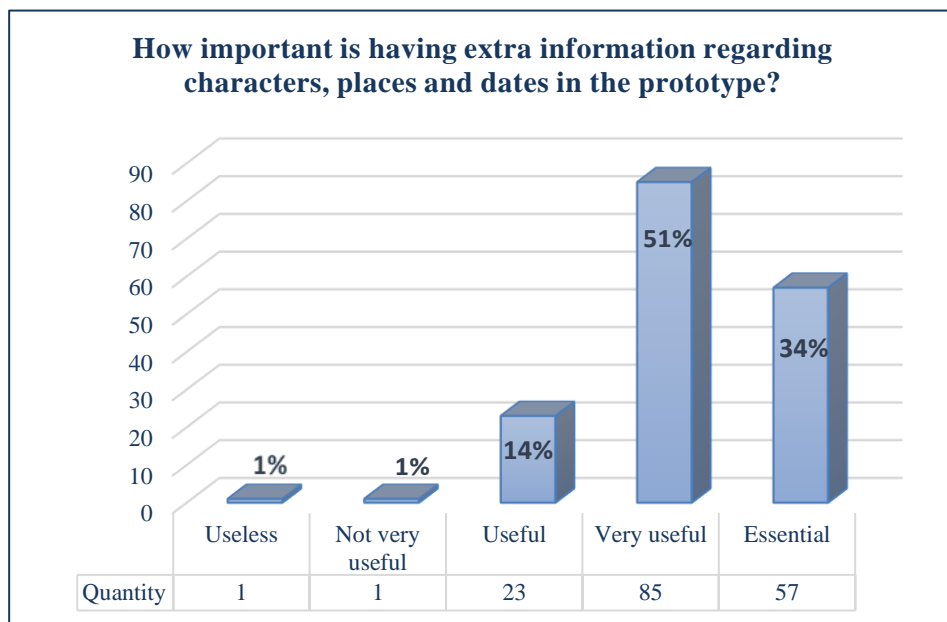


Figure 71: Importance of Consulting Additional Information in the Prototype (F16).

From one to five, one being “Not at All” and five “Extremely Important”, the majority of people (48%) agreed that having a hyperlink to more detailed information about places or

organizations would be “Very Important” (Figure 72). Regarding video’s usefulness (Figure 73), from one to five, one being “Useless” and five “Essential”, the most voted option was four, “Very Useful”, with 42%. Number five got the second highest score, with 33%, followed by number three with 21%. Given that it got mostly positive opinions, it may indicate that the amount of video’s usage in this visual narrative was properly dosed. As the journalists said, it could be a weapon, as long as we do not overuse it.

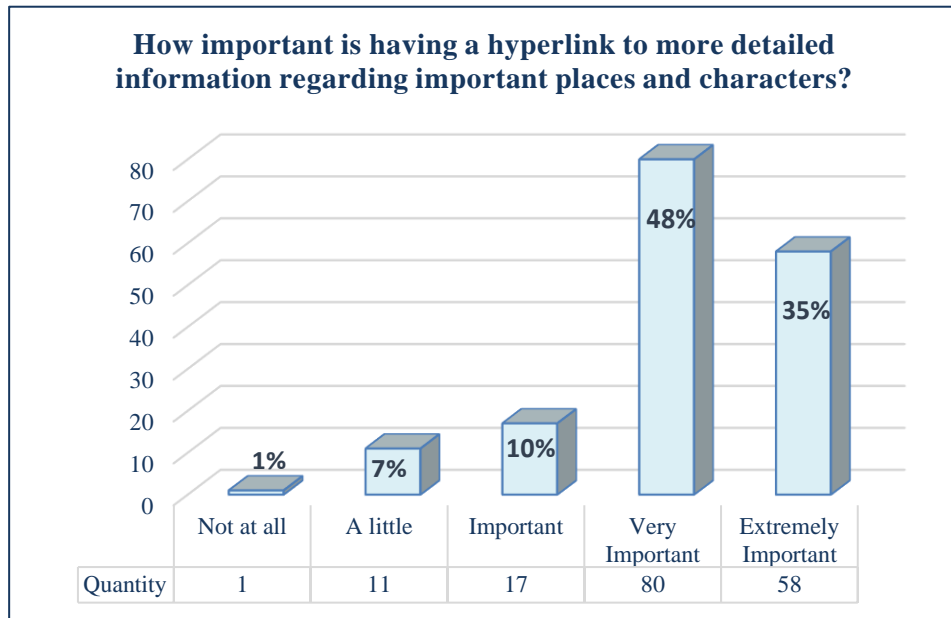


Figure 72: Importance of Having Hyperlinks (F17).

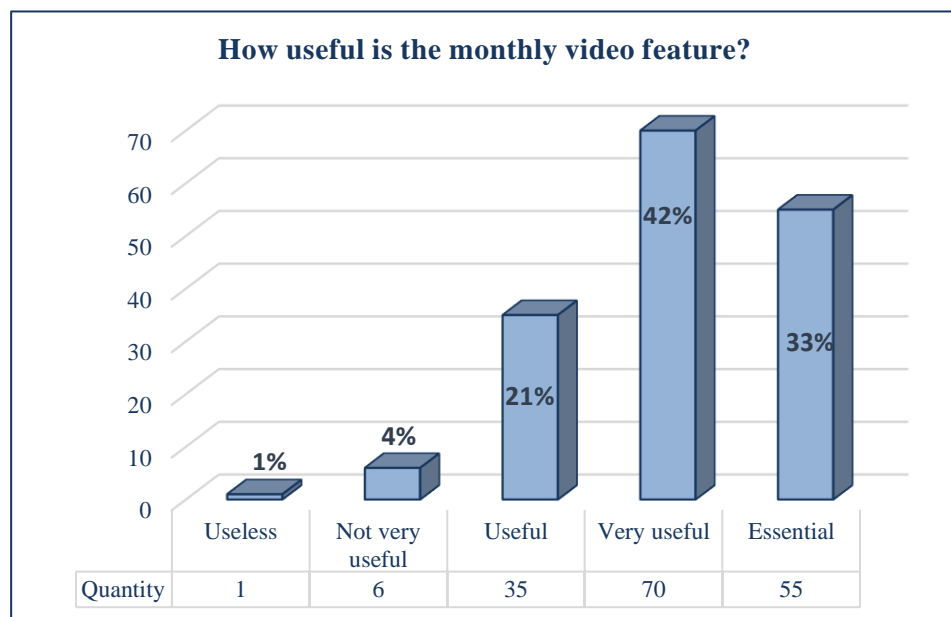


Figure 73: Monthly Video Feature Usefulness (F18).

Testing and Redesigning the Prototype

Regarding the use of storylines (chronologies and images) to help comprehending a narrative (Figure 74), from one to five, one being “Useless” and five “Essential”, the most voted option was four, “Very Useful”, with 47%, followed by number five with 40%. This proves how important storylines can be in a visual narrative.

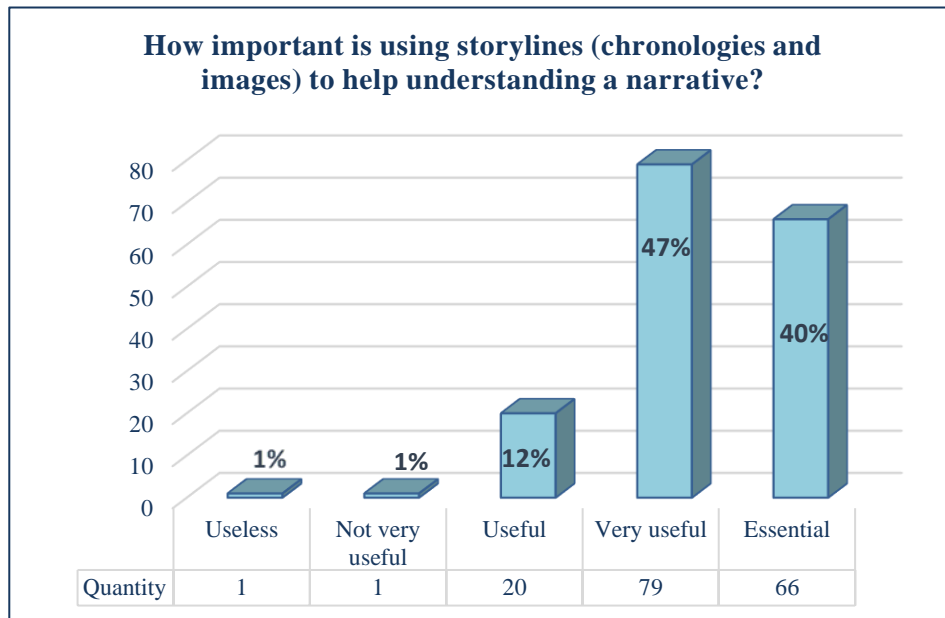


Figure 74: Importance of Using Storylines (F19).

When asked about how helpful an eventual association feature between characters and events could be (Figure 75), the answers were, again, mostly positive. From one to five, one being “Useless” and five “Essential”, the most voted option was four, (“Very Useful”), with 46%.

The final question had people analysing how they would like to see news/events being presented. From one to six, one being “Less Efficient” and six being “More Efficient” regarding ways to represent information, people chose what they thought would be the best option (Figure 76). Below, we present our conclusions about the answers we received for this question, which can be supplemented by Table 31 in [Appendix D.2](#). We have conducted mostly a positive-negative spectre analysis, as we have considered, based on our previous surveys’ analysis, that it is capable of giving us more complete answers than individual analysis.

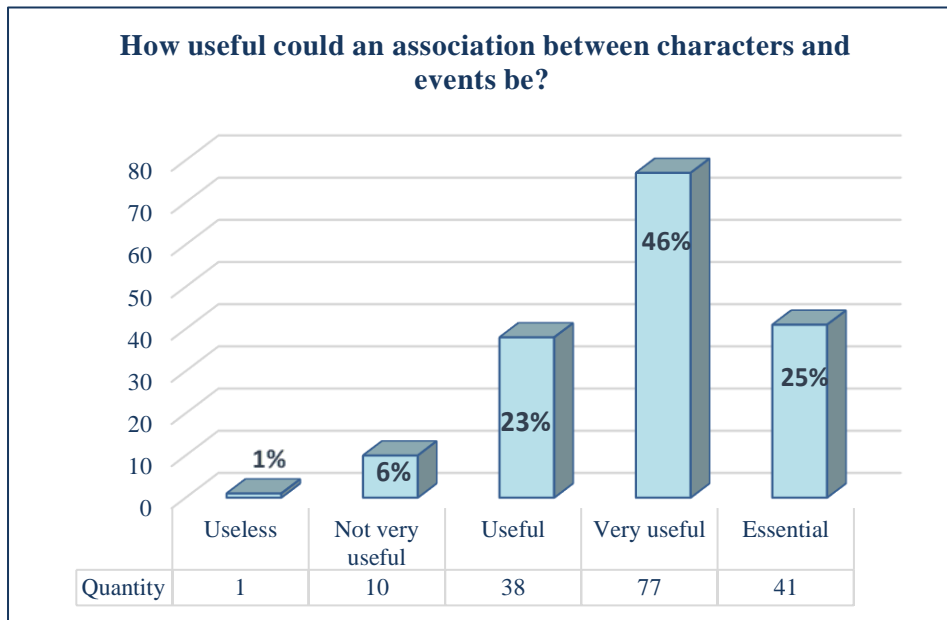


Figure 75: Usefulness of Associating Characters with Events (F20).

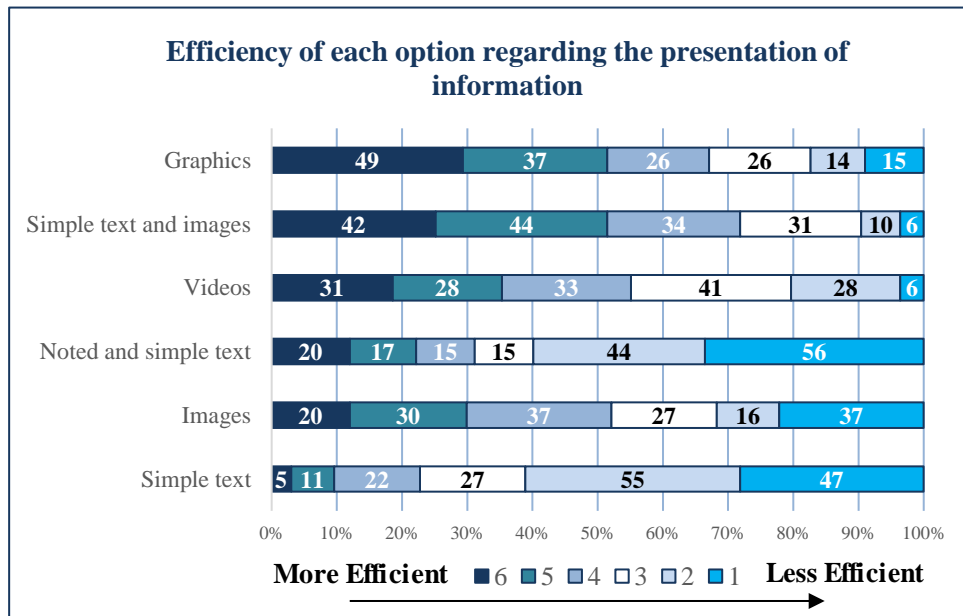


Figure 76: Efficiency of each option when presenting information (F22).

Generally speaking, merely using “Simple Text” is something to avoid. However, simply changing between “Noted and Simple Text” is also not a good option. On the other hand, using “Simple Text and Images” is seen as a very efficient way to represent news, which comes in line with what we have previously concluded. Another good option is to use “Graphics”, as people seem to see these schematics as very useful tools to represent information.

Testing and Redesigning the Prototype

Concerning the exclusive usage of “Images”, we got similar results between less and more efficient opinions, which may indicate that this is not a good option, as it generates a lot of doubt regarding where to place it in the positive-negative spectre. Maybe due to the similarities it shares with photomosaic, but the sole usage of images is clearly not a good path to follow. The sole usage of “Videos”, on the other hand, while seen mostly as an “Ok” option, as it stands in the middle of the positive-negative spectre, has the second highest number of votes if one chooses to look only for the positive spectre. This may indicate that even though using videos solely is not the best option to represent pieces of news, it could be a powerful tool if used alongside its other most voted companions, such as “Simple Text and Images” and/or “Graphics”.

6.4 Future Work

The high number of answers getting four out of five in the multiple-choice questions seem to indicate that the suggestions and/or the already presented features are good options. Some of those already developed features, such as the usage of storylines and monthly video summaries, could be maintained in the future, since they got good results. On the other hand, the suggestions could represent the next step in the project’s evolution, as we already know that users would like to see them. Those suggestions include establishing a connection between characters and events and adding hyperlinks for external information to complement the one presented in the prototype. Besides that, implementing a second language would prove to be a useful feature as well, as 96,4% of the readers considered changing between English and Portuguese would be a good option.

Interestingly enough, when asked in F22 (Figure 74) if noted text, within simple text was a good way to present information, most people considered it was not. However, when we showed that application in F11, 83% agreed that it was a good option, which leads us to think that the answers gathered in F22 would be different if we had shown specific applications of noted text. That being said, having noted text to represent important places, dates or characters’ participations in the story is something that people see as a must-have, so, in a next phase, it should be implemented in the prototype. Based on the gathered results, it is our belief that it would make the events easier to absorb and comprehend.

Version 2.0 saw the characters being represented by cartoons, instead of having actual photographs of themselves. Given that 77,8% of readers agreed on using real pictures, this is something that would need to change. We should also attribute a different number to each event, instead of reinitializing it every month, since 65,9% prefer to see it that way. Also regarding the event buttons, although 50,3% say that they are too small, while 49,7% state that they have the proper size, and it is not a significant difference, eventually changing to slightly bigger buttons could prove to be useful. Substituting the “one-picture” representation in each event’s description by a photo gallery is also a good option, as both the first and the last survey showed us that people see a lot of value in the usage of images. Presenting a few more, without obliterating the text,

seems to be an option that pleases most people. Regarding colour usage, there is a general consensus that titles, dates, names and roles should be of a different colour from the text.

7. Conclusions

Obviously, it would require a lot more time to truly investigate the field of news visualization in depth, but we believe that, within the available time, we have managed to contribute to this investigation with some interesting findings. During our investigation, the majority of surveyed people agreed that visual elements help “A Lot” when it comes to understanding a story, therefore making it clear that one should make use of them. On the other hand, our analysis seems to point out that visual narratives are still not being used enough in journalism to help explain complex stories. If they have the potential to help a lot, then why is it so? – According to the interviewed journalists, there can be several reasons, from not having enough people to create as many visual narratives as they wished, or not create them at all, to not having enough financial resources to produce them.

However, that does not mean they do not plan on using them. In fact, our investigation led us to confirm that visual narratives are seen as great allies not only by journalists, but also by scholars and readers, when it comes to telling complex stories, thus giving us the answer we needed to our first research question – “Does the combination of visual elements and text make news easier to comprehend?” – While textual elements, such as titles and descriptions prevail as some of the most important sources of information in a story, only surpassed by events, image is the one which is considered to be the most appealing. However, text follows right after, reinforcing its importance in a narrative, as the journalists stated. In fact, if we talk about actual applications of this in the prototype, it is possible to draw some conclusions as well. While it is merely made up of text, readers considered the explanation page as highly useful, as it tells them all they need to know in order to use the prototype. This represents a real application of the importance text can have in the comprehension of visual narratives. But can it still hold the reader’s attention by itself?

When asked if they prefer to see merely textual news or combinations of text and other elements, people voted for the last one. In more detail, the combination of both text and images. This leads us to believe that, although textual elements are, indeed, essential for a narrative to work, one must rely on visual elements as well if we truly want to captivate the reader. Maybe

the textual features guarantee a certain degree of maturity and trustworthiness to the narrative, given the importance associated to text, and image tries to assure that the reader stays focused. Graphics seem to be a good option as well, which can be explained by the fact of them generally being the combination of these two elements.

Regarding question number two – “Are multimedia and interaction the pathways for grabbing people’s attention in the 21st century?” – the results might be dubious. At first, we believed that multimedia and interactivity played a big role in getting people’s attention in today’s journalism. Although that is, indeed, true, over the course of this investigation, it became clear that it is not that simple. According to the Attention-Comprehension Gap, it is not enough to captivate the reader’s attention. We need to know how to properly explain things to them, otherwise we will not be able to properly pass on the message and they, in turn, will not be able to absorb it like they should.

While most of the journalists have first confirmed our conviction of multimedia and interactivity being the future of journalism, as long as the use of those elements was not exaggerated, the readers told us otherwise. When compared to other more traditional narratives’ elements, such as titles, characters, events, dates and locations, interactivity actually gets the lowest percentage of voting, regarding the importance it has for the reader/viewer. However, regarding their appeal to readers/viewers, while compared to image, text, colour and audio, interactivity and video get the third and fourth positions, respectively. The first and second places go to images and text, respectively, as explained above. On the other hand, as stated before, the journalists warned us that too much interactivity and multimedia elements could actually end up having the opposite effect to what we wanted. Given the fact that people did not have a way to measure it, one can assume that, without a specific example to be evaluated in detail, interactivity and multimedia will not, at the moment of this investigation, be the go-to options when readers think of the elements a visual narrative should have. Nevertheless, they occupy a mid-range position, which may confirm the statements made by the journalists, that one should use it, although in a balanced way. Otherwise, people would get lost.

This actually opens the path for another relevant hypothesis. The ever-decreasing attention span of people, youngsters, in particular, when it comes to reading news, needs to be fought. The answer seems to be in the combine use of images and text, alongside some multimedia features. To prove our point, let us give the example of video. When initially asked about how appealing video can be to pass on a message, it got one of the worst results, only followed by audio. However, once we showed the reader’s how we wished to implement the video in the prototype, (short films, with 30 to 60 seconds), the vast majority of the surveyed agreed that it would be “Very Useful” to “Extremely Useful”. This seems to indicate that, indeed, making use of multimedia and interactivity can surely be seen as a strength, as long as we keep it simple. In other words, too many multimedia elements might make the reader lose interest in the narrative, as it becomes too dense. Nevertheless, using them is a plus and, according to journalists, the future of their field, if one knows how to dose them. Making use of noted text to highlight important

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information about characters, dates, institutions or places is also a great option to captivate the reader's attention and more easily immerse them in the story. If simple text is already a powerful ally, as it stands as one of the most important features of a visual narrative, then noted text, alongside visual features, could represent something even better, as it would help to clarify the most important parts of the text, thus helping in getting people's attention.

When it comes to our final research question – “Given the fact that we now spend more time using our phones than computers, hence being more familiar with verticality, would people prefer to see a vertically or horizontally oriented visual narrative?” – our surveyed people seemed to point that the horizontal axis is the best option. When given between seven different narratives to choose from, the horizontal ones got the lead. However, even more important is the fact that when compared to hierarchical models, timelines are preferable for much more individuals. This comes in line with what one of the journalists told us regarding people tending to see time on a horizontal direction. Nevertheless, some of the journalists have also stated that readers may prefer a vertical option, given the fact that we are now used to scrolling and doing everything vertically when it comes to reading. This may indicate that the best way to test the validity of this information would be to present the readers with two prototype options: one built vertically and another one horizontally. While it was not possible given the time restraints and, therefore, it is not easy to draw conclusions regarding this specific question, we leave this possible next-step suggestion as a way to continue this investigation in the future.

All in all, with the development of the prototype, we have been able to achieve most of our goals, as we have found a way to actually make a complex bigger story, filled with smaller events, into a simpler one, while at the same time understanding what visual elements play a bigger role in grabbing the readers' attention. The results seem to indicate that by properly using text, image and some interactive and multimedia features, we have created a bigger connection between the reader and the story, than traditional long-form news would be able to create. This, we believe, contributed to reduce the ever-decreasing attention span of people when reading online news. All of this by telling the story on an event-basis, while trying to avoid adding too much noise to the narrative. We also implemented the four different journalistic sources in each event's description, as a way to enrich the narrative and make it more reliable.

7.1 Main Contributions Overview

We started this work by reading several academic papers, which gave us insight on the narrative visualization's field. Some of them, given their close link to the topic and our goals, laid down the foundations for this investigation. The works of Mariana da Costa (da Costa, 2021) and Joana Valente (Valente, 2021) were two of them, due to the narrative visualization being a common theme. “Webjornalismo: Da pirâmide invertida à pirâmide deitada”, from Canavilhas (Canavilhas, 2006), in which he explains his Tumbled Pyramid concept is another one. While

talking about online news, we believe that the author's perspective is the one to adopt, given the time period in which we live in and how people consume written news. Instead of having news written under the traditional inverted pyramid format, which implies writing and, thus, reading based on news' informative importance, Canavilhas proposed that the reader should be able to roam freely within the news article, being able to start reading it from any axis (Canavilhas, 2006). All they needed were enough reading clues. This comes in line with the curiosity gap (Loewenstein, 1994), coined by Loewenstein in 1994. As we give the reader just enough information to grab their attention, they will get curious and crave for more. The trick is in doing it without breaking the Attention-Comprehension Gap (Melonçon & St.Amant, 2015) of the story. Basically, as one tries to captivate the reader's attention, it is also important to remember that we must not lose focus of the message we want to pass. Attention does not equal comprehension.

Following this topic, given that Fisher's Narrative Paradigm states that human beings are storytellers by nature (Fisher, 2009), as well as how important stories can be for our daily-lives, and for the journalistic field in particular, it is only natural that storytelling is inherent to the journalist. During the interview phase, we tried to understand the elements that compose a narrative and how we could properly lay them out to tell an engaging story with the aid of visual elements. Although there seems to be no perfect way to tell a story, as it will always depend on its specifics, there are some guidelines that one should follow every time. First, in order to achieve comprehension, a storyteller must know how to keep it simple. It is not worth it to have something strikingly attractive if we cannot explain it properly to the reader. Second, a visual narrative will always need to have text, no matter how many other elements it may have.

Regarding a more creative outlook on the matter, we have gathered information from several design-related projects. This allowed for a more aesthetic approach on the topic, which, given the visual nature of the investigation, we consider to have been very important. Alongside the ideas gathered from the interviews done to journalists, this was our main inspiration to create the visual representations that would then be sent in surveys to readers.

We also tried to understand the mechanics behind some famous movies known by their complexity, namely the ones by Christopher Nolan, and the reasons why they are able to grab our attention, regardless of how many turns and plot-twists they might have. The reason, we believe, is related to two previously mentioned topics. First of all, Nolan is indeed a great storyteller. Second, he does so, because he knows how to apply the principles of the Curiosity Gap. While he fails in filling in the Attention-Comprehension gap, his movies are still captivating enough to engage numerous people. However, since entertainment and information are two very different, yet interconnected topics, we need to draw the line between Nolan's storytelling method and what the journalistic one should be. From Nolan, we can only learn how to give the readers just enough information to keep them hooked, as the curiosity gap suggests.

The same reason leads us to discard emojis as a possible journalistic visual narrative's element. While they are quick to grab our attention, they are ambiguous as well. This can be captivating for the reader, precisely due to the curiosity it wakes in them, but the truth is that after

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getting them hooked, it will probably fail in delivering information, if the topic is too complex. Finally, we have to state Bongers' contribution to our work, as we tried to create a prototype that sustains an interaction-loop between a human and a machine, thus trying not to become dull.

7.2 Future Improvements

While there is still a lot to be done, the prototype has gathered some positive results on the surveyed readers, namely regarding how much easier it is to understand the story, when compared to both its first version and individual news. However, there is still room for improvement, as referenced in section 6.5.

One possibly interesting feature to add, besides the already mentioned ones in section 6.5, would be to make the prototype work with stories longer than six months. It would definitely require some adjustments, but it would make this visual narrative work with any story, which would prove to be well-invested time. Once those changes have been applied, it would be interesting to conduct a second set of user-tests and surveys, in order to understand if this new version is able to fulfill the user's needs in a better way. Apart from readers, it would also be interesting to contact the previously interviewed journalists and test the prototype with them. That way, we would be able to understand if the prototype truly fits in the journalistic media, just like we have tried it to. Moreover, it would be interesting to test the final version with the students that integrated the focus group, something that we have not done with version 2.0 due to time restraints. If one had the time, that would be a good way to better check on the evolution of our prototype, since they were the first to evaluate it.

Finally, we believe that finding a way for the prototype to induce visual literary habits on the reader could prove to be useful to fight, even more, the decreasing attention span. Given the visual nature of visual narratives, people would, in our opinion, feel more immersed in them, more connected to them, and thus more eager to get informed and talk about the approached topics.

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Appendix A

A. Interviews

A.1 Questions

	<i>Question</i>
<i>The Use of Visual Narratives in Journalism Nowadays</i>	What Are the Most Used Visual Narratives in Journalism and Why?
	In Which Stories Should You Use a Visual Narrative?
	What Is Journalism Still Missing in Terms of Visual Narratives?
<i>Visual Narratives' Specifics</i>	What Characterizes a Good Visual Narrative?
	What Are the Advantages and Disadvantages of Using Each of Them?
	How Do You Select Key-Elements and Characters?

<i>The Visual Aspect of News</i>	How Do You Make Sure You Do Not Lose the Reader's Focus?
	What Is the Importance of Multimedia and Interactivity in A Visual Narrative?
	What Is the Best Way to See a Visual Narrative on Your Screen?

Table 6: Questions Explored During the Interviews.

A.2 Original Quotes Translated

CODE	EXAMPLE
Clear Idea of the Message You Want to Pass	“A visual narrative cannot lack the information you want to convey and the clarity with which you want to do it.”
Helps Clarifying the Message	“The bottom line is always to help get the message across, make it more effective and help the reader understand what you are saying more easily.”
Establishing a Line Between Narrative-Must-Haves and Editorial Choices	“It is essential to define, always at the beginning, key events and select characters with various interventions throughout the story, as well as understand how they intervene. Then the choice is more subjective, each newspaper takes the themes differently and decides how much noise they want to add to the narrative.”
	“You have a narrative by default, which will always be an editorial choice. Regarding extras, additional information, it is always your choice to decide if you want to include them or not (...) you choose the amount of noise you want in your narrative. ”
	“Having multiple sources helps give credibility to your choices and context to events. My way of telling a story is not the same as your way of telling a story.”
Potentially Sensationalist	“The line that separates the aesthetic/appealing from the sensational is sometimes a little thin, you have to be careful”.

	<p>“An impactful image that has to do with the theme is essential.”</p>
	<p>“You have to know how to properly choose the images you use. Although they should be used to grab people’s attention, there are also things that shouldn’t be presented (...) it’s not worth it”.</p>
	<p>“It’s very complicated to define what to show and what not to show, but there has to be a limit (...) Some people are more sensitive than others and may feel uncomfortable with certain things”.</p>
Avoiding Noise as Much as Possible	<p>“As a general rule, the more stuff you have, the harder it will be for someone to understand what you mean”.</p>

Table 7: Codes Associated with the Essentials to Creating Accurate Journalistic Visual Narratives.

CODE	EXAMPLE
Understanding When to Use Visual Narratives	<p>“Visual Narratives make sense in things that involve a lot of information, you can’t do that much with topics that have only one or two news. In the case of more direct news, where the title tells you everything, you have no more content to go for”.</p>
	<p>“Regardless of what you are working with, you have to select what is really important and what seems more complicated. If it seems complicated, let’s put a graphic here, let’s try to explain this to people, let’s deconstruct it”.</p>
	<p>“I think visual narratives are much more effective when they are a complement to something or when they are explanatory. Trying to use them isolated may result in a loss of effectiveness in conveying what is requested”.</p>
The Need of Text	<p>“Your visual narrative will always have text. You can have multimedia elements on the side, but you will always have text”.</p>

Table 8: Codes Associated with What Makes Up a Journalistic Visual Narrative.

CODE	EXAMPLE
Reaching Out to the Audience	<p>“You should always bet on simplicity.”</p>
	<p>“The public ends up being very selective (...) if they need to explore a lot, they won't see it.”</p>
	<p>“Poorly worked representations end up being too simple and not attracting attention. Largely worked ones (...) always have some more captivating detail.”</p>
	<p>“The idea of a concept like this is that someone spends some time exploring and informing themselves and no one is going to do it if it's not graphically and aesthetically appealing.”</p>
Vertical and Horizontal Representations – Advantages and Disadvantages of Each	<p>“We are very much in the habit of reading and scrolling down the pages, it's an intuitive thing”.</p>
	<p>“That's what happens on social networks (...) you scroll from top to bottom and don't get tired, you only stop at what really interests you.”</p>
	<p>“Websites will lose relevance with just text. The long-form allows the use of multimedia elements, (...) it is the future of journalism.”</p>
	<p>“You can always see the beginning and the end, it's easier to go back without getting lost. While if you go horizontally, in book format, it gives you the feeling that it never ends, (...) it gets much duller in my opinion.”</p>
	<p>“Timelines in general work best horizontally. They can work vertically in certain cases, but I think they works better horizontally because of our notion of how time moves.”</p>
	<p>“You can tell a story over time vertically with no problem. (...) A timeline from top to bottom, (...) graphic part on one side and text on the other”.</p>

Table 9: Codes Associated with Different Ways of Representing Stories Through Visualization.

CODE	EXAMPLE
Visual Narratives Appearances	<p>“Each narrative has its own way of being treated and explored (...) it all depends on the theme you are working on.”</p>
	<p>“The goal is to figure out the best way to get the message across and help the reader understand the story more easily.”</p>
Geometric Elements	<p>“Balls would be flashy, (...) arrows are always very confusing (...) at a certain point when the story develops a lot, you create arrows after arrows and it gets very confusing”.</p>
	<p>“The intersection of two events to form a third is the simplest and most direct way that comes to my mind to tell a story.”</p>
Emojis’ Advantages and Disadvantages	<p>“Emojis complementing explanatory video or audio could be useful (...) if you are deaf or speak another language and do not know what they are saying, you can understand what is happening, at least on a basic level, only based on emojis.”</p>
	<p>“I think emojis would help make things lighter.”</p>
	<p>“I love emojis, I think it helps to break the distance barrier. On the other hand, some can be a little ambiguous and you don't interpret them the same way I do.”</p>
	<p>“Overall, using emojis requires more attention from the reader (...), the more the reader has to try, the worse. The message is all the more effective, the easier it is to understand.”</p>
	<p>“Emojis in terms of information are a swampy terrain (...) if you want to make an allusion, even if it is subliminal, you can't leave room for doubt.”</p>
	<p>“For covid, you don't have the corona emoji, just a virus. You also don't have emojis for Putin or Zelensky (...) I think you would always have to have text, audio or video accompanying the emojis to clarify them”.</p>
Graphics as an Alternative	<p>“In the area of lifestyle, graphics are already something that is done a lot in Portugal (...) they can be applied to</p>

to the Use of Emojis	everything, they are not limiting (...) in terms of design they are incredible”.
	“The use of graphics works better than emojis, the message goes through perfectly (...) The person looks at the central pages and gets to know the information clearly”.

Table 10: Codes Associated with Defining a Visual Identity.

CODE	EXAMPLE
Different Kinds of Narratives Used in the Digital World	“For a digital newspaper, I would tell you to bet on interactivity and multimedia (...) it doesn't mean that everything has to be super interactive (...) it depends on the theme. It can be static and still be effective.”
Animating Transitions	“Animations hook people.”
	“Things can gain transparency and opacity as time passes, depending on their degree of importance and the change they create or not in the narrative.”
Using Video and Sound	“In the vast majority of Portuguese journalism, the use of sound is still undervalued.”
	“I think nowadays, video appeals to a lot of people and the shorter it is, the more people will want to watch it.”
	“People avoid reading a lot and sometimes an image may not be so explanatory (...) if you have a short video with a person reading or clarifying certain issues, you can attract more people. Even for those who are not interested, it can be flashy.”
	“Sound allows the reader to feel immersed in what they are reading.”
	“It can act as a distraction, but it can also be a way to absorb people a lot more (...) it's a balance that is difficult to achieve.”
	“Obviously it depends on the work you're doing, but the use of sound doesn't shock me (...) because it takes people there (...) they understand what you're feeling in a certain place and moment.”

Interactivity as a Way to Engage Readers	“Nowadays we have to bet on this type of tools (...) most people who go to websites won’t be reading the articles in depth, people don’t have much patience (...) a more interactive thing grabs their attention.”
	“You are at a time when interactivity is part of your life and, therefore, (...) if you manage to bet on interactivity, it is half the battle for the reader to be stuck there watching, reading and wanting to discover.”
	“There has to be a balance, but it’s been proven that people waste time when they find multimedia news articles.”
The Possibility of Having Different Layers of Information	“For example, having an image with an explanatory title by itself (...) if you clicked on the image you could choose to go to the article and improve your knowledge, or stay in the narrative. You don’t lose focus (...) the person only opens what they want.”
	“I think parallel narratives can be a very interesting option, but there should always be a main narrative defined by whoever is creating it.”
	“You have to choose which is the main visual narrative that will help you to tell the story and which is the tool that will best help you to do it. It can happen that you actually win from time to time when you add other elements, but you can also lose focus”.
	“News within other news (...) the reader can say he is tired, lose the focus of the main narrative and switch off.”
	“You can have all the information in the main narrative and I, as a user, could have an option to filter it like on clothing websites, so there is no noise (...) if I filter and say that I only want to see information about the characters, you can click on them and know where they were involved, you can tell the story from them”.

Table 11: Codes Associated with the Role of Multimedia and Interactivity.

CODE	EXAMPLE
Understanding Messages at First Glance	“There can be no visual pollution, you have to be able to understand at first sight what you are seeing.”
Risks of Overloading the Narrative with Visual Elements	“If you put in too many colors or too much information, it can get confusing and you end up losing it.”
	“I think everything should appear in the same window, (...) you lose focus if you need to keep moving back and forth”.
	“Having all the information in a single image is excessive and ends up losing interest, because people absorb nothing (...) I think that visual memory should be put to good use in here (...) to guarantee it, you must have one or two details that catch the eye, instead of trying to get the person to memorize everything.”
Focusing on Important Information	“We cannot lose sight of what we want to convey to people.”
	“As cliché as this may seem, less is more, it is a fact (...) if you give people too much information, you may end up not being able to achieve the objective you wanted, which is to convey to the person what happened, how it happened, where, when and by whom”.

Table 12: Codes Associated with The Dangers of Visual Pollution.

CODE	EXAMPLE
Defining Your Target	“The issue of older people is complicated, because if all digital journalists were thinking about older people, no one would make visual narratives (...) most people who use social networks, digital tools are the younger ones, it’s called working age population.”

Responding Younger People Stimuli	“These days, youngsters are born with a lot of stimuli, so we have to make sure that we continue to be able to keep up with them and respond to them.”
	“I don't know if it's really appealing to have a very simple representation, it's not super captivating to the point where I go and see it and send it to someone.”
The Possibility of Being Used by Non-Targeted People	“The more intuitive it is, the easier it is to reach and keep the older audience, because it is not enough to arrive, you have to conquer (...) and the older audience is more difficult to conquer.”
	“To be more inclusive, you can put more visual elements that are easy to understand, (...) not opening too many things also helps.”
User-Friendly	“It must be user friendly, straightforward (...) to look and immediately understand how and what to explore.”

Table 13: Codes associated with Inclusion & Accessibility.

CODE	EXAMPLE
Hardship to Define the Ideal Visual Narrative	“There is no such thing as a visual narrative par excellence, it always depends on the theme.”
Effective and Captivating Effect	“The concern should be effectiveness and trying to capture and create a connection with the reader.”
Hierarchical Timelines	“It's funny that you can see not only over time, but also be able to enter each of the events and be able to explore them”.
	“The temporal context is very interesting, but that of the actors as well, because you can see when someone shows up and the influence they have on each event.”
	“It's almost as if the events are explained to each other in layers, instead of having the more classic format of a succession of events over time (...) you are more focused on understanding the how and why, than the actual process. chronological order (...) is interesting.”
	“Visão and Sábado do wordclouds very well (...) it works and you understand them, but the question is: is it

Wordcloud	still up-to-date? With so much good stuff out there, with so many tools and softwares, I don't know if it makes sense.”
	“I never really liked this example, it's like the name implies, it's a cloud of words, it's too dense. (...) with 10 words it can work, but with 100 or 200 it becomes very difficult to find what we want.”
Different Views Over Timelines	“Timelines “sell more” (...) they help especially on topics such as covid and war, for example, which are longer.”
	“One image next to the other with a slash in the middle, which you can drag to see the passage of time. I think it's easy, you don't ask for too much attention to understand how it works (...) you don't have many windows to open and close, you don't lose the person to the other side.”
Photomosaic	“You can put several images, several news to make the general image and you keep clicking to see each news (...) it's interesting, but it has to have an order too, almost like a timeline that is not quite a timeline.”
The Impact of Photography in a Visual Narrative	“You have to know how to choose an impactful photo, (...) visually spectacular photos that captivate people.”
	“You have to know where to play with photography, it has to be in a prominent place, but, at the same time, it must not drown out everything else.”
	“We know that people most of the time don't go to see the news, they see the homepage, they see the headlines and above all they see the image (...) it's what draws the most attention.”
Networks and Hierarchies	“I think they work better with denser issues, which require their exploration (...) but you can't have too much information either, if you have too much within a hierarchy you end up getting lost.”
	“If it is not static, it can work very well (...) it requires interactivity, exploration of the narrative by the reader, instead of a more direct interpretation”.

Table 14: Codes associated with Visual Narrative Representations Nowadays.

Appendix B

B. Visual Representations of the Studied Cases

Below one can find several chronological and hierarchical visual representations of the different case-studies approached in the surveys. They are all in their original language (Portuguese), as the study and surveys have been made in Portugal, consequently having mostly portuguese people participating, thus making it easier to get a wider range of responses.

B.1 Case-study “Russia-Ukraine War” Visual Representations

B.1.1 Timeline Representations

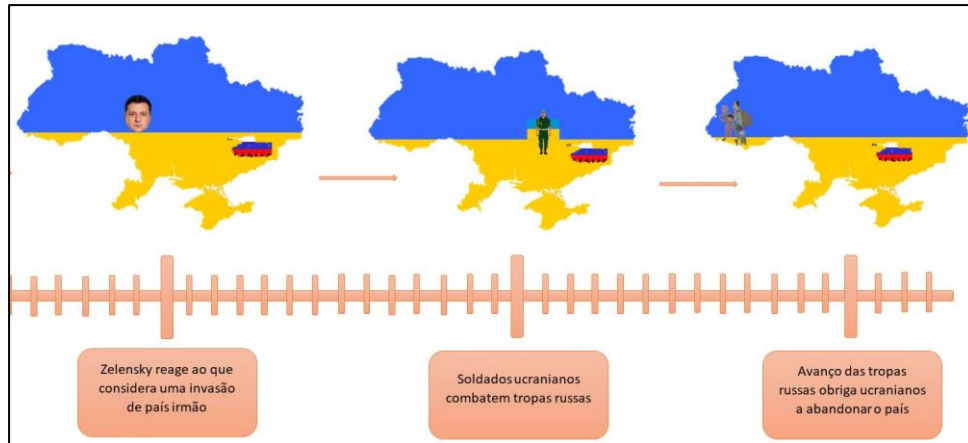


Figure 77: Russia-Ukraine War - Timeline Illustration Model 1 (Geographical Timeline).

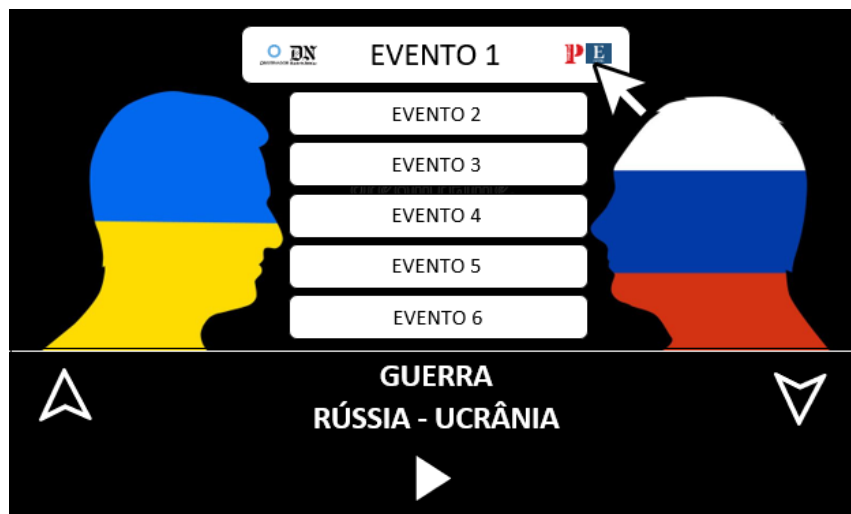


Figure 78: Russia-Ukraine War - Timeline Illustration Model 2 (Vertical Timeline).

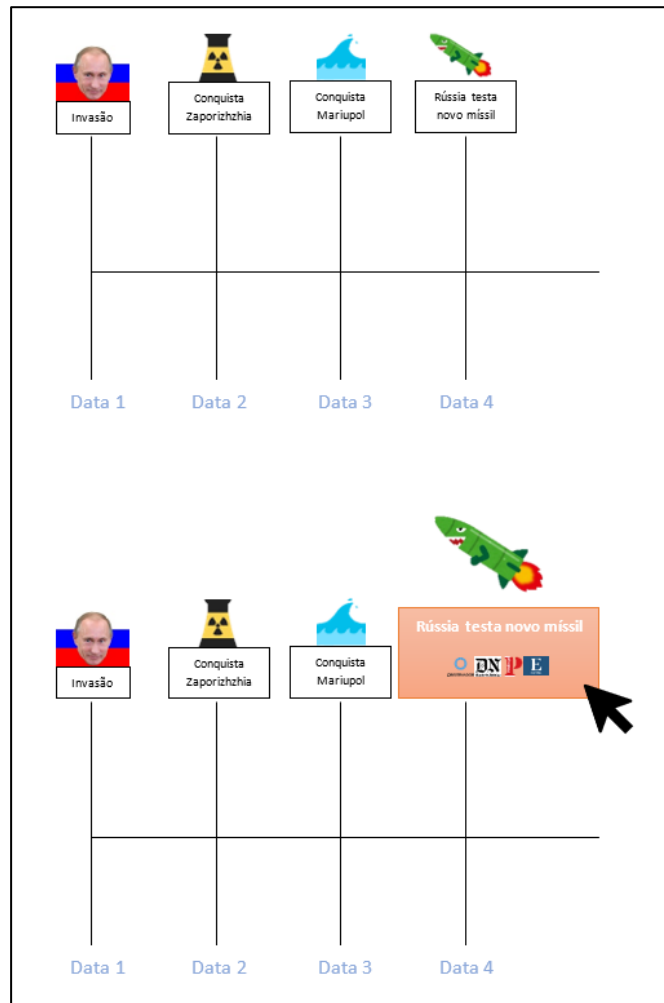


Figure 79: Russia-Ukraine War - Timeline Illustration Model 3 (Horizontal Timeline).



Figure 80: Russia-Ukraine War - Timeline Illustration Model 4 (Before and After).

B.1.2 Hierarchical Representations

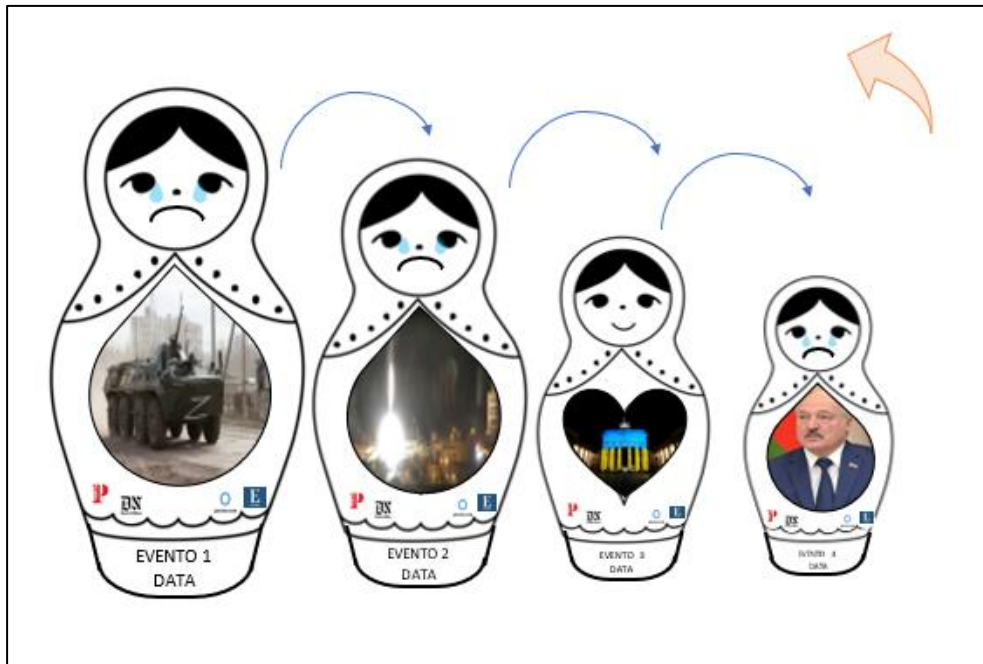


Figure 81: Russia-Ukraine War - Hierarchical Illustration Model (Matrioskas).

B.2 Case-study “Rendeiro” Visual Representations

B.2.1 Timeline Representations

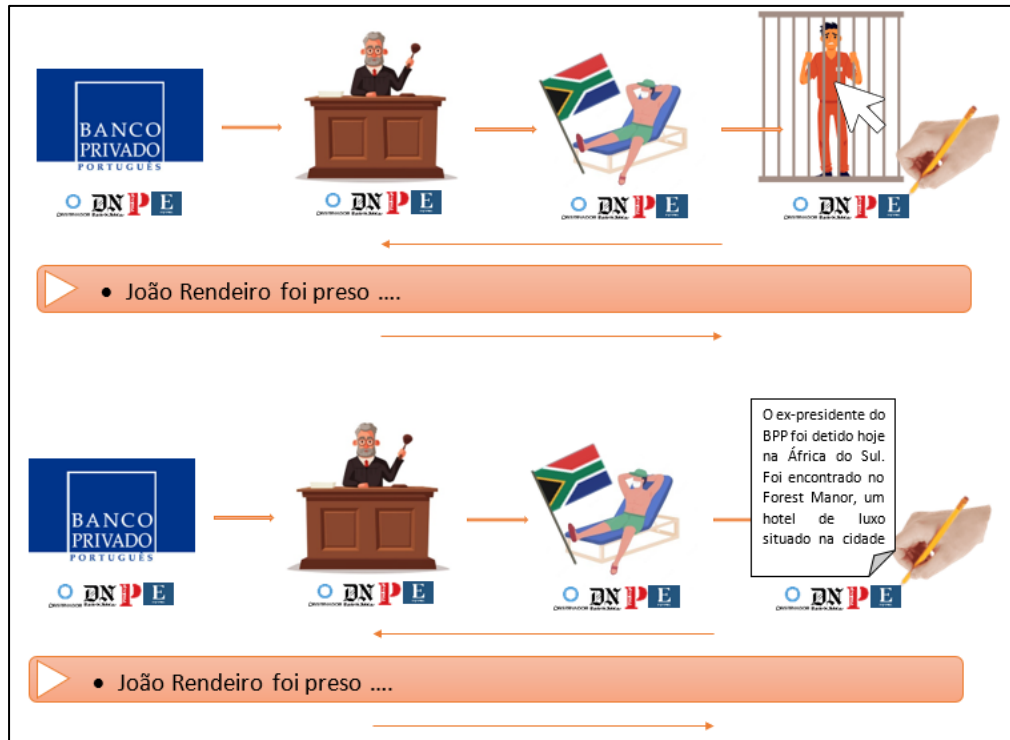


Figure 82: Rendeiro - Timeline Illustration Model 1 (Draw the Story).



Figure 83: Rendeiro - Timeline Illustration Model 2 (Photomosaic).

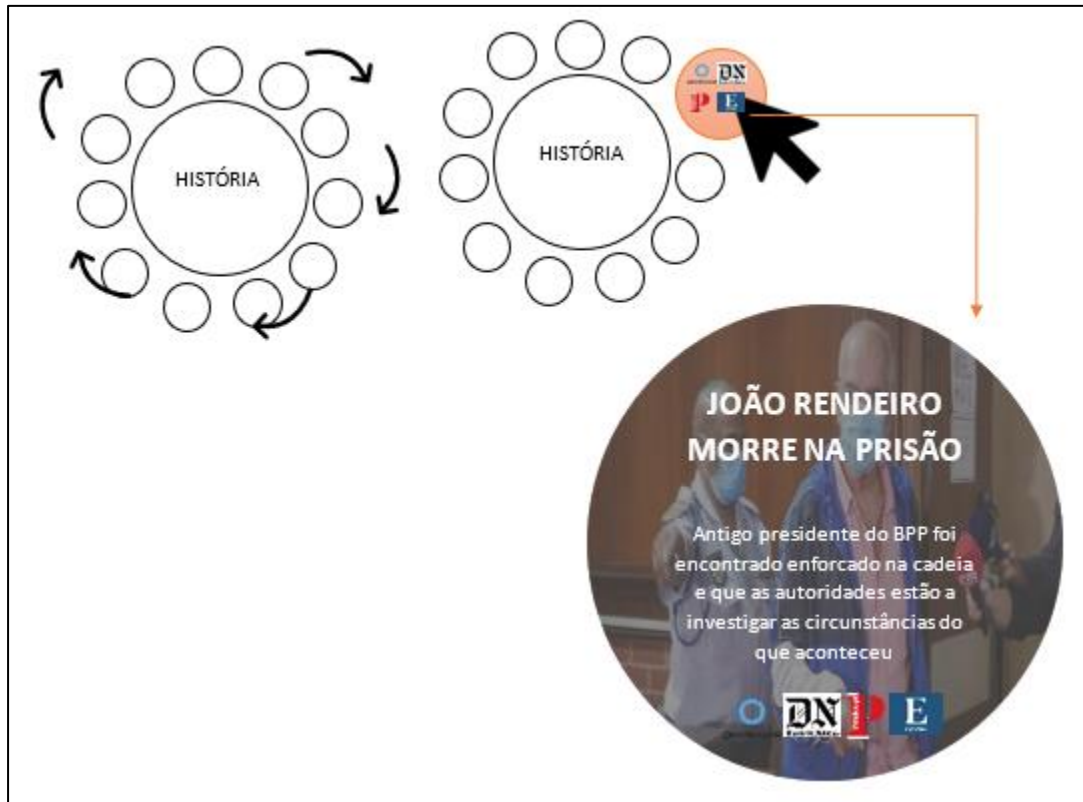


Figure 84: Rendeiro - Timeline Illustration Model 3 (Circle of Events).

B.2.2 Hierarchical Representations

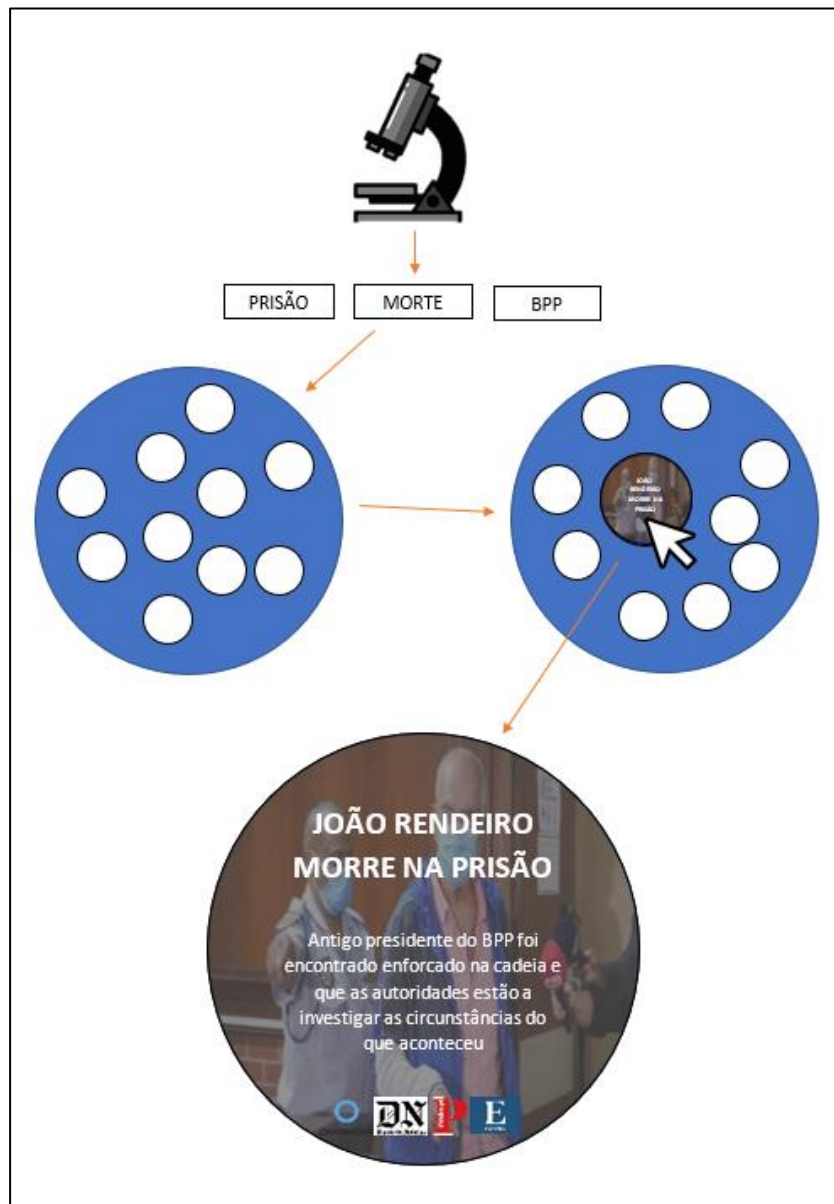


Figure 85: Rendeiro - Hierarchical Illustration Model 1 (Microscope).



Figure 86: Hierarchical Illustration Model 2 (Wordcloud).

Appendix C

C. Pre-prototype Surveys

Below one can find the first two surveys (T and R) in their original language (Portuguese). Besides that, it is also possible to consult the double-entry tables that helped us to analyse the results that generated the most complex graphics.

C.1 Readers' Survey (Survey R)

09/09/22, 13:48

Leitores - Inquérito sobre Utilização de Narrativas Visuais em Jornalismo

Leitores - Inquérito sobre Utilização de Narrativas Visuais em Jornalismo

Olá!

A elaboração deste inquérito enquadra-se no âmbito da minha Dissertação - "Supporting Narratives in News Stories through Visualization" - desenvolvida na Faculdade de Engenharia da Universidade do Porto. Uma "Narrativa Visual" é uma forma de comunicação que inclui, como o próprio nome indica, elementos visuais ao contar uma história. É uma alternativa à narrativa tradicional, meramente textual. Neste projeto pretende-se estudar o quão benéficas estas podem ser para a compreensão de grandes histórias jornalísticas.

Ao longo do inquérito, além das questões, vão ser apresentadas imagens ilustrativas que partilham um objetivo comum: contar visualmente, e de forma resumida, uma história com a qual a grande maioria das pessoas está familiarizada, devido ao seu enorme mediatismo. Todas as respostas são anónimas e os dados fornecidos serão utilizados unicamente para fins estatísticos, respeitando assim as normas de confidencialidade.

Agradeço, desde já, a ajuda e atenção dispensada :)

*Obrigatório

1. **R1. Idade ***

Marcar apenas uma oval.

- 15-17
- 18-24
- 25-39
- 40 ou mais

2. **R2. Género ***

Marcar apenas uma oval.

- Masculino
- Feminino
- Prefiro não dizer

3. R3. Habilitações Académicas *

Marcar apenas uma oval.

- Secundário
- Licenciatura
- Mestrado
- Doutoramento
- Outro

4. R4. Ocupação *

Marcar apenas uma oval.

- Estudante/Investigador
- Desempregado
- Jornalista
- Professor Universitário
- Empregado - Áreas das Ciências e Engenharias
- Empregado - Áreas Artísticas
- Empregado - Área das Ciências Sociais e Humanas
- Empregado - Área que não requer estudos superiores
- Freelancer
- Outro

5. R5. Com que frequência lê notícias online? *

Marcar apenas uma oval.

- Menos de uma vez por semana
- Uma a três vezes por semana
- Mais de três vezes por semana
- Uma vez por dia
- Várias vezes por dia

6. **R6. Principal meio de acesso a notícias ***

Marcar apenas uma oval.

- Redes sociais
 Jornais digitais
 Jornais em papel
 Outras - Televisão e Rádio
 Outra: _____

7. **R7. Em que tipo de histórias jornalísticas acha que narrativas visuais poderão ser mais úteis para melhorar a compreensão do leitor? ***

Ordene as suas escolhas de 1 a 7, sendo 1 a menos útil e 7 a mais útil. Cada linha deverá ter um número diferente

Marcar apenas uma oval por linha.

	1	2	3	4	5	6	7
Notícias "cor-de-rosa"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultura/Arte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tecnologia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ciência e Saúde	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Política	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desporto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Notícias genéricas/sem nenhum grupo em particular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. **R8. Qual destes recursos é mais importante para cativar o leitor? ***

Ordene, de 1 a 6, sendo 1 o menos importante e 6 o mais importante. Cada linha deverá ter um número diferente

Marcar apenas uma oval por linha.

	1	2	3	4	5	6
Texto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Imagem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interatividade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Áudio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vídeo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. **R9. Diga a frequência com que vê narrativas visuais serem utilizadas em jornais para contar histórias mais complexas. ***

1 - Nenhuma; 2 - Pouca; 3 - Alguma ; 4 - Bastante; 5 - Sempre

Marcar apenas uma oval.

	1	2	3	4	5
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. **R10. Acredita que os jornais deveriam apostar mais no uso de narrativas visuais? ***

Marcar apenas uma oval.

- Sim
- Não - a utilização atual é suficiente

11. **R11. Avalie o quanto o uso de elementos visuais facilita a compreensão de uma história jornalística ***

1 - Nada; 2 - Pouco; 3 - Razoavelmente ; 4 - Bastante; 5 - Fulcral

Marcar apenas uma oval.

	1	2	3	4	5
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. **R12. Avalie a importância que cada um destes elementos tem para si numa história.** *

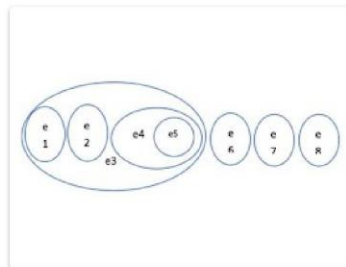
1 - Nenhuma; 2 - Pouca; 3 - Razoável ; 4 - Importante; 5 - Fulcral

Marcar apenas uma oval por linha.

	1	2	3	4	5
Eventos/Acontecimentos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personagens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breves descrições/Subtítulos /Leads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Datas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Localizações	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Títulos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interatividade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. **R13. Qual das seguintes representações lhe parece ser mais perceptível a nível visual?** *

Marcar apenas uma oval.



Timeline --> forma ligações ao longo do tempo - Permite criar uma relação cronológica, de forma direta ou indireta

Hierarquia temporal --> a passagem do tempo dá origem a pequenos subtemas dentro de temas maiores, estabelecendo-se uma relação cronológica e hierárquica.

REPRESENTAÇÕES ILUSTRATIVAS

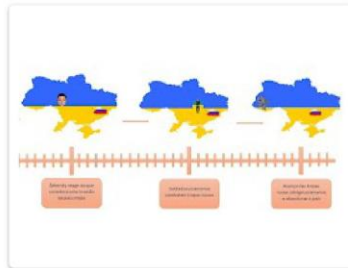
A partir deste momento começarão a ser mostradas algumas representações visuais de conceitos desenvolvidos. Caso tenha dificuldade ao visualizar as imagens apresentadas, pode consultá-las aqui: <https://drive.google.com/drive/folders/1KibCFKjzyiVYDCYWLDk8VcfdIBC4ffaD?usp=sharing>

Case-study
"Guerra
Rússia -
Ucrânia"

Caso tenha dificuldade ao visualizar as imagens apresentadas, pode consultá-las aqui:
<https://drive.google.com/drive/folders/1KibCFKjzyiVYDCYWLdk8VcfdIBC4ffaD?usp=sharing>

14. R14. No case-study "Guerra Rússia - Ucrânia", utilizando uma TIMELINE para contar a história, qual destas opções funcionaria melhor? *

Marcar apenas uma oval.



Timeline Geográfica --> mapa + emojis/grafismos



Timeline Horizontal Normal --> emojis/grafismos



Timeline Vertical --> eventos surgem verticalmente ao longo do tempo



Antes e depois --> Comparação visual direta entre o pré e pós guerra; conta, em simultâneo, a história ao longo do tempo e espaço

15. **R15. Organize, de 1 a 4, sendo 1 a pior e 4 a melhor, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

	1	2	3	4
Timeline Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Horizontal Normal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Vertical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Antes e Depois	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. **R16. Qual das seguintes opções é mais apelativa para contar esta narrativa?** *

Marcar apenas uma oval.



Matrioskas (representação hierárquica) - Neste case-study em particular, de modo a realçar a dualidade Ucrânia-Rússia, a utilização de um elemento tipicamente russo pretende colocar o leitor no centro da narração dos eventos (o interior da matrioska), a partir de uma perspetiva ucraniana (ocidental).

Timelines são a melhor opção

17. **R17. Qual é o melhor tipo de narrativa visual a adotar neste case-study?** *

Marcar apenas uma oval.

- Timeline
- Hierarquia

Case-study
"Rendeiro"

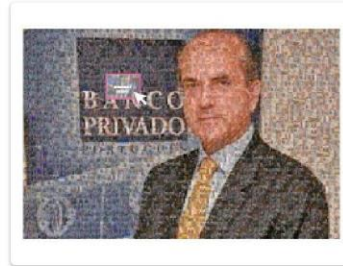
Caso tenha dificuldade ao visualizar as imagens apresentadas, pode consultá-las aqui:
<https://drive.google.com/drive/folders/1KibCFKjzyiVYDCYWLDk8VcfdIBC4ffaD?usp=sharing>

18. **R18. Relativamente ao case study "Rendeiro", qual destas TIMELINES funciona melhor?** *

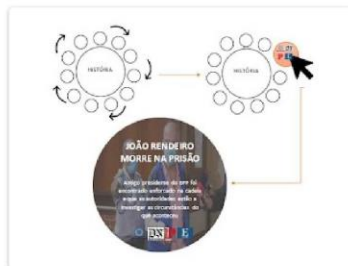
Marcar apenas uma oval.



Desenhar a história --> lápis interativo vai desenhando elementos importantes



Mosaico de fotos --> pequenas imagens (representativas de eventos importantes) formam a imagem maior (história principal)



Círculo de eventos (timeline circular) --> pequenos acontecimentos agrupados ao redor da grande história

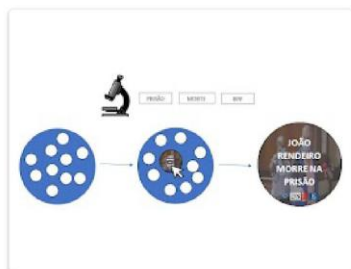
19. **R19. Organize, de 1 a 3, sendo 1 a pior e 3 a melhor, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

	1	2	3
Desenhar a história	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mosaico de fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Círculo de eventos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. **R20. Qual das seguintes HIERARQUIAS funciona melhor no caso "Rendeiro"?** *

Marcar apenas uma oval.



Microscópio --> eventos divididos em grupos (lamelas). Zoom do microscópio permite ver eventos dentro de eventos



Wordcloud --> Agrupa os eventos marcantes da história com base em algum elemento hierárquico (ex: grau de importância; o quão recente é ou não o acontecimento; as vezes que foi lido; etc)

21. **R21. Qual é o melhor tipo de narrativa visual a adotar neste case-study?** *

Marcar apenas uma oval.

- Timeline
 Hierarquia

**Representações
 Genéricas -
 Qualquer
 contexto**

Independentemente do case-study, escolha as melhores opções para contar uma história a nível cronológico e hierárquico

Caso tenha dificuldade ao visualizar as imagens apresentadas, pode consultá-las aqui:

<https://drive.google.com/drive/folders/1KibCFKjzyiVYDCYWLDk8VcfdIBC4ffaD?usp=sharing>

22. R22. Se quiser contar uma história de forma CRONOLÓGICA e aplicá-la a QUALQUER CONTEXTO, qual é a representação que prefere utilizar? *

Marcar apenas uma oval.



Círculo de eventos



Mosaico de fotos



Desenhar a história



Timeline Horizontal Normal



Timeline Geográfica



Timeline Vertical



Antes e depois

23. **R23. Organize agora, de 1 a 7, sendo 1 a que menos prefere utilizar e 7 a que mais prefere, as representações ilustrativas da pergunta anterior.** *

Cada linha deverá ter um número diferente

Marcar apenas uma oval por linha.

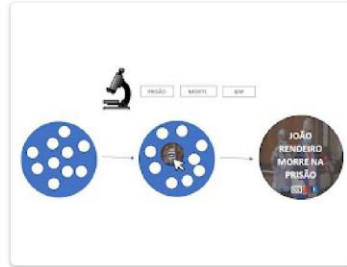
	1	2	3	4	5	6	7
Círculo de eventos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mosaico de fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desenhar a história	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Horizontal Normal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Vertical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Antes e depois	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. **R24. Para contar uma história de forma HIERÁRQUICA e aplicá-la a QUALQUER CONTEXTO, qual é a representação que prefere adotar?** *

Marcar apenas uma oval.



Matrioskas



Microscópio



Wordcloud

25. **R25. Organize agora, de 1 a 3, sendo 1 a que menos prefere utilizar e 3 a que mais prefere, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

	1	2	3
Matrioskas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Microscópio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wordcloud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. **R26. Sugestões/comentários (opcional)**

Este conteúdo não foi criado nem aprovado pela Google.

Google Formulários

C.2 Double-Entry Tables – Survey R

Journalistic stories Evaluation		Tabloids	Culture / Art	Technology	Science and Health	Politics	Sports	Generic News
		Less Useful	1	42,6%	0,6%	2,6%	1,3%	21,3%
↑ ↓	2	12,3%	5,2%	1,9%	3,2%	22,6%	20,0%	34,8%
	3	18,1%	5,2%	14,2%	9,7%	16,8%	18,7%	17,4%
	4	6,5%	15,5%	27,1%	17,4%	8,4%	15,5%	9,7%
	5	7,1%	19,4%	20,6%	29,7%	14,2%	4,5%	4,5%
	6	6,5%	16,1%	20,6%	20,6%	9,0%	22,6%	4,5%
	More Useful	7	7,1%	38,1%	12,9%	18,1%	7,7%	12,3%

Table 15: R7's Percentages of voting per level and category.

Journalistic stories Evaluation		Tabloids	Culture / Art	Technology	Science and Health	Politics	Sports	Generic News
		Less Useful	1					
↑ ↓	2	10,4%	1,6%	2,7%	2,0%	8,7%	6,5%	11,1%
	3							
	4	0,7%	1,3%	2,9%	2,1%	0,4%	1,7%	0,5%
	5							
	6	2,9%	10,5%	7,7%	9,8%	4,4%	5,6%	1,8%
	More Useful	7						

Table 16: R7's Positive vs Negative Spectre's Analysis.

Resources Evaluation		Text	Image	Colour	Interactivity	Audio	Video
		Less Appealing	1	18,1%	2,6%	20,6%	12,9%
↑ ↓	2	9,7%	3,9%	28,4%	12,3%	26,5%	19,4%
	3	12,3%	10,3%	13,5%	21,3%	20,0%	22,6%
	4	10,3%	18,7%	16,8%	23,9%	13,5%	16,8%
	5	5,8%	36,1%	18,1%	16,8%	6,5%	16,8%
	6	43,9%	28,4%	2,6%	12,9%	1,9%	10,3%
	More Appealing						

Table 17: R8's Percentages of Voting per Level and Category.

		Text	Image	Colour	Interactivity	Audio	Video
Less Appealing ↑ ↓ More Appealing	1	6,7%	2,8%	10,4%	7,7%	13,0%	9,4%
	2						
	3						
	4	10,0%	13,9%	6,2%	8,9%	3,7%	7,3%
	5						
	6						

Table 18: R8's Positive vs Negative Spectre's Analysis.

Elements Evaluation	Events	Characters	Short descriptions / Leads / Subtitles	Dates	Locations	Titles	Interactivity
None	7,1%	9,7%	1,9%	6,5%	2,6%	2,6%	5,8%
A Few	10,3%	7,7%	7,7%	15,5%	15,5%	5,8%	14,2%
Reasonable	3,2%	19,4%	23,2%	18,7%	19,4%	16,8%	34,2%
Important	23,2%	37,4%	34,2%	31,6%	41,9%	34,2%	33,5%
Essential	56,1%	25,8%	32,9%	27,7%	20,6%	40,6%	12,3%

Table 19: R12's Percentages of voting per level and category.

	Events	Characters	Short descriptions / Leads / Subtitles	Dates	Locations	Titles	Interactivity
None	2,5%	2,5%	1,4%	3,1%	2,6%	1,2%	2,9%
A Few							
Reasonable							
Important							
Essential							
	0,4%	2,1%	2,3%	1,8%	1,8%	1,3%	3,7%
	11,3%	9,0%	9,6%	8,5%	8,9%	10,7%	6,5%

Table 20: R12's Positive vs Negative Spectre's Analysis.

Representations Evaluation		Geographical Timeline	Horizontal Timeline	Vertical Timeline	Before and After
		Worst	1	14%	21%
↕	2	18%	29%	32%	21%
	3	33%	30%	20%	17%
	Best	4	35%	20%	24%

Table 21: R15's Percentages of Voting per Level and Category.

		Geographical Timeline	Horizontal Timeline	Vertical Timeline	Before and After
Worst	1	7,9%	12,4%	14,0%	15,6%
↕	2				
	3	17,1%	12,6%	11,0%	9,4%
	Best	4			

Table 22: R15's Positive vs Negative Spectre's Analysis.

Representations Evaluation		Draw the Story	Circle of Events	Photomosaic
		Worst	1	7,1%
↕	2	25,2%	58,7%	16,13%
	Best	3	67,7%	24,5%

Table 23: R19's Percentages of Voting per Level and Category.

Representantions		Circle of Events	Photomosaic	Draw the Story	Horizontal Timeline	Geographical Timeline	Vertical Timeline	Before and After
Evaluation								
Less Preferred ↑ ↓ More Preferred	1	16%	59%	3%	3%	3%	6%	10%
	2	32%	21%	10%	4%	4%	5%	24%
	3	18%	7%	19%	11%	5%	20%	19%
	4	8%	5%	15%	14%	19%	18%	21%
	5	8%	3%	12%	22%	27%	16%	13%
	6	11%	4%	15%	24%	25%	17%	5%
	7	7%	1%	25%	23%	18%	17%	8%

Table 24: R23's Percentages of Voting per Level and Category.

		Circle of Events	Photomosaic	Draw the Story	Horizontal Timeline	Geographical Timeline	Vertical Timeline	Before and After
Less preferred ↑ ↓ More preferred	1							
	2	9,4%	12,5%	4,6%	2,5%	1,7%	4,5%	7,6%
	3							
	4	1,2%	0,6%	2,2%	2,0%	2,7%	2,6%	2,9%
	5							
	6	3,7%	1,1%	7,5%	9,8%	10,0%	7,2%	3,7%
	7							

Table 25: R23's Positive vs Negative Spectre's Analysis.

Representantions		Matrioskas	Microscope	Wordcloud
Evaluation				
Less Preferred ↑ ↓ More Preferred	1	23,2%	41,3%	35,5%
	2	46,5%	31,6%	21,9%
	3	30,3%	27,1%	42,6%

Table 26: R25's Percentages of Voting per Level and Category.

C.3 Text2Story's Survey (Survey T)

09/09/22, 13:48

Text2Story - Inquérito sobre Utilização de Narrativas Visuais em Jornalismo

Text2Story - Inquérito sobre Utilização de Narrativas Visuais em Jornalismo

Olá!

A elaboração deste inquérito enquadra-se no âmbito da minha dissertação - "Narrativas Visuais em Jornalismo" - desenvolvida na Faculdade de Engenharia da Universidade do Porto. Uma "Narrativa Visual" corresponde à arte de contar histórias com poucas ou nenhuma palavra, mantendo, no entanto, todos os elementos que constituem a narrativa tradicional. Neste projeto pretende-se estudar o quão benéficas estas podem ser para a compreensão de grandes histórias jornalísticas.

Ao longo do inquérito, além das questões, vão ser apresentadas imagens ilustrativas que partilham um objetivo comum: contar visualmente, e de forma resumida, uma história com a qual a grande maioria das pessoas está familiarizada, devido ao seu enorme mediaticismo. Todas as respostas são anónimas e os dados fornecidos serão utilizados unicamente para fins estatísticos, respeitando assim as normas de confidencialidade.

Agradeço, desde já, a ajuda e atenção dispensada :)

***Obrigatório**

1. T1. Idade *

Marcar apenas uma oval.

- 18-24
 25-39
 40 ou mais

2. T2. Género *

Marcar apenas uma oval.

- Masculino
 Feminino

3. T3. Habilitações Académicas *

Marcar apenas uma oval.

- Secundário
 Licenciatura
 Mestrado
 Doutoramento
 Outro

4. T4. Ocupação *

Marcar apenas uma oval.

- Estudante/Investigador
- Desempregado
- Jornalista
- Professor Universitário
- Trabalhador - Áreas das Ciências e Engenharias
- Trabalhador - Áreas Artísticas
- Trabalhador - Área das Ciências Sociais e Humanas
- Trabalhador - Área que não requer estudos superiores
- Freelancer
- Outro

5. T5. Área de Formação Base *

Marcar apenas uma oval.

- Tecnologias e Ciências da Saúde
- Artes
- Desporto
- Ciências Sociais e Humanas
- Outro

6. T6. Há quanto tempo trabalha com jornalismo? *

Marcar apenas uma oval.

- Menos de 1 ano
- 1 a 2 anos
- 2 a 5 anos
- Mais de 5 anos
- Nunca trabalhei com jornalismo
- Outra: _____

7. **T7. Com que frequência lê notícias online? ***

Marcar apenas uma oval.

- Menos de uma vez por semana
- Uma a três vezes por semana
- Mais de três vezes por semana
- Uma vez por dia
- Várias vezes por dia

8. **T8. Principal meio de acesso a notícias ***

Marcar apenas uma oval.

- Redes sociais
- Jornais digitais
- Jornais em papel
- Outras - Televisão e Rádio
- Outra: _____

9. **T9. Em que tipo de histórias jornalísticas acha que narrativas visuais poderão ser mais úteis para melhorar a compreensão do leitor? ***

Ordene as suas escolhas de 1 a 7, sendo 1 a menos útil e 7 a mais útil.

Marcar apenas uma oval por linha.

	1	2	3	4	5	6	7
Notícias "cor-de-rosa"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cultura/Arte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tecnologia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ciência e Saúde	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Política	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desporto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Notícias genéricas/sem nenhum grupo em particular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. **T10. Qual destes recursos é mais importante para cativar o leitor? ***

Ordene, de 1 a 6, sendo 1 o menos importante e 6 o mais importante.

Marcar apenas uma oval por linha.

	1	2	3	4	5	6
Texto	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Imagem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interatividade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Áudio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vídeo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. **T11. Diga, de 1 a 5, a frequência com que vê narrativas visuais serem utilizadas em jornais para contar histórias mais complexas. ***

1 - Nenhuma; 2 - Pouca; 3 - Alguma; 4 - Bastante; 5 - Sempre

Marcar apenas uma oval.

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. **T12. Acredita que os jornais deveriam apostar mais no uso de narrativas visuais? ***

Marcar apenas uma oval.

- Sim
- Não - a utilização atual é suficiente

13. **T13. Avalie, de 1 a 5, o quanto o uso de elementos visuais facilita a compreensão de uma história jornalística ***

1 - Nada; 2 - Pouco; 3 - Razoavelmente; 4 - Bastante; 5 - Fulcral

Marcar apenas uma oval.

1	2	3	4	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. **T14. No que diz respeito a narrativas visuais e à sua compreensão pelo leitor, * avalie, de 1 a 5, a importância de cada um dos seguintes elementos.**

1 - Nenhuma; 2 - Pouca; 3 - Razoável ; 4 - Importante; 5 - Fulcral

Marcar apenas uma oval por linha.

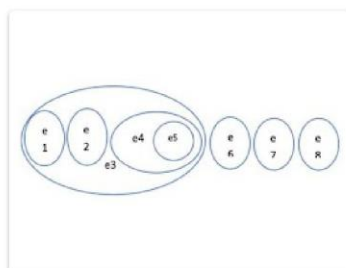
	1	2	3	4	5
Eventos/Acontecimentos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personagens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Breves descrições/Subtítulos /Leads	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Datas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Localizações	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Títulos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interatividade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. **T15. Qual das seguintes representações lhe parece ser mais perceptível a nível visual? ***

Marcar apenas uma oval.



Timeline --> forma ligações ao longo do tempo - Permite criar uma relação cronológica, de forma direta ou indireta



Hierarquia - estabelece uma relação hierárquica entre diferentes atores, elementos e/ou eventos - História conta-se a partir de pequenos sub-temas dentro de temas maiores

REPRESENTAÇÕES ILUSTRATIVAS

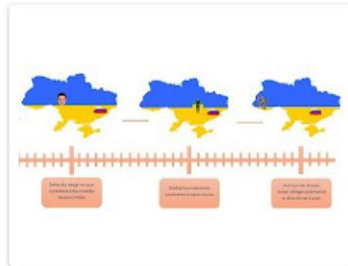
A partir deste momento começarão a ser mostradas algumas representações visuais de conceitos desenvolvidos. Caso tenha dificuldade ao visualizar as imagens apresentadas, pode consultá-las aqui:

<https://drive.google.com/drive/folders/1KibCFKjzyiVYDCYWLdk8VcfdIBC4ffaD?usp=sharing>

Case-study "Guerra Rússia - Ucrânia"

16. T16. No case-study "Guerra Rússia - Ucrânia", utilizando uma **TIMELINE** para contar a história, qual destas opções funcionaria melhor? *

Marcar apenas uma oval.



Timeline Geográfica -> mapa + emojis/grafismos



Timeline Horizontal Normal -> emojis/grafismos



Timeline Vertical -> eventos surgem verticalmente ao longo do tempo



Antes e depois -> Comparação visual direta entre o pré e pós guerra; conta, em simultâneo, a história ao longo do tempo e espaço

17. T17. Organize, de 1 a 4, sendo 1 a pior e 4 a melhor, as representações ilustrativas da pergunta anterior. *

Marcar apenas uma oval por linha.

	1	2	3	4
Timeline Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Horizontal Normal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Vertical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Antes e Depois	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. T18. Qual das seguintes opções é mais apelativa para contar esta narrativa? *

Marcar apenas uma oval.



Matrioskas (representação hierárquica) - eventos diários dentro de eventos semanais, dentro de eventos mensais, dentro do grande evento que é a guerra. O aspeto da matrioska deverá mudar consoante a notícia for, ou não, favorável à Ucrânia

Timelines são a melhor opção

19. T19. Qual é o melhor tipo de narrativa visual a adotar neste case-study? *

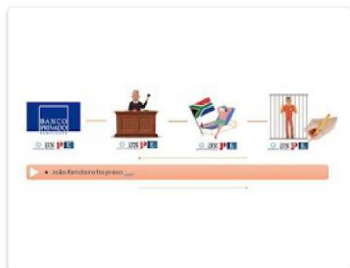
Marcar apenas uma oval.

- Timeline
- Hierarquia

Case-study "Rendeiro"

20. **T20. Relativamente ao case study "Rendeiro", qual destas TIMELINES funciona melhor?** *

Marcar apenas uma oval.



Desenhar a história --> lápis interativo vai desenhando elementos importantes



Mosaico de fotos --> pequenas imagens (representativas de eventos importantes) formam a imagem maior (história principal)



Círculo de eventos (timeline circular) --> pequenos acontecimentos agrupados ao redor da grande história

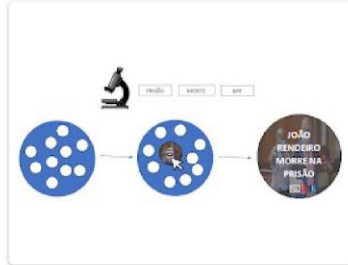
21. **T21. Organize, de 1 a 3, sendo 1 a pior e 3 a melhor, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

	1	2	3
Desenhar a história	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mosaico de fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Círculo de eventos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. T22. Qual das seguintes HIERARQUIAS funciona melhor no caso "Rendeiro"? *

Marcar apenas uma oval.



Microscópio -> eventos divididos em grupos (lamelas). Zoom do microscópio permite ver eventos dentro de eventos



Wordcloud -> Agrupa os eventos marcantes da história com base em algum elemento hierárquico (ex: grau de importância; o quanto recente é ou não o acontecimento; as vezes que foi lido; etc)

23. T23. Qual é o melhor tipo de narrativa visual a adotar neste case-study? *

Marcar apenas uma oval.

- Timeline
 Hierarquia

**Representações
 Genéricas -
 Qualquer
 contexto**

Independentemente do case-study, escolha as melhores opções para contar uma história a nível cronológico e hierárquico

24. T24. Se quiser contar uma história de forma CRONOLÓGICA e aplicá-la a QUALQUER CONTEXTO, qual é a representação que prefere utilizar? *

Marcar apenas uma oval.



Círculo de eventos



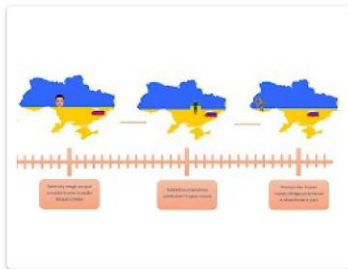
Mosaico de fotos



Desenhar a história



Timeline Horizontal Normal



Timeline Geográfica



Timeline Vertical



Antes e depois

25. **T25. Organize agora, de 1 a 7, sendo 1 a que menos prefere utilizar e 7 a que mais prefere, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

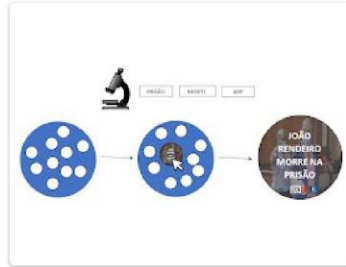
	1	2	3	4	5	6	7
Círculo de eventos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mosaico de fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Desenhar a história	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Horizontal Normal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Geográfica	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Timeline Vertical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Antes e depois	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. **T26. Para contar uma história de forma HIERÁRQUICA e aplicá-la a QUALQUER CONTEXTO, qual é a representação que prefere adotar?** *

Marcar apenas uma oval.



Matrioskas



Microscópio



Wordcloud

27. **T27. Organize agora, de 1 a 3, sendo 1 a que menos prefere utilizar e 3 a que mais prefere, as representações ilustrativas da pergunta anterior.** *

Marcar apenas uma oval por linha.

	1	2	3
Matrioskas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Microscópio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wordcloud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. **T28. Sugestões/comentários (opcional)**

Este conteúdo não foi criado nem aprovado pela Google.

Google Formulários

C.4 Double-Entry Tables – Survey T



		Tabloids	Culture / Art	Technology	Science and Health	Politics	Sports	Generic News
Less Useful   More Useful	1							
	2	14,3%	8,9%	3,6%	1,8%	3,6%	5,4%	5,4%
	3							
	4	14,3%	25,0%	57,1%	41,1%	7,1%	32,1%	8,9%
	5							
	6	0,0%	5,4%	10,7%	7,1%	8,9%	3,6%	7,1%
	7							

Table 27: T9's Positive vs Negative Spectre's Analysis.


		Text	Image	Colour	Interactivity	Audio	Video
Less Useful   More Useful	1						
	2	6,3%	0,0%	8,3%	8,3%	16,7%	10,4%
	3						
	4						
	5	10,4%	16,7%	8,3%	8,3%	0,0%	6,3%
	6						

Table 28: T10's Positive vs Negative Spectre's Analysis.

	Events	Characters	Short descriptions / Leads / Subtitles	Dates	Locations	Titles	Interactivity
None	0,0%	0,0%	0,0%	1,8%	0,0%	0,0%	5,4%
A Few							
Reasonable	7,1%	41,1%	44,6%	35,7%	35,7%	25,0%	71,4%
Important							
Essential	14,3%	14,3%	8,9%	12,5%	14,3%	7,1%	3,6%

Table 29: T14's Positive vs Negative Spectre's Analysis.

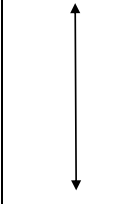
		Circle of Events	Before and After	Photomosaic	Vertical Timeline	Geographical Timeline	Draw the Story	Horizontal Timeline
Most preferred  Least preferred	7							
	6	5,4%	3,6%	1,8%	1,8%	7,1%	10,7%	12,5%
	5							
	4	1,8%	0,0%	0,0%	5,4%	3,6%	1,8%	1,8%
	3							
	2	7,1%	10,7%	12,5%	7,1%	3,6%	1,8%	0,0%
	1							

Table 30: T25's Positive vs Negative Spectre's Analysis.

Appendix D

D. Post-prototype Survey

Below one can check the final survey done to readers after the development of the prototype's 2.0 version. It is also possible to check the double-entry table that helped analyse the final question.

D.1 Reader's Final Survey (Survey F)

09/09/22, 16:55

Supporting Narratives in News Stories through Visualization - Inquérito sobre o Protótipo Final

Supporting Narratives in News Stories through Visualization - Inquérito sobre o Protótipo Final

Olá!

A elaboração deste inquérito enquadra-se no âmbito da minha Dissertação - "Supporting Narratives in News Stories through Visualization" - desenvolvida na Faculdade de Engenharia da Universidade do Porto.

Nesta fase final da investigação pretende-se compreender quer as forças, quer as limitações do protótipo desenvolvido, de modo a percebermos como pode o mesmo facilitar a compreensão de grandes histórias jornalísticas. Ao longo do inquérito vão ser apresentadas diversas imagens ilustrativas que permitam ao utilizador escolher qual a opção que melhor funciona em cada caso.

Todas as respostas são anónimas e os dados fornecidos serão utilizados unicamente para fins estatísticos, respeitando assim as normas de confidencialidade.

Agradeço, desde já, a ajuda e atenção dispensada :)

*Obrigatório

Informações Adicionais

Responda por favor às seguintes questões. O protótipo encontra-se [AQUÍ](#) para eventual apoio às suas respostas, mas só pode ser consultado em computadores, por ser uma versão para desktop.

O preenchimento do inquérito leva cerca de 2 a 5 minutos e as questões são todas de escolha múltipla.

Informação Demográfica

1. F1. Idade *

Marcar apenas uma oval.

- 15-17
- 18-24
- 25-39
- 40 ou mais

2. F2. Género *

Marcar apenas uma oval.

- Masculino
- Feminino
- Prefiro não dizer

3. F3. Habilitações Académicas *

Marcar apenas uma oval.

- Secundário
- Licenciatura
- Mestrado
- Doutoramento
- Outro

**Funcionalidades
do Sistema**

As perguntas seguintes vão dar-lhe a escolher uma de duas opções. O objetivo é perceber qual a opção que funciona melhor em cada um dos cenários apresentados.

4. F4. Quão importante é a página inicial e a explicação que oferece de como utilizar o protótipo? *



Marcar apenas uma oval.

1 2 3 4 5

Nada Importante Extremamente Importante

5. F6. Quão importante é a página que oferece background/informação adicional da narrativa? *

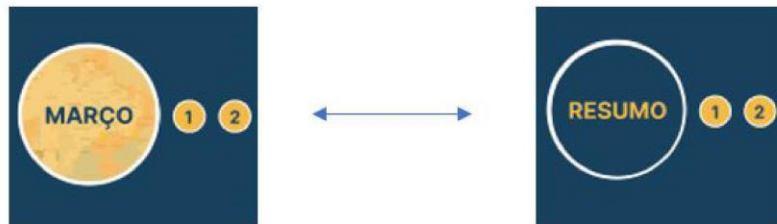


Marcar apenas uma oval.

1 2 3 4 5

Nada Importante Extremamente Importante

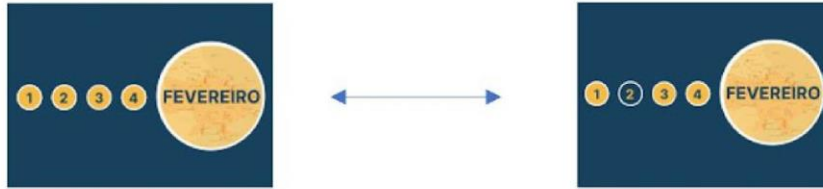
6. F7. Tendo em conta as suas funções, os botões circulares de resumo mensal: *



Marcar apenas uma oval.

- Têm o destaque/tamanho necessário
- Têm demasiado destaque/são demasiado grandes

7. F8. Tendo em conta as suas funções, os círculos mais pequenos, correspondentes a eventos: *

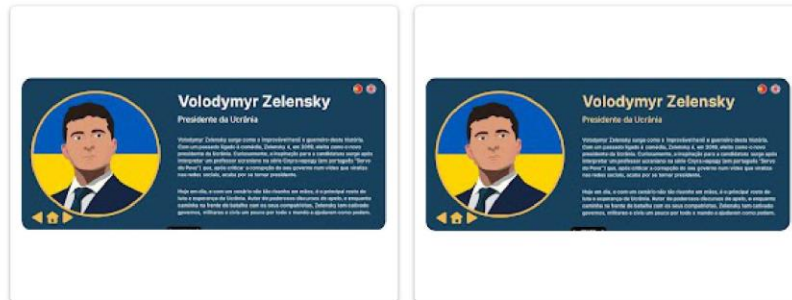


Marcar apenas uma oval.

- Têm o destaque/tamanho necessário
- Têm pouco destaque/são demasiado pequenos

8. F9. Qual das seguintes opções é preferível para consultar um personagem? *

Marcar apenas uma oval.



- Nome e cargo da mesma cor do texto
- Nome e cargo de cor diferente do texto

9. F10. Qual das duas opções é preferível para consultar um evento? *

Marcar apenas uma oval.



Título e data de cor diferente do texto

Título e data da mesma cor do texto

10. F11. Considera que o texto anotado pode ser útil para destacar pessoas, locais, datas e/ou instituições importantes? *

Marcar apenas uma oval.



Sim, é útil.

Não é necessário.

11. F12. Qual das seguintes opções visuais acompanha melhor a descrição do evento? *

Marcar apenas uma oval.

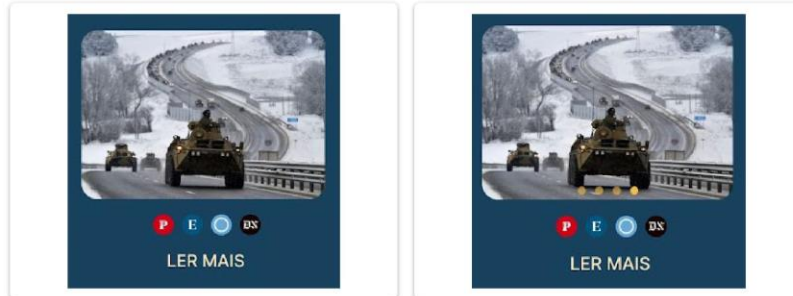


Imagem única.

Fotogaleria.

12. F13. Quão importante é para si ter a opção de consultar informação adicional em jornais digitais, além da disponibilizada no sistema? *

NOTA: Por ser meramente representativa, esta função não se encontra ativa.



Marcar apenas uma oval.

1 2 3 4 5

Nada Importante Extremamente Importante

13. F14. Qual das seguintes opções é mais apelativa? *

Marcar apenas uma oval.



Ilustração do personagem.



Fotografia do personagem.

14. F15. Qual das seguintes opções funciona melhor? *

Marcar apenas uma oval.



Atribuir um número diferente a cada capítulo da história.



Reiniciar a contagem de capítulos sempre que um novo mês começa.

15. F16. Quão importante é para si ter no protótipo a opção de obter conhecimento adicional sobre locais e/ou personagens envolvidos na história? *



The card features a circular portrait of António Guterres on the left, set against a blue background with the UN logo. To the right, the text reads: 'António Guterres', 'Secretário-geral das Nações Unidas', and two paragraphs of biographical information. At the bottom left of the card are navigation icons: a left arrow, a house icon, and a right arrow.

Marcar apenas uma ova.

1 2 3 4 5

Inútil Essencial

16. F17. Tendo em conta tudo o que o protótipo já disponibiliza, quão importante seria para si ter uma hiperligação para informação externa mais pormenorizada sempre que algum local ou instituição fossem mencionadas? *



Marcar apenas uma oval.

1 2 3 4 5

Nada Importante Extremamente Importante

17. **F18. Quão útil é para si a funcionalidade de resumo mensal em vídeo? ***

NOTA: Por ser meramente representativa, esta função não se encontra ativa.



Marcar apenas uma oval.

1 2 3 4 5

Nada Útil Extremamente Útil

18. **F19. Quão importante é a utilização de storylines (cronologias e imagens) para a compreensão de uma narrativa? ***



Marcar apenas uma oval.

1 2 3 4 5

Inútil Essencial

19. **F20. Quão útil seria para si uma eventual funcionalidade de associação de personagens aos eventos da timeline?** *

NOTA: Nem a seta, nem o sublinhado apareceriam. A única indicação de que o personagem participa em determinado evento seria a mudança do referido evento. Quer a seta, quer o sublinhado servem meramente para facilitar a resposta a este inquérito.



Marcar apenas uma oval.

1 2 3 4 5

Nada Útil Extremamente Útil

20. **F21. Considera que a opção de mudar o idioma é útil? ***

NOTA: Por ser meramente representativa, esta função não se encontra ativa.



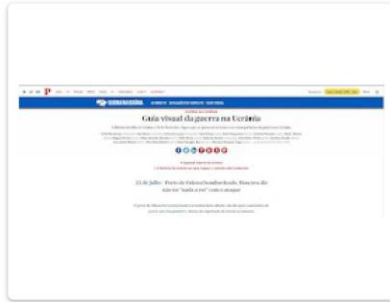
Marcar apenas uma oval.

Sim

Não

21. F22. Para a compreensão e análise de uma história ao longo de 6 meses, qual das seguintes opções prefere? *

Marcar apenas uma oval.



Leitura de artigos individuais e/ou resumos realizados por jornais, (como por exemplo o Guia Visual da Guerra na Ucrânia, feito pelo Público, que combina texto corrido com imagem e vídeo).

Protótipo em questão.

22. F23. As seguintes imagens foram retiradas de diversos jornais digitais a nível nacional e mundial e retratam, de diferentes formas, a Guerra Rússia-Ucrânia. Ordene, de 1 a 6, os componentes abaixo ilustrados, desde aquele que menos eficazmente apresenta a informação (1), ao que mais eficazmente o faz (6).

OPÇÃO A


Feb. 29/23
Russia loses 'winning'

After weeks of learning of Russian advances of Ukraine war, the Biden administration issued a report that the Russian military, while making significant gains in Ukraine, is losing momentum. Analysts and Russian forces now "winning will have gained the war."

Feb. 24
Ukraine wins

Ukraine's military on February 24, Russia launched a full-scale invasion of Ukraine. The invasion resulted in the loss of several hundred thousand lives and millions of Ukrainians with gender inequality and human rights issues in the world. From Ukraine's perspective, it is the war.

OPÇÃO B



OPÇÃO C


Assessing Russia's War in Ukraine

Feb. 29, 2022


As the Russian military advances in Ukraine, the Biden administration has issued a report that the Russian military, while making significant gains in Ukraine, is losing momentum. Analysts and Russian forces now "winning will have gained the war."

Ukraine's military on February 24, Russia launched a full-scale invasion of Ukraine. The invasion resulted in the loss of several hundred thousand lives and millions of Ukrainians with gender inequality and human rights issues in the world. From Ukraine's perspective, it is the war.


OPÇÃO D



OPÇÃO E



OPÇÃO F



Marcar apenas uma oval por linha.

	1	2	3	4	5	6
Opção A - Recurso ao texto anotado e texto simples	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opção B - Recurso a vídeos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opção C - Recurso a texto simples	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opção D - Recurso ao texto simples e imagens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opção E - Recurso a gráficos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opção F - Recurso a imagens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Este conteúdo não foi criado nem aprovado pela Google.

Google Formulários

D.2 Efficiency of Each News Presentation Type


		A	B	C	D	E	F
		Noted and simple text	Videos	Simple text	Simple text and images	Graphics	Images
Less Efficient  More Efficient	1	60%	20%	61%	10%	17%	32%
	2						
	3	18%	44%	29%	39%	31%	38%
	4						
	5	22%	35%	10%	51%	51%	30%
	6						
	7						

Table 31: Positive and Negative Spectre's Analysis of the Efficiency of Each News Presentation Type.

Appendix E

E. Prototype

The non-functional prototype, developed in Figma, can be found and tested in <https://www.figma.com/proto/pvmUPFng7CyPJyk4E0Nq65/Prot%C3%B3tipo-5.0?node-id=225%3A2889&scaling=min-zoom&page-id=0%3A1&starting-point-node-id=225%3A2889>. In order to make it possible to observe all its functionalities, we have implemented in it a case-study: the Russia-Ukraine War.

Due to the fact that our survey was aimed at Portuguese people, we opted to create the prototype in Portuguese, in order to reach a wider range of people. A screenshot of its Home Page follows below (Figure 87).



Figure 87: Prototype's Homepage.