Use of ludic design to fight disinformation: newsgames as a tool to raise awareness about hoaxes

Uso del diseño lúdico para combatir la desinformación: los newsgames como herramienta para la concienciación sobre los bulos

Usando um design divertido para combater a desinformação: newsgames como uma ferramenta para aumentar a conscientização sobre fraudes

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Abstract

The rise of social media, together with a particularly convulsive political situation, has fostered the spread of fake news and other information disorders. In this context, several media outlets and non-profit institutions have launched different verification initiatives with the objective of empowering individuals to critically evaluate fake news. The objective of this research is to explore the potential of five newsgames designed to educate users against disinformation. The methodological proposal is based on an exploratory content analysis of the newsgames, to identify the mechanics, dynamics, and narrative formulas used in its design. Our findings reveal that the correct choice of mechanics and dynamics allows complex arguments to be created in a way that is consistent with news standards. Thus, the intersection of journalism, education, and gaming facilitates "information-driven media" in which news content is constructed through interaction with the game system and is not included just as an accessory element.

Key Words: *Newsgame; Disinformation; Misinformation; Fake news; Playful design; Gamification*

Resumen

El auge de las redes sociales, junto a una situación política particularmente convulsa, fomentan la proliferación de bulos y otros trastornos de la información. En este contexto, algunos medios e instituciones sin ánimo de lucro han desarrollado iniciativas de verificación para mostrar cómo detectar y evaluar críticamente las noticias falsas. La presente investigación tiene como objetivo analizar el potencial de cinco newsgames *diseñados para educar a los usuarios contra la desinformación. La propuesta metodológica se basa en un análisis exploratorio del contenido y la estructura de cada* newsgame *con el objetivo de identificar las mecánicas, dinámicas y fórmulas persuasivas empleadas en su diseño. Los resultados muestran cómo la correcta elección de los recursos lúdicos permite crear argumentos complejos de forma consistente con los estándares informativos. En este sentido, la intersección del periodismo, la educación y el juego potencia un nuevo modelo informativo en el que el contenido se construye a través de la interacción con el sistema de juego y no como un simple elemento accesorio.*

Resumo

O surgimento de redes sociais, juntamente com uma situação política convulsiva, levaram à proliferação de trotes e outros distúrbios da informação. Nesse contexto, algumas mídias e instituições sem fins lucrativos desenvolveram iniciativas de verificação para mostrar à sociedade como detectar e avaliar criticamente notícias falsas. Esta pesquisa tem como objetivo analisar o potencial de cinco newsgames *criados para educar contra a desinformação. A proposta metodológica é baseada em uma análise exploratória do conteúdo, a fim de identificar as mecânicas, dinâmicas e fórmulas persuasivas utilizadas em seu projeto. Os resultados mostram como a escolha correta dos recursos recreativos permite que argumentos complexos sejam criados de maneira consistente com os padrões de qualidade jornalísticos. Nesse sentido, a interseção de jornalismo, educação e jogos facilita um novo modelo informacional no qual o conteúdo é construído através da interação com o sistema de jogo e não simplesmente como um elemento acessório.*

1. Introduction: the increase of misinformation in the digital ecosystem

The phenomenon of misinformation[1] represents the collapse of the old order of traditional journalism in the digital media ecosystem. As Waisbord (2018: 171) argues, "the development of post-truth bears witness to a new chapter in the old struggle for the definition of truth: governments waging propaganda wars, elites and large corporations competing to dominate news coverage, with the continued efforts of conventional journalism to assert its authority".

Disinformation has become a common term in political and journalistic language, linked to strategies developed by governments, institutions, or companies with the aim of manipulating public opinion (Valero and Oliveira, 2018; Zhou and

Zafarani, 2018). The popular expression *fake news* is conceptually inappropriate to refer to the phenomenon because all news by its very nature must be true (Tandoc, Lim and Ling, 2018). Both the Final Report of the High-Level Panel on Disinformation (European Commission, 2018) and the World Economic Forum Report (2019) argue that the term "false news" should not be used when referring to hoaxes, falsehoods, or disinformation. More appropriate terms have been proposed, such as "information disorders" (Wardle and Derakhshan, 2017), "media manipulation" (Marwick and Lewis, 2017) or "digital disinformation" (Valero and Oliveira, 2018).

Disinformation, understood as "information that is false and deliberately created to harm a person, social group, organization or country" (Wardle and Derakhshan, 2017: 20), occurs when using language manipulation techniques, digital image alteration and intentional deception (García-Avilés, 2009). However, considering events such as the 2016 US elections, the Brexit and the COVID-19 pandemic, hoaxes have proliferated increasingly in social media, messaging channels and search engines, through a sophisticated use of algorithms, Big Data techniques and Artificial Intelligence tools (Pérez-Dasilva, Meso-Ayerdi and Mendiguren-Galdospín, 2020; Spohr, 2017).

In this context, the media and many educational institutions have launched different verification initiatives with the aim of creating critical awareness and enabling citizens to evaluate different types of hoaxes and falsehoods (Vizoso and Vázquez-Herrero, 2019). In some instances, playful design has been useful to show users the verification processes and disinformation strategies in a fun, didactic and participatory way (Gómez-García and Carrillo-Vera, 2020; Roozenbeek and Van Der Linden, 2019a).

The aim of this article is to investigate the potential of newsgames, interactive formats that combine playful and informative elements, to educate users against misinformation. To this end, we analyse the design of five newsgames produced by the BBC (UK), Al Jazeera News (Qatar), RTVE Lab (Spain), American University (USA) and the media literacy organisation DROG (Netherlands). These formats contain different playful design strategies with the aim of showing users how to investigate content suspected of being fake and learn about the process of making hoaxes.

Specifically, three research questions are posed:

- RQ1: What persuasive and narrative strategies do newsgames use to build arguments against disinformation?

- RQ2: What persuasive, informative, and playful resources are involved in their design?

- RQ3: To what extent does the structure and design of a newsgame enhance the way in which users interact and perceive the effects of disinformation?

1.1. Validation processes during the consumption of disinformation

Microblogging platforms and social media on the World Wide Web facilitate direct access from producers to consumers (disintermediation) and transform the way users inform themselves and shape their opinions in the digital ecosystem (Waisbord, 2018). The proliferation of links in online content and making it viral through social media and messaging platforms such as WhatsApp (Lotero-Echeverri, Romero-Rodrí-guez and Pérez-Rodríguez, 2018) encourage the proliferation of hoaxes, a breeding ground for disinformation. Digital disintermediation can encourage the spread of rumours, since belief formation is influenced by the way users process information through "a shared system of meaning and a collective framing of narratives that are often biased towards self-confirmation" (Rojecki and Meraz, 2016: 38).

According to Bakir and McStay (2018), some factors in the digital ecosystem account for the popularity of information disorders: the financial decline of traditional media, the speed of the news cycle, the rapid circulation of disinformation with content generated and shared on networks, the emotional nature of online discourse and the use of algorithms in social media and search engines.

Social media have become the preferred source of learning about current events (Vosoughi, Roy and Aral, 2018) and hoaxes often spread rapidly on these platforms. In addition, studies on news consumption among adolescents reveal changing attitudes about what it means to be informed and a preference for news that is highly subjective (Marchi, 2012).

Individuals prefer information that confirms their pre-existing attitudes (selective exposure), regard news that is consistent with their beliefs as more persuasive

than dissonant news (confirmation bias) and tend to accept information that pleases them (Lazer et al., 2018). Various mechanisms encourage the flow of disinformation that validates an individual's false beliefs, although there is limited evidence on whether the problem of disinformation is increasing (Nyhan and Reifler, 2015).

Tandoc et al. (2017) provide a conceptual framework for understanding how individuals take for granted the information they consume on the internet and argue that people tend to engage in a two-step authentication process, both internal and external. Internal acts of authentication refer to an individual's initial encounter with the news. At this first level, the individual relies on three authentication frameworks: the self, the source, and the message. However, if the individual is not convinced by the authenticity of the information, he or she prefers external acts of authentication, which may be intentional or incidental, as they depend on interpersonal and institutional resources (Tandoc et al., 2017).

The dissemination of hoaxes with the intention of misleading the public has become a global problem, reinforced by the ubiquity of the Internet, the potential virality and the fact that many people perceive most news according to their own prejudices and are unable to identify misinformation when it is presented to them (van der Linden, Panagopoulos and Roozenbeek, 2020). The ecosystem of the digital media is transforming the dynamics of information dissemination and facts are being mixed with falsehoods in a process that reflects an impoverishment of journalistic ethics (García-Avilés, 2016; Marwick and Lewis, 2017).

1.2. The playful design of newsgames and their persuasive power

The origin of the term newsgame is attributed to the video game designer Gonzalo Frasca (Galloway, 2004), who defines them as a type of video game where "simulation is mixed with political satire" (cit. in Galloway, 2004: 3). Frasca argues that newsgames can be useful for understanding and debating relevant news, while underlining their strong ideological and oppressive component. This trend, predominant in the analysis of newsgames in the first decade of the millennium, argues that newsgames do not offer an objective representation of facts, but an ideological expression (Meier, 2018).

In recent years, however, trends have emerged that highlight the informative power of the format. According to Plewe and Fürsich (2018), newsgames need not be limited to the role of persuading or editorializing, but "can provide contextual information, just like documentaries or news reports" (2018: 3). Several studies have conceptually limited the newsgame according to its formal characteristics (Meier, 2018; Zehle, 2012), its purpose (Gómez-García and Cabeza-SanDeogracias, 2016; Gómez-García and Navarro-Sierra, 2013; Sicart, 2008) or its design (García-Ortega and García-Avilés, 2018). Bogost, Ferrari and Schweizer (2010, p. 13) define newsgames as "the intersection between journalism and play". For Wiehl (2014), the format consists of video games that combine "real-world based sources with interactive virtual experience and process rhetoric, thus opening a space for dynamic experimentation, analysis and in-depth discussion". Most of the proposals share a common argument: newsgames make the most of user interaction to convey ideas and experiences.

While traditional media use classic persuasive techniques based on verbal and visual rhetoric, video games explore the persuasive power of processes (Deterding et al., 2011) through procedural rhetoric. According to Bogost (2007), procedural rhetoric is based on the reinforcement of argumentation through processes, in the same way that visual rhetoric uses images and verbal rhetoric, oratory. Its advantage lies in the ability to show how things work in a practical way. Thus, thanks to the user's participation, more vivid experiences are presented than through traditional rhetorical formulas (Bogost, 2007: 45).

Within the sphere of human-computer interaction, there are various techniques that allow for the modification of behaviour or the encouragement of certain behaviours: reduction strategies, guided persuasion, suggestion, monitoring, surveillance, and conditioning (Fogg, 2003: 32). Guided persuasion means that "computer technology can lead users through a process or experience" with more opportunities to engage them (Fogg, 2003: 36).

The information included in a newsgame is more persuasive if it fits the users' needs and other relevant factors such as their interests, personality, or context of use (Zehle, 2012). Similarly, technological resources will increase their persuasive power if they are used at the most appropriate times. The principle of self-monito-

ring is based on the idea that allowing users to monitor themselves enhances the modification of attitudes and behaviours, and contributes to achieving pre-determined objectives (Fogg, 2003: 44). On the other hand, the theory of conditioning is based on the use of positive and negative reinforcements to punish, motivate, or encourage the user (Fogg, 2003: 48).

The theory of inoculation stresses the role of counter-argumentation as a factor of resistance to persuasion (McGuire, 1964). Applied to persuasion, inoculation consists of increasing the resistance potential of a subject to a persuasive communication, exposing him previously to reduced doses of that communicative content, to increase his defences and his possibilities of counterargument before being exposed to the definitive attempt of persuasion. According to McGuire (1964), inoculation is more effective in resisting future persuasion than the simple prior exposure of the subject to arguments that reinforce his own convictions. In short, according to the theory of inoculation, individuals' convictions should be tested so that, by reacting, they strengthen them and become resistant to future attacks. Along these lines, a study based on the inoculation of counterarguments in a newsgame on disinformation reduced users' trust and suggestion towards false content related to a current event (Roozenbeek and Van Der Linden, 2019a).

Unlike other genres where the treatment of information follows traditional journalistic criteria, newsgames include rhetorical formulas based on interaction and participation (García-Ortega and García-Avilés, 2018). The format allows for the reinforcement of user literacy when facing hoaxes (Chang et al., 2020) and has been shown to increase psychological resistance to different types of misinformation (Roozenbeek and van der Linden, 2019a; 2019b). Therefore, to understand how newsgames work, we conducted an exploratory analysis of various interactive formats.

2. Material and method

2.1. Sample

To select the sample, a search was carried out using keywords (newsgames, disinformation, fake news) on various platforms (Twitter) and search engines (Google,

Bing, and DuckDuckGo). A total of eight newsgames related to disinformation were identified and analysed. Finally, a stratified sample of five newsgames dealing with disinformation was selected, three produced by the media and two by educational institutions in different geographical areas: BBC (UK), Al Jazeera News (Qatar), RTVE Lab (Spain), American University (USA) and the media literacy organisation DROG (The Netherlands).

An information-driven selection was used to select the stratified sample of newsgames, which is applied when maximizing the usefulness of unique cases based on expectations about their content (Flyvbjerg, 2006). In addition, the criteria of representativeness (different types of playful design), topicality (interactives published in the last five years) and relevance (public recognition and/or professional criticism within the field of new narratives) were followed.

The analysis of case studies allows the study of situations that present multiple variables linked to the context in which they are developed (Martínez-Carazo, 2006). This method has been contemplated as a valid tool to analyse contemporary phenomena in their own context (Yin, 2003: 13). The exploratory cases chosen in this research represent various journalistic and playful traditions and use a variety of rhetorical formulas to convey ideas and arguments about disinformation. In addition to the use of visual elements (visual rhetoric) and text elements (verbal rhetoric), the newsgames selected are structured around a series of mechanics and dynamics (process rhetoric) that determine the way in which the user interacts and perceives the information.

Below is a summary of the five case studies:

Guerra a la mentira (RTVE Lab, 2017). Interactive on the processes of verification of data from open sources. It includes three different episodes: the Omran case of a bombing of the civilian population, the case of Malasya Airlines flight MH17 shot down in Ukraine, and the case of the attack on a United Nations humanitarian convoy in Syria. They all follow a similar structure: an introductory video presents the facts, a simulated chat in which the user must interact with other characters, an interactive challenge, and the conclusion.

iReporter (BBC, 2018). In this format, the user takes on the role of a member of a team of journalists (the BBC Live Team), with the mission of maintaining a balance between accuracy, impact and speed during the coverage of a news crisis. The interactive uses a conversational navigation system in which the user must make decisions and interact with the different characters to advance the narrative and get to the point of refining the truth about what happened.

#Hacked (Al Jazeera News, 2016). This newsgame informs about the techniques and tools available to fight cyber-attacks. Like the previous cases, it uses a conversational narrative through a simulated chat. One of the most interesting aspects is its completely vertical design, which simulates the interface of a mobile phone.

Factitious (The American University Game Lab, 2017). Newsgame developed by the American University Game Lab and the production company JOLT, with a simple structure in which the user must learn to differentiate between authentic and false news. It is structured in different levels of difficulty, for high school, college, and university audiences, and includes numerous resources for educators.

Bad News (DROG, 2018). Newsgame created by the Dutch association of journalists and academics DROG. Unlike the previous cases, Bad News does not show techniques to fight misinformation, but strategies to create it. Through a conversational narrative with an anonymous narrator, the user must make a series of decisions to generate hoaxes and gain popularity on social media.

2.2. Instrument

The research methodology is based on an exploratory analysis of the content, with the aim of identifying the mechanics, dynamics and narrative formulas used to show the verification processes. To carry out the analysis, a qualitative matrix was designed (Table 1) inspired by the works of García-Ortega and García-Avilés (2018), Planells (2015) and Fogg (2003). The analysis tool, which allows the journalistic and playful qualities of a newsgame to be measured, was tested in previous research (García-Ortega and García-Avilés, 2018). It also incorporates the catalogue of game mechanics established by Planells (2015) and the strategies and techniques of persuasion described by Fogg (2003).

Persuasive logics and processes	Reductive technology: persuasion through simplification
	Tunnelling technology: guided persuasion through a predefined sequence of actions.
	Personalization technology: persuasion through the personalization of content.
	Suggestive technology: intervention at the right moment.
	Self-monitoring technology: self-evaluation of the process.
	Surveillance technology: persuasion through the observation of behaviours.
	Conditioning technology: positive or negative reinforcement of behaviour.
Informative elements	Focus: there is a precise goal in how the topics are dealt with.
	Narration: it is narrated in a clear and articulated way, so that it can be properly understood.
	Impartiality: balance in the treatment of news.
	Relevance: it provides relevant information to users and it shows its implications for the decisions on public matters.
	Connection: ability to connect with the public's interests.
	Ethics: it follows the basic ethical principles and human dignity.
	Writing: correctness in the writing of the text.
	Use of sources: its own and verified sources are used.
Ludic elements and mechanics	Interface and game control: how the user plays and interacts with the public.
	Information: the kind of information that is shown to the user.
	Space: areas or scenarios that make up the space of the game.
	Resources: how the available resources are managed.
	Time: how the time of the game experience develops.
	Social: actions of a social nature among different players.

Table 1: *Coding tool used in the analysis.*

Source: Authors

2.3. Procedure

Each interactive was analysed using a series of predefined categories that include five areas of newsgame design: playful tools, procedural logic, information elements, learning strategies and the level of user participation. The same researcher oversaw the analysis using a previously elaborated code book and the tool categories to maintain consistency in the coding guidelines (Macnamara, 2005). After the individual analysis of each newsgame, the results were compared to identify patterns, coincidences, and discrepancies.

3. Results: analysis of the newsgames

3.1. Procedural and persuasive logics

Most of the cases analysed use a storyline structure in which actions and events follow a predetermined sequence. #Hacked, Bad news, iReporter and Guerra a la mentira present a similar approach. Through a conversational narrative, each interactive shows a conflict and various response options from which the player must decide. However, although the user can choose which path to take, all the options are pre-designed and lead to a predefined sequence. This type of resource is very useful for both users and designers. From the user's point of view, the path is easier when presenting closed response options. In the case of the designer, it allows control of the experience to be maintained, since the result of any decision taken by the player is defined beforehand. In this way, both the design process and its playability are simplified. In addition, the possibility of exploring different paths and sequences gives the user a false sense of freedom that enhances engagement and intrinsic motivation (Fogg, 2003).

As far as the identified suggestion logics are concerned, only Bad News and iReporter offer direct advice and suggestions. The Bad News narrator repeatedly addresses the user to suggest actions at key moments. For example, when he or she must decide between several response options or make a risky decision. In the case of iReporter, it is the characters themselves who suggest which decisions they consider most appropriate for the challenge or conflict at hand.

These include whether to publish a comment, to wait to contrast information or to trust a source. However, they always leave the final decision to the player so as not to break the sense of freedom (Image 1).
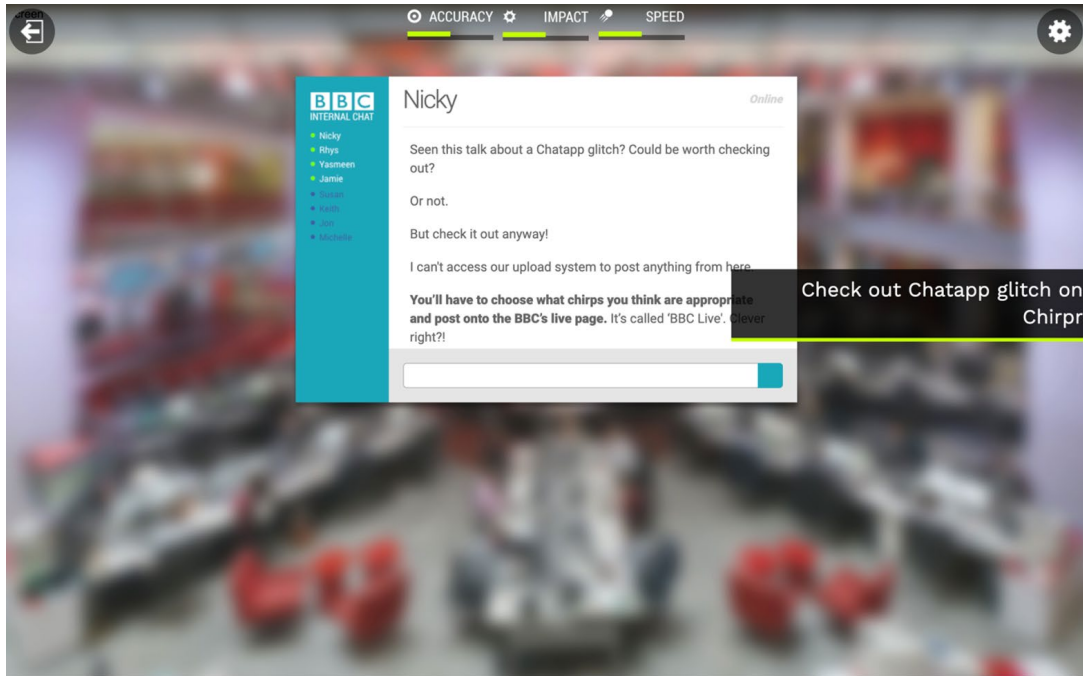

Figure 1: *Suggestion techniques used in iReporter.*
Source: BBC.

The most used persuasive logic is operant conditioning. In the field of video games, positive and negative reinforcements are based on the use of sound and visual elements. In addition, it is common to see rewards such as medals, change of level, accumulation of points or a ranking with the best scores. All the newsgames analysed use some form of positive and/or negative reinforcement. Bad news awards medals as the user completes certain actions, such as creating a false profile on social networks, spreading conspiracy theories, or appealing to the emotions and fears of the readers. In Factitius there are different levels of difficulty that the user can access when carrying out a series of challenges. #Hacked and iReporter are structured in consecutive chapters, so that the user

must complete all the challenges to access the next chapter. Finally, Guerra a la mentira uses several challenges and mini games that the user must overcome to finish the experience.

From the point of view of negative reinforcement, some newsgames such as Bad News or iReporter, include the possibility of losing points using feedback and progress indicators. Both positive and negative reinforcements are included immediately after the action is performed. In this way, the user understands the consequences of his decisions and is enabled to improve in future attempts. In addition, the unpredictability of the outcome - the player never knows what reward or punishment a particular action will bring - has proved to be a useful strategy for encouraging engagement with content (Fogg, 2003). Newsgames thus use the theory of inoculation to test users' convictions and expose them to counterarguments about disinformation techniques.

In general terms, although all newsgames use similar persuasive formulas, they have clear differences in terms of their purpose. Guerra a la metira, #Hacked and iReporter rely on suggestion and tunnelling to highlight and promote actions against false news. In contrast, BadNews, despite using the same persuasive formulas, does so to show the processes and techniques by which disinformation is created. These are two opposing strategies with the same objective: to provide users with the necessary tools to detect false news and disinformation strategies.

3.2. Informative elements

As far as the informative elements are concerned, most of the newsgames meet all the analysis criteria. In terms of approach, the five formats make clear their purpose both in the text (verbal rhetoric) and in the choice of game mechanics (procedural rhetoric). Factitious provides users with resources and tips to differentiate between reliable and unreliable sources of information. Guerra a la mentira focuses on the processes of data verification in open sources. iReporter shows the user the difficulty of maintaining a balance between accuracy, impact and speed when competing for the last hour. Bad News shows

the processes and methods used by some people to create false news and mis-information techniques. Finally, #Hacked reveals various strategies to protect against potential cyberattacks.

Due to the theme and pedagogical purpose of the newsgames, all five are designed and written in a clear, direct, and accessible way. Furthermore, they offer relevant information for public decision-making, the reliability of sources and the techniques needed to differentiate news from hoaxes or fake news. This information is presented to the user in two ways. On the one hand, in a procedural way thanks to the interaction and participation of the user, the decision making and the presence of a branched structure with different response options. On the other hand, in a textual way using messages and recommendations. In the case of Factitious, after classifying the news into true or false, the interactive format offers a series of clues about the reliability of the sources used by the media. In the case of iReporter, the newsgame's characters themselves send messages to the player to indicate the consequences of their decisions.

As far as the use of sources is concerned, there are significant differences. Factitious is based on news items published in various media and includes the original source of the news piece. Bad News and iReporter, on the other hand, use completely fictional stories, so the sources and characters in the story are not real. Besides, although Guerra a la mentira and #Hacked use conversations and characters that are fictitious, they pose situations based on real events. Moreover, both newsgames include additional resources that allow the user to expand the information and consult the original source. Guerra a la mentira includes a section of "Tutorials" where the user can check clues to complete the final challenges, complementary investigations and a dictionary with the technical terms used in the narration (Image 2). On the other hand, #Hacked has a secondary menu that shows interviews, news, and reports about the cyberattacks published by Al Jazeera News.
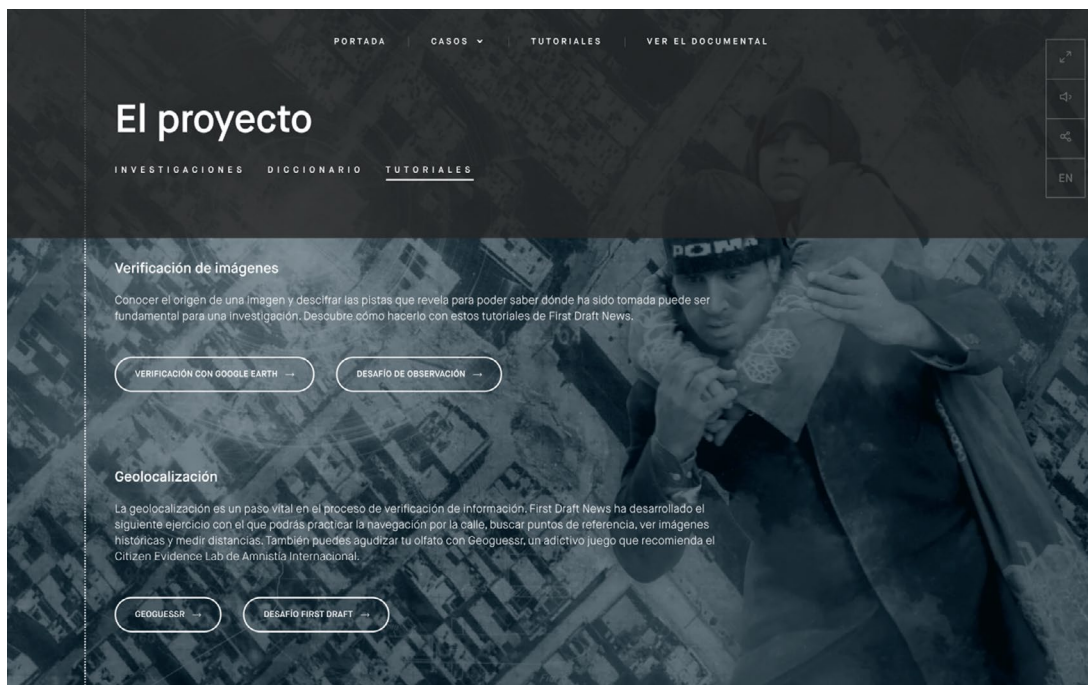
Figure 2: Tips and tutorials section of Guerra a la mentira.
Source: RTVE Lab.

As far as ethics and impartiality of content are concerned, most cases respect the principles of truthfulness and honesty. They use proven information, include complementary documents and links that offer different points of view and show the verification processes used by different media. However, there is one exception. In the case of Bad News, the aim is to show how situations of misinformation occur by involving the user in their creation. Therefore, both the information and the situations that arise are deliberately manipulated.

3.3. Playful and mechanical game tools

Most newsgames share certain similarities in the interface, game control and information displayed to the player. #Hacked, Guerra a la mentira, iReporter and Bad News all rely on a conversational narrative that allows the user to interact with different characters. In the first three cases, the conversation is established

between the user and fictitious characters - friends, colleagues, expert sources... - who help him/her to make decisions. In the case of Bad News, the interaction is limited to the player and an anonymous narrator, who presents the facts and guides the user through the experience.

In terms of the interface, #Hacked and Guerra a la mentira use a simulated chat that is reminiscent of current messaging systems. In iReporter, the user interacts with the characters through simulated video calls received from their companions, both from a smartphone -video in vertical format- and from a computer -horizontal videos-. Bad News also uses a conversational narrative, although the interface is much simpler. It only includes a marker with feedback and progress elements and a minimalist window where the narrator's messages appear. Finally, Factititus uses a simple interface with news published by different media and two buttons to choose whether it is a real news or a hoax.

From the point of view of the mechanics linked to the information, the newsgames use complete information strategies, i.e., the user always knows how the game mechanics work and their effects on the system. In this sense, all the newsgames analysed include clues and indicators that help the player to make decisions efficiently. In the case of iReporter and Bad News, it is the characters themselves who offer advice to the player, while Guerra a la mentira, #Hacked and Factitious include complementary sections with tips and tutorials.

As far as resources are concerned, although there are no collectibles or objects for the user to collect, two newsgames employ mechanics linked to resource management to provide the user with information about their performance. On the one hand, Bad News includes a series of medals that can be unlocked by correctly performing certain challenges. On the other hand, in iReporter, the user must maintain a balance between accuracy, impact and speed, visible always thanks to a progress bar.

Finally, from the point of view of the mechanics linked to the space, it should be noted that no interactive format provides relevant proposals. All the newsgames are based on a simple spatial structure, in which the game space does not include a virtual world or differentiated areas. The highest level of playability is concentra-

ted in the mechanics linked to information, control, and resources. On the other hand, the social mechanics are non-existent, since no newsgame offers the possibility of creating alliances, competing, or exchanging resources with other players.

As for the complexity of the design, it is relevant that all newsgames have a very simple structure. Four of the five cases analysed use a conversational narrative with predefined answers. The mechanics and dynamics used are limited to the selection of the different options. Unlike other newsgames with a more elaborate playful design - stage or virtual world presence, character customisation, object collection, open world... - the newsgames analysed offer a limited variety of playful resources. Moreover, from the aesthetic point of view, some interfaces such as Bad News and Factititus, use a minimalist style with very limited audio-visual resources.

4. Discussion and conclusions

Newsgames have proved to be great allies in promoting user participation (Ferrer-Conill and Karlsson, 2016), improving engagement (Gómez-García and Cabeza-San Deogracias, 2016) and connecting with younger audiences (Meier, 2018). The possibility of presenting information in a visual, didactic, and participative way makes them a useful format for transmitting complex messages (Sicart, 2008; Wiehl, 2014), as in the case of disinformation and hoaxes. The newsgames analysed are based on some elements of the inoculation theory to offer arguments from a double perspective. In Guerra a la mentira, iReporter, Factitious and #Hacked, the player learns how to use the tools to combat disinformation, while BadNews involves him or her in the processes to create hoaxes.

In this sense, two different strategies are observed to build arguments against disinformation (RQ1). On the one hand, a passive narrative strategy through which players receive positive and negative arguments about disinformation and its consequences in society. On the other hand, a process of active refutation (Bad News) in which users must generate their own hoaxes and know the processes involved. Some studies agree that active refutation can be more effective, since the 'internal' counterargument implies a more complex and lasting cognitive process (Pfau et al., 1997).

Despite the differences between both strategies, the five newsgames use similar persuasive, informative and playful resources (RQ2), as summarized in Table 2. From the point of view of persuasion, the most used strategy is operative conditioning, followed by tunnelled or guided narrative. All the newsgames use positive or negative reinforcement to strengthen behaviours. In addition, they use very simple narrative structures based on a predefined conversation with several response options. Although these are strategies that have proven to be very effective in modifying and influencing user behaviour (Fogg, 2003), from a realisation and design point of view they are not particularly innovative. It should be noted that all newsgames have a didactic and informative purpose. For this reason, in most cases, the informative and persuasive component carries more weight than the gameplay.
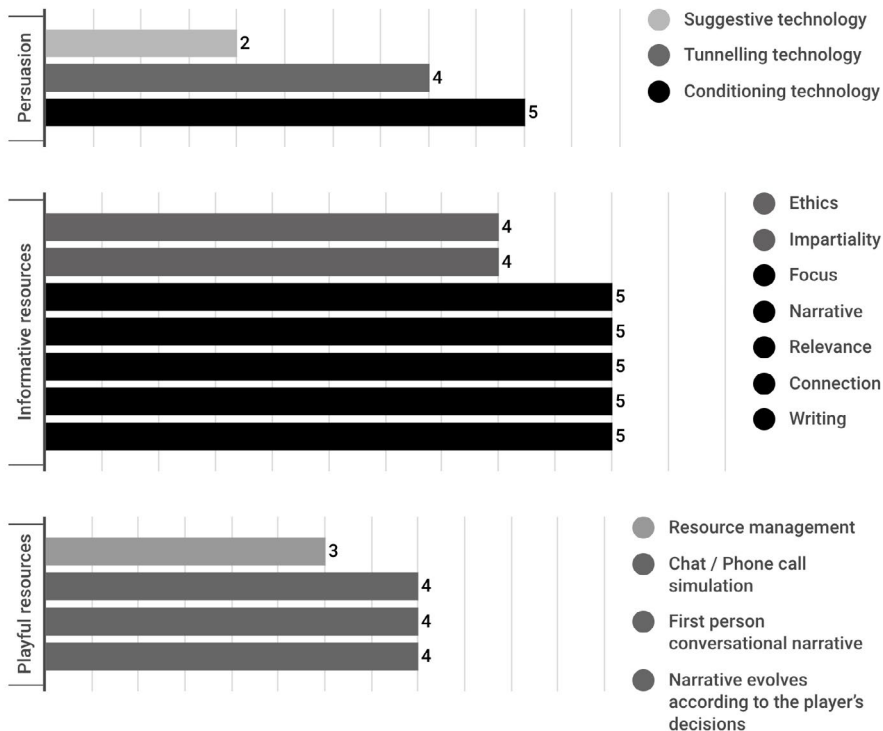

Table 2: *Most used persuasive, informative and playful resources.*
Fuente: Own research.

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From an information perspective, there are clear differences in the treatment and depth of the arguments. Aspects such as the use of links to websites (Factitious), complementary materials (Guerra a la mentira and #Hacked) and real sources and testimonies (Guerra a la mentira, #Hacked and Factitious), enrich the narrative experience and make it easier for the user to better understand the real implications of misinformation (RQ3). Throughout the playful experience, the user interacts with a series of tools that allow him/her to experience the effects of disinformation, enhancing the cognitive effects on this reality. As some previous research shows (García-Ortega and García-Avilés, 2020; Plewe and Fürsich, 2018), newsgames that include resources and context information have a competitive advantage over those that focus exclusively on game dynamics.

This research has limitations due to the size of the sample and the absence of usability or reception tests. To find out the real effectiveness of the analysed strategies, it is necessary to carry out complementary studies focused on the user's reception, which show the consequences derived from the combination of the playful and informative elements, as well as their effectiveness in different user profiles.

Work on disinformation in newsgames has shown that active inoculation of educational games and newsgames significantly reduces users' willingness to trust content created on Twitter through disinformation strategies (Roozenbeek and van der Linden, 2019a; 2019b). However, both studies focus on a single case study, so the results cannot be extrapolated to all newsgames. It would therefore be enriching to draw up a comparative analysis between newsgames with different persuasive, narrative, and playful strategies.

In line with previous research (Chang et al., 2020; Gómez-García and Carrillo-Vera, 2020), our study shows that playful formats can become appropriate tools for instilling learning about disinformation. In this sense, we should promote reflection on the connection between playful and informative formats and media literacy, to understand how the new information and communication technologies make it possible to identify and counteract disinformation about public affairs that affect social life (Calvo, Cano-Orón and Esteban, 2020).

References

Bakir, V., & McStay, A. (2018). Fake news and the economy of emotions: Problems, causes, solutions. *Digital Journalism, 6*(2), 154-175. doi: 10.1080/21670811.2017.1345645

Bogost, I. (2007). *Persuasive games: The expressive power of videogames*. Cambridge: Massachusetts Institute of Technology Press.

Bogost, I., Ferrari, S., & Schweizer, B. (2010). *Newsgames: Journalism at play*. Cambridge: Massachusetts Institute of Technology Press.

Chang, Y. K., Literat, I., Price, C., Eisman, J. I., Gardner, J., Chapman, A., & Truss, A. (2020). News literacy education in a polarized political climate: how games can teach youth to spot misinformation. *Harvard Kennedy School Misinformation Review*. Retrieved from https://bit.ly/2XdHgkS

Calvo, D., Cano-Orón, L. & Esteban, A. (2020). Materiales y evaluación del nivel de alfabetización para el reconocimiento de *bots* sociales en contextos de desinformación política*, Icono 14, 18*(2), 111-137. doi: 10.7195/ri14.v18i1.1515

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification. In: Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments (pp. 9-15).

European Commission (2018). A Multi-dimensional Approach to Disinformation. Final Report of the High-Level Expert Group on Fake News and Online Disinformation. Retrieved from https://bit.ly/3172l1E

Ferrer-Conill, R. & Karlsson, M. (2016). The gamification of journalism. In Davis, D. Z. & Gangadhrbatla, H. (eds) *Handbook of Research on Trends in Gamification*. New York: IGI Global, pp. 356–383.

Flyvbjerg, B. (2006). Five Misunderstandings about Case Study Research. *Qualitative Inquiry, 12*(2). California: Sage.

Fogg, B. J. (2003) *Persuasive technology: using computers to change what we think and do*. San Francisco: Morgan Kaufmann Publishers.

Galloway, A. (2004). Social Realism in Gaming. *Game Studies*, 4:1. Retrieved from https://bit.ly/3jXIKtC

García-Avilés, J. A. (2009). La desinformación. In Herrero, J. C. (ed.). *Manual de teoría de la información y de la comunicación*. Madrid: Universitas, pp. 327-346.

MONOGRÁFICO

García-Avilés, J. A. (2016). Lo imposible: construyendo la ética del periodismo tras el «tsunami» digital. In Suárez Villegas, J. C. & Cruz Álvarez, J. (Eds.) *Desafíos éticos en el periodismo digital*. Madrid: Dykinson, pp. 29-50.

García-Ortega, A. & García-Avilés, J. A. (2018). Los newsgames como estrategia narrativa en el periodismo transmedia: propuesta de un modelo de análisis. *Revista Mediterránea de Comunicación, 9*(1), 327-346. doi: 10.14198/MEDCOM2018.9.1.19

García-Ortega, A., & García-Avilés, J. A. (2020). When journalism and games intersect: Examining news quality, design and mechanics of political newsgames. *Convergence, 26*(3), 517-536. doi: 10.1177/1354856520918081

Gómez-García, S. & Navarro-Sierra, N. (2013). Videojuegos e Información: Una aproximación a los newsgames españoles como nueva óptica informativa. *Icono14, 11*(2), 3-21. doi: 10.7195/ri14.v11i2.604

Gómez-García, S. & Cabeza-San Deogracias, J. (2016). El discurso informativo de los newsgames: el caso Bárcenas en los juegos para dispositivos móviles. *Cuadernos.info*, (38), 137-148. doi: 10.7764/cdi.38.593

Gómez-García, S., & Carrillo-Vera, J. A. (2020). El discurso de los newsgames frente a las noticias falsas y la desinformación: cultura mediática y alfabetización digital. *Revista Prisma Social*, (30), 22-46.

Lazer, D. M., Baum, M. A., Benkler, Y., Berinsky, A. J., Greenhill, K. M., Menczer, F., & Schudson, M. (2018). The science of fake news. *Science, 359*(6380), 1094-1096. doi: 10.1126/science.aao2998

Lotero-Echeverri, G., Romero-Rodríguez, L. M. & Pérez-Rodríguez, M. A. (2018). Fact-checking vs. Fake news: Periodismo de confirmación como recurso de la competencia mediática contra la desinformación. *Index.comunicación, 8*(2), 295-316. Retrieved from https://bit.ly/3fgULXx

McGuire, W. J. (1964). Some Contemporary Approaches. *Advances in Experimental Social Psychology*, 1, 191–229. doi:10.1016/S0065-2601(08)60052-0.

Macnamara, J. R. (2005). Media content analysis: Its uses, benefits, and best practice methodology. *Asia Pacific Public Relations Journal, 6*(1), 1. Retrieved from https://bit.ly/3qjMRxC

Marchi, R. (2012). With Facebook, Blogs, and Fake News, Teens Reject Journalistic "Objectivity". *Journal of Communication Inquiry. 36*(3), 246-262. doi: 10.1177/0196859912458700

Martínez-Carazo, P. C. (2006) El método de estudio de caso. Estrategia metodológica de la investigación científica. *Pensamiento y Gestión*, 20, 165-193.

Marwick, A. & Lewis, R. (2017). *Media manipulation and disinformation online*. New York: Data & Society Research Institute. Retrieved from https://bit.ly/3jZcdTW

Meier, K. (2018). Journalism meets games: Newsgames as a new digital genre. Theory, boundaries, utilisation. *Journal of Applied Journalism and Media Studies, 2*(7.2), 429-444. doi: 10.1386/ajms.7.2.429_1

Nyhan, B., & Reifler, J. (2015). Displacing misinformation about events: An experimental test of causal corrections. *Journal of Experimental Political Science, 2*(1), 81-93. doi: 10.1017/XPS.2014.22

Pérez-Dasilva, J. A., Meso-Ayerdi, K. & Mendiguren-Galdospín, T. (2020). Fake news y coronavirus: detección de los principales actores y tendencias a través del análisis de las conversaciones en Twitter. *Profesional de la Información, 29*(3), e290308. doi: 0.3145/epi.2020.may.08

Pfau, M., Tusing, J., Koerner, A. F., Lee, W., Godbold, L. C., Penaloza, L. J., & Hong, Y. (1997). Enriching the Inoculation Construct: The Role of Critical Components in the Process of Resistance. *Human Communication Research, 24*(2), 187–215. doi: 10.1111/j.1468-2958.1997.tb00413.x

Planells, A. J. (2015). Mundos posibles, grupos de presión y opinión pública en el videojuego Trópico 4. *Trípodos*, (37), 167-181.

Plewe, C., & Fürsich, E. (2018). Are newsgames better journalism? Empathy, information and representation in games on refugees and migrants. *Journalism Studies, 19*(16), 2470-2487. doi: 10.1080/1461670X.2017.1351884

Rojecki, A., & Meraz, S. (2016). Rumors and factitious informational blends: The role of the web in speculative politics. *New Media & Society, 18*(1), 25-43. doi: 10.1177/1461444814535724

Roozenbeek, J., & van Der Linden, S. (2019a). The fake news game: actively inoculating against the risk of misinformation. *Journal of Risk Research, 22*(5), 570-580. doi: 10.1080/13669877.2018.1443491

Roozenbeek, J., & van der Linden, S. (2019b). Fake news game confers psychological resistance against online misinformation. *Palgrave Communications, 5*(1), 1-10. doi: 10.1057/s41599-019-0279-9

MONOGRÁFICO

Sicart, M. (2008). *Newsgames: Theory and design. In International Conference on Entertainment Computing*. Berlin: Springer, pp. 27-33. doi: 10.1007/978-3-540-89222-9_4

Spohr, D. (2017). Fake news and ideological polarization: Filter bubbles and selective exposure on social media. *Business Information Review, 34*(3) 150-160. doi: 10.1177/0266382117722446

Tandoc Jr, E. C; Ling, R.; Westlund, O.; Duffy, A.; Goh, D., & Wei, L. Z (2017). Audiences' acts of authentication in the age of fake news: A conceptual framework. *New Media & Society*, 1-19. doi: 10.1177/1461444817731756

Tandoc Jr., E. C.; Lim, Z.-W. & Ling, R. (2018). Defining 'fake news'. *Digital Journalism, 6*(2), 137-153. doi: 10.1080/21670811.2017.1360143

Valero, P. P., & Oliveira, L. (2018). Fake news: una revisión sistemática de la literatura. *Observatorio (OBS*), 12*(5). doi: 10.15847/obsOBS12520181374

van der Linden, S., Panagopoulos, C., & Roozenbeek, J. (2020). You are fake news: political bias in perceptions of fake news. *Media, Culture & Society, 42*(3), 460-470. doi: 10.1177/0163443720906992

Vizoso, Á., & Vázquez-Herrero, J. (2019). Plataformas de fact-checking en español. Características, organización y método. *Communication & Society, 32*(1), 127-144. doi: 10.15581/003.32.1.127-144

Vosoughi, S.; Roy D. & Aral, S. (2018) The spread of true and false news online. *Science*, 359(6380),1146–1151. doi: 10.1126/science.aap9559

Waisbord, S. (2018). Truth is What Happens to News: On journalism, fake news, and post-truth. *Journalism Studies, 19*(13), 1866-1878. doi: 10.1080/1461670X.2018.1492881

Wardle, C. & Derakhshan, H. (2017). Information Disorder: Toward an interdisciplinary framework for research and policy making, Council of Europe report DGI (2017) September. Retrieved from https://bit.ly/39PzPFN

Wiehl, A. (2014). Newsgames–Typological approach, re-contextualization and potential of an underestimated emerging genre. IFLA Lyon. Retrieved from https://bit.ly/2BJ6Zu2

World Economic Forum (2019) Fake news: what it is and how to spot it. Retrieved from https://bit.ly/318HpYl

Yin, R. (2003). *Applications of Case Study Research*. California: Sage.

Zehle, S. (2012). Play the News: Serious Games between Casual Play and the Work of Reportage. In von Brincken, J. y Konietzny, H. (Eds.) *Emotional Gaming: Gefühlsdimensionen des Computerspielens*. Munich: Epodium, pp. 137–151.

Zhou, X. & Zafarani, R. (2018). Fake news: A survey of research, detection methods, and opportunities. *ACM Comput.surv*, 1, 1-40. Retrieved from https://bit.ly/33gQm4j

Notas

[1]   The European Commission defines disinformation as "verifiably false or misleading information which is created, presented and disseminated for the purpose of financial gain or to deliberately mislead the public". Retrieved from https://bit.ly/36H6LjK