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Playing with truth: newsgames as a sustainable literacy tool for verification

Jugando con la verdad: los newsgames como herramienta de alfabetización sostenible para la verificación

Deadlines | Received: 31/01/2024 - Reviewed: 21/04/2024 - Accepted: 03/05/2024 - Published: 01/07/2024

Abstract

This study's main hypothesis posits that newsgames serve as a sustainable innovation tool capable of addressing social problems. With this premise in mind, the research sought to analyse the potential of newsgames in promoting media literacy among young people, with particular focus on the phenomenon of misinformation, which represents one of the most significant challenges to contemporary societies. To achieve this goal, a systematic content analysis tool was developed for the examination of n=8 newsgames, using a qualitative and quantitative approach. The results show that newsgames effectively tackle issues aligned with the UN's goals, specifically within SDG 10 of the 2030 Agenda. Furthermore, they introduce new perspectives related to social sustainability, social justice, integration, accessibility and inclusiveness. These narratives have the potential to raise awareness and prevent situations of injustice or inequality by immersing players in unwanted simulated experiences. While newsgames predominantly adopt a playful approach, their narrative component affords realistic representations of possible worlds and phenomena. Although these elements are often presented from a critical and satirical standpoint rather than emphasising journalistic principles, they nonetheless contribute to educating individuals about media literacy and to promoting understanding of good journalistic practices, specifically with regard to fact-checking.

Keywords

Literacy; Disinformation; Social Innovation; Newsgames; Sustainability; Fact-checking.

Resumen

La principal hipótesis de este estudio enuncia que los newsgames son una herramienta de innovación sostenible que puede ayudar a enmendar problemas sociales. Teniendo en cuenta este postulado, el objetivo principal de la investigación se centra en analizar el potencial de los newsgames para alfabetizar a los jóvenes sobre el fenómeno de la desinformación, ya que este desorden informativo es uno de los mayores peligros a los que se enfrentan las sociedades contemporáneas. Para ello, se ha diseñado una herramienta para el análisis de contenido de n=8 newsgames, con un enfoque cualitativo y cuantitativo. Los resultados obtenidos permiten concluir que los newsgames abordan temas relacionados con las demandas recogidas por la ONU –concretamente, en el ODS 10 de la Agenda 2030– y abren nuevos horizontes relacionados con la sostenibilidad social, la justicia social, la integración, la accesibilidad y la inclusividad. Estas narrativas tienen el potencial para prevenir situaciones de injusticia o desigualdad, ya que exponen al jugador a experiencias no deseadas. Aunque el enfoque lúdico predomina en estos videojuegos, su componente narrativo proporciona representaciones de mundos posibles que se asemejan mucho a la realidad y su fenomenología. Si bien estos elementos se presentan más desde una óptica de crítica y sátira, que de ejemplificación y defensa de principios periodísticos, pueden cumplir un papel de concienciación y plantear rutas de aprendizaje sobre buenas prácticas periodísticas, específicamente, sobre la verificación de hechos.

Palabras clave

Alfabetización; desinformación; Innovación social; newsgames; sostenibilidad; verificación.

1. Introduction

The New York World was the first newspaper to publish a crossword puzzle in 1913 (Burton, 2005). Until then, no media outlet had considered including a game that required a deep understanding of current events and the news published throughout the week. This first experience established a relationship between entertainment and journalism, leading to the evolution of using video games as a resource to report news or current events. For instance, in 2014, *The Guardian* launched *The Refugee Challenge*, an interactive gamified narrative aimed at raising awareness of the adversities faced by refugees when they are forced to emigrate from their country.

Similarly, new recreational formats like newsgames have emerged, integrating informative content into their narratives (Gómez-García et al., 2021). Newsgames are often considered the informative side of serious games (Abt, 1987; Gómez-García, 2014; Samson, 2015) and represent an intersection between video games and journalism (Bogost et al., 2010). They offer a new news consumption experience (Foxman, 2015; Grace et al., 2016) by combining "playful simulation and relevant aspects of current affairs" (Martínez Cano, 2016: 161), engaging the user "not as a consumer, but as a citizen who must participate in the public sphere" (Morejón Llamas, 2023: 30). This characteristic makes it possible that, through the interaction of the player or agency (Murray, 2017), ideas are transmitted (García-Ortega and García-Avilés, 2021) and a "greater awareness and understanding of social events or phenomena" is created (Herrero-Curiel and Planells de la Maza, 2020: 8). In this sense, several studies (Ferrer-Conill & Karlsson, 2016; Plewe & Fürsich, 2018) reinforce the idea that newsgames are informative experiences that, beyond entertainment, also stimulate players' participation and social awareness.

Newsgames are framed as a journalistic literacy mechanism (Gómez-García & Carrillo-Vera, 2020: 30), as these playful narratives serve to "pose routes with which to participate in the informative construction", optimize learning and favor the motivation of players in different real-world issues. Precisely, one of the issues that needs to be addressed more urgently is disinformation (Iretón & Posetti, 2018). UN Secretary-General António Guterres emphasizes the need for lasting investments in building social resilience and media literacy to combat disinformation (Guterres, 2022: 19). In response to the request of Guterres and the European Commission (2022), verification is presented as a suitable method to combat false, misleading, and inaccurate information, while educating the public about these manipulation attempts (Loterio-Echeverri et al., 2018; Míguez-González et al., 2023; Portugal and Aguaded, 2020).

Fact-checking organizations emerged in the early 2000s in the United States (Humprecht, 2019) and gained traction in Europe from 2010 (Graves & Cherubini, 2016). These organizations aim to provide truth in public discourse through transparent methodologies (Brandtzaeg & Følstad, 2017; Humprecht, 2019), as outlined in the code of principles of the *International Fact-Checking Network* (IFCN)^[1], created by Poynter in 2015 to promote excellence in fact-checking. The Duke Reporters' Lab^[2] report further details the quality attributes that all verification outlets must meet to be included in its database. To ensure transparency in fact-checking methodology, Holan (2022) establishes a series of guidelines that every journalist—and even every critical citizen—should follow to determine the veracity of suspicious information: ask for evidence, check if the information has already been verified, perform basic and advanced Internet searches, consult specific databases and different experts, refer to books and libraries, and always be willing to expand the investigation.

Consequently, research by Hameleers (2022) shows that citizens' misperceptions, derived from disinformation exposure and consumption (Noguera-Vivo et al., 2023), can be corrected when fact-checking is combined with media and digital literacy interventions. For example, research by Roozenbeek & Van der Linden (2019) demonstrated that users' ability to detect disinformation improved after playing *Bad News* (DROG & Cambridge University, 2018), an interactive adventure game that exposes, warns, and familiarizes players with the phenomenon of disinformation. Similarly, the experiment by Chang et al. (2020) yielded encouraging results, showing a real transfer of knowledge and skills to the players: the video game *LAMBOOZLED!* was an effective learning method for students to internalize and assimilate the consequences of disinformation in real life. Additionally, Morejón Llamas (2023) explored the literacy potential of the edugame *Go Viral!* to warn users about the dangers of disinformation. Although *Go Viral!* was not effective in teaching literacy about scientific hoaxes, it proved to be a powerful tool when combined with awareness campaigns or educational resources (Morejón Llamas, 2023).

Newsgames offer psychological inoculation against disinformation, helping to educate users about digital threats (Basol et al., 2020; Morejón Llamas, 2023). This statement is further supported by the research of García-Ortega and García-Avilés (2021), who analyzed the potential of newsgames to modify and influence user behavior. These innovative experiences, as defined by García-Ortega and García-Avilés (2021), have a didactic and informative purpose, with the competitive advantage that "they can become appropriate tools to instill learning about disinformation" (2021: 200).

Social innovation and sustainability therefore emerge as necessary actions to "find sustainable and effective responses to disinformation" (Guterres, 2022: 20). Interestingly, in this fight against false,

misleading, or inaccurate information (Posetti, 2018), agents that traditionally have not been involved in media literacy strategies, such as journalists (Frau-Meigs, 2022; Sádaba and Salaverría, 2023), are now included.

In conclusion, the present research starts from the consideration that newsgames have significant potential to correct the adverse effects of the epidemic of disinformation (Basol et al., 2020; Chang et al., 2020; García-Ortega & García-Avilés, 2021; Hameleers, 2022; Morejón Llamas, 2023; Roozenbeek & Van der Linden, 2019). Given the educational gap in media literacy processes, especially in universities (Castillo Lozano et al., 2023; Ufarte-Ruiz et al., 2018), newsgames represent a valuable tool.

Innovation is essential in all industries (Bhattacharya et al., 2022; Martínez Martínez et al., 2022), including journalism, where it addresses disruptive societal changes by identifying problems and creating new social value (García-Avilés et al., 2019). Newsgames, with their potential to generate information and knowledge (Alardo Vico, 2020), combine innovative potential with sustainable communication (Boons & McMeekin, 2019), effectively addressing social challenges such as disinformation, which threatens democratic coexistence globally (Guterres, 2022).

2. Methodology

2.1. Research hypothesis and objectives

The main hypothesis of this study posits that newsgames have the potential to be a "sustainable innovation" tool capable of addressing "social problems" (Godin & Gaglio, 2019: 35). With this postulate in mind, the primary objective of this research is to analyze the potential of newsgames in educating young people about the phenomenon of disinformation. Research such as Castillo Lozano et al. (2023) recognizes that this informational disorder (Wardle & Derakhshan, 2017) is one of the greatest dangers facing contemporary societies.

Journalists need specific training to effectively combat disinformation. However, the academic programs of universities often lack media literacy components that equip future information professionals with the necessary knowledge, competencies, and skills required by today's media industry (Castillo Lozano et al., 2023). This educational gap is particularly alarming as it affects the employability and career prospects of journalists (Ufarte-Ruiz et al., 2018).

Given that Spanish universities lack specialized training plans in fact-checking, this study proposes the adoption of newsgames as a form of sustainable innovation and an instrumental tool for fact-checking literacy. Based on this main purpose, the following specific objectives are formulated:

O1.- To analyze the implications of quality standards, journalistic quality, and the verification process in the professional work of journalism within the newsgames selected for this study.

O2.- To examine how the ludic experience is designed in the newsgames selected for this study to engage players in the challenges posed by disinformation.

O3.- To study the relevance of narrative aspects in shaping the story of the newsgames selected for this study, supporting the game experience and the position of its recipients in relation to it.

2.2. Method

In this research, employing a qualitative and quantitative approach (Berelson, 1952), a tool for content analysis (Berelson, 1952; Holsti, 1969) has been designed to code information and derive indicators and categories for describing the results (Bardin, 1986). Therefore, content analysis is deemed a suitable method for drawing reproducible and valid inferences (Krippendorff, 1980) about the selected newsgames.

To conduct this content analysis, a classification sheet has been created –see Table 1–, inspired by various works (Bell & Ryan, 2019; Crawford, 2012; Cuadrado, 2013; Cuadrado & Planells, 2020; García-Ortega & García Avilés, 2018; Gómez-García & De la Hera, 2023; Holan, 2022; Hunicke et al., 2004; Murray, 2017; Peña, 2020; Pérez Latorre, 2012; Rogerio & Silva, 2021; Ryan & Thon, 2014; Sicart, 2008; Tandoc et al., 2018; Téramo, 2006; Wardle & Derakhshan, 2017). The outcome is an analysis table with eight categories: newsgame identification, journalistic genre, quality of use, experience design, game narrative, journalistic quality standards, verification process standards, and nature of disinformation. Each category contains units of analysis that allow for the classification of newsgames across different levels and dimensions.

The analysis begins with identifying the newsgames, detailing the title, developer, year of publication, and video game genre. It is also considered essential to provide a brief summary of each game to

highlight its key aspects and the issues it addresses in relation to the environment, historical period, or context (Crawford, 2012).

Subsequently, the journalistic genre is specified (Gómez-García & De la Hera, 2023) to determine the game genres and the type of journalistic message conveyed in each gaming experience. The analysis table also includes the quality of use (García-Ortega & García-Avilés, 2018), which encompasses subjective elements like satisfaction and learning, dependent on the user's context, but crucial for evaluating the quality of an informative video game.

The analysis of experience design utilizes the MDA model –Mechanics, Dynamics, and Aesthetic– (Hunicke et al., 2004; Sicart, 2008) and RMDA model –an update of MDA– (Rogerio & Silva, 2021) to examine the mechanics, dynamics and aesthetics of the ludic construction of video games. These components are tied to the objectives and challenges that define the game's goals (Crawford, 2012) and consider the “Proteus effect” (Peña, 2020), which influences the player's representation in the game environment, as well as the experiences of immersion, performance, and transformation (Murray, 2017).

Regarding the game's narrative, attention is given to both the structuring narrative and its organization, as well as the emergent and embedded narratives that shape player actions (Cuadrado & Planells, 2020). The design of the game world is also assessed from a ludofictional perspective (Bell & Ryan, 2019; Ryan & Thon, 2014), defined by spatial (Cuadrado, 2013) and temporal dimensions (Pérez Latorre, 2012).

Lastly, to evaluate the dimensions of journalistic work and its role in the verification process, criteria are included for journalistic quality (García-Ortega & García-Avilés, 2018) to assess independence, the routines and rules governing information professionals, the standards of the verification process (Holan, 2022) to guide players on the methodology for handling new or suspicious information, and the nature of disinformation (Tandoc et al., 2018; Wardle & Derakhshan, 2017), which is crucial for identifying the types of messages presented in newsgames.

Table 1: Newsgames analysis sheet

NEWSGAME IDENTIFICATION		
Title:	Video game developer:	Year:
Genre:	Topics:	
Abstract:		
JOURNALISTIC GENRE (Gómez-García & De la Hera, 2023)		
Information	<ul style="list-style-type: none"> - Article. - Report. - Interviews. 	
Interpretation	<ul style="list-style-type: none"> - Profile. - Interpretative report. - Interpretative interview. 	
Opinion	<ul style="list-style-type: none"> - Editorial. - Column. - Review. - Caricature. - Letters to the editor. 	
QUALITY OF USE (García-Ortega & García-Avilés, 2018)		
Satisfaction	Players see their goals and expectations fulfilled after the gaming experience.	
Learning	It can be mechanical (improvement of gaming skills) or cultural (the user expands his or her knowledge of the topic being addressed).	
Effectiveness	The two main objectives of any newsgame are fulfilled: to inform and to entertain.	

Immersion	Players feel part of the narrative thanks to the different narrative formulas (first person narrative, personalization of content) and structural elements (surround sound, VR techniques, 360° images).
Motivation	The narrative captures and maintains the user's interest.
Emotion	The story triggers different emotions in the players.
Socialization	It offers various social options, such as sharing the results, contributing your own content, meeting other players or competing in multiplayer mode.

EXPERIENCE DESIGN

(Crawford, 2012; Hunicke et al., 2004; Murray, 2017; Peña, 2020; Rogerio & Silva, 2021; Sicart, 2008)

Objectives and challenges (Crawford, 2012)	<ul style="list-style-type: none"> - Fantasies and emotions that the game aims to convey to the player. - Main objective and secondary objectives.
MDA (Hunicke et al., 2004; Sicart, 2008) o RMDA (Rogerio & Silva, 2021)	<ul style="list-style-type: none"> - Core Mechanic. - Main mechanic. - Secondary mechanics.
	<ul style="list-style-type: none"> - Simple dynamics, which arise directly from the mechanics. - Complex dynamics, which emerge from other dynamics.
	Desirable emotional responses in the player's interaction with the game.
Motivation (Murray, 2017)	<ul style="list-style-type: none"> - Immersion. - Acting. - Transformation.
Representation (Proteus Effect) (Peña, 2020)	Player representation.

GAME NARRATIVE

(Bell & Ryan, 2019; Cuadrado, 2013; Cuadrado & Planells, 2020; Pérez Latorre, 2012; Ryan & Thon, 2014)

Story (Cuadrado & Planells, 2020)	<ul style="list-style-type: none"> - Story (Character). - Speech (Narrator).
Structure (Cuadrado & Planells, 2020)	<ul style="list-style-type: none"> - Lineal. - Arborea. - Networked. - Object-orientated.
Player performance (Cuadrado & Planells, 2020)	<ul style="list-style-type: none"> - Avatar. - Dramatic: goals, motivations, needs and obstacles.
World design (Bell & Ryan, 2019; Ryan & Thon, 2014)	<i>Storyworld</i> and possible worlds.
Ludonarrative space (Cuadrado, 2013)	Environmental storytelling and content design.
Timeline (Pérez Latorre, 2012)	<ul style="list-style-type: none"> - Centric. - Eccentric.
Ludonarrative construction (Cuadrado & Planells, 2020)	<ul style="list-style-type: none"> - Emergent narrative. - Embedded narrative.

JOURNALISTIC QUALITY STANDARDS
(García-Ortega & García-Avilés, 2018; Téramo, 2006)

Reliability	A number of relevant sources are used.
Relevance	What is said is important.
Interest	The content is close to the audience.
Proportion	The more impact and relevance, the more time or space in the media.
Adequacy	Background and consequences are included.
Transparency	The framing is appropriate to the topic.
Clarity	Clear and intelligible language is used.
Comprehensibility	Sentences are used in a logical order.
Integration	Technical quality of images and videos.
Impact	Follow-up by the audience.

VERIFICATION PROCESS STANDARDS
(Holan, 2022)

Ask the person making the claim for evidence	The newsgame allows the user to ask the author who sent the information or, alternatively, to ask questions to find out the specific basis of the message.
See if it's been fact-checked before	The newsgame allows the user to talk to other reporters or search other platforms to see if someone has already verified the information.
Do a basic internet search — then do an advanced search	The newsgame allows the user to do a basic search in different browsers, as well as a search in more specialised tools such as TinEye or InVid.
Strategically search online databases	The newsgame allows the user to search specific databases, such as those of universities, for more specialised information.
Consult experts with multiple perspectives	The newsgame allows the user to interview experts, witnesses, etc. to broaden the angles from which the news is approached.
Use libraries and books	The newsgame gives the user the opportunity to consult books or visit libraries to search for information.
The magic question: What else?	The newsgame gives the user the opportunity to expand their research.

NATURE OF DISINFORMATION
(Tandoc et al., 2018; Wardle & Derakhshan, 2017)

Type of disinformation	<ul style="list-style-type: none"> - Satire or parody: Not intended to cause harm or deception. - Misleading content: This is the misleading use of information to incriminate someone or something. - Impostor content: The type of information that impersonates genuine sources. - Fabricated content: New content that is predominantly false, designed specifically to mislead and damage. - False connection: When headlines, images or captions do not confirm the content. - False context: When genuine content is disseminated with false contextual information. - Manipulated content: When genuine information or images are manipulated to mislead.
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Purpose of disinformation	<ul style="list-style-type: none"> - Economic. - Political propaganda. - Parody. - Manipulation of public opinion.
Format of disinformation	<ul style="list-style-type: none"> - Text: the disinformation with which users interact is written text. - Image: the disinformation with which users interact is an image. - Deepfakes: disinformation is created by artificial intelligence and is usually presented in video format.

Source: own elaboration based on Bell & Ryan (2019), Cuadrado (2013), Cuadrado & Planells (2020), Crawford (2012), García-Ortega & García-Avilés (2018), Gómez-García & De la Hera, (2023), Holan (2022), Hunicke et al. (2004), Murray (2017), Peña (2020), Pérez Latorre (2012), Rogerio & Silva (2021), Ryan & Thon (2014), Sicart (2008), Tandoc et al. (2018), Téramo (2006), and Wardle & Derakhshan (2017)

To assess the reliability of the measurement instrument of this study—the analysis sheet—Krippendorff's alpha (2011) was employed. Three external coders classified the different variables of analysis for the same newsgame using the provided analysis sheet. The alpha coefficient calculated by Krippendorff (2011) yielded a result of $\alpha = 0.833$. According to Krippendorff (2011), this value indicates an acceptable level of agreement among experts, thereby validating the proposed analysis sheet (Manterola et al., 2018).

Subsequently, after determining the reliability of the analysis instrument, the research by Tejedor and Tusa (2020) was used as a reference to study the newsgames that constitute the sample using the case study method (Martínez Carazo, 2006; Yin, 1994). This approach enabled a diagnostic evaluation (Casado Romero et al., 2010) of each of the selected video games.

2.3. Study sample

This study examines the potential of newsgames as a tool for fostering verification literacy, focusing on a selection of $n=8$ video games—see Table 2—. The criterion for selecting these 8 units of analysis is primarily based on temporal relevance: the newsgames were released between 2016 and 2023. This period is characterized by social, political, and informational turmoil, marked by significant events such as the rise of populist and nationalist figures in various democratic or semi-democratic societies, including Donald Trump in the United States (2017), Jair Bolsonaro in Brazil (2019), Erdoğan in Turkey (2023), and Javier Milei in Argentina (2023). Additionally, this timeframe encompasses other pivotal historical events like Brexit in 2016, the assault on the U.S. Capitol in 2021, the war in Ukraine in 2022, and the recent Spanish national and regional elections in 2023, among others.

To select the video games that constitute the sample, a meticulous search was conducted through specialized websites, developers' social networks, and app stores, as well as a bibliographic review of literature and existing teaching experiences related to newsgames and disinformation. This process confirmed the appropriateness of including these 8 projects in the study sample, not only from a social perspective but also from academic and scientific viewpoints. Subsequently, titles that were inherently video games were chosen, excluding other forms of media such as gamified interactive narratives or immersive experiences based on augmented reality (AR) or virtual reality (VR).

Table 2: Newsgames analyzed in the study sample

Title	Year	Video game developer
<i>Headliner</i>	2017	Unbound Creations
<i>Headliner: Novinews</i>	2018	Unbound Creations
<i>Bad news</i>	2018	Gusmanson
<i>BBC iReporter</i>	2018	Aardman Animations
<i>Fake it!</i>	2020	voxalgames
<i>Harmony Square</i>	2020	Gusmanson
<i>Plague Inc: Evolved – Fake News</i>	2020	Ndemic Creations
<i>Editor's Hell!</i>	2023	Pixelated Goose Games

Source: own elaboration

Following this selection process, the case study technique was employed to analyze the 8 newsgames included in the study sample, utilizing the content analysis sheet developed for this research.

3. Findings and discussion

3.1. Newsgame identification

The newsgames selected for this study –see Table 2– represent a diverse set of characteristics. To better understand these games, it is necessary to provide a brief overview of each one to explore their specific aspects:

- *Headliner* (Kasztalski, 2017) and its sequel *Headliner: Novinews* (Kasztalski, 2018). These newsgames place the player in the role of a journalist leading a media outlet. The main objectives include making money by controlling information, maintaining a strong position, and assessing the impact of professional decisions on family, acquaintances, and society at large.

- *Bad News* (DROG & Cambridge University, 2018). This game allows the player to assume the role of a hoax generator or seller. The player must abandon ethics and become an unscrupulous media mogul, exploring manipulative tactics necessary to gain followers through disinformation. This false credibility acts as a 'psychological vaccine'.

- *BBC iReporter* (BBC & Aardman, 2018). This game provides insight into the journalistic work of a BBC reporter, requiring the user to access information of varying provenance and reliability, and use their sources and digital resources to deliver topical news content.

- *Fake it!* (Voxalgames, 2020). The player follows the story of a freelance journalist working for small publishers. In pursuit of financial success, the player becomes rich and famous but is driven to select articles that inspire emotions, such as fear and anger, fostering ideological polarization.

- *Harmony Square* (DROG & Cambridge University, 2020). The player becomes the head of *Disinformation in Harmony Square*, a quiet place where residents are obsessed with democracy. The player must spread disinformation, encourage ideological polarization, and social confrontation to accumulate 'Likes'. The aim is to explore manipulative techniques used to fuel social and political conflict (Roozenbeek & Van der Linden, 2020).

- *Plague Inc: Evolved - Fake News* (Vaughan, 2020). Combining simulation and strategy, this game operates under the premise that a convincing story can spread as fast as an infectious disease. The player's mission is to spread hoaxes to cause chaos and potentially the extinction of humanity.

- *Editor's Hell!* (Pixelated Goose Games, 2023). Similar to *Headliner* and *The Westport Independent* (Double Zero One Zero, 2016), this game places the player as the editor of a newspaper in a troubled country. The player must decide which news stories should headline and assign them to journalists, generating information and distributing it across different cities in a country hurtling towards dictatorship.

Broadly speaking, all newsgames belong to the simulation genre —although *Editor's Hell!* and *Plague Inc: Evolved - Fake News* can also be identified with the management and strategy genres—. They offer realistic experiences related to the creation and propagation of disinformation (Peterson, 2023). Simulation in digital contexts immerses the player in realistic and challenging activities in environments designed to simulate real-world experiences, with decisions having palpable repercussions and consequences (Reinhardt & Thorne, 2016).

All newsgames address disinformation from various approaches —such as health, foreign policy, or climate change, among others— and in different scenarios. *Headliner*, *Headliner: Novinews*, *Editor's Hell!*, *Harmony Square*, and *Fake it!* explore populist environments and political or government intervention. In other cases, such as *Bad News* or *BBC iReporter*, disinformation affects social and media credibility and influence. A more strategic and generic context is present in *Plague Inc: Evolved - Fake News*, where hoaxes cause global chaos.

None of the newsgames analyzed specify a specific historical moment, except for *Headliner: Novinews*, which references the 2017 UK general election. The animated design and themes like genetic transformation illustrate a contemporary or even futuristic society. These themes, represented in a videoludic world, aim to raise awareness of social disparities, aligning with the UN's SDG 10 of the 2030 Agenda (United Nations, 2022), and open up new horizons related to social sustainability, social justice, integration, accessibility, and inclusivity, feasible from a holistic perspective (Boons & McMeekin, 2019).

3.2. Journalistic genre

The news genre category analyses the way in which information/disinformation is presented to the player. In all of the selected newsgames, news reporting is the only journalistic genre that appears.

While *Harmony Square*, *Bad News*, *Plague Inc.*, *Headliner*, and *Headliner: Novinews* do not allow editing hoaxes, the player simply makes decisions on what to publish and what not to publish. In *Editor's Hell!* and *Fake it!*, the player can construct, even if minimally, the news from fragments previously defined by the game. Consequently, given that they do not engage with journalistic genres, all the newsgames analyzed lack the differentiating factor implied by the professional practice of journalism in the context of disinformation.

All the selected newsgames, except *BBC iReporter*, share a common goal: to create a new world (dis) order—be it on a smaller or larger scale—with the aim of demonstrating the power the player has and allowing them to enjoy the chaos generated. In this context, it is observed that corporate pressure—publisher, supervisor, boss, government liaison, etc.—and the propagation of disinformation prevail over social and family welfare in the dynamics of the game. The only exception is *Headliner: Novinews*, where the involvement of non-playable characters in the narrative aspect is more intense and deeper. Overall, it is concluded that behaving inappropriately in these newsgames is crucial if the player wants to experience the effect of disinformation and build a lasting story. In contrast, in the case of *BBC iReporter*, the aim is to achieve current affairs reporting by providing news that is rigorous, generates impact, and reaches its audience before those of its competitors. However, in the process, having to prioritize some of these factors over others leads to situations of disinformation for which the reporter in the lead role is responsible.

Regarding the latter, these titles conceive the game as a world of representation in which, as Pérez Latorre (2012) states, the implicit player is an actor and character who not only witnesses the functioning of systems conditioned by journalism but actively intervenes in them, becoming part of their own process of signification. This is because, within their satire—with the exception of *Plague Inc: Evolved - Fake News*, which is more sober—the games have a consciousness-raising value (Kalsoom & Khanam, 2017). Simulation and simulation serve to show the consequences of actions in the game itself and their parallels with the offline world—beyond the cybersphere—exposing the workings of political systems, institutions, and individuals with the purpose, at times, of exposing corruption, abuse of power, or mistakes in the political process.

3.3. Quality of use

The analysis of quality of use, according to García-Ortega and García-Avilés (2018), focuses on assessing how games address player satisfaction, learning, and effectiveness. Satisfaction is linked to the player's ability to spread disinformation and, with it, disorder and chaos, except in the case of *BBC iReporter*, which aims for the opposite. *Headliner* and *Headliner: Novinews* have a multi-cursor structure and, while providing a sense of freedom, player decisions that do not support disinformation lead to a quick and apathetic endgame. Conversely, if the player spreads hoaxes, the pace of the game and the involvement of the characters in the plot increases. The player feels a sense of greater freedom—albeit directed—and also assumes greater reflective freedom, since the choice proposals allow them to act with the stories they identify with—metaphysical freedom—as well as to modify them and determine the role the player himself plays within them—ludic freedom directed at the spaces of possibility. Stories, in turn, construct and constrain the player's possibilities—the semiotic and hermeneutic freedom of the player confronted with a text in which they are reflected (Loy, 2010 cited in Navarro-Remesal, 2023). In this respect, in terms of effectiveness, they fulfil the competence of raising awareness of bad informational practices, which are highly dangerous and detrimental to democracy and social coexistence (Gómez-García and Carrillo-Vera, 2020).

Although immersion is addressed in the experience design section, it is worth noting that, in the cases analyzed, immersion is determined by the gameplay, with no elements of the journalistic environment to motivate the player to exercise the profession in the game. In contrast, motivation and excitement vary between the selected newsgames. In *Plague Inc: Evolved - Fake News*, the campaign allows for motivation and excitement to be maintained at all times; whereas, in *Headliner* and *Headliner: Novinews*, the narrative involvement of family members and acquaintances engages the player more in the gameplay. In *Fake it!*, *Bad News*, *BBC iReporter*, *Harmony Square*, and *Editor's Hell!*, the motivation and excitement drop off a little, but remain secondary objectives.

In terms of socialization, *Bad News* and *Harmony Square* incorporate challenge elements to encourage the player's friends and see who has gained the most followers and likes. *Plague Inc: Evolved* and *Editor's Hell!* have generated communities outside the game—forums, Discord, etc.—but these are not officially integrated into the game. In *Fake it!*, *BBC iReporter*, or *Headliner*, there are no such socialization elements. *Headliner: Novinews* has had a greater impact in the digital environment and has generated comments and criticism on platforms such as *Steam*, but none of the games have created a community to discuss disinformation and its implications for media education.

3.4. Experience design

Regarding the design of the experience, seven of the eight games share the objective of using disinformation to 'infect' (Aguaded, 2014) the population. To this end, through a predetermined itinerary, the newsgames reward the player with prestige and tools to obtain greater power and recognition if they contribute to spreading hoaxes. *Bad News* and *Harmony Square* translate these benefits into likes and followers, while *Editor's Hell*, *Fake it!*, and the two installments of *Headliner* do so through a positive profit account that guarantees the professional continuity and happiness of the protagonist character and their family. The case of *BBC iReporter* has its particularities because, although it follows a similar scheme to *Bad News* and *Harmony Square*, adding or subtracting points to the categories of rigor, impact, and speed depending on the consequences of the actions carried out, it seeks to inform. Consequently, what it scores is achieving the development of good journalistic practices in a context of information immediacy and intoxication.

Contrary to the main purpose of *BBC iReporter*, the challenges posed by newsgames vary between managing news and distributing newspapers to please the government and ideologically sympathetic sectors of the population, as in *Editor's Hell*; or deciding whether or not to publish news conditioned by pressures from the editor-in-chief and other dynamic elements of the plot, as in *Headliner*. In *Bad News* and *Harmony Square*, strategies such as impersonation, emotion, polarization, conspiracy, discrediting, amplification, escalation, and trolling are established as achievements to be acquired. In *Plague Inc: Evolved - Fake News*, the main challenge is to create false information and use various strategies to spread it worldwide, so that the population ends up more misinformed—intoxicated—than informed.

In relation to the MDA model, all disinformation-oriented proposals share a clear core mechanic: to initiate journalistic activity - the main mechanic—and to disinform using different stratagems—secondary mechanics. In *Bad News* and *Harmony Square*, a sort of malevolent virtual Big Brother encourages the player to be responsible for spreading disinformation. In *Fake it!*, the player's freelance journalistic activity is initiated by phone calls from an external liaison named Jimmy. *Plague Inc: Evolved - Fake News* begins with the production of a manifesto, without much prior context, which reveals the intention to create a disinformation plague. And *BBC iReporter*, albeit from a desire to properly inform audiences, reproduces that premise of a newly recruited BBC reporter who interacts with his colleagues via the broadcaster's internal chat room, as well as with his sources via a mobile instant messenger. On the other hand, in *Editor's Hell*, *Headliner*, and *Headliner: Novinews*, the basic point-and-click mechanics focus on generating news stories from a newsroom. Although *Headliner: Novinews* features more complex secondary mechanics, these do not provide real freedom to the player, as they are limited to the aesthetic space of the game, i.e., they allow the player to perform actions inside the protagonist's flat or on the street.

The dynamics offer multiple responses and actions—some clearly forced, others more subtle—based on pre-existing news stories, as in *Fake it!*, *BBC iReporter*, *Bad News*, and *Harmony Square*; headlines and news bodies, as in *Editor's Hell* and the two *Headliner* games; or character tokens, actions, tools, or power-ups similar to those of a board game, as in *Plague Inc: Evolved*. Thus, in the case of *Editor's Hell* and *Headliner*, the dynamics are simple and arise from a simple mechanic, while in *Headliner: Novinews*, the dynamics are more narrative-driven and lead to different endings which, unlike the first version, involve a motivational implication to reach them all and give meaning to their replayability.

The aesthetics vary from simple games, such as *Bad News* and *Harmony Square*, which are reminiscent of classic conversational adventures, to *Headliner: Novinews*, which stands out for a more careful graphic design that combines polygonal animation with more detailed characters at key moments, or *BBC iReporter*, which opts for the use of real images.

All these ludological aspects are closely related to the game's narrative through motivation, as all newsgames use the power of seduction, influence, and control, derived from quests, to trigger player immersion, performance, and transformation (Murray, 2017). This is called dramatic agency (Murray, 2017), that is, activating the player's emotional involvement with situations that deliver what is promised and reward completionism—*Plague Inc: Evolved - Fake News*, *Editor's Hell*, *Headliner* and *Headliner: Novinews*; world building and improvement—*Fake it!*; or the desire for recognition—*Bad News* and *Harmony Square*—in the cybersphere. In all the games, the player is prompted to engage in activities that imply a series of consequences in society, and there is a correspondence between the decisions the player makes and the landscape of growing disinformation that is generated.

Finally, the representation of the player is symbolic in all cases and corresponds to the so-called 'Proteus effect' (Peña, 2020), since the power given to avatars to carry out actions with serious consequences is presented as a phenomenon that can compromise and condition the behavior of players within the game. Furthermore, despite the fact that in some titles—*Plague Inc: Evolved - Fake News*, *Editor's Hell*, *Fake it!*, *BBC iReporter*, *Bad News*, and *Harmony Square*—an anonymization of the character

takes place, the player behind it might experience a profound feeling and reflect on the possible consequences that such incidents can have in the real world.

3.5. Game narrative

The eight video games analyzed present a narrative centered on the character, either represented by an avatar or embodied by the player, who guides the development of events. The story is influenced by a kind of machine-narrator with omnipotence in the configuration of the game world, structuring a linear development interrupted only by chapters or dialogues that mark changes of stage. In terms of world design and ludonarrative space, all newsgames are situated in a plausible present, posing possible worlds (Bell & Ryan, 2019) and incorporating contemporary issues such as immigration, climate change, political structures, and genetic modification. These issues serve as a pretext to confront the player with poor reporting practices. In Juul's words, 'video games are half-real' (2014: 173), meaning they are an intersection of real activities and fictional worlds.

The emotional involvement of the player, or dramatic agency, is achieved through the alignment of the player with their avatar in terms of projection, involvement, and empathy. In *Headliner: Novinews*, emotional involvement is particularly evident due to its narrative development and its focus on portraying human relationships rarely explored in other titles. Another factor influencing the player's emotional involvement is the ludonarrative construction, which is based on emergent and embedded narratives arising from the player's interventions or pre-programmed events. Additionally, they employ the concept of centric or eccentric time, which varies according to the player's performance or the machine-determined progression of the main story.

In all eight newsgames examined, the narrative is embedded, as it is the machine that conditions the plot, although the player may feel they are shaping it. Even in games with multiple endings, such as *Headliner* or *Editor's Hell*, all consequences are predefined and lead to a conclusion based on the player's decisions. This preconfiguration of narrative branching also affects time in several newsgames: in *Plague Inc: Evolved - Fake News, Fake it!*, *BBC iReporter*, *Bad News*, and *Harmony Square*, time is mainly eccentric and dependent on the progression of the machine-defined macro-story. In contrast, in *Headliner* and *Editor's Hell*, time is mostly centric and linked to the player's performance, who determines its development by editing news, walking down the street, or chatting with family members.

3.6. Journalistic quality standards

In the analysis of the eight newsgames, it stands out that in *Plague Inc: Evolved - Fake News* there are no journalistic texts to evaluate. In other titles, *reliability* varies: in *Fake it!*, a single source and a ticker-like title are used, while in *Bad News* and *Harmony Square*, disinformation arises from distorted or fabricated news stories. *Editor's Hell* allows slight modifications to the text to change some relevant aspects of the news, while in *Headliner*, *Headliner: Novinews*, and *BBC iReporter*, the news is already written, and the player only has to decide what is published.

Except in the case of *BBC iReporter*, which tries to illustrate in a very light-hearted way the processes involved in the work of a reporter, the video games do not follow a rigorous journalistic process. *Relevance* and *transparency* are completely neglected, with the exception of *Fake it!*, which depends on the player's ideological bias. Moreover, video games do not provide prior context or background to help place the player at a particular starting point. In these newsgames, the main objective is to generate disinformation—or information, in the case of *BBC iReporter*—from the outset, always bearing in mind future repercussions.

Interest is a common mechanic in all video games: the player must know how to place the topics in the newspaper to determine which topics will be more interesting—even if they are not—and thus capture the audience's attention. The topics covered are socially relevant issues, such as health, genetic transformation, or public health. In terms of proportion, it is found that in *Fake it!* only the impact is considered, while in *Bad News* and *Harmony Square*, the news is ephemeral and constantly replaced to divert the public's attention. In *Headliner* and *Headliner: Novinews*, defending and maintaining a firm stance—staying with the medium—becomes important to generate impact over time and have greater social repercussions. Interestingly, although *BBC iReporter* has a more serious approach, it uses less compromising topics, such as the crash of a mobile messaging app or the downing of a satellite, as a pretext to deliver its consciousness-raising and literate message.

The *design* of all newsgames is generally simple, especially those that are text-based and clickbait, such as *Bad News* and *Harmony Square*. *Headliner: Novinews* is also an improvement on its predecessor. The language used is generally clear and telegraphic, and the integration of images accompanying news stories is limited in all but the two versions of *Headliner*, where low-quality or blurred images are used. In *Bad News* and *Harmony Square*, even questionable memes are used. For its part, *BBC iReporter*, which is

related to proposals such as *Her Story* (Barlow, 2015) or *Telling Lies* (Barlow, 2019), is based on the linking of video recordings, video chats, and digital interfaces that simulate communication equipment and devices.

In turn, *impact* is measured by the repercussions that publications have on different social groups. *Headliner* and *Novinews* feature animations that reflect the reactions of different groups—with protests, suicides, arson, and even murder—to disinformation, while in other games, *impact* is based on levels of reputation and skepticism—as in *Fake it!* or *BBC iReporter*—or affects only the level of happiness of the player's family—as in *Editor's Hell!*

3.7. Verification process standards and nature of disinformation

With regard to the standards of the verification process, only one of the games includes, in its narratives, some of the stages contemplated in the fact-checking methodology (Holan, 2022). However, it is a shallow verification that, while assisting a playful experience with a lighthearted and fun tone, serves to achieve the same awareness-raising goals mentioned above. Consequently, in the newsgames analyzed, false, misleading, misrepresentative, or deceptive news is the most common, as at no point is the player offered the opportunity to submit them to any filter or process of documentary consultation—comparison with other news items, databases, books, etc.—or personal consultation—questioning experts, informants, or witnesses.

On the other hand, considering the nature of disinformation, it is found that newsgames deal with different types of hoaxes—satire or parody, misleading content, impostor content, fabricated content, false connection, false content, and manipulated content—and disinformation strategies (Tandoc et al., 2018; Wardle & Derakhshan, 2017) in search of economic interest, political propaganda, parody of people or institutions, and manipulation of public opinion.

This infocinated and disinformation-saturated scenario has serious consequences for essential practices such as social, economic, and environmental sustainability (Stanišas et al., 2019). In newsgames, the player can see, sometimes simultaneously, how infocination and disinformation can be used as narrative artifacts to harm populations and destabilize governments. In these cases, the identities of characters and news events become blurred. Precisely for this reason, the lack of attention or even the direct attack on sustainability depicted in these video games, in its social, economic, and environmental dimensions, reveals the serious consequences that can result from global disinformation practices. Video games provide a simulation that, at best, fosters a critical approach, raises public awareness of the need to combat disinformation, and emphasizes the urgency of addressing these phenomena in the cybersphere from a digital and media literacy perspective (Gómez-García and Carrillo-Vera, 2020).

4. Conclusions

Since the first crossword puzzle appeared in a printed newspaper—*The New York World*—in 1913, games and journalism have forged a strong bond of convenience. As a result of this symbiosis, CNN journalist and Uruguayan researcher Gonzalo Frasca proposed the term 'newsgames' in the early 2000s to capture the intersection between journalism and video games. Currently, the study of these playful-journalistic experiences is arousing great interest among the scientific community, especially to examine the literacy potential of newsgames to combat a pandemic that is so dangerous and harmful to today's societies (Castillo Lozano et al., 2023; Wardle & Derakhshan, 2017).

The main hypothesis of this study is not confirmed, as it is found that most of the analyzed newsgames do not have the potential to be a media literacy tool in strict terms of information verification. However, they are presented as an exceptional videoludic opportunity to transcend mere entertainment—casual game—and offer a formal approach—serious game—from which to raise awareness about the risks of disinformation. In this sense, *BBC iReporter* is emerging as a title that could achieve a real literacy power, given its limited, albeit well-intentioned, commitment.

In this process of hypothesis testing, the newsgame analysis sheet—Table 1—which has been designed *ad hoc* for this research, has been the key instrument for designing a method that is not only valid and useful for this article, but also replicable for future studies on newsgames and open to new videoludic proposals that seek to teach literacy, in different dimensions and strategies, to future information professionals. In this way, the main objective of this research, focused on analyzing the potential of newsgames to teach citizens about the phenomenon of disinformation, is fulfilled.

The newsgames analyzed reflect the characteristics and particularities of the contemporary stage in which they are framed. In response to the specific objectives O1 and O3, the analysis carried out reveals that, in these projects, the ludological component prevails, as they offer an experience that is more entertaining or fun than educational or formative. It is also undeniable that they can present solid and

relevant narratives, offering representations of possible worlds that are not too different from those of the real world and the problems that underlie it, although it is true that these different aspects are presented from a point of view closer to criticism and satire than to exemplarity and the defense of journalistic principles. In this sense, there is a lack of a better balance between the narrative aspect and the capacity of these projects to offer a quality journalistic proposal to fulfill a vital literacy and awareness-raising function on the importance of educating in the verification of information.

From a sustainability perspective—in its social, economic, and environmental dimensions—the analyzed newsgames are a timely literacy pathway to address social problems in an interactive and educational way. In response to the specific objective O2, it has been found that by allowing players to get involved, directly and by taking an active role in informational decisions, in undesirable situations of inequality or injustice, these newsgames promote the empowerment of their players and foster a sense of civic responsibility. This ability of newsgames to transcend casual entertainment and become effective tools for serious learning, thus becoming potential training complements to nourish the academic offer with specific knowledge, competences, and professional skills in content verification (Castillo Lozano et al., 2023; Ufarte-Ruiz et al., 2018), underlines their potential as agents of social and cultural change.

In short, and despite the fact that most of the games analyzed do not present an appropriate proposal to teach literacy about the verification process, it is possible to infer—through other games analyzed—that newsgames can exhibit literacy potential and, consequently, become useful tools for social innovation to tackle serious problems such as disinformation, while promoting citizen participation to fight against the effects of manipulation emanating from suspicious information. However, as previous work has concluded (Morejón Llamas, 2023), it is also necessary to recognize that the literacy capacity of newsgames is not absolute and, therefore, it is advisable to complement this training with specific learning resources and complements to teaching to correctly and effectively address disinformation literacy and verification.

Finally, this research encourages the continuity and breadth of this interdisciplinary field of study, as a better understanding of the role of newsgames in contemporary society can better harness their potential to promote more informed journalism, a more active citizenry, and a fairer and more equitable society.

5. Contributions

Assignments	Author 1	Author 2	Author 3
Conceptualization	X	X	X
Content curation	X	X	X
Formal analysis	X	X	X
Acquisition of funds	X		
Research		X	X
Methodology		X	X
Project management	X		
Resources	X	X	
Software	X		
Monitoring	X	X	X
Validation	X	X	X
Visualization		X	X
Writing: original draft	X	X	X
Drafting: proofreading and editing	X	X	X

6. Acknowledgement

Translator: Marta Pérez-Escolar.

7. Funding

The research from which this paper derives did not receive any funding.

This paper is part of the special issue "Communication, social innovation and sustainability" belonging to the R+D+I Project "Innovation ecosystems in the communication industry: players, technologies and configurations for the emergence of innovation in media and communication" (INNOVACOM), with reference PID2020-114007RB-I00. It was funded by the Ministry of Science, Innovation and Universities, AEI/10.13039/501100011033.

Proyecto **INNOVACOM PID2020-114007RB-I00** financiado por:



8. Declaration of conflict of interest

The authors declare that there is no conflict of interest.

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10. Notes

1. The code of principles of the International Fact-Checking Network (IFCN) is available at the following link: <https://acortar.link/ZfEQkJ>

2. Information on the quality indicators used by *the Duke Reporter's Lab* to assess the excellence of fact-checking initiatives is available at the following link: <https://acortar.link/c68EF4>