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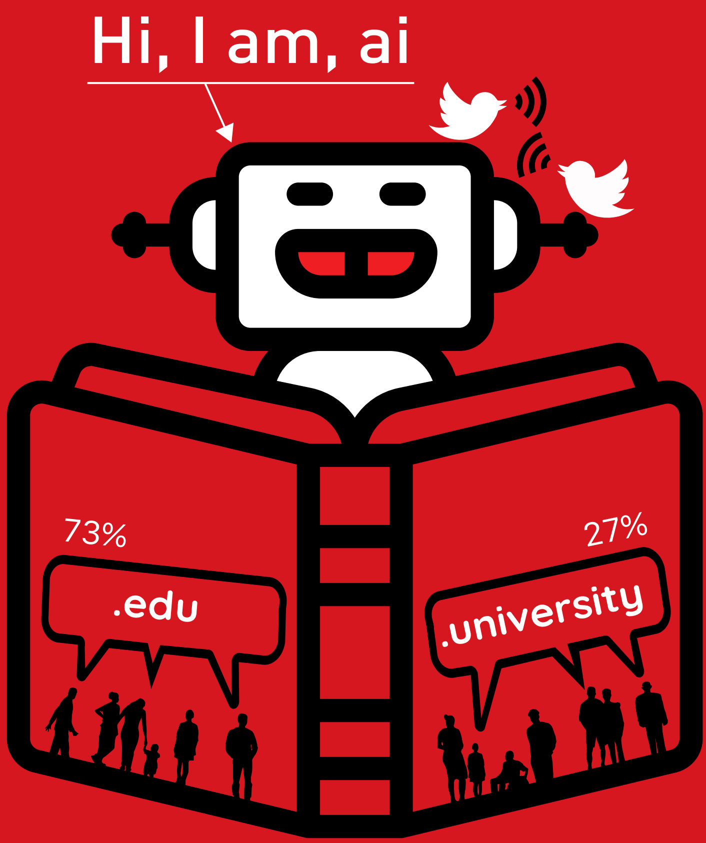

Educommunication

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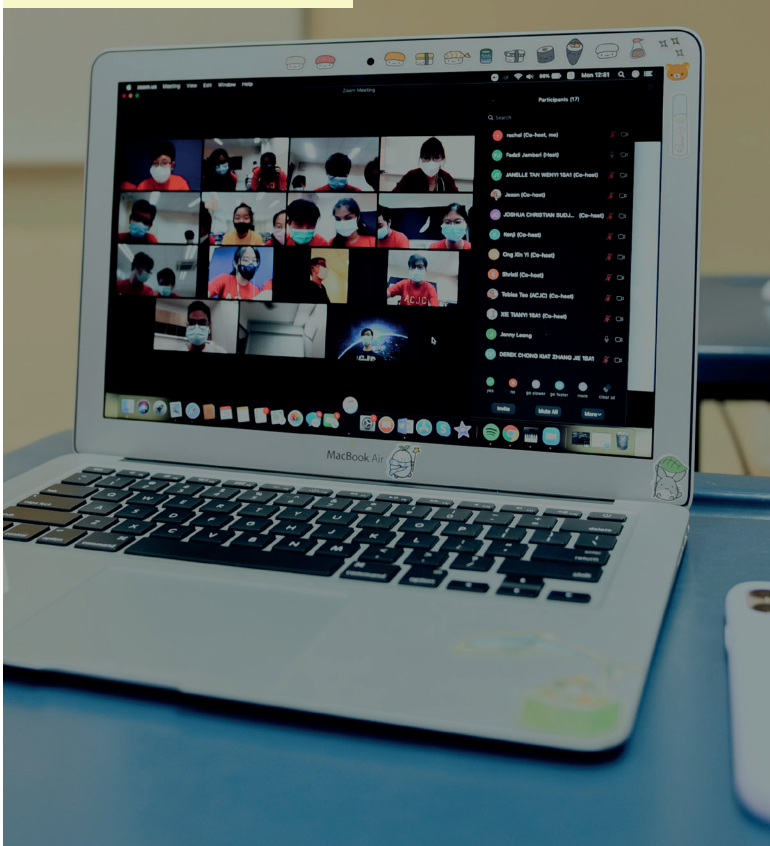

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Abstract

Information, communication, and digitalization technologies have driven the unlimited access to knowledge, thereby promoting creativity, economic and cultural development, and the emergence of a global world at breakneck speed over recent decades. Across its multiple dynamics, this digital revolution has opened new educational opportunities that are closely connected to emerging technologies and, recently, to artificial intelligence. These advances have had an unexpected impact on people's lives, altering the values of society and our understanding of the role of education and the modern school in this scenario of global communication. In this context, media education arises from the clear influence of electronic devices and digital technology on society. The aim of this study is to review our understanding of the scientific relevance of the terms "media education" and "educommunication" during the last two decades to describe its evolution on the basis of its terms, locations, thematic stages, and methodological approaches using a systematic quantitative–qualitative review of 598 articles collected from the *Web of Science* between 2000 and 2021. The results suggest that such scientific interest can be divided into two stages, viz. reflections on media education in its terminological diversity (2000–2012) and measurement, implementation, training, and educommunicative digitization in terms of technological–digital development (2013–2021). We conclude that studies in this transdisciplinary field, which have historically been spread across North and South America, Europe, North Africa, and the North/South East Asia–Pacific region, have broadened their perspective from early criticism of media education to consider the "glocalization" of media education, directing interest toward the cultural digitization of the Global South, algorithmic literacy, and the digital and ethical–critical (self-)management of individual and collective identity.

Keywords

Media education; Educommunication; Media literacy; Media competency; Scientific mapping; Social media; ICT; Glocalization; Digital culture; Digital literacy; Review article.

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1. Introduction

In the 1960s, digital technology was viewed through a utopian perspective as a revolutionary movement by and for the people. Technology was conceived as a means of enabling unlimited access to global knowledge, creativity promotion, local business development in a broad context, and the reemergence of democracy, which resulted in what **Buckingham** (2020) defined "digital capitalism." This cross-cultural approach led to new active and participatory educational practices focused on learning as a consequence of global trends related to artificial intelligence or aerospace technology. However, owing to the Covid-19 pandemic, digitalization intensified in all fields of life (work, education, industry, and society, among others), leading to emerging concerns about participation in the online world, beyond the preliminary research on equity and the impact of media education on development, democracy, and human rights (**Martínez-Bravo** *et al.*, 2021).

Currently, the concept of media education is conceptualized as a personal development process involving the media for the promotion of critical thinking, perception, interpretation, analysis, and judgment of media messages as well as for digitalized modes of self-expression (**García-Matilla**, 2022). In this sense, media education is considered the result of this process in which individuals are actively encouraged to develop competencies in the communication and information fields (**Fedorov**, 2008). Moreover, the study of media education has also been explored in Ibero-American contexts, where the combination of education and communication has become a transdisciplinary field known as "educommunication," in which individuals assume a more proactive and critical role regarding the media (**Lotero-Echeverri** *et al.*, 2019). In this context, we have noted two unique traits that differ from the research preconceptions of the Global North. Firstly, one finds educommunication as liberation of the oppressed, the development of the critical perspective, and the meaningfulness of dialog (**Freire**, 2005). Secondly, one observes the emergence of environments that prioritize technological, media, and digital inequality and precariousness (**Mateus** *et al.*, 2022). As pointed out by **Bermejo-Berros** (2021), these two concepts are both compatible and necessary for their dialectical integration and epistemological conceptualization insofar as "media education" and "educommunication" combine to define the relevance of communication in education.

Considering these theoretical–practical proposals, schools are currently enhancing their programs through literacy initiatives to enhance digital inclusion in society as a utopian support for media education curricula (**Poyntz** *et al.*, 2021), to promote the dissemination of new cross- and transmedia strategies (**Jenkins** *et al.*, 2013). According to **Buckingham** (2020), this democratic–digital vision remains far from promoting informed discussion and debate, as social media contribute to the development of a digital world that is controlled by a few corporations that are responsible only to their own shareholders. Thus, the problem we face in terms of research is a digital paradigm change that has revolutionized the foundation of society and, consequently of education, in which it becomes imperative to analyze the social reality beyond didactics, considering the interdependent and current aspects of media education (**Gómez-Galán**, 2020). In other words, we must understand media education from the Global North and South as a strategy oriented toward the analysis of consumption, ideological demystification, and the verification of the truth in the light of changing and dynamic challenges that reflect marginal perspectives and result in new demands for the development of media competencies (**Nichols**; **LeBlanc**, 2020).

Starting from this framework, the present study delves into studies directed toward the analysis of the impact of "media communication" and "educommunication" at the scientific level through a systematic review. Recent studies using this method have considered analyses of this phenomenon with regard to disinformation or multiliteracy (**Valverde-Berrocoso** *et al.*, 2022), "fake news" in the light of the new challenges of creative production and consumption (**Kim** *et al.*, 2021), the risks of democracy as a result of fake news and big data (**Ottonicar** *et al.*, 2021), and the specific impact of digital literacy on education (**George-Reyes**; **Avello-Martínez**, 2021), among others. However, literature lacks an evolutionary analysis of the educommunicative object itself with the aim of understanding the corresponding intercultural perspectives during the last two decades. We thus attempted to identify works on media education from the English speaking–Western perspective (in English) as well as the Ibero-American view (in Spanish), with the following specific objectives: (a) to explore the main scientific concepts in media education, (b) to map the geographical zones that are interested in media education from a scientific perspective, (c) to distinguish the thematic stages in the scientific literature in this transdisciplinary area, and (d) to identify their methodological approaches.

2. Literature review

2.1. Historical evolution of the concept: media education

The concept of "media education" has been given numerous definitions over the years, always responding to the specific needs of context and traditions. In line with this permanent technological diversity and the rhythm of the emergence of new media, an extensive theoretical–conceptual debate has been generated, diversifying the global concept of knowledge, its objectives, and the implementation of media education plans in education environments (**McDougall**, 2013). Officially, the term "education for communication" was introduced for the first time in 1982 by the United Nations Educational, Scientific and Cultural Organization (*Unesco*) as a way of integrating media into all levels of education as well as promoting research (**Avello-Martínez** *et al.*, 2013). This proposal was reviewed at the *Unesco* summits in 2005 and 2007, followed by the launch in 2006 of the curriculum *Media literacy: a kit for teachers, students, parents and professionals* (**Frau-Meigs**, 2006), aimed at the implementation of media literacy in the curricula of secondary school teachers. Considering this proposition, in the early twentieth century, "media literacy" was defined as the reflective ability of audiences to understand and select the media and to produce their own content (**Alvermann**; **Hagood**, 2000). In other words, this concept was understood as a way of analyzing the media to promote critical thinking regarding the messages received –and perceived– by people (**Cheung**, 2004).

Media education continued to evolve as new technological advances occurred, addressing concerns and challenges associated with digital culture (**Acerbi**, 2019). Some of the more widespread scientific terms have been: "media education," which refers to the development of individuals' competencies for understanding and using communication media in a more critical and conscious way (**Fedorov**, 2008); (2) "digital literacy," a term introduced by **Gilbster** (1997) for the development of the information society, which refers to the ability to interpret and technologically use digital technology and its resources; and (3) "information literacy" , which refers to the ability to identify, analyze, and evaluate information in its different formats (**Buitrago** *et al*., 2017). Meanwhile, in 2011, an update of the *Unesco* curriculum was presented, *Media and information literacy: curriculum for teachers* (**Wilson** *et al.*, 2011); "media education" became "media and information literacy" (MIL), and the perspective and implications of this methodology were expanded to the education scenario. Afterwards, the Alfamed Research Network on Media Competencies for Citizens, from the Euro-American area, introduced the *Alfamed curriculum for teacher training in media literacy* (**Aguaded** *et al*., 2020) with a multicultural and plural perspective that broadened the previous approaches, adapting it to the post-pandemic challenges in the third decade of the twenty-first century. This document was ratified, at the same time, by the *Unesco Media and information literacy curriculum for educators and learners* (**Grizzle** *et al*., 2021), which incorporated, along with educators, students as a central element in the media–digital learning process.

As a result of this terminological plurality, other projects and research studies have proposed concepts such as "new media literacies" (**Jenkins** *et al.*, 2009), "multiple literacies" (**Bergomás**, 2010), and "transmedia literacy" (**Scolari** *et al.*, 2018), contributing to the debate on the convergence between the areas of communication and education. Despite this variety of concepts, the present study departs from the concept of "media education" with respect to how it addresses, from a broad scientific perspective, the idea of reading and writing, comprehension, and critical use of communication, technological, and digital media (**Aguaded**; **Guerra-Liaño**, 2012; **Buitrago** *et al*., 2017; **García-Matilla**, 2022).

2.2. New scenarios for cybercitizens

With the massive and compulsive presence of the internet, social networks, and multiple electronic devices, the role of the media has become a central axis of global(ized) society. As pointed out above, these advances result in unprecedented situations that generate new meanings, having an overwhelming impact on the population (**Mason**; **Metzger**, 2012). In fact, following the worldwide Covid-19 crisis, the post-pandemic society has challenged the idyllic vision of digital globalization in the sense of an ingenious and positive view of technology as the facilitator of communication and the personal, professional, and educational activities of individuals (**Abolfathi** *et al.*, 2022). However, the growth in consumption has been exponential, with the use of social networks peaking in 2022 according to the *Digital 2022 global overview report* (*DGO Report*, 2022), such that platforms such as *YouTube*, *Instagram*, *Facebook*, *Twitter*, and *TikTok* have gained 13.5 new users per second, being the preferred type of media (95.7%) for the consumption of information, content creation, digital self-representation, and social interaction by young adults (**Xiao** *et al.*, 2021).

Many studies have demonstrated that the ways in which we express ourselves, become informed, communicate, and understand everyday life vary as new technological–digital functionalities appear. These social processes affect the structure and the way in which media education is implemented today (**Abolfathi** *et al.*, 2022), creating new challenges to the role of the prosumer (production and consumption of media and digital content) (**Toffler**, 1980), which result in new self-representations, constructions, and management of the digital identity as well as emergent narratives and (un)awareness of citizens' perspectives (**Feher**, 2019); That is, digital platforms, social networks, and the actions they enable have shaped the way in which citizens participate in society since the advent of the internet era (**Buckingham**, 2007). Its broad use and consumption have become embedded in everyday life, with resources such as hashtags,

> Schools are enhancing their programs with literacy initiatives for the digital inclusion of the society as a utopian support for media education curricula

likes, and comments providing multiple options for taking part in social activities (**Chen** *et al.*, 2011), and thereby the manner in which we learn and teach (**Tejada-Fernández**; **Pozos-Pérez**, 2018). Therefore, in an environment of abundant data and information exchange, the need arises to understand the inner workings and influence of these platforms, for the construction of competent cybercitizens (**Aguaded**; **Vizcaíno-Verdú**, 2020).

> Media education continued to evolve as new technological advances appeared, addressing concerns and challenges associated with digital culture

Various studies have demonstrated that to intervene democratically in these complex digital scenarios, knowledge and development of a series of competencies that facilitate the analysis of messages are fundamental, beyond the technical features, concerned with heterogeneity and the intent of sociocultural meanings (**Mezquita-Romero** *et al.*, 2022). Additionally, media education implementation projects have shown that when specific educommunicative processes are applied, citizens develop their socio-proactive capacity, encouraging them to think critically about possible stereotypes, discriminations, or violence (**Erstad** *et al*., 2021). Thus, media education promotes not only participation but also the construction of cybercitizens as agents of social change through the responsible use and consumption of communication media, technologies, and platforms (**Kumari**, 2020). As a result, the present study intends to present the historical–geographical evolution of educommunicative interests during the last two decades and to understand their sociohumanistic trends.

3. Method

The present study included a systematic review and the use of a science mapping method from a quantitative–qualitative perspective (meta-ethnography). Meta-ethnography, defined as synthesis and discussion with respect to research about a specific subject of specialization (**Noblit**; **Hare**, 1988), allows a broadening of the interpretations of preexisting original studies to create a theoretical–visual argument about the scientific evaluation of media education over the last 20 years from 2000 to 2021. Likewise, science mapping, that is, the process of visualizing potentially significant patterns and trends about a scientific question (**Chen**, 2017), enables the identification of components, dynamics, and structures with respect to geographical scenarios, subject trends, and methodological frameworks.

3.1. Search and selection procedure

The search, selection, and synthesis of the data was performed through a systematic review according to the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (*Prisma*) standards (**Moher** *et al*., 2015). As we consider an interdisciplinary portmanteau between "communication" and "education," with a broad range of data and an extensive history over the last two decades, the search was limited exclusively to the most well-recognized international database: the Core Collection of the *Web of Science*. The data obtained were thus guaranteed to have an international perspective, with documents supported by high-quality indexation criteria, thus avoiding the potential errors in similar results obtained from other platforms.

Regarding the procedure, the search was narrowed down to a limited set of terms (in Spanish and English): "alfabetización mediática," "media education," "educomunicación," "educommunication," "educación mediática," and "media education," adopting the following strategy: "[term]" AND [2000 to 2021] AND [Title] AND [Article] AND [Spanish / English] AND [Education Educational Research / Communication]." The initial search obtained a total of 613 scientific articles within the areas of Education and Communication during the last two decades.

Next, duplicate records were filtered out by using the *RefWorks* bibliography manager. This process included a double screening: (1) an automatic process using the manager software, and (2) a manual process on the basis of qualitative reading by the authors. For the latter, the *Spider* (sample, phenomenon of interest, design, evaluation, research type) strategy was applied (**Methley** *et al.*, 2014) to define the eligibility criteria for the qualitative analysis. The final criteria applied were (a) sample (international, regardless of date or geographical zone), (b) phenomenon of interest (media education as the main axis of the object of study), (c) analysis design (cross-sectional, longitudinal, or experimental), (d) evaluation (perceptions and conclusions about the impact of media education), and (e) type of research (qualitative and/or quantitative). This resulted in 598 studies (Fig. 1).

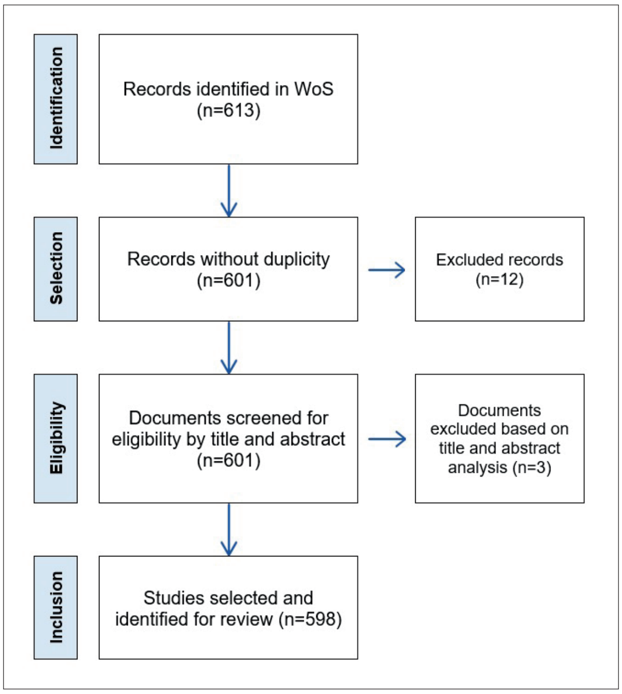

Figure 1. Flow diagram of the selection process

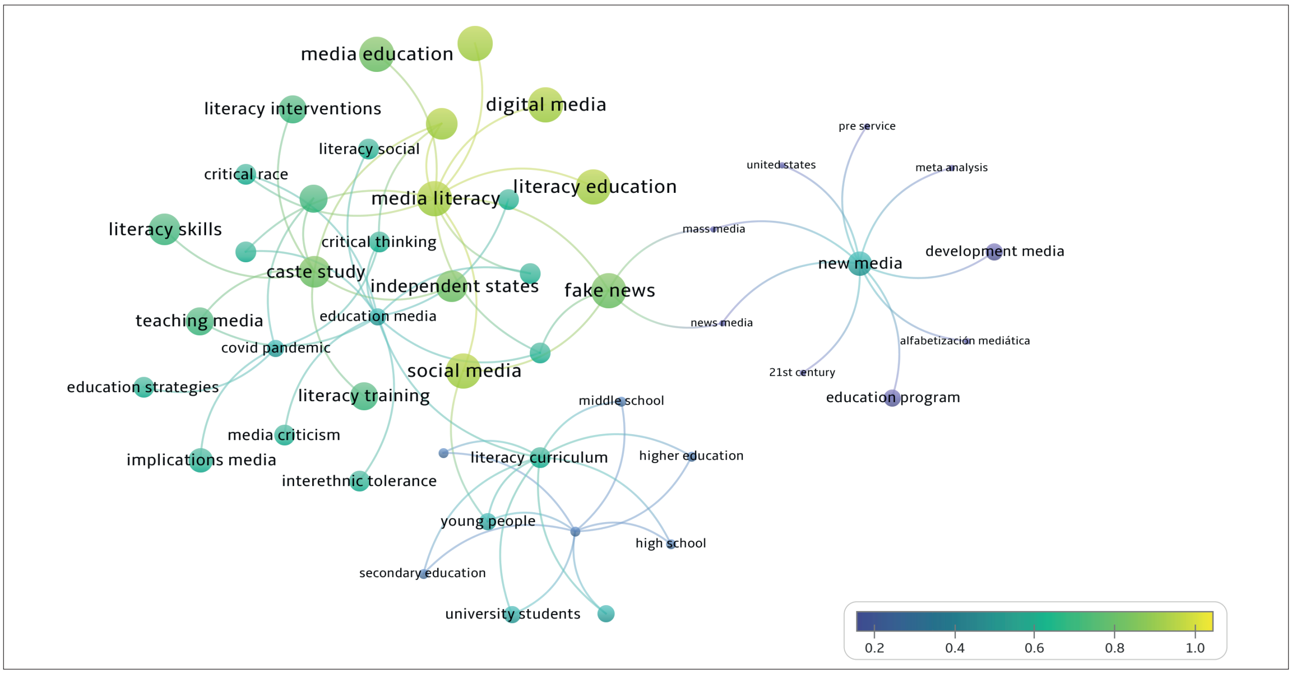

Figure 2. Network of conceptual co-occurrences in media education studies

3.2. Analysis and data synthesis

Because the body of work was broad, diverse, and complex, the data were analyzed and interpreted in two ways: quantitative and qualitative. The former provides a global approach to the phenomenon with respect to the concepts, while the latter allows a deeper analysis of the evolution of media education with respect to its methods, themes, populations, etc., through the application of science mapping to reveal the trends and issues considered during the last two decades. The quantitative analysis was performed by analyzing the article titles using the *WordCounter* platform so that, using the two terms, we could identify concept referring to studies on media education. Meanwhile, the qualitative analysis was performed through the codification using the *Spider* scheme, establishing indicators for each of the articles selected. Additionally, science mapping of the results was performed by using the network analysis and visualization software *VOSviewer 1.6.18* and *Gephi 0.9*.

4. Results and discussion

4.1. Conceptual approach to studies on media education

To explore the studies on media education, we identified 48 keywords identified on the basis terminological density whose meaning differed from the terms that composed them, thus being considered as consolidated scientific concepts. The most interesting ones, in order of appearance, were “media literacy,” “media education,” “literacy education,” “critical media,” “digital media,” “social media,” “case study,” “new media,” “literacy skills,” “literacy training,” “school students,” “higher education,” “literacy interventions,” “fake news,” “21st century,” “information literacy,” and “critical thinking”, among others (Figure 2).

Through co-occurrence analysis, the main clusters were identified as (1) “media literacy,” in association with “media education,” “critical media,” “digital media,” “fake news,” “social media,” or “case study”; (2) “new media” with “development media,” “education program,” “meta-analysis,” “mass media,” “news media,” and “21st century,” among others; (3) “literacy curriculum” with “middle school,” “higher education,” “high school,” “university students,” “young people,” “secondary education,” and “education media.”

The data revealed some trends and concerns about media education studies, among which we observed phenomena associated with fake news, interethnic tolerance, or the Covid-19 pandemic. We also identified analytical approaches on critical thinking, media criticism, racial criticism, or the involvement of education, or scenarios based on the use of case studies as the main type of analysis in primary and secondary schools, and university.

4.2. Media education for a “glocal” community

Based on the sample, throughout the analysis, a growing interest was observed in the study of media education in different educational, political, and social contexts. In the first decade (2000–2012), we found studies localized to a specific geographical location, whose aim was fundamentally to conceptualize the idea of “media educa-

> With the massive and compulsive presence of the Internet, social networks, and multiple electronic devices, the role of the media has become a central axis of global(ized) society

tion." In contrast, during the second phase (2013–2021), a proliferation of studies was observed related to technological–digital development and its implication in society (Figure 3).

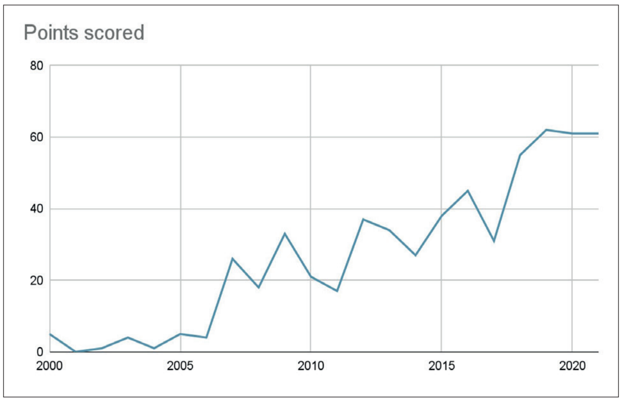

Figure 3. Evolution of the number of studies in media education

The first few years (2000–2003) revealed studies dedicated to theoretical reflections on the concept of media education and the importance of recognizing media as an influential element in society, left over from previous communication theories. As the years passed, it was observed how media education changed worldwide to include African, Asian, and Latin American countries, in agreement with *Unesco* recommendations on its implementation in school curricula and teacher training on the critical use of media and social networks (**Avello-Martínez** *et al.*, 2013).

With the passage of time, the sample broadened in terms of both reach and number (**Scharrer**, 2005; **Gruba**, 2006; **Austin** et *al.*, 2007; **Pinkleton** *et al.*, 2008; **Primack** *et al.*, 2014). However, in many countries, scientific concerns about media education were scarce, especially in Southern Africa, some Latin American countries, or western Asia (Figure 4). Studies on media education were particularly prevalent in North and South America, Europe, Northern Africa, and the North and South East Asia–Pacific region.

According to the data obtained, three representative population segments were observed: (1) students, encompassing different age groups, for which activities were proposed both inside and outside the classroom for the development of technological–digital media competencies (**Pinkleton** *et al.*, 2008; **Byrne**, 2009; **Cheung**, 2010; **Medina-Cambrón** *et al.*, 2015); (2) educators, focusing on training for the implementation of technological, digital, and audiovisual resources in different education environments (**Belova**; **Eilks**, 2016; **Wang** *et al.*, 2018); (3) families and older individuals, focusing on the integration and inclusion of the different generations involved in information and communication processes (**Tsvetkova**, 2019). This classification supports what **Jaakkola** (2020) considers to be a limitation in the study of media education, in that the samples were homogeneous with respect to the worldwide community. In this line, media education, according to **Abolfathi** *et al.* (2022), would have to be understood in all areas and collectives from a "glocal" (both

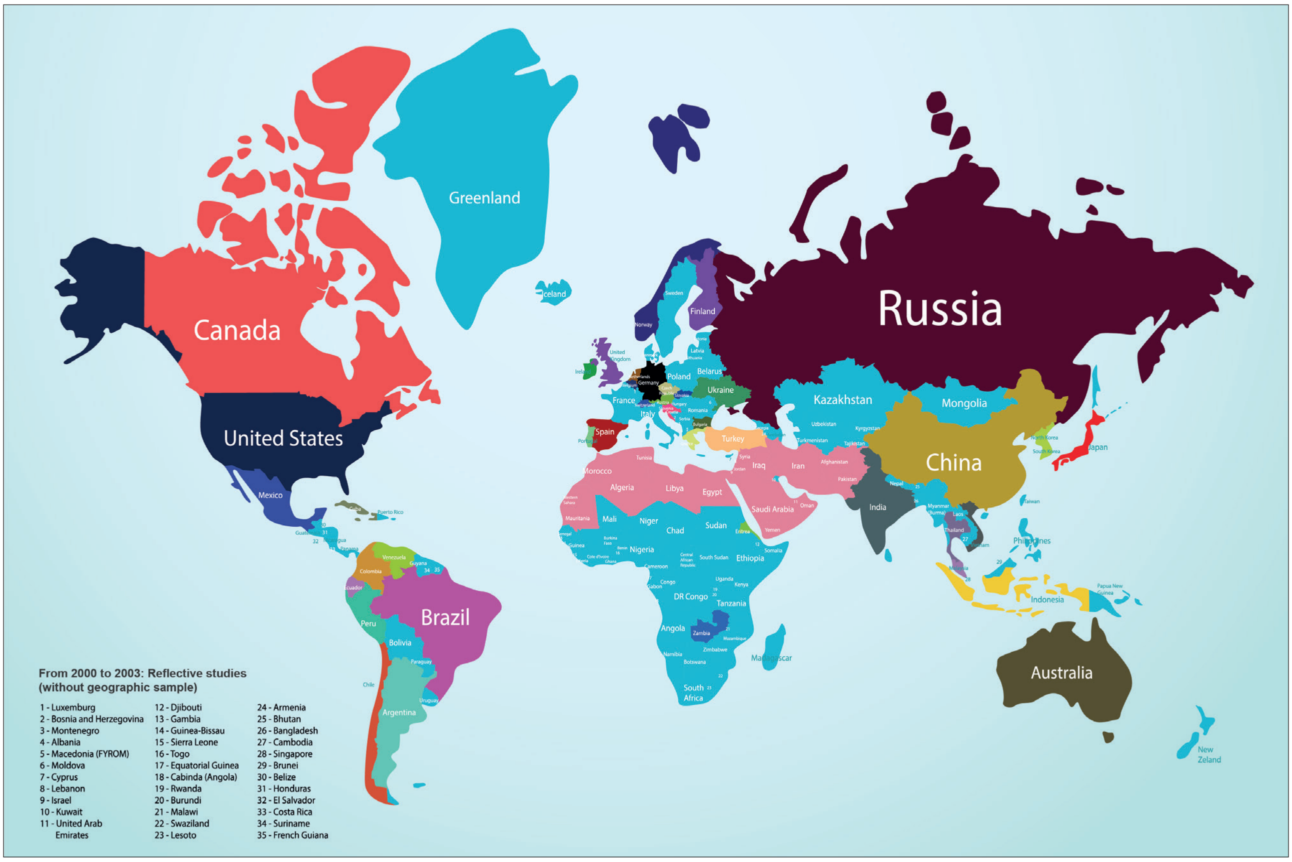

Figure 4. Geographic map of studies on media education from 2000 to 2021. See an interactive evolution at:
https://view.genial.ly/6267ffbf4d958600180afc19

global and local) point of view (**Hemer**; **Tufte**, 2005), considering the evolutionary and constant impact of technology, the media, social networks, and information in the lives of individuals (**Xiao** *et al.*, 2021).

4.3. Thematic evolution of media education in science

As a result of the media education activities conducted by the *Unesco*, the publication of different curricula for the training of educators and students (**Wilson** *et al.*, 2011; **Aguaded** *et al.*, 2020; **Grizzle** *et al.*, 2021), and the consolidation of social networks, researchers have reformulated the concept over the last two decades, following emerging social phenomena that have led to preferred lines of research. As shown in Figure 5, among the hundreds of studies analyzed, five stages could be identified: (1) conceptualization, which includes studies on terminologies and reflections on media as an educational venue; (2) implementation, which includes the analysis of media legislation, the surge and challenges of technological advances, and new media representations of audiences; (3) formative, which possesses new scenarios regarding participative culture, education 2.0, and the conceptual debate on previously introduced terminology; (4) measurement, which analyzes the opportunities and consequences of media education according to the digital gap and identity; and (5) digitalization, which mainly studies the impact of social networks, the prosumption of information, and the shaping of digital identity.

> In these complex digital scenarios, the knowledge and development of a series of competencies that facilitate the analysis of messages are fundamental, beyond the technical features, concerned with heterogeneity and the intent of the sociocultural meanings

The following evolutionary stages can be defined:

Conceptualization stage (2000–2005)

In this period, media education started to be conceived at the conceptual level through reflective studies. Research studies explored diverse terms from different perspectives and disciplines (**Alvermann**; **Hagood**, 2000), while also trying to clarify and unify their social necessity (**Gutiérrez-Martín**; **Tyner**, 2012). During this stage, the term was explored within different political and social contexts without consensus on its definition, with the discussion progressively expanding according to temporal and geographical needs (**Buckingham**, 2003).

Implementation stage (2005–2010)

This stage resulted from the launch of the first *Unesco* curriculum (**Wilson** *et al.*, 2011), in which studies were planned, centered on the application of media education in the different phases of education (from early childhood to university). Studies were mainly experimental in character with a quantitative approach, focusing on classroom experiences and the practical exploration of media activities with pedagogic aims. Studies during this period present evidence that a higher level of media competency related to media education led to greater critical awareness of media use and consumption (**Cheung**, 2009; **Opertti**, 2009; **Nam**, 2010).

Formative stage (2011–2015)

During this stage, it was observed that, despite institutional efforts made on curricular and legislation issues, citizens had difficulties and deficiencies in learning about media, due to a lack of training of teachers (**Cabero**; **Liano**, 2011). Thus, studies focused on the media competencies of professors to improve and effectively implement quality criteria to ensure effective student learning. During this period, the importance of media education for citizen participation was underlined, with the emergence of some of the first studies on social networks (**Faiola** *et al.*, 2010). However, the focus

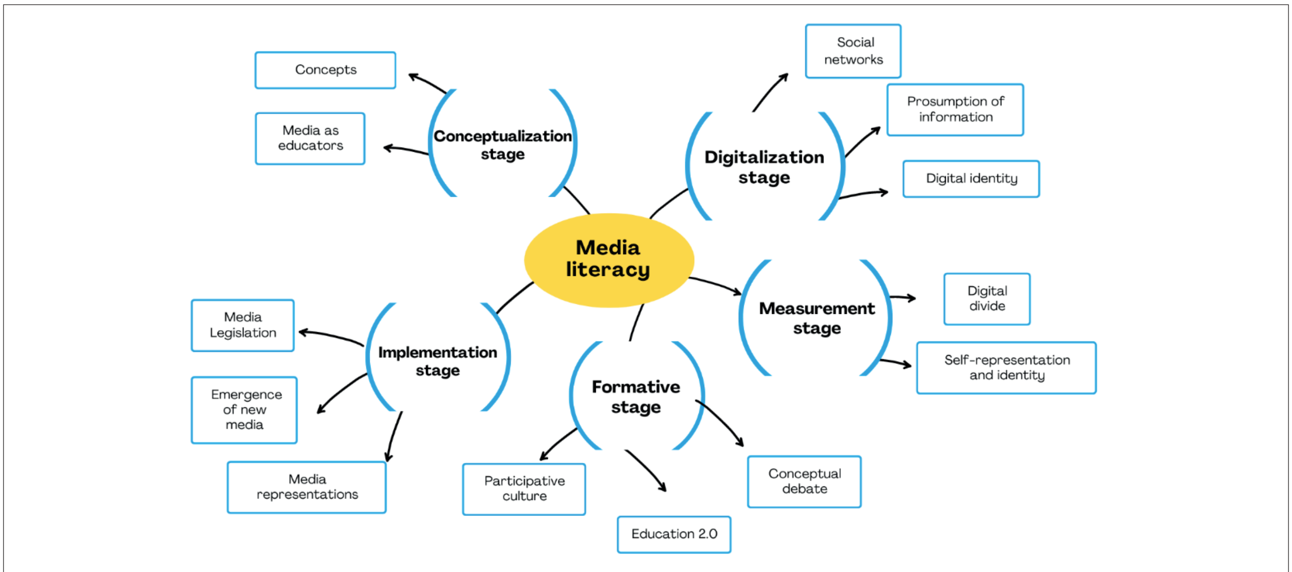

Figure 5. Advances of media education in stages and sub-themes

of media education remained almost intact, addressing the challenges associated with accessing, reading, evaluating, reflecting on, and creating media content (**Medina-Cambrón**; **Ballano-Macías**, 2015). Likewise, this period also saw the emergence of studies with small samples that considered population segments complementary to the profile of professors or students, such as older individuals (**Santibáñez-Velilla**, 2013; **Abad-Alcala**, 2014), vulnerable and/or traditionally marginalized collectives, and groups at risk of social exclusion (**Franco-Álvarez**; **Martul**, 2013).

> The data showed some trends and concerns about media education studies, among which we observed phenomena associated with fake news, interethnic tolerance, or the pandemic due to Covid-19

Measurement stage (2016–2018)

Studies during this period demonstrated that the implementation of educommunicative methodologies had not been successful, focusing on measuring the level of media education of citizens as well as the development of new formal and informal teaching–learning formulas (**Xiao** *et al.*, 2021). We identified studies with approaches directed toward the training of users and audiences (**Moekotte** *et al.*, 2017; **Dezuanni**, 2018), and works oriented toward the analysis of media texts and understanding the mechanisms of online content creation (**Buitrago** *et al*., 2017).

Digitalization stage (2019–2022)

In this last phase, the transformation of the media and the access to information enabled the analysis of consumption and distribution of information, data, and news (disinfomedia, fake news, and information saturation, among others) (**Acerbi**, 2019; **Abolfathi** *et al.* 2022) as well as the habits of vertiginous digital consumption, platforms, algorithms, and the monetizing and diversification of data (**Poyntz** *et al.*, 2021; **Nichols**; **LeBlanc**, 2020). In this last stage, studies defined media education as the capacity to access, participate in, create, redefine, and interpret media messages as proactive citizens (**Shinta** *et al*., 2019; **Fardiah** *et al.*, 2020; **Arik**; **Arik**, 2021).

4.4. Analysis design and types of studies

Having identified the themes of scientific interest, the preferred research designs of media education studies were analyzed by network analysis (Figure 6). During the conceptualization stage, most of the works were reflective, aiming to apply literature reviews and trials to address the concepts that explained the needs of society in terms of media (**Buckingham**, 2007). In turn, during the implementation and formative stages, the studies became more quantitative, mainly quasi-experimental or experimental, regarding the reduction to practice as well as the verification of the effects of educommunicative training, and the evaluation of the programs designed and executed through questionnaires, experimental groups, etc. (**Cabero and Liano**, 2011; **Abad-Alcala**, 2014; **Tully**; **Vraga**, 2017). In the last stage analyzed, that of digitalization, the analyses were eminently qualitative, including in-depth interviews, discussion groups, documental and/or bibliometric analysis, or ethnography, as well as emerging techniques such as digital ethnography, the digital analysis of content, and the analysis of social networks, among others (**Shinta** *et al*., 2019; **Fardiah** *et al.*, 2020; **Arik**; **Arik**, 2021).

> It is especially worth mentioning how "digitalization" has become the cultural *modus operandi* of modern civilization

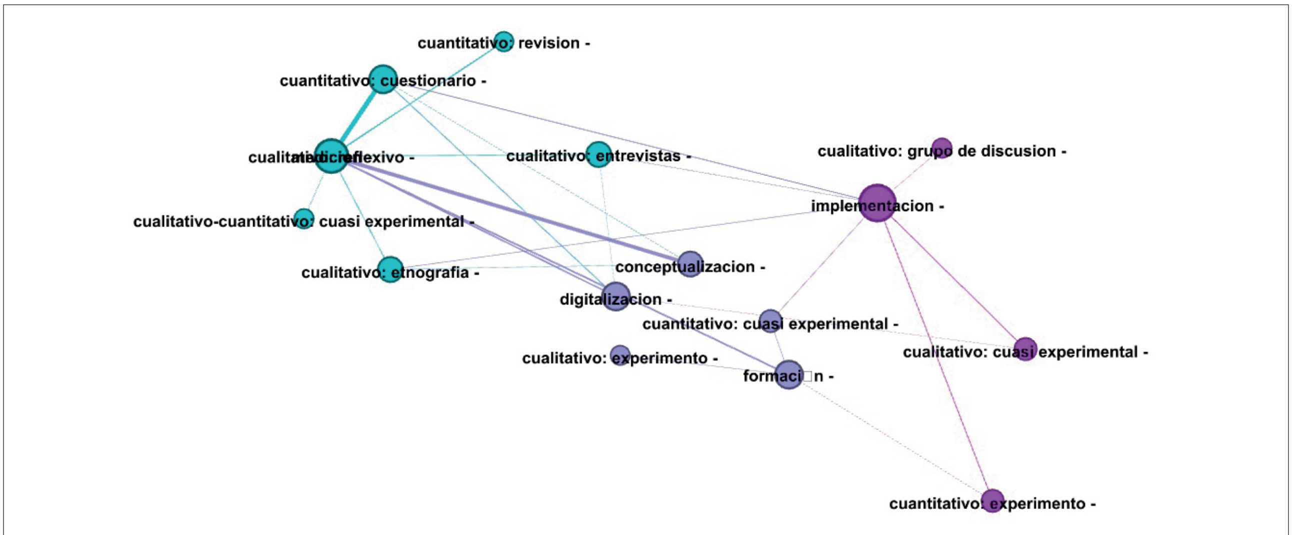

Figure 6. Network of research approaches according to the stage of the education studies of the media analyzed

5. Conclusions, limitations, and outlook

The results of this historical–evolutionary analysis of studies on media education reveal that, for many decades, this research tradition has been conditioned by the highly universal uses and effects of technological–digital advances of devices and media. Therefore, it is especially worth mentioning how "digitalization" has become the cultural *modus operandi* of modern civilization. Everything revolves around digitalization, the sacred totem of modern civilization. Indeed, these platforms have changed the way in which we conceive the media, either owing to their beneficial use, with critical and responsible ideas, or the self-expression of the "digital I." This is why future media education plans highlight the challenges regarding our capacity to understand the codes and languages of the internet in algorithmic and datafied terms, as well as the development of competencies for the prosumption of creative content that exploits human communication according to conscientious, ethical, and judicious criteria.

> Despite the introduction of international mapping that builds the road towards "glocalization", the population segments were fundamentally homogenous

As observed in this work, despite the introduction of international mapping that builds the road towards "glocalization," the population segments were fundamentally homogeneous, until the last digital stage, when concern for minorities and the Global South can be observed. In particular, social networks open the way to analysis of individual and/or collective (self-)representation, prosumption of information and news (fake news, disinfodemia, hate speech, etc.), and the transformation and dissemination of heterogeneous and emerging languages that modify the way we understand language today (emojis, memes, interactions, etc.). These trends have resulted in the development of new hypotheses regarding the role of educommunication for the educator and the student, which are repeatedly adapted to processes that, as of today, extend over just 24 hours, at most, through an Instagram story.

In the face of the great number of new ways in which society can be analyzed in educommunicative terms, as well as the relentless and continuous advance of information technologies, communication, and digitalization, we admit that this study was limited to a description of studies collected from a single database, i.e. the *Web of Science*. This decision was not trivial, as our approach to the phenomenon of media education resulted in a very large number of works whose extension to other document platforms (or in temporal terms) would have resulted in an untenably large quantitative–qualitative sample. This review thus provides a starting point for future studies on the deficiencies and resulting scientific challenges for agents of educommunicative change, as an agent of digital "glocalization," media education "in" and "for" the Global South, algorithm and data literacy, and digital (self)- and ethical–critical management of individual and collective identities.

> We start from a review that forecasts future studies on the deficiencies and consequent scientific challenges for agents of educommunicative change, as an agent of digital "glocalization", media education "in" and "for" the global south, algorithm and data literacy, and digital (self)-and ethical-critical management of individual and collective identities

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Cómo reformar la evaluación de la investigación en España. La acreditación institucional como respuesta al *Acuerdo europeo sobre evaluación*. Carta

How to reform research evaluation in Spain. Institutional accreditation as a response to the European *Agreement on research assessment*. Letter

Ismael Ràfols; Jordi Molas-Gallart

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Resumen

La reforma de la evaluación de la investigación propuesta a nivel europeo en el reciente *Agreement on Reforming Research Assessment* representa una ventana de oportunidad para reformar el sistema español, en un momento en que se debate la nueva *Ley Orgánica del Sistema Universitario* (*LOSU*). Este acuerdo europeo establece la primacía de la evaluación por pares basada en criterios cualitativos con el fin de poder reconocer la diversidad de contribuciones y carreras investigadoras, y aboga por el abandono del uso inapropiado de las métricas basadas en revistas. ¿Cómo puede reformarse la evaluación en España, muy basada en estas métricas, para alinearse con estos principios? En esta carta proponemos que no es posible transitar hacia los principios del acuerdo europeo sin realizar cambios estructurales en la gobernanza de la evaluación, con una devolución de autonomía a las universidades. Abogamos que habría que limitar las evaluaciones individuales por agencias externas a la universidad y fomentar, en cambio, la evaluación institucional. Recogemos una propuesta de 'acreditación institucional' como mecanismo de control público a los procesos de contratación y promoción de profesores en la universidad.

Palabras clave

Evaluación de la investigación, Evaluación cualitativa; Acreditación institucional; Evaluación; Investigación; *Ley Orgánica del Sistema Universitario* (*LOSU*); Agencias de acreditación; Indicadores; Métricas; Promoción; Investigadores; España.

Abstract

The reform of evaluation proposed at European level in the recent *Agreement on Reforming Research Assessment* represents a window of opportunity to reform the Spanish evaluation system, at a moment when the new *Organic Law of the University System* (*LOSU*) is being debated. This agreement establishes the primacy of peer review based on qualitative criteria in order to be able to recognize the diversity of contributions and research careers, and advocates to stop the inappropriate use of journal-based metrics. How can evaluation in Spain, heavily based on these metrics, be reformed to align with these principles? In this letter we propose that it is not possible to move towards the principles of the European agreement without making structural changes in the governance of evaluation, with a return of autonomy to the universities. We advocate that individual evaluations by agencies outside the university should be limited, and that, instead, institutional evaluation should be encouraged. We collect a proposal for 'institutional accreditation' as a public control mechanism for the hiring and promotion of professors at the university.

Keywords

Research evaluation; Qualitative evaluation; Institutional accreditation; Evaluation; Research; *Organic Law of the University System* (*LOSU*); Accreditation agencies; Indicators; Metrics; Promotion; Researchers; Spain.

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1. Introducción

En julio de 2022 se publicó el *Acuerdo para la reforma de la evaluación de la investigación*[1] resultado de un amplio proceso de consulta y debate auspiciado por la Comisión Europea. Trescientas cincuenta organizaciones (agencias de evaluación y financiación, universidades, institutos de investigación, fundaciones y sociedades científicas), incluidas las principales instituciones españolas (34 en total), participaron en los encuentros que consensuaron el *Acuerdo*, mostrando su interés en contribuir al proceso de cambio. El *Acuerdo* establece la primacía de la evaluación cualitativa y por pares, lo que choca con las prácticas dominantes en España, en especial en acreditación y evaluación de méritos (**Delgado-López-Cózar**; **Ràfols**; **Abadal**, 2021).

Existe un amplio consenso sobre la necesidad de reformar la evaluación en España en la dirección propuesta por el *Acuerdo*, pero no están claros los instrumentos y procesos a través de los cuales podría implementarse tal reforma. El anteproyecto de la *Ley Orgánica del Sistema Universitario* (*LOSU*), que en estos momentos se debate en el Congreso, por un lado mantiene un sistema de acreditación y evaluación de méritos individual por agencias externas, y por otro lado introduce las contratos-programas de las universidades y la acreditación institucional que permitirían evaluar cada departamento o universidad de acuerdo con sus misiones singulares (**Ahedo-Gurrutxaga**; **Martínez-Palacios**; **Ormazabal-Gaston**, 2022).

¿En qué dirección habría que desarrollar la evaluación en España para alinearla con los procesos de reforma impulsados internacionalmente? Este fue uno de los principales debates en un curso sobre la evaluación de la investigación que organizó el *Ministerio de Universidades* el pasado mes de julio en la *Universidad Internacional Menéndez Pelayo* (*UIMP*)[2]. El curso fue inaugurado por el ministro Joan Subirats[3] y contó con la participación de representantes de la *Comisión Europea*, *Science Europe*, la *Asociación Europea de Universidades* (*EUA*), y de las principales instituciones españolas implicadas en el *Acuerdo*, como la *Agencia Estatal de Investigación* (*AEI*), la *Agencia Nacional de Evaluación de la Calidad y Acreditación* (*Aneca*), la *Conferencia de Rectores de las Universidades Españolas* (*CRUE*), el *Consejo Superior de Investigaciones Científicas* (*CSIC*), la *Fundación La Caixa*, y varios expertos en evaluación.

Participamos como ponentes en el encuentro y en esta carta editorial queremos compartir, primero, los argumentos que se presentaron sobre la necesidad de un cambio en la gobernanza de la evaluación hacia una devolución de mayor autonomía a la universidad, y segundo, lo que consideramos que fue la idea más prometedora del encuentro: la acreditación institucional, es decir, la sustitución de la acreditación individual de investigadores por una acreditación a departamentos o universidades. Este mecanismo permitiría que las universidades retomaran plenamente la capacidad y responsabilidad de contratar a sus profesores con criterios adecuados a sus propios objetivos y misiones, pero reteniendo al mismo tiempo una garantía de control externo por parte de las agencias de evaluación y acreditación.

¿En qué dirección habría que desarrollar la evaluación en España para alinearla con los procesos de reforma impulsados internacionalmente?

2. Los vientos de cambio que soplan desde Europa: la primacía de la evaluación cualitativa

El movimiento hacia un *Acuerdo para la reforma de la evaluación* ha conseguido en 2022 progresar de un modo inesperadamente exitoso. La *Comisión Europea* y otros gobiernos que han fomentado en la última década los conceptos de ciencia abierta e investigación responsable se habían encontrado con que los sistemas de evaluación basados implícita o explícitamente en métricas de publicaciones (bibliométricas) resultan un gran escollo para conseguir cambios en las prácticas hacia la ciencia abierta. Eso se sumó a la constatación de que el papel determinante de los indicadores bibliométricos en los procesos de evaluación estaban pervirtiendo las prácticas científicas, como ha sido ampliamente documentado en España y en muchos otros países (**Weingart**, 2005; **Cañibano** *et al.*, 2018; **Delgado-López-Cózar**; **Ràfols**; **Abadal**, 2021; **Delgado-López-Cozar**; **Martín-Martín**, 2022).

En 2020 la *Comisión Europea* acordó promover una reforma y en diciembre de 2021 publicó el documento *Hacia una reforma del sistema de evaluación de la investigación*, en el que invitaba a las instituciones científicas europeas e internacionales a construir una coalición voluntaria para avanzar conjuntamente hacia un nuevo sistema de evaluación (*European Commission*, 2021). El *Consejo Europeo* apoyó en junio de 2022 la necesidad de reformas en evaluación, en especial en relación con la ciencia abierta[4]. En julio, la *Comisión Europea* hizo público el texto consensuado del *Acuerdo* para la reforma de la evaluación. En septiembre la *Comisión* anunció la creación de la *Coalition for Advancing Research Assessment* (*CoARA*, *https://coara.eu*), cuya constitución está prevista para principios de diciembre. Ahora (otoño de 2022) se está trabajando en la formalización del compromiso de las instituciones que firmarán el *Acuerdo*, se comprometerán a llevar a cabo la reforma y formarán parte de la nueva coalición. En el momento de escribir esta carta, más de 125 organizaciones ya han anunciado su firma, entre ellas 6 españolas y entidades de prestigio como *CERN*, *CNRS* y *DFG*. Además, en países como Suiza, Noruega o los Países Bajos se ha conseguido un rápido un consenso: las principales agencias de financiación y las asociaciones de universidades ya han suscrito el *Acuerdo*[5].

El *Acuerdo* es un documento ambicioso que bebe de propuestas hechas en los últimos diez años como la *Declaración de San Francisco sobre la Evaluación de la Investigación* (*DORA*)[6], el *Manifiesto de Leiden* o los *Principios de Hong Kong* (**Hicks** *et al.*, 2015; **Moher** *et al.*, 2020). Pero este *Acuerdo* no quiere ser otra declaración más, sino un verdadero motor de cambio. En resumen, nos encontramos con un movimiento de reforma auspiciado y participado por las principales instituciones de política científica europeas, y por lo tanto se espera que genere transformaciones trascendentes.

El documento propone principios generales que giran en torno a un objetivo central: que los procesos de evaluación valoren la investigación de acuerdo con la pluralidad de conocimientos y contextos de la ciencia en el siglo XXI. Esto es, que las prácticas de evaluación puedan atender a la multiplicidad de contribuciones de las instituciones científicas y los investigadores, tanto en espacios académicos como en otros espacios sociales, y en especial con prácticas de ciencia abierta y responsable que la *Comisión Europea* ha venido apoyando.

Los principios centrales del *Acuerdo* son la necesidad de “reconocer la diversidad de contribuciones y carreras académicas de acuerdo con las necesidades y la naturaleza de la investigación”, por lo que la evaluación debe basarse “en la evaluación cualitativa para la cual la revisión por pares es central, respaldada por el uso responsable de indicadores cuantitativos”, se deben “abandonar los usos inapropiados (…) de las métricas basadas en revistas y publicaciones (…)” y “evitar el uso de rankings de organizaciones (...) en la evaluación de la investigación”.

El *Acuerdo* no prescribe prácticas de evaluación específicas, sino que establece que las instituciones de investigación deben implementar estos principios generales según sus contextos y misiones, respetando “la autonomía de las organizaciones de investigación” y “la libertad de investigación”.

Ahora bien, las reformas de los sistemas de evaluación se encuentran con importantes obstáculos. Una parte de la resistencia al cambio es cultural: las generaciones de investigadores que han crecido y “naturalizado” la evaluación cuantitativa tendrán que acostumbrarse a otro tipo de evaluación. Otras barreras son institucionales, en general asociadas a criterios formales (calidad según rankings de revistas o factor de impacto). Además, en unos pocos países europeos, entre ellos España e Italia, los procesos de acreditación y promoción mediante procesos burocráticos con métricas rígidas por parte de agencias centralizadas constituyen unas importantes barreras adicionales. ¿Cómo se podrían superar estas barreras institucionales de criterios burocráticos y cuantitativos que rigen en España?

3. Hay que transformar la gobernanza para poder cambiar los criterios de evaluación

¿Habría posibilidad de cambiar los criterios de las evaluaciones manteniendo un sistema de acreditación y evaluación de méritos por agencias externas como existe ahora en España? ¿Se puede realizar una evaluación individual por pares que sea sensible a la diversidad de contribuciones científicas y contextos de aplicación desde agencias burocratizadas y lejanas al contexto?

Creemos que no, que es imposible adoptar los criterios más contextualizados y diversos de evaluación que propone *el Acuerdo* en estructuras de evaluación burocráticas y distantes al evaluado. Las estructuras centralizadas requieren el uso de criterios estandarizados que puedan aplicarse con rapidez y de forma homogénea a la pobla-

“Es imposible adoptar los criterios más contextualizados y diversos de evaluación que propone *el Acuerdo* en estructuras de evaluación burocráticas y distantes al evaluado”

ción evaluada. Tal necesidad da lugar a rigideces que resultan incompatibles con la apreciación de la diversidad que busca el *Acuerdo*. No se pueden implementar la pluralización y flexibilidad de criterios evaluativos desde maquinarias administrativas que deben evaluar cientos de currículums en cada convocatoria, y que por lo tanto no pueden evitar simplificar las decisiones utilizando métricas. El coste y el tiempo necesarios para adoptar evaluaciones contextualizadas y plurales desde agencias externas serían exorbitados. En la práctica es imposible aplicar criterios diversos y flexibles desde los procesos de estandarización que necesitan las burocracias[7]. Valga recordar el colapso administrativo que experimentó *Aneca* cuando se implementó el sexenio de transferencia y se recibieron más de 25.000 solicitudes[8].

> El sistema individual de acreditación y evaluación de méritos por parte de agencias externas a la universidad no ha servido para sus objetivos de evitar la endogamia y mejorar la calidad investigadora

Además, estos sistemas de acreditación no han conseguido sus objetivos a pesar de su alto coste administrativo. La acreditación por agencias externas fue introducida en los años 2000s para evitar la contratación de profesores con rendimiento investigador muy bajo y ante extendidas sospechas de nepotismo. Pero ¿han conseguido las acreditaciones o evaluaciones por agencias externas mejorar los procesos de selección de profesores y reducir la endogamia? ¿Tiene sentido dedicar meses de trabajo de los candidatos a preparar la extensísima documentación necesaria para las acreditaciones?

Los niveles de endogamia e internalización de las universidades españolas sugieren que la acreditación individual no sólo no ha conseguido diversificar las plantillas, sino que ha supuesto una barrera adicional para los candidatos internacionales. Según datos del curso 2019-20, el 73% del personal docente e investigador (PDI) trabaja en la misma universidad en que leyó su tesis, y sólo el 2,5% del PDI tiene nacionalidad extranjera en las universidades públicas (*Ministerio de Universidades*, 2022). También hay dudas respecto a los efectos beneficiosos de los sexenios (**Osuna**; **Cruz-Castro**; **Sanz-Menéndez**, 2011), en comparación con los efectos negativos (**Delgado-López-Cózar**; **Ràfols**; **Abadal**, 2021; **Delgado López-Cózar**; **Martín-Martín**, 2022). El sistema actual tiende a asegurar una capacidad investigadora mínima, pero no impide que se contraten perfiles anodinos porque no incentiva la búsqueda de contribuciones creativas, originales o arriesgadas (**Rodríguez-Navarro**, 2021).

En resumen, el sistema individual de acreditación y evaluación de méritos por parte de agencias externas a la universidad no ha servido para sus objetivos de evitar la endogamia y mejorar la calidad investigadora (**Rodríguez-Navarro**, 2021; **Cruz-Castro**; **Rodríguez-Navarro**; **Sanz-Menéndez**, 2022), y además es incompatible con las buenas prácticas evaluativas fomentadas por el *Acuerdo* europeo. En consecuencia, habría que cambiar la actual gobernanza de la evaluación.

Sin embargo, la *LOSU* mantiene el requerimiento de acreditación individual por parte de las agencias para la contratación universitaria, y el carácter individual de los méritos y los incentivos, así como la evaluación externa de los méritos por parte de las agencias de calidad. Creemos que es una lástima que, en un momento de transformación mundial de la evaluación, la *LOSU* no elimine los mecanismos de gobernanza que impiden que las instituciones españolas sigan las mejores prácticas internacionales.

Para que las universidades españolas puedan adoptar los nuevos criterios de evaluación creemos imprescindible un cambio en la gobernanza. Para poder realizar una evaluación más plural y flexible con criterios cualitativos hay que evaluar menos veces, pero mejor, a nivel colectivo y desde lugares decisores más cercanos a la práctica, desde los cuales haya capacidad para comprender el valor de los contenidos.

Para conseguir esto hay que devolver a las universidades la capacidad de tomar todas las decisiones de contratación y promoción, como ocurre en la mayoría de los países europeos. ¿Cómo conseguir esta devolución a la autonomía sin riesgo de generar favoritismos y más endogamia?

4. Acreditación institucional: autonomía universitaria con garantía de control

En el curso de la *UIMP*, la propuesta más prometedora fue realizada por Sebastián Chávez de Diego[9], director de *Evaluación y Acreditación* (*DEVA*) de la *Agencia Andaluza del Conocimiento* (*DEVA*, 2022): la acreditación institucional de centros, que presentamos a continuación, de acuerdo con nuestra interpretación. Por un lado, se devolvería a las universidades (que tuvieran la capacidad) la plena autonomía de contratación y promoción de sus profesores sin necesidad de acreditación previa. Por otro lado, cada cierto tiempo (entre 4 o 6 años), la agencia de evaluación externa acreditaría que la institución cumple con unos criterios acordados de calidad en procedimientos y resultados. En general sería preferible realizar la acreditación a nivel de departamentos universitarios con un área de investigación definida, pero podría realizarse también a nivel de facultad o universidad donde fuere pertinente.

Este sistema de gobernanza permitiría una flexibilidad de contratación que favorecería la valoración de perfiles según las necesidades específicas de cada universidad y departamento. Y a la vez, la agencia de acreditación podría ejercer un control sobre los procedimientos, procesos y prácticas de contratación y promoción, de modo que solamente los centros con demostrada capacidad y resultados pudieran ejercer la autonomía.

> Este sistema de gobernanza permitiría una flexibilidad de contratación que favorecería la valoración de perfiles según las necesidades específicas de cada universidad y departamento

La propuesta no supone un gran cambio legislativo o de procesos porque la acreditación institucional es un mecanismo que ya existe y es aplicado por varias agencias para evaluar la docencia de títulos oficiales[10]. Se trataría de añadir componentes de selección y promoción de profesores a los procedimientos actuales de acreditación. Además, se podría introducir de modo gradual y adaptado a las diversas capacidades de las universidades españolas. De hecho, el anteproyecto de la *LOSU* menciona explícitamente el concepto de acreditación institucional y su regulación[11]. Sin embargo, los efectos de la acreditación institucional en el funcionamiento de los procesos de contratación y evaluación podrían ser importantes, y su aplicación podría tener consecuencias altamente transformadoras en las plantillas de profesores.

“La acreditación institucional haría posible la contratación y promoción de perfiles con méritos distintos para que los equipos departamentales pudieran tener personal con capacidades diversas y complementarias”

En cuanto a criterios, la acreditación de unidades evaluadas podría desarrollarse combinando estándares procedimentales y análisis de resultados. Los primeros incluirían los procedimientos y regulaciones internas para la contratación del profesorado, como los criterios de los concursos o la composición de tribunales, y en general el sistema interno de fomento de la calidad, por ejemplo, en promoción e incentivos (*DEVA*, 2022). Los análisis de resultados comprenderían dimensiones como la diversidad de profesores en términos de género, origen académico y de país; las contribuciones académicas, docentes y sociales de la unidad; las colaboraciones con actores socioeconómicos; las prácticas de ciencia abierta, innovación responsable e integridad.

Hay dos grandes ventajas de este marco evaluativo centrado en las contribuciones contextualizadas del departamento y no del individuo. En primer lugar, facilitaría la evaluación según las múltiples misiones de la universidad, de modo que impacto social, ciencia abierta, o docencia podrían ser visibilizadas junto con el criterio ahora dominante, el prestigio de las publicaciones (en verdad, peor aún: ¡el factor de impacto de las revistas!). Este punto es crucial porque misiones como docencia de calidad, gestión creativa o contribución social cobran importancia en la universidad del siglo XXI, pero no se prestan a una evaluación individual por puntos y a distancia, puesto que tienen que responder a los compromisos y especialización singulares de cada universidad. Además, una evaluación especializada permitiría valorar ciertos aspectos de modo formativo, es decir, sugiriendo medidas a implementar para la mejora.

En segundo lugar, la acreditación institucional haría posible la contratación y promoción de perfiles con méritos distintos para que los equipos departamentales pudieran tener personal con capacidades diversas y complementarias. Esto permitiría que hubiera profesores especializados en ciertas funciones y que el departamento funcionara un poco más como un equipo según misiones y necesidades (docencia, impacto social, investigación, divulgación, etc.). La autonomía permitiría buscar nuevos perfiles para nuevos retos, con la posibilidad de acertar o equivocarse, sin pasar por el filtro gris y conservador de criterios estandarizados.

En lo que se refiere a los problemas de endogamia, con la eliminación de la acreditación individual se eliminarían los filtros ‘negativos’ que representan barreras de acceso a investigadores extranjeros o con perfiles poco convencionales. En cambio, se facilitaría contratar con filtros “positivos” explícitos a docentes o investigadores con perfiles brillantes justamente en aquellas funciones que le falten a un departamento. Además, la acreditación institucional permitiría evaluar varios aspectos de diversidad, como la procedencia académica de los profesores, pero también el género y la nacionalidad, y visibilizar e incidir sobre los mismos.

Finalmente, hay que destacar la posible sinergia de la acreditación institucional con una novedad de la *LOSU*, la financiación parcial por objetivos. El anteproyecto de ley introduce programaciones multianuales de las universidades que serían acordadas con las Comunidades Autónomas. Estas programaciones abren la oportunidad de singularizar la misión de cada universidad, con una parte de la financiación condicionada al desempeño en relación con estas misiones. Las universidades y departamentos propondrán en la programación multianual una priorización de misiones, reflejada en objetivos docentes, de investigación, y de vinculación social. En otras palabras, una parte de la financiación de las universidades irá asociada a un sistema de incentivos institucional.

En este contexto, sería posible y razonable alinear la evaluación desarrollada para la acreditación institucional con los objetivos de las programaciones, lo que favorecería un equilibrio entre el ejercicio de autonomía y responsabilidad en las universidades. Dentro de esta lógica de autonomía universitaria deberían ser las unidades acreditadas quienes gestionaran los principales incentivos individuales (complementarios a los sexenios) de acuerdo con sus objetivos y criterios singularizados –otra novedad de la *LOSU*.

5. Conclusión: Una nueva evaluación para la ciencia del siglo XXI

En el curso que se impartió en la *UIMP* hubo consenso en que debemos repensar la evaluación en un contexto de cambio global en las misiones de la investigación, y en la transformación hacia la ciencia abierta (que incluye la participación de actores sociales) y la contribución a la solución de retos globales (**Saenen** *et al.*, 2019; **Molas-Gallart** *et al.*, 2021; **Janssen**; **Bergek**; **Wesseling**, 2022). En un mundo donde la difusión de tecnologías atañe a todos los ámbitos de la vida, y donde el uso de conocimiento académico ocupa espacios sociales cada vez más diversos, los procesos de evaluación deben reflejar estos cambios en lugar de erigirse como una barrera a los mismos. La evaluación tiene que evolucionar de acuerdo con la creciente importancia del conocimiento y la universidad en la sociedad.

El anteproyecto de *LOSU* reconoce la importancia de las nuevas misiones de las universidades y abre opciones para que haya una evaluación más plural de sus contribuciones. Sin embargo, y en contradicción con estas ambiciones de pluralidad epistémica y servicio a la sociedad, el anteproyecto mantiene los elementos centrales de la gobernanza de acreditación y evaluación, con un foco individual y por parte de agencias externas. Pensamos que es un error mantener un sistema antitético a los objetivos de la política universitaria y científica y que, sin embargo, no ha conseguido evitar la persistencia de la endogamia.

De todas formas, el anteproyecto de ley mantiene suficiente riqueza de opciones para que su aplicación permita mejoras sustanciales. Hasta en el caso de que la *LOSU* mantenga la acreditación y evaluación de méritos individual, habría la oportunidad de que los nuevos elementos legislativos que apuntan hacia la acreditación institucional y la mayor autonomía universitaria sean luego regulados y aplicados de un modo que se alinee con los principios del *Acuerdo europeo*.

Para conseguir este alineamiento, es fundamental que el desarrollo de la *LOSU* evite que sean las agencias de acreditación quienes apliquen con criterios burocráticos la lógica diversificadora del *Acuerdo* europeo. La contraposición de lógicas (estandarización contra flexibilidad) podría llevar a un colapso administrativo por proliferación de indicadores y evaluadores, con un coste innecesariamente elevado. La solución sería, por el contrario, rebajar la importancia de la acreditación individual con un procedimiento simplificado, de mínimos, y desarrollar en paralelo la acreditación institucional como principal filtro de control, para que sean las universidades quienes apliquen la diversidad de criterios que propone el *Acuerdo* europeo según las misiones singulares de sus unidades.

Existe en este momento una ventana de oportunidad para reconducir la evaluación de la investigación en España hacia horizontes más positivos, en el que la evaluación tenga menos que ver con la burocracia y el control, y más con la ilusión de apoyar el papel de la universidad y de la investigación en la construcción de un futuro mejor.

6. Notas

1. *https://coara.eu/agreement/the-agreement-full-text*

2. Curso 'La evaluación de la investigación: retos y oportunidades para el sistema universitario español'
http://www.uimp.es/agenda-link.html?id_actividad=655l&anyaca=2022-23

3. Su intervención se puede ver en:
https://surfdrive.surf.nl/files/index.php/s/RTm7ONEuIDmZd2t

4. *https://www.consilium.europa.eu/media/56958/st10126-en22.pdf*

5. La lista de firmantes es pública:
https://coara.eu/agreement/signatories

6. *https://sfdora.org*

7. Por ejemplo, **James Scott** (1998) hizo una descripción detallada de cómo las medidas de eficiencia y control burocráticos aplicadas por los estados modernos en urbanismo y agricultura tuvieron efectos muy nocivos debido a la supresión de diversidad. Esta crítica a las consecuencias de la uniformización burocrática puede extrapolarse también a la investigación (**Ràfols**, 2019).

8. *https://www.csif.es/contenido/nacional/educacion/268060*

9. Su presentación está en:
https://surfdrive.surf.nl/files/index.php/s/3LIGGpHORWausy3

10. Agencias como *DEVA*, *ANECA* y *AQU* ya han desarrollado sus procesos de acreditación institucional:
https://deva.aac.es/?id=acreditacioninstitucional
https://www.aneca.es/acreditacion-institucional
https://www.aqu.cat/es/Universidades/Evaluacion-de-instituciones-y-centros/Acreditacion-institucional

11. El artículo 5 de la *LOSU* refiere que "el Gobierno regulará el procedimiento y las condiciones para la acreditación institucional de los centros universitarios, basada en el reconocimiento de la capacidad de la universidad para garantizar la calidad académica de aquéllos".

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Universities and knowledge transfer in the communication field. Letter

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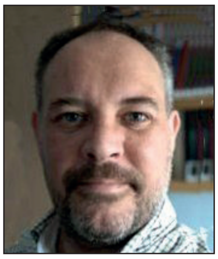

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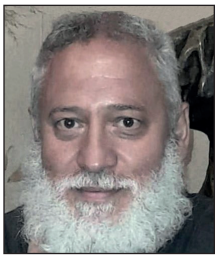

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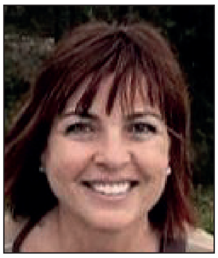

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Abstract

"What is the role of universities nowadays?" is one of the questions that those of us who work there should be asking ourselves. Knowledge transfer has emerged as academia's third mission and must drive social change and development. Specifically, this paper aims to analyze knowledge transfer's significance in the social sciences and, more specifically, in communication sciences, by looking at the call for the six-year academic research period on knowledge transfer in 2018 and taking into account what is happening in other disciplines. The contributions of the Spanish university community in terms of knowledge transfer fall behind other countries in our field. Only approximately 1% of international patents result from Spanish research. This disparity between these two realms demonstrates the need to promote knowledge transfer as the third helix of the triple helix of an interactive and dynamic university model in communication with institutions and social agents.

Keywords

Transfer; Transference; Knowledge; Research; Social sciences; Communication; Innovation; Development; University.

1. Introduction

Universities must be thought of as open, transparent, and able to engage with knowledge agents and focus their research on solving the complex problems facing society. Knowledge transfer should be collaborative, with multidisciplinary contributions and participation and guidance from institutions and social agents. With this in mind, the six-year academic research periods on knowledge transfer were launched. The concept of knowledge transfer is difficult to define, especially in the social sciences, which makes it difficult to find ways to make academic activities profitable so that they can be incorporated into this new approach. However, to achieve this objective, two questions must be asked: What does knowledge transfer mean, and what criteria justify its social or economic value? This dynamic concept must meet the shared demands of the global context and, at the same time, be understood within local socioeconomic and educational contexts. In other words, a university must bear in mind and focus on the fact that it is located in a specific place so that it is aware of the needs of its surroundings and takes them into account when defining its research agenda, as its results will in part depend on the culture of participation.

2. The university's roles

Universities' need to adapt to social needs is not new. To the two classic missions of universities –research and teaching– we must add a third for the 21st century: knowledge transfer. No one doubts that universities and other research institutions play a crucial role in the development of the knowledge economy (*OECD*, 1999) through their third mission (**Molas-Gallart** *et al.*, 2002), which includes

> "those activities related to the creation, application, use and operation of technology and knowledge of the university outside of the academic environment, through interaction with the rest of society" ["*aquellas actividades ligadas a la generación, aplicación, uso y explotación de la tecnología y el conocimiento de la Universidad fuera del entorno académico, mediante la interacción con el resto de la sociedad*"] (**Galindo-Melero**; **Sanz-Angulo**; **De-Benito-Martín**, 2001, p. 114),

which is definitely an addition to its traditional functions of teaching and research.

As the number of scientific institutions increases, effectively managing the dissemination and knowledge transfer of their research activity becomes more complex (**Geuna**, 1996); this is because the number of players involved –companies, administration, civil associations, etc.– is also increasing, as are the forms and means for dissemination, making knowledge management the cornerstone of the knowledge companies of **Drucker** (1994). Drucker calls for the creation of more complex knowledge management bodies, capable of not only interlinking various research groups but also bringing the other social agents into the fold, not just targeting them when deemed necessary. This concept is a major shift in the way in which research and knowledge transfer are understood due to the specific importance that this author places on each of them, as management is more important for this author than the research itself. As **Echeverría-Ezponda** (2008, p. 541) points out, Drucker's concept of the knowledge company has received quite a few criticisms, as

> "it calls into question the principal value of classical science: knowledge is an end in and of itself. It is not denied that it is an asset, but it is not the main one" [*pone[r] en cuestión el principal valor de la ciencia clásica: el conocimiento es un fin en sí mismo. No se niega que sea un bien, pero no es el principal*],

even if it has significantly influenced the way in which knowledge transfer is understood.

We can find many more approaches that, broadly speaking, say roughly the same thing, although they start from different areas of knowledge or focus on one part of the knowledge transfer process or another. From a more sociological perspective, **Gibbons** *et al*. (1994) refer to two major models of knowledge production: the first is the classical view –linear and isolated from other agents and even from researchers in other fields– which corresponds to the science-push model, from the scientific policy management point of view. In contrast to this first model, they present a second, more complex and variable model with greater collaboration among agents, though occasional and circumstantial (collaboration and interdisciplinarity embody the applicability of the knowledge acquired, but in a closed and predetermined context), which does not necessarily exclude or replace the first and, once again, is the result of the first model's evolution as the historical context in which it is developing has changed. As we can see, this transfer model has great similarities to the demand-pull management model.

Finally, although it originated approximately five years before the new millennium, the triple helix model returns to a focus on the management of relationships between the three major agents of development –the university, the administration (or government), and industry– but it takes this one step further. According to this theory (**Leydesdorff**; **Etzkowitz**, 1996), innovation stems from the relationships established between these three agents. Unlike other approaches, it does not prioritize the role of some agents over others and focuses the innovation process on the different forms of interaction that occur between these agents.

In this way, it can be observed how, over time, universities have taken on more roles –first teaching, then research, and, finally, knowledge transfer– in an increasingly complex environment, as not only has the historical context in which they carry out their work changed but this change has pushed them to permanently establish more relationships, not only among their university colleagues –from interdisciplinarity to multidisciplinarity and transdisciplinarity (**Castelló-Mayo**; **López-Gómez**; **Méndez-Fernández**, 2019)– but also with a growing number of increasingly heterogeneous social agents. Thus, their third mission appears to be characterized by complexity –in their policies (management), their dimensions (due to the agents involved), their processes (due to the forms it takes), their measurement (due to the valuation of transfers), their specific importance (due to the emphasis given to each of them), or even their philosophy (owing to the way in which science, innovation, and knowledge are conceived of). Knowledge transfer should be understood as community knowledge that allows research to fulfill its social role as a creator of solutions to technical and scientific problems, but also to other social or political problems (**Loiti-Rodríguez**; **Suárez-Villegas**, 2022, p. 12). This view of knowledge transfer demonstrates the need for interdisciplinary approaches to social challenges and collaboration between areas of knowledge (**Mato-de-la-Iglesia**, 2021).

> A university must bear in mind and focus on the fact that it is located in a specific place so that it is aware of the needs of its surroundings and takes them into account when defining its research agenda

3. Knowledge transfer in the social sciences

In disciplines related to pure science, the outputs of knowledge transfer, such as patents and objects created for technological and scientific applications, are more obvious. Companies themselves have implemented research and development and innovation (R&D&i) policies to remain competitive in their fields, turning to university departments and signing contracts to promote research to improve their performance. In contrast, it is more complicated to define knowledge transfer in the social sciences, as it does not have a productive purpose per se but rather a social, educational one; it requires investments whose result can only be seen in the long term, dealing with issues such as the integration of social groups, media literacy, or educational activities about gender equality. However, these disciplines possess a number of notable characteristics regarding knowledge transfer:

- First, by requiring a lesser degree of implementation, the gap between basic and applied research is usually narrower than in other disciplines.
- Second, these fields are net producers of content.
- Third, they possess –especially in this day and age– an extraordinary capacity to reconcile and/or confront technology with the cultural context in which it is applied (**Castro-Martínez** *et al*., 2008, p. 621).

Therefore, when we talk about the sciences, we must understand the entire spectrum of disciplines related to humanity, be it to gain larger shares of technological or scientific developments or achieve improvements in the social, educational, and family arenas or in the knowledge of history or culture in general, whose benefits lie in the density of critical capacity and analysis of social and personal reality.

With this in mind, the *National Commission for Assessment of Research Activity* (*CNAI*) launched a call for six-year academic research periods on knowledge transfer in 2018 with the intention of promoting a proactive awareness of academia and achieving greater interaction with social agents, establishing a more horizontal vision between universities and social agents of knowledge (*Spain*, 2018). This evaluation process served to elucidate what the different disciplines considered knowledge transfer to be, so that researchers could determine which activities could be considered knowledge transfer.

> Knowledge transfer should be understood as community knowledge that allows research to fulfill its social role as a creator of solutions to technical and scientific problems, but also to other social or political problems

In two articles on the six-year academic research periods on knowledge transfer, four communications researchers analyze which the products or activities are considered to be knowledge transfer and which are not based on the reports submitted by other colleagues (**Repiso-Caballero**; **Torres-Salinas**; **Aguaded**, 2019; **Repiso-Caballero** *et al*., 2019). Although they find that, on balance overall, the call has been positive, they were critical of the subjectivity of the evaluation processes and the disregard for certain tasks related to academic management, which are precisely tools through which research and knowledge transfer are disseminated –the publication of scientific journals or the organization of academic congresses that have a strong impact on the scientific community to facilitate meeting with other social agents. The reviews of the evaluations received from some of the applicants for the merit of transfer in the communications field revealed a lack of clear evaluation criteria, great subjectivity indicated by having received different evaluations for merits that were practically the same (nominally more than substantively different), and, obviously, great confusion on the part of those evaluated, as it was unclear to them what knowledge transfer meant.

4. Knowledge transfer in the communication field: categories

In addition to the various empirical studies on the academic community's motivations regarding knowledge transfer –among which professional promotion, economic remuneration, and networking appear to stand out– (**Jiménez-Contreras** *et al*., 2002; **Link**; **Siegel**; **Bozeman**, 2007; **García-Pintos**; **García**; **Piñeiro**, 2010; **Padilla-Meléndez**; **Del-Águila-Obra**; **Garrido-Moreno**, 2010; **Aceytuno-Pérez**; **Sánchez-López**, 2014), considerable efforts have been made to identify and measure knowledge transfer (**Fonbuena**, 2019; **Mato-de-la-Iglesia**, 2021). Most of these contributions come from business administration and human resources (**García-Aracil**; **Palomares-Montero**, 2012; **Díaz-Catalán** *et al*., 2019), while many fewer contributions from the humanities and social sciences focus on knowledge transfer (**Castro-Martínez** *et al*., 2008; **Castelló-Mayo**; **López-Gómez**; **Méndez-Fernández**, 2019).

The concept of knowledge transfer in the communications field has been given different names. For example, the term "applied communication" is used in the English-speaking world; this term even lent its name to a scientific journal launched in the 1980s. Some justifications and methodologies of this concept have been offered by various authors from American universities (**Cissna**, 1982; **Boyle**; **Schmierbach**, 2019). In Latin America, for example, it is more common to hear the term "communication for social change" ["*Comunicación para el cambio social*"], since their more critical or political perspective of communication takes precedence.

The aims of knowledge transfer in the communications field can be classified into two types:

- One is instrumental –the set of services that can be provided to other disciplines, companies, or institutions to achieve effective communication, either of the knowledge of a subject (history, archeology, architecture, etc.) or of the ob-

jectives of companies and institutions to better enable them to reach their target audience or improve the internal communication of organizations.
- Another type would be the key benefit of knowledge transfer in political communication.

Communication could be described as the gaseous form of any other type of power, as some entities seek to influence citizens through the information environment in which they disseminate their messages in a relatively disguised manner. Therefore, knowledge transfer in the communications field is aimed at empowering citizens in the face of attempts to manipulate information or interlace public interest with spurious interests in any other way that might affect information processes. Designing mechanisms to sift through information, as well as resources to guarantee citizens' right to information, will prove essential in knowledge transfer. Through their websites, Spanish research groups have made a significant effort to disseminate their projects, which is another level of knowledge transfer, as they are available to institutions and other agents interested in putting their results into practice (**Claes**; **Barranquero**; **Rodríguez-Gómez**, 2021).

> In disciplines related to pure sciences, the products of knowledge transfer are more obvious. In contrast, it is more complicated to define transfer in the social sciences, as it does not have a productive purpose but rather a social one; it requires investments whose result can only be seen in the long term

4.1. Essential in nature

The aim of knowledge transfer in the communications field is political in its most radical sense, relating not only to the activity of political agents, parties, and institutions but also to the activity of the community such that it can become aware of itself as an object that must play a part in its own destiny or, in more tangible terms, in the decisions that can make it essentially free and egalitarian as a society. Therefore, universities can set up observatories, blogs, studies, and reports aimed at reporting on the democratic quality of society, whether their criteria be the transparency of political powers, the functioning of institutions, the consideration for different groups, the defense of common values (gender equality, ecology, etc.), the promotion of culture and sports, the fostering of critical thinking when faced with fake news, the development of media literacy projects, the defense of fair play, or the prevention of addictions, or a myriad of activities aimed at harnessing the potential of new technologies directed at quality communication, backed by the prestige of the leadership from researchers who are committed to society (**López-Pérez**; **Olvera-Lobo**, 2016). This critical function can also be carried out through art, a sector in which, through technology development, communication has currently taken on a special role by means of audiovisual products, cinema, advertising, and other products that act as a mirror of society, raising awareness of social problems. Critical thinking is a value implicit in these activities –their backbone– through which the purpose of transferring knowledge to society can be seen.

Communication empowers citizens with critical thinking when public media are held accountable and there are criteria to measure the quality of communication. These criteria include verification, rigor, and public interest but also criteria related to the sense of the media's social and educational responsibilities: social integration, citizen participation, the promotion of constructive debates on issues essential for democratic coexistence (such as civic education), awareness of ecological culture or gender equality, and respect for different social identities.

4.2. Instrumental in nature

The centrality of communication in networked society has exponentially increased the number of other professional roles (**Genaut-Arratibel**, 2012; **Salaverría-Aliaga**, 2016). Technological changes have altered our social skin. Effective communication determines the success of institutions, companies, and even individuals. Ways of working, modes of consumption, and personal relationships –everything passes through a communicative interface. Communication has become one of the preferred means for effective corporate organization when it comes to commercial marketing strategies, customer service models, electoral campaigns, and specialized information service initiatives for guiding institutions, the media, and social agents. Therefore, there is a very wide range of opportunities for knowledge transfer in line with the new work niches in communication, which should be explored by university departments with the aim of guiding teaching, research, and knowledge transfer to educate future professionals. New graduates in the communications field are not only opting to pursue journalism, advertising, or audiovisual communication. These figures have morphed into a variety of hybrid profiles that require practical intelligence and communicative imagination in addition to technological training.

An example of this type of initiative is the *Laboratorio de Actualidad* (*Labak*), a spin-off from the *Universidad del País Vasco* that is led by Professor María-José Cantalapiedra. This company, which was launched in 2018, is dedicated to the management and distribution of information content with the aim of developing and utilizing technological products related to institutional, business, associative, and journalistic communication on the basis of work carried out by researchers from the *Bitartez Group*. It grew out of the design of a prototype for designing targeted and automated agendas, a result of a project selected in a call for applied research; this design was derived from the results of previous research that, when understood, enabled not just the dissemination of said results but also the designing of tools as well as access to classic contributions of knowledge transfer, such as patents, design registrations, etc., through the formation of multidisciplinary groups. These alternatives can be foreseen by active communication departments if they maintain open channels with the social and business agents in charge of developing these new professional roles.

4.3. Networks and intermediation

Initiatives that give professionals, researchers, and public representatives the opportunity to meet, such as knowledge networks, congresses, and the management of scientific journals, should be considered another supplementary form of knowledge transfer, as they represent other forms of knowledge transfer and should thus be recognized as such. As **Nonaka** and **Takeuchi** (1999) point out:

> Knowledge transfer in the communications field can be classified into two types: one is instrumental and the other, political

> "The production of complex knowledge is precisely a process in which knowledge cannot be easily codified and transferred (tacit knowledge) and needs to be 'understood and transmitted' by direct interaction within a network or micro-community of knowledge".

Networking and collaborative and interdisciplinary work are necessary to achieve sufficient knowledge transfer to address the different perspectives on human reality. For example, technological developments will be most useful if they are accompanied by corresponding studies on psychology, ethical standards, and a legal regulation that identify their effects on citizens.

5. Conclusions

Knowledge transfer has been more widespread and, therefore, more proceduralized –if we may use the expression– in the pure sciences –be they physics, chemistry, or mathematics– that provide industry with solutions, the object of intellectual property obtained through patents. However, it is not always so easy to demonstrate knowledge transfer in the social sciences, the benefits of which are more difficult to patent. This transfer is diffuse, more intangible, and aimed at empowering citizens. With respect to merits in research, certain judgment criteria could help to define and distinguish it. In turn, knowledge transfer is associated with applied research, and the research tradition has built a mental framework in which aspiring to a purely intellectual and linguistic embodiment, separate in construction and constructive terms, is seen as inappropriate for the humanities and social sciences, which are geared toward thinking rather than doing.

The six-year academic research period on knowledge transfer represents a shift in public policies that presents a model of an open, dynamic university that engages in dialog with institutions, social agents, and companies. It has also brought this concept, which has existed in academia and university policy since its latency, to the forefront. A preexisting conceptual vagueness permeated this call, especially in some areas such as the one in question, and this was demonstrated by leading researchers in this area. One could say that the dialog that enriches the other two missions of universities –education and research– is the guiding principle of the call for the six-year academic research period, but it is still not without its challenges, both technical (circumstantial) and conceptual (structural). In fact, the six-year academic research periods on knowledge transfer themselves have become objective proof –and, as such, identifiable and analyzable– of the difficulty in measuring and assessing knowledge transfer in the communications field, as well as in finding ways to make it effective.

Last but not least, to improve knowledge transfer, it will be necessary to streamline university bureaucracy and offer more dynamic and agile ways to manage the implementation of such transfer projects. Moreover, such bureaucracy is not a problem that rests solely on the teaching and research staff. The academic community has been aware of this shift towards excessive bureaucratization for years (**Castro-Martínez** *et al.*, 2008; **Padilla**; **Del-Águila**; **Garrido**, 2010), and it seems that, neither the administrations nor –to a lesser extent– the universities have found a solution thus far: the lack of flexibility and the decentralized management and support platforms for research and knowledge transfer tasks remain, even today, a great burden. In another way, the increasing bureaucratization of academic work will ultimately discourage the undertaking of any initiative that involves a burden that does not have sufficient compensation and recognition, an effect in which the gender gap in the six-year academic research periods could also be observed.

Universities should make their researchers' ability to provide services to public and private entities known. They should do so as a shared merit of their institution, a virtue associated with its dedication to service to society, as it would be short-sighted to depend exclusively on the constant and poorly paid labor of those who at times sacrifice their academic life to implement good ideas and projects developed in the university environment. In summary, the possible applications of the so-called dissemination model to keep the gears turning and create knowledge transfer include redefining the competencies and resources of the management units of knowledge transfer.

> Initiatives that give professionals, researchers, and public representatives the opportunity to meet should be considered another supplementary form of knowledge transfer, as they are indeed other forms of knowledge transfer

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Use and adoption of digital educommunication media by university professors during the Covid-19 pandemic: cases of the *National Autonomous University of Mexico* and the *Autonomous University of Chihuahua*

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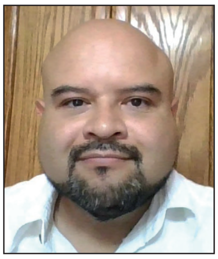

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Abstract

This article analyzes the educational use of digital educommunication media (DEM) by four groups of professors working at the faculties of *Philosophy and Letters* and of *Engineering* at the *Autonomous University of Chihuahua* (*UACH*) and at the *National Autonomous University of Mexico* (*UNAM*). Seven hypotheses and three research questions were posed, which were related to the use of DEM (specifically: images, animations, and video; presentations (*PowerPoint/Prezi*); digital texts; the Cloud; social media/instant messaging; and email), their qualities and the differences regarding their use, among the different groups studied. A two-phase mixed-methods explanatory sequential approach was employed, with a first phase of quantitative data collection and a second qualitative phase. A stratified sample of 177 professors was selected, which was distributed proportionally between the two selected faculties and universities. All professors completed a 144-item questionnaire in the first phase, and on the basis of their answers, ten professors were selected to be interviewed in the second phase, to ensure the diversity of the interviewed group in terms of sex, age, faculty, and educational level at which they teach, as well as their teaching experience and experience in the use of DEM. Among the results, we found that: a) the choice between using DEM or traditional media in class was not determined by teachers' perception about their students' learning with technology; b) the characteristics of each DEM determined its use, but the use of a given DEM was not related to the activities that it could enable; c) the professors exclusively teaching in graduate programs, the younger ones, those from *UNAM*, or those of Engineering did not present significant differences to their counterparts in terms of their use and assessment of DEM; and d) the qualitative data reaffirmed these trends and helped typify the challenges and opportunities of using DEM, particularly those that arose from the period of the exclusively online education model that was adopted owing to the COVID-19 pandemic.

Keywords

Digital media; Digitalization; Educommunication; Educational technology; Technology use; Technology adoption; Higher education; University professors; Digital competences; Skills; University pedagogy; Teaching; Covid-19; Coronavirus; Pandemics; Distance teaching; E-learning.

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1. Introduction

Before defining 'educommunication,' it is pertinent to conceptualize its two components. Firstly, education can be conceptualized as the sum of activities that aim to seek, investigate, and create valuable legacies: to integrate the most significant; and foster the curiosity toward knowledge. Additionally,

> "an educational fact is, essentially, a communicative fact" (**Martínez-Salanova-Sánchez**, 2018, pár. 1).

Then, communication is a social act that implies two individuals interacting with each other (**Mead**, 1973). Such interaction integrates three sequential elements: an individual's expression, a response to such expression by an interlocutor, and the result of the initial expression (**Garza-Guzmán**, 2009). Various theorists define communication as the activity in which a person (or group) sends and receives messages (**Moore**, 2015). It can also be defined as the process by which one acts upon receiving information, as well as the situation in which a source transmits a message to a receiver, with the aim of influencing their behaviour. In addition, communication includes the transmission of information (**De-Miguel**, 2010), and it is different from the process of disseminating information, because some feedback must emerge from within the sender-message-receiver circuit. In this way, a dynamic phenomenon of information exchange and role switching occurs, since the receiver then becomes the sender during feedback.

Between the 1920s and 1930s, the first educommunication experiences were conducted in schools by Célestin Freinet and Frank Raymond Leavis (**Méndez-Ojeda** *et al.*, 2014). Freinet founded a school newspaper in the Bar-sur-Loup (France) rural school, under the novel concept of learning using communication tools. Freinet found that students built their literary and communicational skills by participating in the school newspaper, through the analysis of sociocultural facets that other teachers did not consider before. This was

> "a channel of free expression that fostered communication among peers, but also among elementary school teachers" (**Méndez-Ojeda**; **Luque-Ortiz**; **Pérez-Curiel**, p. 16).

Years later, Freinet's work was replicated and enriched worldwide by his successors, such as Paulo Freire, Mario Kaplún, and Francisco Gutiérrez (**Prieto-Castillo**, 2010; **Méndez-Ojeda** *et al.*, 2014).

> Between the 1920s and 1930s the first educommunication experiences occurred in schools

Considering the cited background, the concept of digital educommunication media (DEM) refers to the information and communication technologies (ICTs) that are within professors' reach and that can be used to facilitate teaching, learning, and communicational processes. We chose the term 'educommunication' instead of other concepts such as 'technology-mediated education' or 'digital literacy' (or even 'media literacy') since, according to **Narváez** (2021), the latter imply a combination of technology, culture, training, qualification, and education. On the contrary, focusing on the DEM, their use, and adoption allows adopting an inter- and transdisciplinary approach between education and communication (**Barbas-Coslado**, 2012, p. 158).

ICT-supported teaching and learning should not be assumed to imply an inferior education; rather, it is an integral part of the changes in the processes intended to learn about the world and explaining it, which in turn is tuned to and depends upon the technological tools used in each historical moment (**Cardona-Ossa**, 2006). ICTs enable professors to better monitor their students' individual learning and aids them in improving the organization of their teaching materials. In addition, they help combat professors' boredom and monotony (**Jarvis**, 2015). **Díaz-Barriga** (2008) points out some positive aspects of teaching and learning in online environments:

- Generates digital literacy in students and professors, which is related to "high-level thinking" models through searching, analysing, and discovering digital information collections.
- Facilitates the access to trustworthy data and to specialists in different fields of knowledge and allows for the inclusion of meaningful tasks.
- Provides alternatives to turn learning processes into tasks that involve self-regulated and metacognitive reflections.
- Engages students in case analyses, projects and problem-solving, as well as in activities that enable collaboration, dialogue and the generation of their own criteria and knowledge.

- Promotes personal and online communication for educational and social purposes, fostering a sense of community and reducing the perception of isolation.
- Motivates the production of digital portfolios and evaluations that reflect students' achievements, the skills they acquired, and enables self-assessment.
- Provides constant evaluation to students, in addition to offering them working alternatives in a challenging, but approachable, environment.
- Allows understanding and helping students with their individual needs by using digital formats that do not imply a single answer to a given question or problem, rather, they show the various correct choices employing texts and multimedia.
- Considers the inclusion of diverse mentoring and online participation levels.

In this way, DEM

> "can be privileged as instruments and resources for treating curricular areas at different educational levels, due to their capacity to motivate, their informational potential, their global focus, and their transcendence" (**Araque-Hontangas**, 2009, p. 3).

Using DEM in higher education may lead to the establishment of three characteristics: a) interactivity and flexibility; b) link professors and students; and c) facilitate the access to educational materials and other information sources (**Duart**; **Sangrà**, 2000). According to **Jarvis** (2015), some of the benefits of using DEM are:

- Save time and money: less photocopying and reliance on expensive books.
- Selection and retention of information: print documents can be lost or thrown away once the exam/unit in question has been passed. This does not happen when the information is digitally stored, which also facilitates its organization.
- Transferability: it is easy to upload the material of an entire course to the cloud and ask a student to grant their classmates with access to it, or to send pertinent information by email to a couple of students and then ask them to disseminate it among their peers.
- Student achievement: using DEM effectively and consciously in the classroom contributes to develop a sense of achievement among students.
- Inclusion: demographic, social or health factors can be obstacles to learning, but they can be reduced, or even eliminated, by using DEM.

> Digital educommunication media facilitate teaching, learning and communicational processes

However, there are mixed perspectives when assessing how DEM have been permeating education. If we only consider the impact of ICTs on education, specifically regarding learning, teaching and evaluation, changes have been arguably modest (**Natriello**, 2005). **Piccoli**, **Ahmad** and **Ives** (2001) warn that the poor design and execution of educational programs enhanced by ICTs can increase students' levels of anxiety, confusion, and isolation. Another problem is that DEM are seen by many professors not as solutions, but as requirements demanded by their institutions (**Jarvis**, 2015). Furthermore, it should be noted that the positive impact of using DEM in the classroom could vary from course to course. In fact, **Machin**, **McNally** and **Silva** (2007) found it difficult to measure long-term learning outcomes when these were enabled by DEM. They do not necessarily ensure educational inclusion, equity, quality, or innovation if they are employed as information repositories and are exclusively used to send information to students (**Díaz-Barriga**, 2008).

In addition, online classes can be unsuccessful when students' expectations of satisfaction and quality are not met, which could be further harmed if professors lack digital skills and if students do not have enough motivation or self-teaching skills. The lack of human contact, and of appropriate social and educational contexts within courses are other affecting factors (**Ojeda-Castañeda**, 2005).

Although there are abundant studies on the use of DEM in the classroom, they mostly focus on students, while those centred on professors and the relationships with their adoption and use of DEM are scarcer. This latter point of view allows identifying positive aspects in favour of using DEM in the classroom as means to save time and money, and as the mandatory technologies that were employed worldwide to offer educational processes during the COVID-19 pandemic.

2. Methodology

This research was non-experimental, cross-sectional, and descriptive, and was conducted under an explanatory and sequential mixed methodology, which, according to **Creswell** (2013), begins with a quantitative phase of data collection and analysis that informs the design and implementation of a second phase of qualitative data collection and analysis. A stratified sample of professors from two Mexican universities was employed: from the *National Autonomous University of Mexico* (*UNAM*) and the *Autonomous University of Chihuahua* (*UACH*), focusing on two faculties for each university: *Philosophy and Letters* (*FFyL*), and Engineering (*ENG*). Sampling was carried out under the criteria of maintaining a 10% standard error, a confidence level of 90% (Z=1.645) and a probability of success of 50%, and 50% of failure, meaning that 50% of professors from the sample should use DEM for teaching, as opposed to traditional methods.

These two universities were chosen to have two dissimilar cases in terms of university size (in number of students and professors), of assets, ranking and geographic location (north of Mexico *versus* centre); under the assumption that these two dissimilar cases would yield marked differences, or rather, interesting similarities. *UNAM* is the largest university in Mexico, its campus is located in Mexico City, it leads the national ranking of universities, and it is among the top 105 in the world, according to the *QS World University Rankings 2022* (*UNAM*, 2021). Meanwhile, *UACH* is one of the two state universities in the state of Chihuahua, located in the north of the country and its main campus is in the city of Chihuahua (*UACH*, 2020). Table 1 specifies the resulting sample and the total number of professors in each of the four groups.

Table 1. Calculation of the sample for the questionnaire

University	Faculty	Population	Sample
UACH	*FFyL*	52	30
	ENG	91	40
UNAM	*FFyL*	238	53
	ENG	260	54
	Total	641	177

A first version of the questionnaire was piloted with 43 professors from *UACH*, both from *FFyL* and from the *Faculty of Political and Social Sciences*. Their responses resulted in a Cronbach's alpha value of α=.972 across the 92 items of the pilot questionnaire, the data was then analysed, and the questionnaire's items were improved. After applying such improvements, the final version of the questionnaire, which contained 144 items, was sent to the sample of 177 professors. In this application, a Cronbach's alpha of α=.961 was obtained. Based on the responses to the latest version of the questionnaire, ten professors were chosen to be interviewed, prioritizing diversity in terms of sex, age, faculty, educational levels in which they teach, and their years of teaching experience and of using DEM. Table 2 presents the general characteristics of the professors interviewed.

Table 2. Characteristics and codes of the interviewees

Interviewee	Sex	Age	Institution	Programs in which they teach	Teaching experience(years)	Experience using DEM
Int1	Female	50	*UACH-FFyL*	Bachelor	33	29
Int2	Male	37	*UACH-FFyL*	Bachelor, master, and doctorate	6	6
Int3	Female	38	*UNAM-FFyL*	Doctorate	7	7
Int4	Female	62	*UNAM-FFyL*	Bachelor	2	1
Int5	Male	69	*UNAM-ENG*	Bachelor, and master	45	15
Int6	Male	41	*UNAM-FFyL*	Bachelor, master, and doctorate	16	10
Int7	Male	32	*UNAM-ENG*	Bachelor	5	4
Int8	Female	41	*UACH-ENG*	Bachelor, and master	12	12
Int9	Female	31	*UACH-ENG*	Bachelor	8	5
Int10	Male	49	*UNAM-ENG*	Bachelor	27	12

In the first phase of this research (quantitative), data was collected by using the mentioned questionnaire, which included open and closed-ended questions (multiple choice questions, rankings and items that employed a Likert-type scale). The second phase (qualitative) involved conducting structured interviews with professors who were selected based on their years of teaching experience and using DEM, as well as their age and institutional affiliation. Given the context of the COVID-19 pandemic, professors' years of experience under a virtual education scheme was also considered.

It is important to note that the data collection was carried out between 2020 and 2021, it was unintentionally started when the *World Health Organization* declared the beginning of the pandemic, while interviews took place months later. This represented certain limitations for conducting this research, since professors could only be contacted by email or telephone, thus extending the time it took for data collection to conclude, and thus it required multiple contacts and reminders. In addition, both instruments were applied online, the questionnaires were conducted through *Google Forms* and the interviews through *Google Meet*.

This study was driven by three research questions:

a) How do professors' perceptions toward their students' learning influence their decision of using DEM or traditional methods in class?

b) How does DEM's assessment influence professors' decision to use them in class?

c) Are there significant differences in the use of DEM between professors of different ages, universities, faculties and among those teaching at specific educational levels?

Six DEM were studied: 1) digital texts; 2) images, animations and videos; 3) presentations (e.g., *PowerPoint*/*Prezi*); 4) email; 5) social media and instant messaging programs (e.g., *Facebook*, *Twitter*, *WhatsApp*, *Telegram*); and 6) cloud-based file and information hosting services (e.g., *Dropbox*, *Google Drive*).

Given the above and emphasizing that the focus was on studying the use and adoption of the six DEM selected by university professors from the dissimilar groups of the selected institutions and faculties, the following hypotheses were proposed, which exclusively considered professors' perceptions:

H_1: Professors using DEM more frequently consider that their students learn better.

H_2: Professors using traditional methods more frequently consider that their students learn better.

H_3: DEM are more frequently used if they are better evaluated through TAM, QUM, and the activities that they enable

H_4: Professors teaching in graduate programs use DEM less, but more effectively than professors in undergraduate programs.

H_5: Younger professors use DEM more frequently and effectively than older professors.

H_6: *UNAM* professors use DEM more frequently than *UACH* professors.

H_7: *ENG* professors use DEM more than *FFyL* professors.

2.1. Design of the questionnaire

Adhering to the order in which this research was carried out, we present below the design of the questionnaire that was used in the first quantitative phase. This questionnaire was divided into the following four sections and contained a total of 144 items, 123 of which were intended to be rated with a Likert-type scale. Additionally, it included five open questions.

a) General data: this first part requested the following general data from the professors: sex, age, institution where they work (faculty and university); field of study, educational levels in which they teach (bachelor, master, or doctorate programs), years of teaching experience and of using DEM in the classroom. These general data were collected to cross-reference and segment the data obtained throughout the entire questionnaire, to determine professors' profiles and their characteristics, in addition to conducting statistical analyses.

b) Generalities of DEM (abbreviated 'generalities'): this second section sought to collect data about professors' preference of using DEM in class, or if they opted for more traditional teaching methods. This allowed verifying how dependent they were on DEM to carry out their teaching and determining certain generalities about their classes and particularities behind teaching processes for specific fields of knowledge.

c) Evaluation of DEM ('I consider'): this third part of the questionnaire presented 72 items to be rated using a five-point Likert-type scale (0 to 4, zero being 'totally disagree', and four 'totally agree'). Questions about DEM's characteristics were included, which used the key concepts of the Technology Acceptance Model (TAM) (**Davis**; **Bagozzi**; **Warshaw**, 1989), in combination with their 'qualities of use' model (QUM), a conceptual model that was generated for this research, to serve as a complement to TAM and it was grounded on the review of the specialized literature. The key concepts of the TAM, which is commonly used to study the use and adoption of ICTs, include: useful, easy, motivates its use, frequently used; while QUM's adjectives were: reliable, simple, versatile, fun, time-saving, transmits information better, solves problems, makes it easier to express myself. Both models (TAM and QUM) were used to ask professors to evaluate the six DEM studied (images, animations and video; presentations (*PowerPoint*/*Prezi*); digital texts; cloud-based file and information hosting services; social media/instant messaging; email), by using these models' concepts. TAM is used to analyse users' acceptance and evaluate systems (**Davis**; **Bagozzi**; **Warshaw**, 1989). It includes the concepts of ease of use and perception of usefulness, which influence individuals' behaviour regarding their acceptance of a given technology, as well as the intensity of their current use of the ICT in question. Similarly, QUM was used as a complement and contrasting element to TAM, to investigate professors' perceptions regarding DEM's effectiveness, use and adoption when teaching their classes.

> Online classes can be unsuccessful when students' expectations of satisfaction and quality are not met

d) Use of DEM in class (subdivided into three parts: 'prioritize', 'activities', 'student learning'). The prioritize subsection sought to collect data on the six DEM under study, as they were used by professors, and which ones they used the most. The activities subsection inquired about their preferences for using each DEM, depending on how they enable the following activities:

- transmit information;
- motivate or raise awareness;
- exemplify/explain; and
- encourage creativity.

The student learning subsection asked professors to express their perception of their students' learning, focusing on DEM, and the importance and use of its graphic and aesthetic possibilities.

Finally, professors' reflections and perceptions were collected through a series of open-ended questions:

- their opinion regarding in which courses they consider that DEM are mostly used;
- positive and a negative aspects of using technology in their classes;
- if they have received any training on using DEM in their classes;
- the websites they mostly use to enrich their classes;
- the technical difficulties they have experienced while working with DEM;
- the number of *WhatsApp* university-related groups in which they are included;
- the number of unread emails in their inboxes;
- recommendations for their institutions to further facilitate the use of technology in their classes; and finally,
- an invitation to participate in the interview.

The results obtained through the questionnaire were useful to learn more about the use of DEM by professors (e.g., which ones they used for a specific activity or which ones are for general use), and to determine the pros and cons of using DEM in education.

2.2. Design of the interview questions

The data collection instrument used in the second phase of research (qualitative) was the interview, which included nine questions, divided in four topics:

- current and future changes of using DEM in education;
- graphic and aesthetic possibilities;
- experiences during the COVID-19 pandemic; and
- considerations about the questionnaire's results.

3. Results

> 75% of the professors declared having previous experiences in virtual education

Regarding the analysis of quantitative data obtained from the questionnaire, at a descriptive level, 75% of the professors from both institutions declared having previous experiences in virtual education, which was to be expected, since the beginning of the data collection coincided with the declaration of the COVID-19 pandemic, at the beginning of 2020. Therefore, it may be assumed that professors responded from their current experiences at the time of answering the questionnaire, instead of considering their entire teaching careers. Most professors (80%) relied on DEM when explaining or presenting a topic, they preferred using a projector to present their visual aids instead of relying on the blackboard, 70% versus 30%, respectively.

Regarding the provision of reading materials, all participants declared that they send digital reading materials to their students, instead of using print documents. In terms of how they approach teaching problems and case studies, professors relied almost entirely on DEM (80%), as opposed to traditional methods (20%).

The results from DEM's evaluations by using TAM included that all DEM were adopted almost equally. The three most widely used by professors were, in order of importance: email, images, animations and video; and cloud-based file and information hosting services. In contrast, presentations (*PowerPoint*/*Prezi*) scored the lowest. Regarding the most and least important DEM, according to the statistical medians obtained in each TAM adjective, the following was obtained:

- Useful: the cloud was typified as the most useful DEM, while professors perceived social media and instant messaging programs as less useful.
- Easy: the easiest to use was email, while the cloud was its counterpart.
- Motivates its use: the DEM that most motivated professors toward using it were images, animations and video, in the opposite extreme, participants chose email.
- Frequently used: the most frequently used DEM turned out to be email and the least, images, animations and video.

Regarding QUM's adjectives, images, animations and video, as well as presentations (*PowerPoint*/*Prezi*) and digital texts were preponderant in their adoption; in contrast to social media and instant messaging programs, which reported the lowest scores. Images, animations and video were evaluated well both in terms of TAM and QUM. Regarding the most and least important DEM, according to the statistical medians obtained in each quality of use adjective, the following was obtained:

- Reliable: *PowerPoint*/*Prezi* turned out to be the most reliable, while social media and instant messaging programs were the least reliable.
- Simple: email was the simplest, while images, animations and video were considered more complex.
- Versatile: images, animations and video were the most versatile, while digital texts were considered to be the most one-dimensional for educational work.
- Fun: images, animations and video were typified as the most fun to use, while email was the furthest from this concept.
- Time-saving: the cloud was considered the most time-saving DEM, while social media and messaging programs showed the opposite trend.
- Transmits information better: the preferred DEM for this was images, animations and video, as opposed to social media and instant messaging programs, which was unexpected, as this is apparently the primary function of the latter.

- Solves problems: the cloud was the best qualified for this purpose, while social media and instant messaging programs were the worst qualified.
- Makes it easier to express myself: to express themselves better, professors reported resorting more to images, animations and video, while social media were less preferred.

Regarding the specific DEM that professors would like to learn to use better, images, animations and videos were mentioned the most (32.2%), followed by the cloud (29.4%), social media and instant messaging programs (9%), digital texts (1.7%) and *PowerPoint*/*Prezi* (0.6%). Although we compared the answers of the professors from the four groups, no significant differences were found regarding the previous topics. However, differences between *UACH* and *UNAM* could be perceived in their answers to the open-ended questions included in the questionnaire. We approached the analysis of the answers to these questions by applying a content analysis method, generating a codification of categories from the answers' themes. We then compared the categories initially created to integrate a stronger final categorization, by avoiding ambiguity and ensuring that the categories presented adequate uniqueness. The final categorization is used below.

When asking professors to mention a positive and negative aspect of using DEM, the following categories were obtained. Their frequency and response percentage are presented in Table 3.

Table 3. Comparison of positive and negative aspects by institution

Aspects		*UACH*		*UNAM*	
		Frequency	**Percentage**	**Frequency**	**Percentage**
Positive	Comfortable	8	11.4	12	11.2
	Didactic	11	15.7	32	29.9
	Dynamic	**21**	**30.0**	22	20.6
	Information provision	14	20.0	23	21.5
	Economic	4	5.7	11	10.3
	Motivating	9	12.9	2	1.9
	Did not know/did not answer	3	4.3	5	4.7
	Total	70	100	107	100
Negative	Digital divide	10	14.3	**23**	**21.5**
	Time consuming	6	8.6	9	8.4
	Technological dependence	4	5.7	3	2.8
	Lack of educational materials	6	8.6	3	2.8
	Less student engagement	10	14.3	15	14.0
	Less personal interaction	9	12.9	20	18.7
	Did not know/Did not answer	4	5.7	11	10.3
	Technical issues	**12**	**17.1**	11	10.3
	Tedious	6	8.6	5	4.7
	Illegitimate use by students	3	4.3	7	6.5
	Total	70	100	107	100

In summary, *UNAM* professors perceived DEM as more didactic and economic (that is, effective; since they make it easier to do more with less), for almost twice as much as *UACH* professors. *UNAM* considered the digital divide to be much more serious, in addition to pointing out more frequently the problem caused by a lack of social interaction in online education. *UACH* professors perceived DEM as much more motivating, considering them to be attractive, stimulating, eye-catching and dynamic; that is, practical, simple, easy, fast, agile, versatile, and

Table 4. Comparison of the most used resources by institution

Resources	*UACH*		*UNAM*	
	Frequency	**Percentage**	**Frequency**	**Percentage**
Various	**22**	**31.4**	35	32.7
Repositories	17	24.3	**36**	**33.6**
YouTube	10	14.3	17	15.9
Did not use any/Did not know	6	8.6	2	1.9
Learning platforms	6	8.6	4	3.7
Google	5	7.1	6	5.6
Preparation of graphic material	3	4.3	6	5.6
Survey administration	1	1.4	1	0.9
Total	70	100	107	100

immediate. To a much lesser extent, professors from both universities considered relevant the topics of technological dependence, lack of educational materials, technical issues, and tedious. Regarding the most used websites to enrich their classes, Table 4 presents the comparison between institutions.

Within the various category, professors mentioned the following: *Google Scholar*, *Google Classroom*, *Genially*, *Canva*, *Moodle*, *Google Meet*, *Edmodo*, *Google Drive*, *Kahoot*, and *Prezi*. *UNAM* professors declared to make more use of repositories and information systems (e.g., *Ebsco*, *Latindex*, *Dialnet*, *Redalyc*, *Conricyt*, *Elsevier*, *SciELO*, *Sci-Hub* or *Libgen*); but at the same time, they made less use of educational platforms. In contrast, a very low percentage of *UACH* professors do not use websites to enrich their classes. Instead, they rely on educational platforms.

When asked about the greatest technical difficulties they face, the responses of the participants were divided into the following seven categories:

- DEM training and use;
- hardware issues;
- unstable internet connection;
- did not know/did not answer;
- other difficulties;
- software issues; and
- various.

Table 5. Comparison of technical difficulties by institution

Technical difficulties	*UACH*		*UNAM*	
	Frequency	Percentage	Frequency	Percentage
DEM training and use	**18**	**25.7**	16	15.0
Hardware issues	13	18.6	15	14.0
Unstable internet connection	10	14.3	**50**	**46.7**
Did not know/Did not answer	10	14.3	11	10.3
Other difficulties	10	14.3	2	1.9
Software issues	6	8.6	5	4.7
Various	3	4.3	8	7.5
Total	70	100	107	100

Table 6. Comparison of recommendations by institution

Recommendations	*UACH*		*UNAM*	
	Frequency	Percentage	Frequency	Percentage
Support for using digital resources	**16**	**22.9**	20	18.7
Training on using DEM	15	21.4	**29**	**27.1**
More and better hardware	15	21.4	20	18.7
Improve internet quality	11	15.7	14	13.1
Improve students' conditions	7	10.0	4	3.7
Did not know/Did not answer	4	5.7	14	13.1
Various	2	2.9	6	5.6
Total	70	100	107	100

Table 5 presents the comparison between institutions in this regard.

UNAM professors highlighted the poor quality of the internet connection as the main difficulty, communicating their discomfort regarding its poor conditions and instability, which was unexpected, given the difference in resources between *UNAM* and *UACH*.

UACH professors mostly resented the lack of training, in addition to noticing more difficulties related to their students, perceiving that they do not read or study the digital materials provided to them, as well as a lack of visual communication (i.e., when they connect to online classes, they do not turn on their camera). The types of recommendations that professors would make to their respective universities are presented in Table 6.

Although these recommendations were distributed almost evenly between the two universities, *UNAM* professors leaned slightly more toward suggesting more training for using DEM. Participants demanded advanced courses about using DEM (to take place ideally one week before starting each semester, or on weekends). *UACH* professors requested more digital resources and better conditions for their students.

3.1. Results from the interviews

In this section we present the results derived from the interviews, grouped into three main categories:

- current and future changes of using DEM in education;
- graphic and aesthetic possibilities; and
- experiences during the COVID-19 pandemic.

Regarding the analysis of the interviews, we used the transcripts to group the answers in the three main categories mentioned. Using content analysis, we compared professors' responses to generate specific categories and registered the topics on which interviewees showed both common and dissimilar perspectives. The results shown below are supported by citations from the interviews, to further illustrate such agreements or disagreements, which were extracted from the most compelling verbal expressions.

> Digital educommunication media usage frequency does not affect professors' perception of their students' learning

Regarding current and future changes of using DEM in education, the professors interviewed expressed that the most notable include certain changes in the professor-student contact and the time dedicated for preparing lectures. They commented that distance education will not be able to overcome face-to-face communication and DEM will not represent valuable resources if professors are not very communicative themselves, highlighting the importance of social interaction for teaching. Some DEM, in addition to generating technological dependency, are not so easy to use (Int1, *UACH-FFyL*; Int5, *UNAM-ENG*; Int10, *UNAM-ENG*). Regarding future perspectives, interviewees agreed that using DEM in education, in any modality (hybrid, distance, synchronous or asynchronous), is here to stay.

They warned about the risks associated to a poor implementation of technology in the classroom. However, two interviewees expressed relatively positive perspectives and acceptance toward a higher use of DEM in future education, pointing out the following:

> "I think we will have a pandemic for a while and without wanting to be apocalyptic, virtuality is going to increase and with it, its challenges and difficulties" (Int2, *UACH-FFyL*).

In addition,

> "if we really manage to implement and properly appropriate technology, it can represent a great advance for having a circular and complete education. If we cannot appropriate and make proper use of the media, it will be a failure" (Int3, *UNAM-FFyL*).

Regarding the graphic and aesthetic possibilities of the materials generated through DEM and used by professors to enrich their classes, they highlighted the importance of graphic design, as

> "digital knowledge and time are required to develop graphic materials with a certain aesthetic" (Int8, *UACH-ENG*).

It was even suggested that

> "we should all have a short course [about this] at some point in our lives" (Int7, *UNAM-ENG*).

The interviewees mentioned the following graphic and aesthetic aspects as transcendental when relying on technology for their teaching:

- Backgrounds: blank backgrounds or with a minimalist design, so that students focus more on the contents (Int3, *UNAM-FFyL*). It is useful to contrast the colour of the text with the background (Int9, *UACH-ENG*).
- Avoid animations and gifs, as they end up stealing attention (Int8, *UACH-ENG*).
- Prevent reading aloud a screen full of text, as this was characterized as nonsense (Int5, *UNAM-ENG*). It is also an error to load visual aids with too much text (Int10, *UNAM-ENG*).
- Font: as sober, serious, and legible as possible (Int3, *UNAM-FFyL*; Int8, *UACH-ENG*).
- It is not appropriate to exclusively provide students with multimedia materials, since they should also be taught or invited to read and analyse (Int8, *UACH-ENG*).
- Videos must be clear, short, concise, without background noise. No student will watch a long video in its entirety, and it is crucial to plan when it would be appropriate to play it in class (Int6, *UNAM-FFyL*).
- Digital documents must not be overloaded with graphic content (Int9, *UACH-ENG*).
- At the graduate level, the simpler the graphic content, the better (Int3, *UNAM-FFyL*). Several interviewees stated that if it is a presentation intended from professors for professors, it is recommended to avoid visual aids.
- For abstract topics (e.g., philosophical themes), it is a good idea to use videos (Int6, *UNAM-FFyL*).
- Students tend to work intuitively with the Google suite. Also, *Meet*, *Zoom*, *Facebook* or *Padlet* have a more user-friendly visual aesthetic (Int6, *UNAM-FFyL*).

Regarding the issues related to the COVID-19 pandemic, professors identified various challenges. They resented the lack of contact with their students, which they perceived had an impact on their learning outcomes. In addition, they declared that this situation, from the outset, generated some fear and reluctance toward technology, as they had to be urgently trained just to catch up. Participants mentioned that the DEM they implemented during the pandemic included video, presentations, cloud-based file and information hosting services, social media, instant messaging programs, video conferencing systems, and learning management systems. However, these were not implemented in such an orthodox way, as it would have occurred within the usual scheme of face-to-face classes and tied to

> Professors' technological preferences were not influenced by their university, the level of the programs where they teach, nor by their faculty or age

a classroom environment. Undoubtedly, the most noticeable change was the daily use of digital materials in education, turning them from a complement into the basis for generating daily lectures:

> "I had to incorporate new tools, in particular *Zoom* ... Now I conduct evaluations with *Google Classroom*. I also started using *One Note*. I had already heard of all these tools, but I did not start using them properly until this pandemic detonated" (Int10, *UNAM-ENG*).

Professors found several opportunities, such as the considerable amount of online educational materials that they had access to, schedule flexibility, a better capacity for synthesis, and the ease of being able to access class contents anytime, given the advantages of asynchronous communication. Another advantage they pointed out included the proliferation and the easy access of massive open online courses (MOOC), typical of distance education and which can be accessed by any interested person.

> The most used information systems included *Ebsco*, *Latindex*, *Dialnet*, *Redalyc*, *Conricyt*, *ScienceDirect*, *SciELO*, *Sci-Hub* and *Libgen*

3.2. Hypothesis testing

In this section, we present the analysis of each hypothesis that was posed at the beginning of this study, by carrying out the relevant tests. The results are shown below.

- H_1: Professors using DEM more frequently consider that their students learn better

  To test this hypothesis, we generated the 'use DEM' analysis dimension, which we calculated by averaging the five variables related to professors' actions in the virtual education modality: presenting and explaining with DEM, presenting visual aids with a projector, using digital reading materials, and using DEM for problems and case studies. For this and other hypotheses that implied averaging the values of several variables to group them on a dimension of analysis, we conducted the appropriate Tukey tests of linearity and additivity, confirming the presence of the additivity effect in all the cases where we grouped several variables (at a level of significance between elements of sig=.000).

  In the case of this first hypothesis, we divided the sample in two groups, depending on the values of the calculated variable (use DEM): a) professors using DEM less frequently (0-50 points); b) professors using DEM frequently (51-100). The other variable involved in this hypothesis corresponded to the 'learning' analysis dimension, which in turn averaged the nine variables that were related to professors' perceptions of their students' learning when using DEM. Given the variables involved and that the 'use DEM' variable presented a non-normal distribution, a non-parametric test of independent samples was carried out, which rejected this first hypothesis (sig=.943). In other words, DEM's usage frequency does not affect professors' perception of their students' learning.

- H_2: Professors using traditional methods more frequently consider that their students learn better

  To test this hypothesis, we generated the 'Traditional use' analysis dimension, which we calculated by averaging the variables related to the use of traditional media in class, which included: explaining topics without DEM support, using the blackboard, providing students with print materials, and not using DEM to present problems and case studies. Given the distribution of this variable, a non-parametric test of independent samples was used again, which also resulted in rejecting this hypothesis (sig=.892). This implied that professors' perception of their students' learning does not influence their choice to use traditional media either.

- H_3: DEM are more frequently used if they are better evaluated through TAM, QUM, and the activities that they enable

  This hypothesis involved three dimensions of analysis: 'TAM', 'QUM' and 'activities', which were variables calculated by averaging other variables, as indicated in the test of H_1. Given the distribution of these variables, we used a non-parametric test of independent samples, with which H_3 was supported if the DEM evaluations are carried out by using TAM (sig=.031) or QUM (sig=.050), but it was rejected when evaluating DEM through the activities that they enable (sig=.823).

- H_4: Professors teaching in graduate programs use DEM less, but more effectively than professors in undergraduate programs

  This hypothesis involved dividing the sample into two groups, according to the educational levels at which they teach: a) those not teaching in graduate programs; and b) those teaching at graduate programs. This hypothesis involved carrying out two tests, which resulted in rejecting this hypothesis in all cases: a) regarding DEM usage frequency (employing 'use DEM' variable, see H_1) (sig =.386); and b) regarding usage effectiveness (see H_3) through TAM (sig=.879) and QUM (sig=.777).

- H_5: Younger professors use DEM more frequently and effectively than older professors

  To test this hypothesis, the variables 'use DEM', 'TAM' and 'QUM' were used, as well as an age variable, which was calculated to divide the sample in four groups: a) less than or equal to 39 years old; b) from 40 to 46; c) from 47 to 54; and d) more than 55. Since this test involved comparing values among four groups, an analysis of variance (Anova) was conducted and resulted in rejecting this hypothesis. That is, young professors do not use DEM more frequently than their older colleagues (sig=.477); nor do they use them more effectively, either if we measure effectiveness by employing TAM (sig=.833), or QUM (sig=.873).

- H_6: *UNAM* professors use DEM more frequently than *UACH* professors

  The sample was divided in two groups: a) *UNAM* professors; and b) *UACH* professors. A non-parametric test of independent samples was carried out, which resulted in rejecting this hypothesis (sig=.247), which implied that there was no distinction between the preferences of the professors from either university in terms of using DEM.

- H_7: *ENG* professors use DEM more than *FFyL* professors

  The sample was divided into two groups: a) *FFyL* professors; and b) *ENG* professors. A non-parametric test of independent samples was carried out, which resulted in rejecting this hypothesis (sig=.441); meaning that *ENG* professors do not use DEM more frequently than *FFyL* professors.

4. Discussion

> Professors claimed that distance education will not surpass face-to-face models, but either will benefit from having professors with high communication skills

Email was considered the simplest and easiest DEM to use, it was also widely used to share information; but it was not characterized as the most fun, versatile, or the one that most motivated its use. No professor expressed any motivation to learn to use it better. Moreover, 45.8% of the professors commented that they did not have any unread mail, which may indicate some of their information management habits; although this percentage my fluctuate daily: in the same day you can have a dozen unread emails, and on that same day you may delete or read them. Surprisingly, email turned out to be the highest rated DEM under TAM, but this did not set it too far apart from the other five.

Regarding images, animations and video, it turned out to be the DEM that most motivated its use and, therefore, it was the most frequently used. 30% of the professors declared that they would like to learn to use them better, considering them the most fun and that allow them to best express themselves; but at the same time, they are the least simple. In addition, they were characterized as versatile, being considered as viable tools to motivate, exemplify or explain. They expressed using them to communicate complex ideas and enrich classes. If videos are to be used or created, they should be short, straightforward, and free of background noise. Length is crucial, as long videos will tend to be ignored by students, even partially. Producing videos takes time and effort, they tend to occupy considerable hard drive space on professors' devices; but they can be reused. Regarding the moment to use videos in the class, it can be in the middle for an activity, at the beginning as an introduction to a given topic, or at the end, to enable students' reflections.

Regarding presentations (*PowerPoint*/*Prezi*), they were frequently used and were qualified as useful to exemplify or explain topics in class. It was also considered the most reliable, but professors would not like to learn how to use them better. **Jarvis** (2015) comments that graphic content must be relevant to the learner, while he suggests including references to pop culture. Professors claimed that they are needed the least for graduate studies, since the emphasis is switched to students' self-learning skills and their ability to read, analyse, interpret, and write independently.

Although in an optimistic and propositional manner, **Jarvis** (2015) invites to increase students' participation through social media and instant messaging programs, **Noguera-Fructuoso** (2015) warns that students tend to feel uncomfortable when professors enrich their classes with less hierarchical means. The professors who were part of this research considered privacy protection in social media to be poor, which were coupled with other negative aspects of this DEM, such as its tendency to distract users' attention and the presence of hoaxes or fake news. This was considered the least useful and reliable DEM, and they considered it the most difficult for expressing themselves. However, the effectiveness of social media and instant messaging programs lies in their ability for answering questions and sending messages quickly and easily, surpassing more conventional means, such as email.

Cloud-based file and information hosting services turned out to best support sharing information with students, professors claimed that they would like to learn to use these better, they considered it as the most useful DEM under TAM, it was characterized as the least easy to use, but the best for problem-solving. The largest concern toward this DEM is the mistrust it generates regarding the potentially inappropriate use of the information stored (e.g., accidentally deleting a shared folder, sharing with third parties without consent). But, if managed well, it can be a great document management tool. Finally, digital texts were considered more useful and suitable for sharing information, but they were less relevant for professors in terms of the other aspects studied.

4.1. Digital educommunication media: current and constant challenges

The digital divide stood out as one of the greatest challenges, as pointed out by participants. **Berrío-Zapata** and **Rojas** (2014) warn that

> "globalization marginalizes the populations that are not compatible or close to their interests and ICTs are attached to this process" (p. 135).

Unfortunately, in Mexico there is a large socioeconomic disparity, as well as inequalities of access to capable computer equipment among students and even for classrooms.

It can be difficult for professors to implement ICTs in their classes, since they may lack enough training or skills (**Díaz-Barriga**, 2008; **Jarvis**, 2015; **Nupairoj**, 2016) Consistently, the professors who participated in this study stated that they require more training to improve their knowledge about the quantity, scope, and advantages of the tools available for education.

Jarvis (2015) mentions a series of recurrent problems behind the use of DEM, which were reflected in professors' answers, such as:

- limited compatibility among the various hardware available in each classroom or in their homes;
- the investments that many professors make from their own resources to acquire the most recent or comfortable software and hardware to work with;
- the size and quality of digital files; and
- the lack of software and hardware updates in educational institutions.

4.2. Profile of the digital professor

Professors with more experience in teaching and in using DEM recognized that, more than the technological tool, it is the didactic strategy employed what achieves a successful education. After all, and as **Jarvis** (2015) deduced, the use of technology in the classroom will not change professors' personality, enthusiasm, or teaching methods by itself. According to **Nupairoj** (2016), regardless of the media, professors must develop a series of specific characteristics and skills.

It became clear that, through the accelerated DEM training experienced by professors during the pandemic, they developed more digital competencies and adopted DEM more widely than ever before. Still, some were hesitant and uneasy about whether they were making a good use of ICTs, while others stressed the need to be stricter about preserving their personal time and weekends. For example, they found it inappropriate that their students would seek their advice on Sunday mornings.

However, it is commendable that professors were able to implement ICTs with such haste and under such a drastic change to a completely online educational model, due to the context of the pandemic; being forced to practically redo their lectures and adapt them in a very short time, while in many cases lacking the experience or training to do so. Otherwise, it would have been impossible for formal education to continue during the pandemic. However, it should be noted that **Piccoli** *et al.* (2001) warn of the risks of a poorly designed virtual class, considering that this can increase students' anxiety, confusion, and feelings of isolation. Studying from home was not an easy process and students went through this for almost three years (2020-2022); judging by professors' impressions and comments, stress and these emotions were present among students. When using technology to enrich their own training, professors considered it prudent to be more aware of the level of their students' visual aids and to exploiting their curiosity, because more than ever, today they have all the media at their disposal.

> In Mexico, there is a large socioeconomic disparity, as well as inequalities of access to capable computer equipment among students and even for classrooms

5. Conclusions

This research allowed determining some pros and cons of using DEM in higher education. Among the positive aspects, we found that the DEM were qualified by professors as predominantly dynamic and didactic, and as such:

- They are practical, agile, and quick, to the degree of achieving immediacy in terms of response times.
- They imply simplicity and ease.
- They are versatile and effective, contributing to the personalization of the content at the professor's discretion.
- They facilitate synthesising contents, thereby, helping to reduce the time consumed.
- They improve students' understanding, attention, and learning, reinforcing information.
- They invite students to interact more in class.
- They support teaching with a variety of digital resources, which are complementary and reusable.

On the other hand, and parallel to the issue of the digital divide, participants found three notorious negative aspects of DEM: a) precarious personal interaction, b) lack of commitment from students, and c) technical problems. Therefore, the cons identified are the following:

- Remote work might hinder socialization. Lack of trust will limit student participation.
- While not in a physical classroom, non-verbal communication is drastically affected, reducing the feedback that professors can receive from their students. For example, several professors complained that few students wanted to turn on their cameras.
- DEM can be unmemorable for students, to the point of becoming distractions and not aids to education.
- Professors should not rely exclusively on DEM, since technical failures such as blackouts, outdated or damaged equipment, and a poor internet connection will reduce the quality of the class or even make it impossible to take place.
- Lack of training and ignoring the available digital tools may negatively affect lectures' quality.

The COVID-19 pandemic and the distance education model brought about a series of phenomena worldwide. Almost paradoxically, while a tremendous reach was achieved in terms of communication, lockdowns also decontextualized education, taking it out of the controlled environment represented by the classroom and placing it in homes around the world –something that added a notorious difficulty to teaching–learning processes and might have decreased their seriousness. Although professors' digital training was sudden, those who participated in this research claimed to be happy with the results. Although in a forced and sudden way, they declared that they had learned to use and exploit some DEM that, in another moment, they may have not considered.

> The pandemic amplified communications' reach, but it also decontextualized education

It was notable that, during the pandemic and under the subsequent and exclusively online education model, the concept of "digital natives" was more frequently questioned; such concept implies that younger people are more receptive to ICTs and hence they can adopt them more easily, efficiently, and immediately. During lockdowns and faced with the typical problems of using the ICTs at their disposal, this might not have been so simple, especially when young people must use ICTs for academic work. Such doubts toward the notion of digital natives were already pointed out by previous research (e.g., **Margaryan** *et al.*, 2011) and perhaps the pandemic has accentuated them, as evidenced by the observations of some of the surveyed professors and in more recent post-COVID-19 research (**Smith** *et al.*, 2020; **Janschitz**; **Penker**, 2022; **Zvacek**, 2021).

Inferentially and by addressing the research questions, we can conclude that professors' perception about their students' learning does not influence their choice using DEM or traditional methods. However, if professors assess a given DEM positively, this determines its usage for enriching their lectures, which is consistent with TAM. Finally, there were no significant differences in DEM usage between professors of different ages, universities, and faculties or between those teaching at different academic levels. Regarding the hypotheses, all were rejected except for H_3: DEM are more frequently used if they are better evaluated through TAM, QUM, and the activities that they enable. The rejection of the other hypotheses might also allow refuting certain stereotypes held around the use of ICTs by professors, at least within the context studied. In other words, rejecting these hypotheses implies that, contrary to what one might think, owing to its size and resources, *UNAM* professors do not necessarily use DEM more frequently or effectively than *UACH* professors; neither engineers necessarily use them the most, nor the youngest. The use and adoption of DEM is not that simple.

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Role of social capital in education. Results of a survey on the individual social capital of school librarians

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Abstract

Schools and school libraries play a vital role in the formation of the attitudes and behaviours of young people. Adolescence is an important period of acquisition of knowledge, socialisation, development of artistic sensitivity and enculturation, which an individual will use for the rest of his or her life. The competencies and attitudes of school and school library personnel may significantly affect the development of children and youth. It seems relevant, then, to examine their social attitudes and the level of their social capital. The paper presents the results of a survey conducted among school librarians in 20 countries around the world. The survey examined the level of their individual social capital, social attitudes and civic attitudes. According to its results, school librarians have an average level of individual social capital; however, their social capital, social activity and civic engagement are among the lowest compared with the personnel of the other types of libraries.

Keywords

Social capital; School libraries; Libraries; Teacher-librarians; Cultural capital; Social activity; Civic engagement; Educational processes; School; Society.

1. Introduction

Schools and school libraries, alongside families, play a crucial role in the formation and development of the attitudes of a young person. What is important in school libraries, apart from suitable infrastructure, extensive book collections and modern equipment, are the knowledge, skills, competencies and attitudes of the library personnel, and their openness to the needs and problems of others. Social capital studies determine the readiness to collaborate and help others of specific social groups –in this case of school librarians. The paper discusses the problem and presents the results of a survey conducted among school librarians from 20 different countries.

2. The social capital theory *vs.* cultural capital

Social capital has recently been a popular topic with researchers from various disciplines. The concept originates from sociology but currently, it has a much broader application –it is used in education, psychology, pedagogy, library and information science as well as in other seemingly unrelated areas (geography, economics, law, etc.). Social capital is very often analysed in the context of such values as economic capital or cultural capital. According to Alice Brémond, Jean-François Couet and Anne Davie, these capitals can be defined in the following way:

- economic capital is a collection of tangible and financial assets owned by an individual or group of individuals;
- cultural capital is a resource of knowledge, behaviour and skills that may contribute to educational and professional success in the same way as economic capital;
- social capital is a set of social relationships that may lead to social success (**Brémond**; **Couet**; **Davie**, 2006).

Despite numerous studies on and popularity of this research field, the social capital theory was developed relatively recently. It is believed that the term "social capital" was used for the first time in 1916 by the sociologist Lyda J. Hanifan –state supervisor of rural schools in West Virginia. He emphasised the importance of engaging local communities in the work of schools. Hanifan believed that social capital comprised tangible substances that counted for most in the daily lives of people. Among these substances, he included: good will, fellowship, sympathy and social intercourses, which is what makes a community. He believed that an individual was helpless socially, if left to him or herself. Only when an individual comes into contact with others (e.g. neighbours or, at school, with other pupils and with teachers), will there be an accumulation of social capital, which may satisfy his or her social needs and which may bear a social potentiality sufficient to the substantial improvement of living conditions in the whole community. According to Hanifan, the community as a whole will benefit by the cooperation of all its parts, while the individual will find in his or her associations the advantages of the help, the sympathy, and the fellowship of others (e.g. the family, neighbours or peers). He defined social capital as a set of intangible community values, such as, for example, camaraderie, solidarity, kindness and social contacts between members of a local community and their families who, as a result, form a separate social unit (**Hanifan**, 1916).

Hanifan's concept has since been developed and redefined by other researchers. In particular, it is worth noting Pierre Bourdieu, the French sociologist, anthropologist and philosopher who studied both social and cultural capital. Bourdieu believed that individuals build their social capital resources through participation in social life and, although they do that all their lives, the crucial period is childhood, when an individual learns certain norms of behaviour, habits and proper use of language from the family and significant others (many habits and reading skill are learned this way –by reading with parents or by school reading, etc.). Bourdieu noted that children may acquire certain linguistic and cultural competencies only from their families and it is not possible to compensate for their lack (e.g. in the case of children of dysfunctional parents) in any other way, not even through school education, meaning that individuals deprived of cultural and social capital resources will always be disadvantaged in achieving success in life (**Bourdieu**, 1971). Individuals from different groups acquire different levels of cultural and social capital. The development of cultural capital is affected, apart from an individual's personal motivation, by certain external factors, especially the family and school environment, where a young individual develops his or her personality, skills and knowledge.

Different communities place a different emphasis on education as a value, on learning, reading, using books, going to the theatre or museum, etc. (**Sztompka**, 2012). Thus, there exists a link between one's cultural and social capital resources and preferred lifestyle that may include regular or occasional contacts with books, libraries and other forms of culture.

One of the elements of cultural capital acquired in childhood are reading habits instilled in a child by the parents, school and local library, and by the school library, if it is sufficiently influential and manages to attract pupils. Commitment in this area may contribute to a child's further development and continued education, and the choices he or she will make later in life. It is worth noting that, in some analyses, the number of books in one's house is an indicator of cultural capital, while the reading of newspapers is one of the indicators of social capital (**Knapik**; **Kowalska**, 2011).

Some researchers identify what is called the objectified social capital consisting of cultural goods such as paintings, sculptures, instruments, books and other (**Bourdieu**, 2004). Thus, access to this particular form of capital will also determine the personal development of an individual. Libraries, especially school and public libraries, are obliged to provide objectified cultural capital to individuals who do not have sufficient resources of that capital within their private networks (i.e. family, acquaintances, etc.). Accordingly, school libraries are obliged to provide children with access to books, especially if children's families do not have adequate resources or are unwilling to encourage children to use public libraries (a child does not go to public libraries).

3. Social capital *vs.* educational processes

It seems that all types of libraries are capable of building social capital. The best prepared to do this appear to be public libraries that offer not only cultural but also social and inclusion programmes to develop the cultural and social competencies of the local community. According to Nancy Kranich, university libraries may strengthen student citizenship skills by promoting collaborative partnership between campuses and communities as well as assist with integrating public and community engagement into teaching and research. School librarians, apart from providing pupils with the books they need for school, may develop the portfolio of activities offered by the library, e.g. by participating in civic educational programmes that help pupils understand the rights and responsibilities of citizenship (**Kranich**, 2001). School libraries may do much more than just teach to read –they may also show pupils how to use cultural institutions (organise trips to other libraries and other cultural or educational institutions, such as: museums, exhibitions, theatres, cinemas) and participate in cultural and social life–; they may work with pupils individually –talk to them about the book as a cultural asset– or through group projects that focus on social needs and promote inclusion, support and acceptance as values that are important in the life of every educated person.

It is worth noting that civic education should begin in the early years of schooling and instead of being limited to theoretical book knowledge, it should be founded on real civic engagement, i.e. practical activities performed in collaboration with members of the civil society. One of the studies on the social capital of schools used civic engagement (i.e. responsibility sharing, collaboration and education in school practice) as an indicator of student engagement (**Dudzikowa** *et al.*, 2011). Unfortunately, in some countries and communities, schools do not cooperate with non-governmental organizations, cultural centres or libraries and, consequently, young citizens only learn theoretical knowledge (**Pazderski**, 2014).

Although the development of social capital depends on many different factors, it can certainly be stimulated through educational processes. The school and school library are a part of the local community, and the form and quality of their work are to some extent influenced by the local community. Schooling may also be used as a tool to develop human capital –build competencies, skills and knowledge that will determine the educational and professional future of students. In analyses involving the educational process, social capital is defined as social resources and networks that help individual people to promote achievement and attain desirable educational ends (**Hemmings**, 2007).

Pupils' performance at school is certainly affected by a number of factors, some of which can be identified as components of the social capital of the local community and family. These include, among other things, the quality of the school, the family model, parents' engagement in their child's education, relationships within the family, the quality and nature of contacts between parents and children, the quality of contacts with relatives and the support they offer to adolescents, the level of control over a child (including social control), a network of social contacts, membership in organisations, religious practices and the quality of the neighbourhood (**Mikiewicz**, 2014). According to recent research, development of social capital in schools may be significantly influenced by the attitude of leaders –school principals who contribute to its development through innovation, attention to the quality of teaching and strong leadership (**Birasnav**; **Gantasala**; **Gantasala**, 2022; **Parlar**; **Polatcan**; **Cansoy**, 2020). Also, there is currently a tendency to explore the impact of gender on the flow of cultural and social capital in schools, due to the fact that the teacher profession is female-dominated (**Grinshtain**; **Addi-Raccah**, 2020).

Conditions are conducive to development when the local community (specifically, the parents) feel responsible for the education and cultural development of children and the school and local cultural institutions offer high-quality cultural education. There must be mutual interest in educational success for the development to proceed. Good models and thorough knowledge taught at school may be undermined by the negative influence of the family, whereas good habits learned at home may erode at school, if the school is poorly organised and unprepared for its educational and didactic role. Thus, it is important that local communities focus on education and recognise the role of cultural education, making a good use of the possibilities offered by cultural institutions, including libraries (**Wojciechowska**, 2019).

Numerous studies on social capital are based on the educational community, understood as one of the fundamental social subsystems. In general, education is identified with upbringing and means all the various processes through which an individual acquires new skills and competencies and develops his or her attitudes and values. The goal of education is to prepare a person to take a certain place in the social structure that employs social capital resources. It has been proven that school performance is affected not only by a student's intelligence and individual work but also by a number of other factors, such as: the choice of school, the school's curriculum, the values and attitudes of teachers as well as the student's social background (the higher the social class, the more engagement in the educational process), parents' assistance and other issues, such as the school's budget, location and impact of its neighbourhood. Thus, it should be assumed that successes are attributable not only to students themselves but also to their educational and social background. Students relationships with the school, family and friends constitute an important link in the process. With them, students may make a better or worse use of the potential offered by school and its neighbourhood (**Bartkowski**, 2007). In integrated communities with strong bonds children and adolescents more often receive financial and cultural support from the family and relatives, which is important for successful education and development. At the same time, young people whose communities have weaker bonds and do not provide such support have fewer chances to achieve educational success. Thus, social capital increases students' chances to finish a school and continue learning. It should be noted that education is considered to be one of the most important factors for the development of social capital (**Mikiewicz**, 2014) and school libraries may significantly contribute to education.

> There are two major sources of the social capital of students: the family and the school. Thus, social capital is sometimes regarded as a family resource (it may even be called the social capital of a family), and the resources that the parents/family have (their social position, information to which they have access and financial and physical resources) may be used to the advantage of children

Robert Putnam, the American political scholar and social capital researcher, noted that countries, regions, local communities and families with a higher educational level are more willing to trust and collaborate with others, as a result of which they participate in various forms of activity, such as local sports clubs, cultural centres, libraries and schools (**Putnam**, 2001; **Helliwell**; **Putnam**, 2007). Thus, communities with higher educational levels more often engage in projects that support the schools or libraries of their children. These projects, which include both material aid (renovation of premises, purchasing equipment, furniture and devices for children) and help in the activities offered by the school (extracurricular activities, extra library services, etc.), engage the social capital resources of parents. These resources may be professional or private contacts, civic skills, recruitment of volunteers and sponsors, social support or establishment of cooperation with various partners, e.g. to help equip the school library or prepare more cultural activities. Thus, the educational process (involving the school and school library) is better in communities that are more active and have more social capital resources, which they can use to contribute to the school or school library, or a local public library (**Wojciechowska**, 2019). Putnam wrote (in the context of American communities) that states where residents trust each other, participate in organisation, volunteer, vote and maintain informal relationships with friends –are the same states where children flourish: where babies are born healthy, teenagers tend not to be parents, nor drop out of school nor get involved in violent crime or die prematurely due to suicide or homicide. In states that score high on social capital, children perform much better at school than in states with a lower degree of civic involvement (**Putnam**, 2001). Putnam's studies showed that social capital resources (especially informal social capital like private relationships and contacts more than formal social capital like participation in associations and organisation or performance of pro-social public functions, etc.) affect children's education more than the educational level, race, affluence or completeness of the family, which made him conclude that relationships and an atmosphere of community (that either encourages or discourages from learning) play a much more important role than individual factors, i.e. private resources or efforts (**Putnam**, 2001).

> Parents and the school teach and show how to use resources and how to build one's own social capital

Based on Putnam's research, the following four elements contributing to the quality of children's lives were identified:

1. Family social capital –the intellectual potential of parents or carers in a household;

2. Family financial capital –the total income in a household that a family can invest in the quality of life of its members;

3. Internal social capital/social capital in the family –the relationships and interactions between parents (and other adults in a household) and children; what the family thinks about the desired educational achievements of children and their overall well-being;

4. External social capital/social capital in the community –social support networks, collective standards regarding local institutions and social infrastructure, civic engagement in the community, which together enable coordination and cooperation for mutual benefits (**Mikiewicz**, 2014).

It should be noted that all the capital categories listed by Mikiewicz may involve the book and the library as a factor of social and cultural development. Family social capital, meaning the intellectual potential of parents, is to some extent determined by their past contacts with books and libraries, by their reading habits and level of cultural participation. Meanwhile, family financial capital sets an economic framework for cultural and educational activity in the broad meaning of the term, including purchasing books and buying tickets for cultural and educational events. Internal social capital is linked with relationships in the family, including the carers' expectations of school results as well as readership education and cultural development of children. This means that some parents and carers will try to stimulate the readership activity of children and engage their contacts with the book or even with the library. The last category –external social capital– means the capital of a given community, e.g. the local community, which may choose certain models of upbringing and contact with culture over others, focusing on the development of local institutions such as, for example, public and school libraries (**Wojciechowska**, 2019).

4. Nature of social capital in schools and families

There are two major sources of the social capital of students: the family and the school. Thus, social capital is sometimes regarded as a family resource (it may even be called the social capital of a family), and the resources that the parents/family have (their social position, information to which they have access and financial and physical resources) may be used to the advantage of children. Parents and the school teach and show how to use resources and how to build one's own social capital. In general, there are three types of assistance, that school libraries, engaged in the educational activity of schools, may also offer. These three types of assistance are:

- Financial assistance –money spent on the education and upbringing of a child (this may include, among other things, money spent on buying books);
- Physical assistance –time spent with a child, providing a child with his or her own space to learn (this may include time spent on learning to read, going to the library together and attending educational events organised by the library);
- Assistance in public space –collecting information on the child's future teacher, using one's contacts to enrol a child with a selected teacher, helping the teacher, helping in the classroom, at the school or school library, collecting information on the quality of the school library and ensuring child's participation in extracurricular activities offered by the library (**Nyczaj-Drąg**, 2009).

However, educated and gifted parents and access to a relevant, extensive infrastructure and physical resources are not enough for a child to develop effectively. Physical presence at home is needed as well as a strong emotional bond with a child and time spent by an adult to pass his or her knowledge and wisdom on the child and to awaken interests and passions in the child. Adults who, despite having broad knowledge and thorough education, spend little time with children have less impact on their education and professional achievements. James Coleman, the American researcher on the sociology of education and social policies, describes this phenomenon as structural deficiency in family social capital (**Coleman**, 1988). Mark Smith, Lionel Beaulieu and Glenn Israel examined school dropout rates among students from families with low social capital. They determined that in families with a high level of social capital (i.e. where children receive the care and attention of adults, have few siblings and live constantly in one place, which means a network of friends and good neighbours, etc.), the school dropout rate is 2.6%, whereas in families with low social capital, the rate grows alarmingly to 47.7% (**Smith**; **Beaulieu**; **Israel**, 1992).

Not only family social capital but also school social capital is crucial, because a student's social relations are not limited to his or her bonds with the family. Thus, a student's relations with teacher(s) and with other students and the parents' relations with the school may prove very important, and the quality of those relations may vary. It may happen, for example, that students form enclosed, hermeneutic groups in the educational space, where they propagate negative models and behaviour, e.g. aggression, disregard of school duties or substance abuse.

School social capital also includes school's relations with universities, employers offering on-the-job training, etc., which help pupils decide on the choice of university, give expert insight into the areas of interest for pupils and advise them on possible career or university paths. Some school and academic libraries offer study and career counselling.

Studies show that both capital types –school social capital and family social capital– are vital for educational success, though family capital may be more important (**Mikiewicz**, 2014). The indicators listed in Table 1 are applied to examine both types of capital. It should be noted that one of those indicators is students' participation in extracurricular activities in school libraries.

Table 1. Indicators to analyse family and school social capital

Family social capital	School social capital
- How much do parents trust their children? - Do parents talk to their children about school curricula? - Do parents talk to their children about school (extracurricular) activities? - Do parents talk to their children about schoolwork and homework? - Do parents check their children's homework? - Do parents attend school meetings? - Do parents attend school events?	- Do children participate in extracurricular activities (sports clubs, hobby clubs, library activities, etc.)? - How often does the school contact parents? - Is there a team spirit among teachers? - Do teachers get on well with the school's administrative authorities? - Do teachers provide for the individual needs of their students (based on information from parents)? - What is the quality of the school environment (atmosphere at school –based on information collected from students regarding a sense of safety, aggression, absenteeism, etc.)?

Source: based on **Mikiewicz** (2014). *Kapitał społeczny i edukacja*, pp. 213-214).

Researchers identify three basic categories of relations and social capital in education: relations in the family and parents' expectations, relations between parents and the school, and relations and atmosphere at school, which includes school values, norms and culture (**Mikiewicz**, 2014). School libraries, being part of educational institutions, participate mainly in the relations at school, promoting the values of readership culture, although they may also be to a limited extent responsible for the relations between parents and the school. This concerns in particular contacts with the families of the youngest pupils who need the family's and library's help learning to read and improving their reading skills. Here,

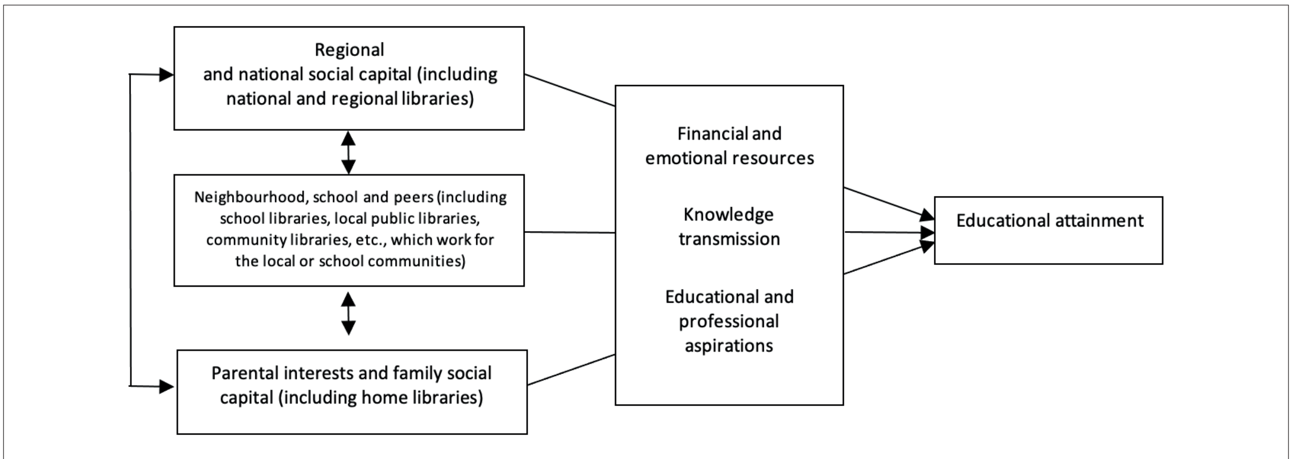


Figure 1. A model of the impact of social capital on educational attainment taking into account the role of libraries

libraries can act as active culture animators, provided they have adequate infrastructure, resources and personnel, and that the personnel have the right attitudes and knowledge (**Wojciechowska**, 2019). Also, school libraries may play an important role in the development of gifted students who wish to broaden their knowledge as well as pupils with special educational needs who require additional support.

In the context of education, social capital may be examined and analysed on a number of levels: on the micro level, which means the level of individual achievements (individuals may improve their educational performance e.g. by using library resources); the meso level –related to the achievements of the local community and respective schools (including school libraries and community libraries that offer educational programmes, e.g. school readership contests that help improve pupils' performance in reading comprehension tests); and the macro level, which reflects the achievements of the entire society (to which various library networks also contribute through their educational and training projects). David Halpern proposed a model of the impact of social capital on educational achievements in consideration of these three levels. Figure 1 presents that model, taking into account the role of school libraries in the impact process (**Halpern**, 2005).

5. Goal and methodology of the research

Many studies on social capital in education are based on Nan Lin's network theory, according to which social capital consists of various resources that an individual can access through a network of contacts (**Lin**, 2001). These studies analyse social capital quantitatively. They trace connections within a network that enable access to resources which are valuable in educational processes. Thus, what is examined is the size and density of the network rather than the processes within it. The basic question in such analyses is *how many?* (e.g. how many friends, how many acquaintances, how many family members, how many teachers, how many pupils in a group?). The survey presented in this paper is also based on the assumption that an extensive network of social contacts is a source of multiple benefits for its members. The analysis focused on the following four areas:

1) The individual social capital of school librarians;

2) The social activity of school librarians;

3) The civic engagement of school librarians;

4) The attitude to life (including the number of acquaintances in a social network) of school librarians.

In order to analyse social behaviours and attitudes in the professional group of librarians, a study on social capital in libraries was launched in 2018 (**Wojciechowska**, 2020; 2021a; 2021c; 2021d; **Wojciechowska**; **Topolska**, 2021; **Wojciechowska**, 2022). The first part of the study was conducted among the personnel of all types of libraries in 20 countries across the world. An electronic survey was sent to librarians in: Australia, Austria, Belgium, Belarus, Canada, Czechia, Denmark, France, Germany, Hungary, Ireland, New Zealand, Poland, Russia, Slovakia, Sweden, Switzerland, Ukraine, the UK and the USA. In the first part of the study, the total of 6,593 respondents from all types of libraries sent their feedback in 2018 and 2019. Next, a subgroup of school librarians was set apart from the rest of the respondents (university libraries were not included in this analysis). Accordingly, the analysis presented in this paper is a part of a larger study on the individual social capital (ISC) and attitudes of librarians. That study is scheduled to be completed in 2022. The main purpose of the analysis was to answer the following questions:

- What is the individual social capital level of school librarians?
- What is the social activity of school librarians like?
- What is the civic engagement of school librarians like?
- What are the life attitudes of school librarians?
- Are the attitudes and individual social capital levels in this group significantly different than those of other librarian groups?

The statistical data presented in this paper based on the study results concern a group of 447 of school librarians. Most members of this group were women –more than 97% of the study population (n=436; 97.5%). Most respondents declared to be over 50 years old (n=217; 48.6%) or 31-50 years old (n=215; 48.1%). Only 15 respondents, i.e. 3.4%, were 30 years or younger. The level of individual social capital was determined using the resource generator –the standardised *Questionnaire for the Measurement of Individual Social Capital* (*KPIKS*), developed by the Polish psychologist Rafał Styła (**Styła**, 2009), based on a tool prepared by Martin van der Gaag and Tom Snijders –the Dutch researchers of individual social capital (**Van-der-Gaag**; **Snijders**, 2004; 2005). Next, the other indicators were examined, i.e. social activity, civic engagement and attitudes to life of school librarians. These indicators are presented in descriptive statistics with discriminatory power (Table 2). Discriminatory power determines the significance of responses in the construct of all the answers given by the respondents. In other words, it measures coherence of the results. This value is the factor loading used in the evaluation of variable structures in the main component analysis (**Topolski**, 2020a; 2020b). The paper also presents descriptive sta-

> Efficient school libraries and public libraries are important in a successful educational and didactic system, as they stimulate the development of children and youth

tistics with a test for two and multiple * structure indicators (Table 3). The level of significance $p<0.05$ means that a given answer is statistically significant and dominant compared to the other answers. The model was verified using the five-fold cross-validation method and the resulting significances are a mean value for the respective data folds.

The challenges encountered during the research were caused by major cultural, political and organizational differences in the backgrounds of respective respondents. For example, in Belarus it was impossible to discuss civic engagement and the questions asked there only involved the social capital level of local librarians. Also, the respective countries have different norms and customs regarding social activity, e.g. making donations. However, it is impossible to eliminate such difficulties from a research that is conducted in so many countries.

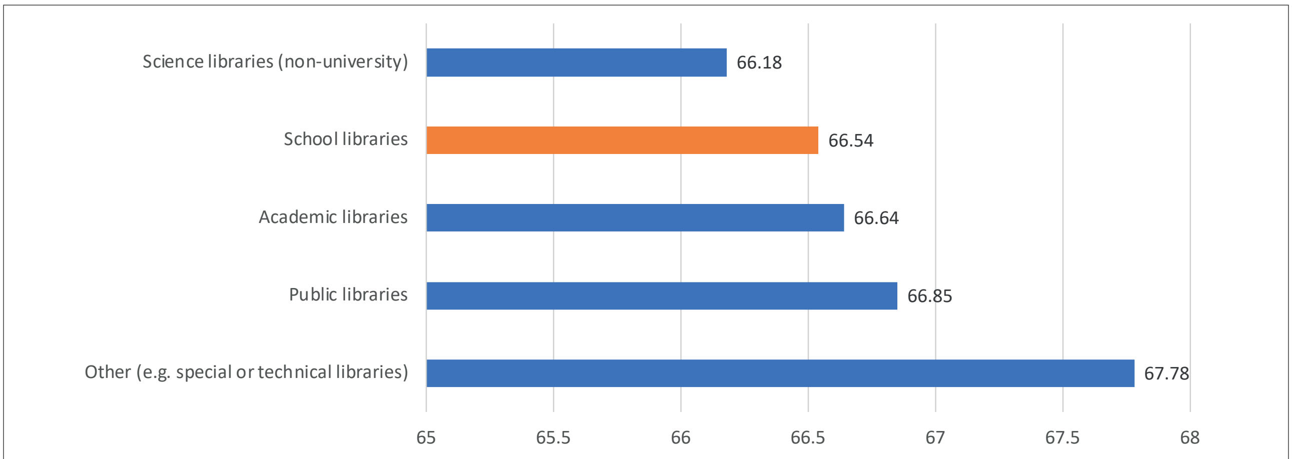
6. Results of the survey

The survey results are presented in descriptive statistics with discriminatory power in Table 2. As has already been noted, discriminatory power determines the significance of responses in the construct of all the answers given by the respondents. The strongest variable with the most discriminatory power was individual social capital, which reached the level of 66.54 (Table 2). In the *KPIKS* scale, it is an average level and at the same time one of the lowest scores in the professional group of librarians. Only librarians working in science libraries have lower social capital, which is not surprising given the fact that those libraries usually have a narrow group of professional users and their most important task is to provide expert information rather than engage in programmes and social relations. Meanwhile, the fact that school librarians have a low level of social capital (compared to other librarians) is alarming, because it suggests limited social activity, although it is particularly desirable for professionals working with children and youth.

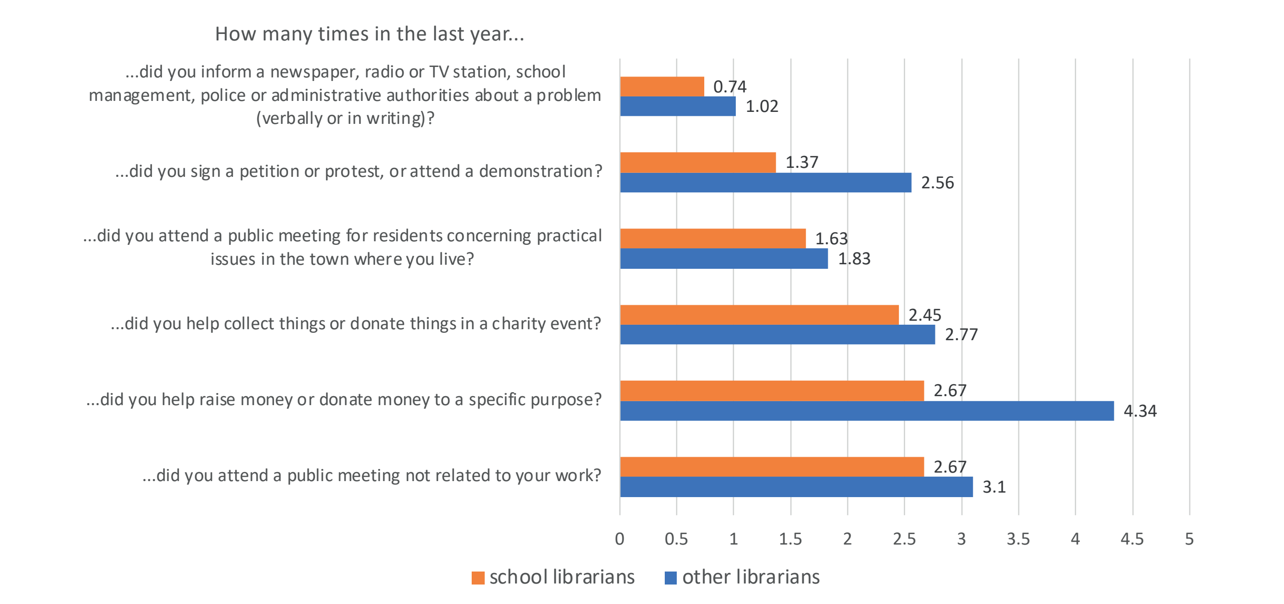
Table 2. Descriptive statistics with discriminatory power of properties

	Mean	Standard deviation	Median	Discriminatory power
Individual social capital level	66.54	10.62	69.00	0.783
Are there persons actively engaged in social work in your library? Specify the number of such persons	3.38	11.05	1.00	0.677
How many times in the last year did you attend a public meeting for residents concerning practical issues in the place where you live?	1.63	2.69	1.00	0.598
How many times in the last year did you attend a public meeting not related to your work?	2.67	6.82	1.00	0.687
How many times in the last year did you sign a petition or protest, or attend a demonstration?	1.37	5.47	0.00	0.569
How many times in the last year did you inform a newspaper, radio or TV station, school management, police or other authorities about a problem (verbally or in writing)?	0.74	1.96	0.00	0.576
How many times in the last year did you help raise money or donate money to a specific purpose?	2.67	4.44	2.00	0.711
How many times in the last year did you help collect things or donate things in a charity event?	2.45	3.77	2.00	0.732

Another important factor that was analysed was the social activity and civic engagement of school librarians, which involve openness to social dialogue, collaboration and compromise. Professionals should promote social activity of pupils and help them become conscious citizens willing to contribute to their community and ready to make decisions that will



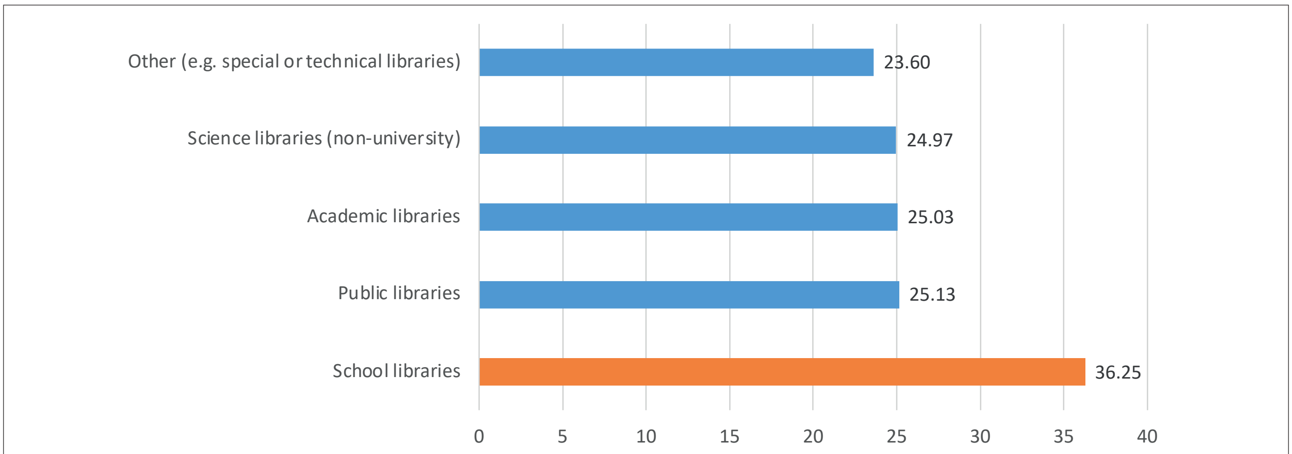
Graph 1. Individual social capital of school librarians compared to the personnel of other libraries



Graph 2. The social activity and civic engagement of school librarians

influence the community's future and development. Only professionals who are socially active and civically engaged and experienced in participating in and implementing social and civic programmes can pass on to their students the right values, experiences and knowledge, which the students will use as a foundation for their adult decisions. Graph 3 presents a chart of variables in a specific hierarchy based on mean values, relating to social activity and civic engagement of school librarians. According to the survey results, school librarians are less socially active and civically engaged than the other groups of librarians. This finding is alarming and should be analysed in more depth, given the fact that school librarians (alongside with the family and teachers) are responsible for developing children's interest in literature, culture and their neighbourhood at the time when their character, attitudes and interests form.

The data presented in Table 3 enable further analysis. It is very important that librarians are aware of what influence they can have on the local community. Without such awareness, people often resign from various projects or initiatives. School librarians believe their influence on the life of the local community to be average (according to 41.6% respondents), and this belief is shared by the personnel of most of the other types of libraries. Importantly, however, school librarians more often assess their influence as high (on average, by 3% more often compared to the entire population), suggesting that they are likely to get engaged in school and local community projects. By way of comparison, a vast majority of school librarians (88.8%) volunteered for their community, church, district, village or town, which is ca. 8% more than the result scored by the personnel of the other types of libraries. School librarians also had much bigger social networks, measured by the number of acquaintances. On average, school librarians had a network of 36 persons, compared to 25 persons for the personnel of public libraries and only 23 for the personnel of special libraries (Graph 3). However, this result requires explaining, because a very large number of acquaintances may mean that relationships are more superficial (Wojciechowska, 2021b). Thus, the best are medium networks that, on the one hand, ensure access to resources and, on the other hand, provide an individual with emotional support.



Graph 3. The size of the individual social network of school librarians

Table 3. Descriptive statistics for categorical variables with variance test

Question		n	%	TWS
Have you ever volunteered for your community, church, district, village or town, or have you ever done social work for the needy?	Yes	397	88.8%	p=0.0021
	No	50	11.2%	
Did you work as a volunteer over the last five years?	Yes	212	47.4%	p=0.243*
	No	235	52.6%	
What do you think is the impact of people like you on the life of the local community?	Major	117	26.2%	p=0.012
	Average/not much	186	41.6%	
	Minor	111	24.8%	
	None	33	7.4%	
Do you agree that "Most people can be trusted"?	Yes	206	46.1%	p=0.254*
	No	241	53.9%	
Is the library an institution that can be trusted?	Yes	428	95.7%	p<0.001
	No	19	4.3%	
Do you agree with the statement: "I can trust most of my colleagues at work"?	Yes	241	53.9%	p=0.254
	No	206	46.1%	
Do you agree with the statement: "I can trust my boss"?	Yes	275	61.7%	p=0.023
	No	171	38.3%	
Do you think libraries should be more active in establishing relations with their users in the Internet, second life, Internet forums, blogs, etc.?	Yes	297	66.4%	p=0.012
	No	150	33.6%	
Choose the statement that you agree with the most.	In order to develop, the library needs coordinated activity of the governing authorities, managers and employees	377	84.3%	p=0.0025
	Library development is dependent on the decisions of the managers and governing authorities	70	15.7%	
Would you agree to have your salary reduced in order to:	Save the library from decline	42	9.4%	p=0.041*
	Avoid layoffs in the library	67	15.0%	
	Give a chance for employment to a person in serious need	180	40.3%	
	I would agree under a different condition	55	12.3%	
	I would not agree under any conditions	103	23.0%	
The appearance of the library and its immediate surroundings is the responsibility of:	The management	17	3.8%	p=0.018
	The management and employees	125	28.0%	
	The management, employees and patrons	305	68.2%	
Do the mangers of your library promote pro-social activities?	Yes, they believe them to be an element of the library mission	175	39.1%	p=0.019
	Yes, provided they do not affect the basic library services and the librarians do not neglect their work	227	50.8%	
	No, they try to avoid such projects, which are time and money consuming	45	10.1%	
Do you know a librarian who volunteers for the community, church, district, village or town, or does social work for the needy?	Yes	199	44.5%	p=0.089
	No	248	55.5%	
What is important for you in your life?	Be someone or with someone who is popular and admired	5	1.1%	p=0.041*
	Be able to do only what I want to do	202	45.2%	
	Be professionally successful	151	33.8%	
	Be financially successful	136	30.4%	
	Always have friends	177	39.6%	
	Have a loving family	359	80.3%	
	Help the needy	73	16.3%	
	Look good and attractive	21	4.7%	

TWS = test for two structure indicators; * TWS = test for multiple structure indicators.

School librarians, the same as other librarians, believe that libraries can be trusted (95.7%); they also trust their bosses (61.7%; p=0.023), though somewhat less than the personnel of the other types of libraries. It should be noted that trust is indispensable for social capital to accumulate in a given community.

As regards outside collaboration, some librarians noted that libraries should intensify their relationships with patrons in the Internet, second life, Internet forums, blogs, etc. This was the opinion of 66.4% of school librarians, while the score for the entire population was 73.5%. This is an interesting issue, because school librarians have contact with adolescents who spend a lot of time in the virtual world and expect institutions and services to be available online. Perhaps school librarians are aware of the excessive use of those media by children and youth and are reluctant to digitise libraries so as not to replace traditional contacts with readers, especially the inexperienced ones, with remote contacts. This problem will certainly be subject to many studies and analyses, especially in the context of social alienation caused by the COVID-19 pandemic, which is particularly destructive to the social contacts and emotional health of children and youth.

Also, more than 84.3% of school librarians agreed that "in order to develop, the library needs coordinated activity of the governing authorities, managers and employees" and that the appearance of the library and its surroundings is the responsibility of the managers, employees and users (68.2%). It is an interesting area of research and worth exploring. It would be informative to ask adolescents whether they feel responsible for the interior of the library, do they take care of it and does the local community support the school and the library. Community engagement in the development of local institutions and care for their condition are a manifestation of social capital; local institutions are treated as a common good that benefits the entire community.

Another area of analysis were the attitudes of school librarians to life, which were slightly different from those of other librarians. What matters the most for school librarians in life is: to have a loving family (80.3%) and to able to do only what one wants to do (45.2%). Meanwhile, for other librarians, the most important thing in life, apart from a loving family, are friends and helping people in need. Thus, school librarians seem to be less engaged in volunteering, though more than half of them stated that their managers promote pro-social activities, provided they do not affect the basic library services and the librarians do not neglect their work.

7. Conclusion

Efficient school libraries and public libraries are certainly important in a successful educational and didactic system, as they stimulate the development of children and youth. Such libraries constitute an element of social capital and they help achieve better educational results, translating to individual well-being and the development of local communities and even entire regions. In order for libraries to be a source of such support, their role needs to be acknowledged and they need investment. Social capital must be fostered to yield good results, because, if left unattended, it quickly deteriorates.

Libraries (and other cultural institutions, such as cultural centres or day clubs) come second after schools as the main providers of informal education in many countries, meaning that they already participate in the educational process, which is substantial in the formation of social capital. Thus, their didactic impact on the local community should be examined, which includes the impact on the user's ability to broaden his or her knowledge, engage in lifelong learning and develop information skills (**Głowacka**, 2009). Even though such studies are not popular yet and pose certain methodological challenges, it should be noted that there already are some studies on the impact of social capital in education on reading comprehension. These include, for example, studies conducted by William Carbonaro (**Carbonaro**, 1998), Yongin Sun (**Sun**, 1998) or Suet-Ling Pong (**Pong**, 1998). Various libraries (school, public, academic libraries) may also significantly contribute to the development of social capital of children and youth by promoting norms and desired behaviours and attitudes that are important for group integration, cohesion and cultural capital, determining the possibilities for social advancement, professional position and personal development.

As the survey presented in this paper shows, school librarians have an average level of individual social capital and lower social activity and civic engagement than other librarians, but they are somewhat more experienced in working with the local community. Their main focus is family life, but it is also important for them to be able to do what they want to do. Close friends are less important and they have more acquaintances, which means their relationships are somewhat superficial. Unfortunately, school librarians tend to trust other people less than their counterparts in other libraries. It may be concluded that school libraries have a lover level of social capital and other related attributes (trust, social activity, civic engagement, etc.) than other types of libraries. Accordingly, future studies should focus on exploring the reasons behind this problem. Unfortunately, it is often forgotten that school libraries have a major impact on the choices and attitudes of young people. They foster reading habits in children and youth and teach them how to use knowledge bases and develop their passions throughout their education. The poor condition of school libraries in many countries, and in particular lack of funding, outdated equipment and insufficient book collections mean that their role is still disregarded. It is also forgotten that public libraries are not able to bridge the gaps and do the job of school libraries.

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Knowing how to share and to protect oneself: key factors on digital cybercritical education for children

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Abstract

Children live together consuming, producing, and sharing digital content. These are hypermediated communication actions typical of cyberculture, and require training in critical thinking that, even when minors receive it, is not always perceived as necessary, which can put the privacy of children at risk. This study focuses on analyzing the cyber skills of primary and high school students to act critically, and examines the level of conceptual, attitudinal, and procedural competence that children perceive they have acquired to access, consume, create, and share digital content on social media. The specific objective is to understand some of the components that may be related to young people's perception of the training they have received, as well as whether there are differences in terms of their willingness to acquire training to protect themselves when creating and consuming digital content. To this end, a 25-item questionnaire on the knowledge, attitudes, and actions of young people was designed, validated, and administered to a sample of 417 Spanish students completing primary and high school education. The results obtained indicate that, at the conceptual level, there are no differences between the educational stages, while differences were found at the attitudinal and procedural levels. The two factors identified show that, although high school students have acquired certain critical and protective attitudes, they behave more riskily in their self-presentation and posts than primary school students when accessing, creating, and sharing digital content on social media, and that the training received and the willingness to learn about how to create and share were the differentiating variables for increased protection. We conclude that there is a need for introducing education specific to the critical analysis and self-protection of Internet use at the primary education level, as well as additional training that would help to avoid risky behavior during high school.

Keywords

Internet; Minors; Adolescents; Cyber critical education; Protection; Cyber communication; Digital content; Skills; Protective abilities; Primary education; Secondary education; Training.

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1. Introduction

Different forms of hypermediated cyber-communication are recreating new cultural behaviors among different social audiences (**Saavedra-Llamas**; **Papí-Gálvez**; **Perlado-Lamo-de-Espinosa**, 2020). In this context, cybercommunication can be understood as a process of mediatized information exchange that takes place mainly through two channels: the Internet in general and social media in particular. Moreover, these exchanges arise within the context of so-called cyberculture that develops through different practices and interactions within mass media and the Internet. This in turn creates a network in which citizens live together and participate by consuming and producing audiovisual content from an increasingly younger age (**Garmendia-Larrañaga** *et al.*, 2016); *OCDE*, 2017; **Rodríguez**; **Ballesteros**, 2019; **Gutiérrez-Lozano**; **Cuartero**, 2022; *Eurostat*, 2022). In Spain, in particular, access to and consumption of digital content occurs increasingly early (**Azurmendi**, 2018), usually before the age of 8 years (**Núñez-Gómez** *et al.*, 2021), becoming intensified among the Spanish population over the age of 16, who are frequent consumers of social media (**Sánchez**; **López**, 2020; *Ontsi*, 2021).

Not only is content massively consumed, but its production is also on the increase owing to the exponential use of social media among other factors. This expected cultural activity implies two basic behaviors: consuming and creating content in different formats, constantly and often fleetingly. These are behaviors that, although they have become normalized and widespread among different generations and different platforms or networks, present users with certain challenges that require training in a set of educational communication skills, training that the European Union is promoting through a sustainable and effective adaptation policy initiative for all countries through the *Digital Education Action Plan* (2021-2027). Among all the skills that should be prioritized, at least concerning consumption, are those that enable users to make critical consumption, whereas, on the behavioral side of creating and sharing, the skills that enable users to know how to produce content based on the values of respect, security, and protection of privacy are the most important (**Pérez-Tornero**, 2017; **Caldeiro-Pedreira** *et al.*, 2021). These two challenges are also the focus of the various digital citizenship plans that are being implemented at both the European and national levels (*DigComp Project*, *European Commission*; the *Krumsvik model*, Norway; the *TPACK model*, USA; the *JISC model*, UK; the *ISTE Standards*, USA; and the *P21 model*, USA).

Progress in the acquisition of these skills is being encouraged through training specific to digital competence, in the context of schools, both for children and for trainee and in-service teachers. (**García-Ruiz**; **Gozálvez**; **Aguaded**, 2014; **Martínez-Sanz** *et al.*, 2016, **Pérez-Escoda**; **García-Ruiz**; **Aguaded**, 2019; **Domingo-Coscollola** *et al.*, 2019; **Torres** *et al.*, 2022). However, this training is not carried out homogeneously across different localities and educational centers, which may have very different digital needs and demands. Also, the assessment of the skills acquired by children is quite dissimilar. Consequently, there is a need for research that addresses the effectiveness of the training received by students to face different challenges and to ascertain, as this study aims to do, whether acquiring digital competence takes place at different educational levels. Additionally, it is necessary to know if competence progresses favorably between the stages of primary and secondary education and whether certain training in critical thinking and self-protection needs to be reinforced.

2. The need for school-based prevention in the face of digital risks

Citizens in general, and specifically younger age groups, are surrounded by technological devices (*Deloitte*, 2021), which does not necessarily imply they know how to coexist with or critically use such tools. Individuals are exposed to a huge amount of information in different formats in which interaction is essential as part of cyberculture. People access, consume and transmit information, but at the same time shape their moral personalities and their individual and social identities. By participating, they identify themselves with a

> "space of interaction that allows them to discuss topics involving content that favors a connection with other subjects" [translation] (**Astorga-Aguilar**; **Smith-Fonseca**, 2019, p. 5).

Far from being conceived as moral techno-panic or an exaggeration of the dangers (**Marwick**, 2008), it is assumed that cyberculture ultimately shapes certain behaviors associated with creating and publishing private information, which can be expropriated and exploited (**Fuchs**, 2011) without being perceived as potentially dangerous by the users of such digital spaces, especially in the case of minors. Much of the literature on the use and participation of minors in online activities has referred to the recreation of user empowerment through actions of freedom and the capacity for decision-making (**Ito**, 2013; **Boyd**,

> This study focuses on analyzing the training of primary and high school students for critical Internet usage in terms of their perceived levels of conceptual, attitudinal, and procedural digital competence in accessing, consuming, creating, and sharing content on social media

2014; **Gillespie**, 2018). These skills are not assumed to be acquired by children, generating a pathologization and an excessive perception of vulnerability, which effectively polarizes the discourse towards risks. This effect is already beginning to be perceived by the children themselves when they are trained in digital skills (**De-Leyn** *et al.*, 2022). In this sense, digital literacy must move away from risk-based reductionisms and solution-based approaches to managing screen time (**Forsler**; **Guyard**, 2020). Therefore, **Biesta** (2017) claims that young people develop their ability to make judgments, but also to be critical, and calls for an education that responds to these parameters so that they can understand, comprehend, and act consciously and responsibly in different contexts in which they live.

In this regard, studies have confirmed that, while creative (**Kupers** *et al.*, 2019), children are also impulsive or compulsive and not particularly reflective about their digital outputs (**Varona-Fernández**; **Hermosa-Peña**, 2020; **Martínez-Sanz**; **Arribas-Urrutia**, 2021; **Varchetta** *et al.*, 2020). At times, they do not know how to access the information they need or access content that is unwanted, illegal, or has an emotional impact because they are still in a stage of development (**Arab**; **Díaz**, 2015; *Informe Unicef*, 2021; **Raposo-Rivas** *et al.*, 2021; **Casillas**; **Cabezas**; **García-Valcárcel**, 2022). In this sense, both minors and young people are aware of some anti-values (also known as counter-values, as they are the opposite of the values shared or agreed upon by a community, **Buxarrais**, 2014) present when they use, share, and disseminate digital content. However, not all young people can perceive these values, and, later on, take more risks than others when consuming this type of content (**Caldeiro-Pedreira** *et al.*, 2021). All of these potential risks put children in a situation of sharing, in an unprotected way, their data with others because they lose their privacy by losing control over the diffusion of their personal life on social media. Therefore, it becomes necessary for children and young people to acquire an active and critical role online and to be able to not only receive information but also create and share it by acquiring the skills that alert them to the risks they are taking when carrying out certain activities associated, for example, with the use of photos, names and real locations on social networks (**Hernández-Serrano** *et al.*, 2021; **Jones** *et al*., 2022). Nonetheless, there is a need for appropriate training in the critical use of the Internet and social media (**Braman**, 2006; **Vargas**, 2018) that calls for transformative literacy and education that makes young people critically aware of the exploitation of cultural behaviors of exhibition and exposure of private data. Young people should be empowered from an early age to be able to interact ethically, detecting misuse or counter-values that may place them in contexts of personal and social risk (**Pérez-Tornero**, 2017; **Díaz-Arce**; **Loyola-Illescas**, 2021).

3. Training in digital competence, from teacher to students

Digital literacy has received much attention and is a concern of various educational bodies and policies. Although it is a general priority, it is a specific one for the teaching staff in charge of training minors in the effective use of technologies and the prevention of digital risks. In Spain, the *Common Framework for Digital Competence in Teaching* (*Intef*, 2017) responds to the objective of achieving an adequate integration of the use of digital technology in teaching, Integrating technology as an end, but also as a means, through which students acquire digital skills. The framework has its origin in the *DigComp Report* (**Ferrari**, 2013) which condenses a set of competencies grouped into five areas, plus a sixth one that is later developed, dedicated to the acquisition of student competencies (*DigCompEdu* [2019]) and which has been recently revised (*European Commission*, 2022) and updated to be more in line with the needs derived from socio-digital developments. The framework divides the development of the competencies into knowledge, skills, and attitudes that favor the relationship with technology in a reliable, critical, and safe way. It follows the guidelines for digital accessibility and the creation of accessible resources and also includes, as a novelty compared to previous versions, examples referring to emerging technologies and systems driven by artificial intelligence.

Among these updates and priorities is the need to develop attitudes, knowledge, and skills for creative and critical reflection. This objective corresponds to the educator, but more specifically to the media and digital training professional, under the umbrella of the discipline that arose through the symbiosis of education and communication for carrying out training in critical, creative, and reflective expression and consumption of media and digital platforms. In this sense, media education (educommunication) refers to the continuous process of teaching and learning, from a perspective that allows

> "identifying barriers to overcome and potentialities to take advantage of for the benefit of a much deeper and more relevant learning" (**Arias-Vallejo**; **Chiappe-Laverde**, 2016, p. 469).

Generating such an outlook and willingness for ethical and responsible use is increasingly necessary given that the recreation of cybercultures based on digital use and trends does not always allow for the development of critical and protective skills. It is important to work along these lines, encouraging young people to make judgments and criticisms about what is appropriate, as opposed to what they want (**Biesta**, 2017). It should be remembered that teacher training in digital competence (**Torres-Barzabal** *et al.*, 2022; **Bravo-Villares**; **Fernández-Sánchez**, 2022) also involves choosing which competencies are most desirable as a means to achieve this goal. In addition, while digital skills frameworks continue to be updated to respond to major future challenges (*OECD*, 2019; **Bianchi** *et al.*, 2022), the existence of insufficient skills or knowledge

"It is necessary for children and young people to acquire an active and critical role online and to be able to not only receive information but also create and share it"

catalogs is being criticized, and it is, therefore, more effective to generate a real protective attitude (**Schaffar**, 2021). Along these lines, **Biesta** (2017) has also shown that definitions of competence belong to the past while what is most needed is to develop a pedagogy of response, which helps learners to make judgments, experience responses, generate critiques, and most importantly understand the complexity of cyberculture.

4. Towards the training of critical skills for internet usage and digital production

Critical cyberconsumption, within cyberculture, is related to training for digital participation that allows the development of critical awareness and the empowerment of the user, so that he or she can avoid the main risks derived from impulsive and irrational digital use. It is based on the idea of the prosumer developed by **Gilmore** (2006), **Bruns** (2014), and prodesigner (**Hernández-Serrano** *et al.*, 2017), where the user not only knows how to consume critically but also contributes to the creation of content through design, reflection, and awareness of their participation, individually and collaboratively, in a safe and respectful manner. Content that will then be able to be disseminated and shared in different digital spheres.

Following **Habermas** (1987), training for critical Internet usage requires a literacy of consciousness, raising awareness of the existence of potential risks that affect not only the user but also the citizens who are involved in the communicative process to which their actions refer. In this context, the main issue is to be aware that the risks arising from inappropriate use of the Internet exist and that they have consequences not only for individuals but also for society. To this end, it is essential in the first instance to develop an attitude that makes it possible to identify inappropriate use of the Internet. Additionally, there is knowledge, which in this case refers to the different ways of dealing with risks, and finally, there are the actions or, in other words, the know-how or putting knowledge into practice. This would encompass the attitudes, knowledge, and procedures that seek an active and participatory development (**Grocott**, 2022) that transcends individuality to focus on the development of social competencies that directly address the changes and future challenges that may arise.

There is a need for critical and reflective learning that is framed within education for responsible citizenship (**Bell**, 2016), whose actions and responsibilities are necessarily interlinked (**Biesta**, 2017). In short, there is a need for training that alludes to cyber-consumption and critical digital production that should address the risks and dangers of the Internet and social media, especially because the most recent studies (*Eurostat*, 2022) show that primary and high school pupils sometimes spend more time surfing the net than working on their academic studies. This situation has been heightened by the confinement resulting from the COVID-19 pandemic and implies the need to develop a form of reflexive and critical expression that goes beyond the mere domain of applications and tabs (**Hargreaves**; **Shirley**, 2021). In this sense, digital competence for learning should enable students to become self-directed and self-determined learners (**Greenhow**; **Robelia**, 2009; **Sánchez-Romero**; **López-Berlanga**, 2020), responding to conceptual, attitudinal, and procedural levels of digital competence (**Cabezas-González** *et al*., 2022).

5. Objective

This study focuses on analyzing the training of primary and high school students for critical Internet usage in terms of their perceived levels of conceptual, attitudinal, and procedural digital competence in accessing, consuming, creating, and sharing content on social media. As a specific objective, we are interested in understanding some of the effects that may be related to the perception that young people have regarding the training they have received, in line with recent studies in this area (**Hernández-Serrano** *et al.*, 2021; **Barredo** *et al*., 2021). This also includes determining whether there are differences in the willingness to acquire training in self-protection for the creation and consumption of digital content.

6. Materials and methods

6.1. Instrument

The instrument used to collect the data was designed based on attitudes, knowledge, and procedures included in the following international competence frameworks: *DigCompEdu* of the *European Commission* and *TEL*; *Findings, Technology and Engineering Literacy* from *National Assessment of Educational Progress*. The subjects chosen are related to the critical consumption and actions for creating and sharing digital content and act as study variables in line with the available literature.

For constructing the instrument, a multistage Delphi validation process was used with the participation of a panel of five experts in methodology and eight teachers with expertise in digital competence, both in primary and high school education. In this process, the items that did not meet the criteria of being sufficiently pertinent and clear were modified or discarded, following the indications established by **García-Ruiz** and **Lena-Acebo** (2018). Finally, 25 items were selected for this study, representative of the set of knowledge (6 items), attitudes (9 items), and procedures (10 items) related to the competencies required for creating and sharing critically and safely, all of which were assessed on a four-point Likert scale.

What is most needed is to develop a pedagogy of response, which helps learners to make judgments, experience responses, generate critiques, and most importantly understand the complexity of cyberculture

The use of the questionnaire was carried out with the prior informed consent of the legal guardians, both in digital format and on paper, and always in the presence of a member of the research team in the classroom when it was filled in. The questionnaire can be found at the following link:
https://doi.org/10.6084/m9.figshare.20383209.v2

6.2. Sample

The study involved pupils in the final years of primary (1^{st} to 6^{th} grade) and compulsory high school (7^{th} to 10^{th} grade) in the Spanish education system. Access to the research sample, in the case of minors, involves a series of difficulties that imply a complex approach to developing the research plan. Given that the sample was exceptionally complex, it was necessary to perform the survey in the presence of a researcher from the group, acting as a reference in its implementation. This in turn implied the selection of an incidental sample of convenience. The sample was taken from primary and high schools, both public and semi-private, in the Spanish cities of Huelva, Lugo, Pamplona, Salamanca, Santander, and Seville. The study considered the responses of 417 students: 224 students in the 6th year of primary education, with a mean age of 11.02 years (SD=0.48), and 193 students in the 4th year of compulsory secondary education or high school (10^{th} grade), with a mean age of 15.28 years (SD=0.92). The sample, corresponding to the 6th year of primary education included the participation of 86 female students and 138 male students, while the sample of pupils in the 4th year of compulsory high school included 104 female pupils and 89 male pupils.

6.3. Analysis

The analysis of the results was carried out in two stages. The first focused on assessing differences in conceptual, attitudinal, and procedural competence. For this purpose, the responses of the participating students corresponding to the two educational stages (primary and high school) were compared by analyzing the possible differences using the Mann-Whitney-Wilcoxon U test. The effect size was also evaluated using the Rank Biserial Correlation (Rr) and Cohen's d in the case of significance in the test. The statistical power for a limiting value of $\alpha=0.05$ was also calculated for each case.

The second stage of the analysis corresponded to studying the differences in competence between those students who acknowledged having received training (or not) in the creation and dissemination of content on social media, as well as those who showed a positive (or negative) willingness to create and share content on social media. Two items included in the questionnaire administered were used for sample segmentation, with the study sample being distributed according to the characteristics shown in Table 1.

Table 1. Distribution of results according to year

	Willingness: "I care about learning and sharing content on social media"			**Training: "My teachers have taught me how to create and disseminate content on the Internet"**		
	No	**Yes**	**Total**	**No**	**Yes**	**Total**
Fourth year of compulsory high school (10^{th} graders)	105	88	193	112	81	193
Sixth year of primary school (6^{th} graders)	117	107	224	145	79	224
Total	222	195	417	257	160	417

On the other hand, to reduce the dimensionality of the items studied and identify the underlying factor structure, an exploratory factor analysis (EFA) was carried out using Factor software version 12.01 (**Lorenzo-Seva**; **Ferrando**, 2006). For its development, the 27 proposed items were initially considered, finally discarding those with a normalized MSA value of less than 0.50 (**Lorenzo-Seva**; **Ferrando**, 2006), reducing the number of items considered to 14. As the sample was larger than 400 subjects, the sample was subdivided into two equivalent subsamples for assessing the factor analysis using the Solomon method (**Lorenzo-Seva**, 2021), evaluating the equivalence of the samples based on the Ratio Communality Index. This index yielded a result of 0.9665, close to the maximum value of 1.0.

7. Results

7.1. Level of conceptual, attitudinal and procedural competence of primary and high school students

Concerning the attitudes associated with the level of conceptual competence (see Table 2), statistically significant differences were found between the groups (U=26841.500, p<.001, Rr=0.242, d=0.472, $1\text{-}\beta_{\alpha=0.05}=0.994$). This indicated that students were able to search for information on the Internet to keep up to date, with the mean value for the group corresponding to the 10^{th} graders being higher. ($M_{4HIGHSCH}=2.927$ vs $M_{6GRADE}=2.536$). Similarly, significant differences were found in the perception of their ability to identify safe and unsafe sites on the Internet (U=24041.500, p<.040, Rr=0.112, d=0.249, $1\text{-}\beta_{\alpha=0.05}=0.994$), with the mean value also being higher for the 10^{th} graders. ($M_{4HIGHSCH}=2.834$) as opposed to the value obtained for the 6^{th} graders ($M_{6GRADE}=2.571$), although the effect size, and therefore the difference, was small. Regarding the acquisition of knowledge to recognize false news or information on the web, no statistically significant differences were found between the groups studied, with their mean values being reasonably high. Similarly, no significant differences were found between the groups regarding their perception of their awareness of the repercussions and risks of sharing private information on the Internet, with the mean values for their perceptions also being remarkably high ($M_{4HIGHSCH}$ =3.528 vs M_{6GRADE}=3.290). This indicated that this was the knowledge that the students mostly perceived they had acquired. No differences were found for knowledge regarding privacy protection, such as profile privacy configuration, for which the mean values were related to the response "often or always", or in knowing how to delete their content. In this case, the extremely low mean values indicated, according to the student's self-awareness, they had not acquired this knowledge.

Table 2. Level of conceptual knowledge

	U	P / $1\text{-}\beta_{\alpha=0,05}$	Rr / d (Δ/σ)	Group	N	Mean	SD	SE
I know how to search for information on the Internet to keep up to date.	26841.500	<0.001	0.242	10th graders	193	2.927	0.746	0.054
		0.994	0.472	6th graders	224	2.536	0.903	0.060
I know how to identify safe and unsafe sites on the Internet.	24041.500	0.040	0.112	10th graders	193	2.834	0.898	0.065
		0.994	0.249	6th graders	224	2.571	1.192	0.080
I recognize when information on the Web is false.	21252.000	0.752		10th graders	193	2.762	0.740	0.053
				6th graders	224	2.768	0.970	0.065
I know the risks of sharing private information on the Internet.	22054.500	0.671		10th graders	193	3.528	0.707	0.051
				6th graders	224	3.290	1.148	0.077
I know how to delete content that I post on the Internet without leaving any traces.	21913.000	0.798		10th graders	193	1.969	0.935	0.067
				6th graders	224	2.009	1.116	0.075
I know how to make my profiles private.	21944.000	0.758		10th graders	193	3.404	0.873	0.063
				6th graders	224	3.286	1.075	0.072

Concerning the indicators for the level of attitudinal competence (see Table 3), statistically significant differences were observed in the use of social media and the Internet for informative purposes to keep up to date (U=29898.500, p<.001, Rr=0.383, d=0.754, $1\text{-}\beta_{\alpha}=_{0.05}$=0.994), as well as taking care of one's digital content that is shared online (U=26746.500, p<.001, Rr=0.237, d=0.296, $1\text{-}\beta_{\alpha=0.05}$=0.962). For both of these indicators, more high school students perceived they had acquired these skills ($M_{4HIGHSCH}$=3.135 vs M_{6GRADE}=2.478).

Regarding attitudes towards the content that is consumed, there appeared to be differences between the two age groups. Once again, it is the high school students who were more aware of the influence that content had on their way of thinking and acting (U=29602.500, p<.001, Rr=0.369, d=0.686, $1\text{-}\beta_{\alpha=0.05}$=0.999, $M_{4HIGHSCH}$ =2.503 vs M_{6GRADE}=1.933). It is also this group that showed the greatest awareness of the influence their active participation has on who they are and what they like (U=29308.000, p<.001, Rr=0.356, d=0.638, $1\text{-}\beta_{\alpha=0.05}$=0.999, $M_{4HIGHSCH}$ =2.518 vs M_{6GRADE}=1.924), considering that the more personal content that is shared, the more popular a person may become (U=28458.500, p<.001, Rr=0.317, d=0.534, $1\text{-}\beta_{\alpha=0.05}$=0.999; $M_{4HIGHSCH}$ =2.088 vs M_{6GRADE}=1.598).

Differences were also found regarding acquiring attitudes on the impact of participation (U=29616.500, p<.001, Rr=0.242, d=0.472, $1\text{-}\beta_{\alpha=0.05}$=0.994; $M_{4HIGHSCH}$ =2.658 vs M_{6GRADE}=1.960), with the older students being more aware of the risk of being exposed to strangers with access to their data (U=17977.500, p<.001, Rr=0.168, d=0.163, $1\text{-}\beta_{\alpha=0.05}$=0.339; $M_{4HIGHSCH}$=3.218 vs M_{6GRADE}=3.375). However, in the latter case, the differences cannot be considered appreciable. Despite these results, no statistically significant differences were found to exist between the two groups of students concerning the perception of one's respectful attitude in the use of the Internet, being one of the attitudes the majority of the students thought they had acquired.

In addition, the high school students showed a more critical attitude, as they responded "often" to the question referring to cross-checking the information they access (U=26024.500, p<.001, Rr=0.204, d=0.432, $1\text{-}\beta_{\alpha=0.05}$=0.999; $M_{4HIGHSCH}$=3.041 vs M_{6GRADE}=2.670), although the differences found were not highly statistically significant.

Concerning the level of procedural competence (see Table 4), that is, the actions that students take in the use of the Internet and social media to consume, create and share content, statistically significant differences were found in the use of their images to communicate with others (U=32980.500, p<.001, Rr=0.526, d=1.010, $1\text{-}\beta_{\alpha=0.05}$=1.000; $M_{4HIGHSCH}$=2.326 vs M_{6GRADE}=1.487) and the use of photographs of places visited (U=29980.500, p<.001, Rr=0.387, d=0.669, $1\text{-}\beta_{\alpha=0.05}$=0.999; $M_{4HIGHSCH}$=2.285 vs M_{6GRADE}=1.696). These differences are also observed when selfies are taken and shared (U=31442.000, p<.001, Rr=0.455, d=0.819, $1\text{-}\beta_{\alpha=0.05}$=1.00; $M_{4HIGHSCH}$=2.311 vs M_{6EP}=1.567) or videos posted in which the students appear (U=28387.5000, p<.001, Rr=0.313, d=0.550, $1\text{-}\beta_{\alpha=0.05}$=0.999; $M_{4HIGHSCH}$=1.927 vs M_{6GRADE}=1.460). This also includes videos in which others are the protagonists (U=30932.500, p<.001, Rr=0.431, d=0.862, $1\text{-}\beta_{\alpha=0.05}$=1.00; $M_{4HIGHSCH}$=1.876 vs M_{6GRADE}=1.223) sharing their experiences, behaviors that are more common among high school students.

There is also evidence of a greater propensity for risky behavior among older students, such as accepting invitations from strangers (U=31937.500, p<.001, Rr=0.447, d=0.928, $1\text{-}\beta_{\alpha=0.05}$=1.000; $M_{4HIGHSCH}$=1.865 vs M_{6GRADE}=1.201) while, according to the mean values, primary school students more frequently respond "never". The mass diffusion of content received via social media was greater among high school students, although it had a lower effect (U=25772.000, p<.001, Rr=0.192, d=0.295, $1\text{-}\beta_{\alpha=0.05}$=0.999; $M_{4HIGHSCH}$=1.663 vs M_{6GRADE}=1.433) and, therefore, a less significant difference was

Table 3. Level of attitudinal competence

	U	P / 1-$\beta_{\alpha=0,05}$	Rr / d (Δ/σ)	Group	N	Mean	SD	SE
The Internet allows me to keep up to date with the latest news.	29898.500	<0.001	0.383	10th graders	193	3.135	0.765	0.055
		0.994	0.754	6th graders	224	2.478	0.966	0.065
What I see on the Internet influences the way I think and act.	29602.500	<0.001	0.369	10th graders	193	2.503	0.791	0.057
		0.999	0.686	6th graders	224	1.933	0.868	0.058
I think before I post personal photos or videos.	17977.500	<0.001	-0.168	10th graders	193	3.218	0.863	0.062
		0.339	0.163	6th graders	224	3.375	1.047	0.070
Actively participating on social media shows who I am and what I like.	29308.000	<0.001	0.356	10th graders	193	2.518	0.879	0.063
		0.999	0.638	6th graders	224	1.924	0.979	0.065
I am aware that when I participate on social media others may obtain my data.	29616.500	<0.001	0.370	10th graders	193	2.658	0.956	0.069
		0.999	0.671	6th graders	224	1.960	1.118	0.075
One should try to be respectful when participating in social media.	19852.500	0.104		10th graders	193	3.326	0.831	0.060
				6th graders	224	3.357	1.001	0.067
Creating your videos and sharing them helps you become more popular.	28458.500	<0.001	0.317	10th graders	193	2.088	0.923	0.066
		0.999	0.534	6th graders	224	1.598	0.913	0.061
I am careful about the content I share because I know that it influences others.	26746.500	<0.001	0.237	10th graders	193	2.352	0.919	0.066
		0.962	0.296	6th graders	224	1.969	1.013	0.068
Information should be sought from different sources and cross-checked.	26024.500	<0.001	0.204	10th graders	193	3.041	0.728	0.052
		0.983	0.432	6th graders	224	2.670	0.969	0.065

observed between the two age groups. Moreover, no differences were found between primary and high school students regarding the capacity for critically analyzing the intentions of the messages received via social media.

Regarding preventive and protective attitudes, the primary school students were more likely to cover the camera on their devices when not in use (U=19153.000, p<.001, Rr=0.114, d=0.213, 1-$\beta_{\alpha=0.05}$=0.518; $M_{4HIGHSCH}$=2.596 vs M_{6GRADE}=2.835), although this difference was small. In addition, no differences between the groups were detected concerning the use of secure passwords, which was one of the actions that obtained the highest average score. This result indicates that this is a protective attitude ingrained in students at both stages.

Table 4. Level of procedural competence

	U	P / 1-$\beta_{\alpha=0,05}$	Rr / d (Δ/σ)	Grupo	N	Mean	SD	SE
I share photographs of myself to communicate.	32980.500	<0.001	0.526	10th graders	193	2.326	0.891	0.064
		1.000	1.010	6th graders	224	1.487	0.769	0.051
I accept invites from strangers.	31937.500	<0.001	0.477	10th graders	193	1.865	0.837	0.060
		1.000	0.928	6th graders	224	1.201	0.568	0.038
I use secure passwords to prevent my accounts from being hacked.	20874.000	0.392		10th graders	193	3.679	0.629	0.045
				6th graders	224	3.638	0.852	0.057
I share through social media everything I am sent.	25772.000	<0.001	0.192	10th graders	193	1.663	0.788	0.057
		0.794	0.295	6th graders	224	1.433	0.772	0.052
I take selfies and share them.	31442.000	<0.001	0.455	10th graders	193	2.311	0.934	0.067
		1.000	0.819	6th graders	224	1.567	0.881	0.059
I record videos of what others are doing and share them.	30932.500	<0.001	0.431	10th graders	193	1.876	0.910	0.066
		1.000	0.863	6th graders	224	1.223	0.564	0.038
I create videos in which I appear to share them on social media.	28387.000	<0.001	0.313	10th graders	193	1.927	0.893	0.064
		0.999	0.550	6th graders	224	1.460	0.803	0.054
I share pictures of what I see and where I am.	29980.000	<0.001	0.387	10th graders	193	2.285	0.840	0.060
		0.999	0.669	6th graders	224	1.696	0.917	0.061
I question the intentions of the messages I receive.	21523.000	0.938		10th graders	193	2.539	0.860	0.062
				6th graders	224	2.536	1.124	0.075
If I'm not using the webcam, I cover it up.	19153.000	0.031	-0.114	10th graders	193	2.596	1.288	0.093
		0.518	0.213	6th graders	224	2.875	1.337	0.089

7.3. Differences in competence among students based on the training received and willingness to learn

Dimension reduction was performed by applying a exploratory factor analysis (EFA). Due to the characteristics of the data, the polychoric correlation matrix was computed from the standardization of the item variables, a strategy appropriate for Likert-type items and data with excessive kurtosis, achieving multivariate normality according to Mardia's criterion (**Mardia**, 1970). Similarly, appropriate indicators of adequacy were estimated (Kaiser-Meyer-Olkin: KMO=0.897, 90% Bootstrap Confidence Interval [0.837-0.889]; Barlett χ= 2577.3, df=91, P <.001) for the minimum rank factor analysis and an optimized parallel analysis based on the permutation of 500 random correlation matrices according to the Minimum Rank Factor Analysis (**Timmerman**; **Lorenzo-Seva**, 2011). This made it possible to estimate the number of appropriate factors to be considered at two. The fit achieved in this process was assessed as extremely high with a goodness-of-fit index (GFI) of 1.00 (**Hu**; **Bentler**, 2009). Likewise, the root mean square of residuals (RMSR) value reached was 0.061, which is close to the value of the Kelley criterion proposed for the model (0.059) (**Kelley**, 1935). The factors were extracted using Robust diagonally weighted least squares (RDWLS) and successfully explained 53.64% of the total variance. To simplify the resulting underlying factorial interpretation, a Robust Promin rotation was applied, which is advantageous for the simple explanation of the factors and the construction of the factors in terms of the stability of the solution (**Lorenzo-Seva**; **Ferrando**, 2019b). The factors obtained showed good simplicity indices (Bentler's S= 0.99 P97; LS=0.47, P96) that reinforced the decision to adopt the proposed solution. In addition to the above, all items showed a factor loading above 0.400, as indicated in Table 5.

Table 5. Factor loadings of the items included in the factors identified

	Factor 1. Lack of privacy protection	Factor 2. Critical and protective attitudes
I take selfies and share them.	0.942	
I create videos in which I appear to share them on social media.	0.920	
I record videos of what others are doing and share them.	0.888	
I share pictures of what I see and where I am.	0.816	
I share photographs of myself to communicate.	0.795	
I accept invites from strangers.	0.505	
I share through social media everything I am sent.	0.428	
The Internet allows me to keep up to date with the latest news.		0.719
I am careful about the content I share because I know that it influences others.		0.657
Information should be sought from different sources and cross-checked.		0.624
What I see on the Internet influences the way I think and act.		0.577
Actively participating on social media shows who I am and what I like.		0.441
I know how to search for information on the Internet to keep up to date.		0.420
Creating videos and sharing them helps you become more popular.		0.420

Furthermore, Table 6 shows the descriptive statistics corresponding to the scores of the students participating in the study for the two factors identified: the lack of privacy protection and critical and protective attitudes.

Table 6. Descriptive statistics of the scores for the factors identified

	F2. Critical and protective attitudes	F1. Lack of privacy protection
Mean (SD)	16.707 (4.018)	12.005 (4.365)
Asymmetry (SD)	-0.049 (0.120)	0.774 (0.120)
Kurtosis	-0.423 (0.238)	-0.032 (0.238)
Minimum	7.000	7.000
Maximum	27.000	25.000

Factor 1, associated with the lack of privacy protection, includes those items related to the risks taken by students according to their level of procedural competence, as it is the actions or behaviors performed by these students that determine the type of risks they take when using social media. These items are as follows: I share photographs on social media to communicate; When I am on social media, I accept invites from strangers; I take selfies and share them; I often record videos of what others are doing and share them; I create videos of myself to share; I share photos of what I see and where I am; and, I share through social media everything that I am sent. The majority of primary school students responded that they "never" did these actions, while the high school students said they did them "often". This suggests high school students are not acquiring procedural competence, which needs to be further reinforced at this level to avoid risky behavior regarding privacy protection when sharing their own and other people's personal information.

Regarding factor 2, on critical and protective attitudes, this includes the items related to the level of conceptual competence (the students know how to search for information to keep up to date) and attitudinal (where the majority of them consider that: the Internet allows them to keep up to date with the latest news; what they see on the Internet influences the way they think and act; you have to take care of the content you share because it influences others; you have to look for information from different sources and cross-check it, but rarely consider that actively participating gives insight into how they really are, or that you gain popularity by creating videos and sharing it), are attitudes that involve reflection, contrasting and responsibility when creating and disseminating content. In parallel, these are all items for which the mean score values of primary school pupils were found to be associated with the response "never/rarely" while for the group of high school students, the responses to these items were often affirmative, according to the higher mean values. This would indicate that it is important to teach such attitudes and knowledge at the primary school stage, in a preventive and protective manner.

> Cybercultures based on digital use and trends does not always allow for the development of critical and protective skills

Based on the factors identified, the differences between students who reported having received training in content creation and sharing and those who did not were analyzed (see Table 7). Statistically significant differences were found between the students who responded they had received training in the score of the first factor (U=17262.000, n_{No} =222, n_{YES}=195, p<.001, Rr=-0.202, d=0.389, $1\text{-}\beta_{\alpha=0.05}$=0.956), with a higher score for the students who received training (M_{No}=15.982 vs M_{YES}=17.533). However, both groups, including students who had received training and those who did not, showed similar behavior concerning the actions related to factor 2.

Table 7. Differences in the mean factor scores between students who did and did not receive training

	U	P $1\text{-}\beta_{\alpha=0,05}$	Rr d (Δ/σ)	Group	N	Mean	SD	SE
Factor 2. Critical and protective attitudes	17262.000	<0.001	-0.202	No	222	15.982	4.037	0.271
		0.956	0.389	Yes	195	17.533	3.843	0.275
Factor 1. Lack of privacy protection	19990.000	0.175		No	222	11.748	4.364	0.293
				Yes	195	12.297	4.359	0.312

Similar to the above, differences were analyzed according to the willingness to receive training concerning both factors (see Table 8). In this analysis, statistically significant differences were observed between those students willing to learn how to create and share content on social media and those who did not in the score of factor 2 on protective attitudes, U=12531.000, n_{No} =257, $n_{Sí}$=160, p<.001, Rr=-0.391, d=0.692, $1\text{-}\beta_{\alpha=0.05}$=0.998); it was observed that those students who showed willingness had more protective attitudes. (M_{No}=15.693 vs $M_{Sí}$=18.337). Regarding factor 1, differences were also found between the two groups (U=14449.000, n_{No} =257, n_{YES}=160, p<.001, Rr=-0.297, d=0.524, $1\text{-}\beta_{\alpha=0.05}$=0.952), where a higher mean score was obtained for those students more concerned about learning how to create and share content on social media. (M_{No}=11.140 vs M_{YES}=13.394).

Table 8. Differences in the mean factor scores between students who did and did not show willingness to learn how to create and share content on social media

	U	P $1\text{-}\beta_{\alpha=0,05}$	Rr d (Δ/σ)	Group	N	Mean	SD	SE
Factor 2. Critical and protective attitudes	12531.000	<0.001	-0.391	No	257	15.693	3.785	0.236
		0.998	0.692	Yes	160	18.337	3.852	0.305
Factor 1. Lack of privacy protection	14449.000	<0.001	-0.297	No	257	11.140	4.007	0.250
		0.952	0.524	Yes	160	13.394	4.566	0.361

8. Discussion and conclusions

Our results indicate that there are differences from primary to high school education in the digital competence required for appropriately creating and sharing digital content that is dependent on the knowledge, attitudes, and procedures that students perceive they have acquired.

At the conceptual level, both primary and high school students perceive that they know how to search for, contrast, or recognize false information, actions associated with critical Internet usage. Concerning protection and security, both groups reported they were aware of the risks of sharing personal information, but not all students indicated they were aware of the options for setting up private profiles. In addition, many did not know how to delete posted information, which could indicate possible false-posi-

> A lack is detected of preventative training for primary school students to develop critical and reflective attitudes

tive self-awareness, or disproportionate self-awareness, if this is compared with the risky actions they reported taking when creating and sharing digital content found in the procedural analysis, confirming the risk regarding privacy found in other studies on the behavior of minors (**Díaz-Arce**; **Loyola-Illescas**, 2021; **Hernández-Serrano** *et al.*, 2021; **Hernández-Serrano** *et al.*, 2022). The fact that no significant differences were found at this level indicates that this knowledge is acquired early on, progresses positively, and is maintained according to the student's self-perception. Thus, other tests are needed to assess the actual performance and application of this knowledge (**Casillas-Martín**; **Cabezas-González**; **García-Valcárcel**, 2022).

> We are interested in understanding some of the effects that may be related to the perception that young people have regarding the training they have received, in line with recent studies in this area

The greatest variability was found to exist in the acquisition of attitudes related to the production, dissemination, and consumption of digital content. High school students use social media and the Internet more frequently to stay up to date and, above all, to share digital content and their personal information. Both of these behaviors are more typical in the use of social media by this age group as opposed to primary school students (**Núñez-Gómez** *et al.*, 2021; *Ontsi*, 2021). Therefore, the results show that older students are more aware that their actions and what they share on social media can influence the way they think and act, or what others may think of them. This perception of the repercussions is remarkable because it puts the students on the right path for taking responsibility for what they produce and distribute, an attitude that is necessary for transformative competence in digitality (*OECD*, 2019; **Biesta**, 2017). However, they also have other attitudes that are largely in contrast to and associated with a lack of protection such as the fact that they need to actively participate to be known or to gain popularity. In this context, adolescents could be affected by two aspects: the first is the demand for the mass production of content, which is characteristic of cyberculture, and the second is the progressive need to gain recognition from their peers, which is characteristic of adolescence. This would explain why, as other studies have confirmed, social interaction and connecting with other people, as well as self-presentation, are the main reasons that motivate teenagers to use social media (**Brailovskaia**; **Schillack**; **Margraf**, 2020; **Spears**, 2021; **Hernández-Serrano** *et al.*, 2021). The risks that minors are unaware of are associated with the lack of privacy protection, as they tend to prioritize creating and posting their content, as shown by the results associated with the procedural level. Nonetheless, it is striking that the highest mean attitudinal scores were obtained by the group of primary school children with regard to thinking before posting their photos or videos or behaving respectfully when participating on social media. This may indicate that these attitudes are not maintained or that they evolve positively to ensure privacy protection and ethical behavior. Also, these attitudes seem to be lost later on in high school, which supports our argument for the need to reinforce training that would increase the awareness of these students about the repercussions of their actions in the digital world. The proposal by **Pérez-Tornero** (2017) focuses on this form of training and states that the appropriate use of the Internet is guaranteed when there is a good online coexistence with others. This in turn requires a high level of tolerance and respect, which provides the students with the essential attitudes for becoming digital citizens.

At the procedural level, differences were observed in actions related to digital self-representation that were more common in high school students than in primary school students. These actions include taking selfies and sharing them, posting videos of themselves, and even videos of what others do to share experiences, all of which corroborate that their form of communication is marked by the exhibition and constant representation of what they do, who they do it with, and where they are. There is also evidence of a greater propensity for risky behavior among older students, such as accepting invites from strangers or immediately sharing everything they are sent, although the average score obtained revealed that this is an action that does not occur very often. This progression towards risk-taking would make it necessary to continue training minors in the management and production of their personal information, be it photos or videos, to promote a reflective attitude about the repercussions of their digital content (**García-Ruiz**; **Pérez-Escoda**, 2021; **Renés-Arellano**; **Lena-Acebo**; **Hernández-Serrano**, 2021; **Pérez-Escoda**; **Lena-Acebo**; **García-Ruiz**, 2021; **García-Ruiz**; **Gozálvez**; **Aguaded**, 2014; **Martínez-Sanz** *et al.*, 2016; **Redondo-García**, 2016; **Pérez-Escoda**; **García-Ruiz**; **Aguaded**, 2019; **Domingo-Coscollola** *et al*., 2019; **Torres-Barzabal** *et al.*, 2022).

Concerning the factors identified, it could be concluded that the two groups separately highlighted critical attitudes that are protective, as well as other actions that could be risky like self-representation and the sharing of personal information. Both factors would refer to levels of competence that are hardly found in primary school students and more frequently in high school students, which could indicate a negative behavioral trend, as well as a lack of preventative training for primary school students to develop critical and reflective attitudes. It should also be noted that critical training in proper Internet usage focuses on the cultivation of attitudes (**Saavedra-Llamas**; **Papí-Gálvez**; **Perlado-Lamo-de-Espinosa**, 2020), rather than the mere teaching of information or procedures for some applications or devices that may be constantly changing. In fact, when analyzing the differences according to the training received from the students' teachers, it was corroborated that the higher mean scores for the factor referring to

> It is essential to put in place preventive training that will help to ensure children grow up in a safe environment within cyberculture in which values like respect, security, and privacy protection are paramount

the acquisition of critical and protective attitudes were associated with those who had received such training.

The results obtained highlight the need to promote the teaching of critical thinking for Internet usage among minors, starting from an early age, to avoid the risks associated with consuming, producing, and disseminating digital content

However, concerning more risky behaviors, the students who had received training and those who had not presented similar mean scores for factor 2, related to critical and protective attitudes. According to the interpretation we have been making, these results could indicate that as children have greater access to social media, with a higher level of creating and posting their photos and videos, it is this immersion in cybercultural behaviors that would reverse the effect of the protective training received. In contrast, we could consider that students who are exposed to these risks are also aware of the need for training, since, when analyzing the effect of willingness to learn to create and share content on networks, it is significant that, according to the differences found, those who did show this willingness were also those who most frequently showed risky and unprotected behavior.

In conclusion, the results obtained highlight the need to promote the teaching of critical thinking for Internet usage among minors, starting from an early age, to avoid the risks associated with consuming, producing, and disseminating digital content. Even with training, there is the potential for children to compromise their privacy when sharing their photographs with others or welcoming strangers into their digital social spaces, which are the most significant risk-taking behaviors. The identification of these shortcomings is timely because it orients the development of new training and digital literacy actions by understanding which ones need to be reinforced at each stage, regardless of whether or not there is a willingness to learn or whether specific training has been received. This reversal, toward a propensity for taking risks, makes it necessary to continue training students at higher levels in the management and production of their personal information, be it photos or videos, and encourage them to reflect on the repercussions of the digital content they produce (**Pérez-Escoda**; **García-Ruiz**; **Aguaded**, 2019; **Domingo-Coscollola** *et al.*, 2019; **Torres-Barzabal** *et al*., 2022). And, above all, it is essential to put in place preventive training that will help to ensure children grow up in a safe environment within cyberculture in which values like respect, security, and privacy protection are paramount (**Pérez-Tornero**, 2017; **Caldeiro-Pedreira** *et al.*, 2021). In terms of the study's limitations and areas for improvement, further research on new aspects linked to risk-taking when young people consume and use the Internet and social media, as well as topics related to, for example, business, games, fake phenomena, or the limitations of artificial intelligence, among others is still needed.

9. References

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Methodology for the evaluation of media literacy in children and youth. Recommendations and trends

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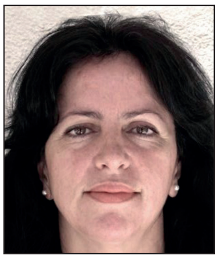

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Abstract

In the current communicational scenario, transformed by technological and digital advances, media literacy is considered a crucial competence for active and informed participation in society. In this context, the main objective of this study was to assess the media literacy competences of 416 students of the 4th, 6th, and 9th grades in Portugal, identifying training needs and presenting suggestions for intervention. A non-experimental quantitative methodology was used, and the participants completed a self-response questionnaire. The results indicate that the three grades studied have a transversal need regarding the use of media, the production of media content, and participation in society through the media, and also regarding the analysis, understanding, and assessment of media content. We confirm the importance of media education in the development of media literacy and present some intervention suggestions for the promotion of these competences in the school context, namely the reinforcement of some curricular content, the use of guiding documents, and the development of critical thinking. We emphasize the importance of training teachers and parents on the subject, and finally, we also emphasize the importance of deconstructing the belief that digital natives have natural competences in this regard and therefore do not need training in this area.

Keywords

Media literacy; Media education; Educommunication; Assessment; Evaluation; Media; Kids; Youths; Teenagers; Digital natives; Media messages; Uses of the media; Production of media content; Participation; Critical thinking; Comprehension; Media content; School environment; School context.

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1. Introduction

The technological and digital development that today's society has witnessed advances at an exponential rate and, over time, has transformed the daily lives of citizens, namely the communicational scenario. Effectively, the way we use and understand the media has changed, especially if we focus on the post-Internet era, due to the amount of information available as well as the possibilities of using the various communicational platforms that currently exist (*Conselho da União Europeia*, 2020). The development of these new digital technologies, namely mobile devices, facilitated the use and access to media, where the permanent online state is a reality. For this reason, society is characterized by a participatory culture, which offers citizens opportunities not only to consume media messages but also to participate actively through interaction, sharing, and content creation (**Jenkins**, 2007).

This whole scenario places us, on one hand, in front of an enormous framework of possibilities that can facilitate and bring advantages and opportunities both at a personal, professional, and educational level, but on the other hand, it also implies risks in the face of certain information and content such as misinformation, hate speech, and cyberbullying, among others, so media literacy becomes an essential condition to develop (**Grizzle** *et al.*, 2016; *Conselho da União Europeia*, 2020).

Considering the youngest, it is of common knowledge that they are constantly connected to the internet through digital media. In the particular case of generations that grew up in the context of the digital age, their communications and interactions are largely centered on digital media (**Matos**, 2017). In fact, in 2020, 98% of young people in the European Union and in particular 100% of Portuguese young people of these generations, indicated the use of the internet during the last 3 months (*European Commission*, 2021).

For this reason, there are several denominations attributed to these young people, but the most common label is digital natives (**García-Ruiz** *et al.*, 2020). According to **Prensky** (2001), the author of this denomination, these digital natives, once they grew up immersed in the world of new digital technologies, are considered experts in this regard. The affirmation of the existence of digital natives is based on the assumptions that this group has sophisticated skills and knowledge in the area of information technologies, has particular characteristics or different learning styles from previous generations, and has the ability to multitask (**Akçayir**; **Dündar**; **Akçayir**, 2016; **Bennett**; **Maton**; **Kervin**, 2008) and therefore have been identified as highly competent in media literacy. However, this notion of digital natives can have consequences; as **Boyd** says, it

> "obscures the uneven distribution of technological skills and media literacy across the youth population, presenting an inaccurate portrait of young people as uniformly prepared for the digital era" (**Boyd**, 2014, pp. 179-180).

Jenkins (2007) also alerts to the possible consequences of defending the concept of digital natives. It points out the inexistence of equal access that could compromise the equal participation of these young people in society, highlight the fact that many of these children and young people still do not have the capacity to understand how the media can influence the perception of the world and still refers to the ethical issue related to a possible little conscious, informed, and safe practice since young people currently have the possibility to create and share content in a free and public way (**Jenkins**, 2007).

Therefore, it is urgent to reflect on the challenges that technological and digital developments have brought, considering that they currently require not only technical skills for their use but also critical reflection skills on the information received, with the objective of safe and responsible use (**Matos**; **Festas**; **Seixas**, 2016).

Thus, there is consensus on the recognition of the importance of media education and media literacy as a fundamental condition for developing critical reflection skills, which enable children and young people to communicate with and through the media and to participate in an active and conscious way in society (**Pereira** *et al.*, 2014; **Buckingham**, 2020; **Taddeo**; **De-Frutos-Torres**; **Alvarado**, 2022).

Society is characterized by a participatory culture, which offers citizens opportunities not only to consume media messages but also to participate actively through interaction, sharing, and content creation

The growing interest in the area of media literacy is evident, and there have been several initiatives by international entities in order to assess the competences of citizens in this field. However, it is important to underline the specific need for studies focused on children and young people in order to be able to respond to their needs through reasoned interventions. This assessment, despite its clear importance, is recognized as an extremely complex task owing to the various ways of carrying it out, mainly resulting from different perspectives (**Livingstone**; **Thumim**, 2003; **Pereira**; **Pinto**; **Moura**, 2015; **Schilder**; **Lockee**; **Saxon**, 2016).

> It is urgent to reflect on the challenges that technological and digital developments have brought, considering that they currently require not only technical skills for their use but also critical reflection skills on the information received, with the objective of safe and responsible use

In this context, we highlight some studies, namely those promoted by the European Commission, whose theoretical foundation fits into a conceptual map developed in the light of relevant theories on media literacy (e.g., **Aufderheide**; **Firestone**, 1992; **Livingstone**; **Van-Couvering**; **Thumim**, 2005; **Martens**, 2010), in which two fundamental dimensions of analysis were identified:

- individual competences (personal competences, uses and critical understanding, social competences, communicative skills); and
- context factors (media education, media literacy policies, media industry, society civil status, and media availability).

Three studies were carried out with the objective of, firstly, the construction and validation of instruments for the assessment of media competences and, later, the effective assessment to measure the levels of media literacy in the European Union. The first, entitled *Study on assessment criteria for media literacy levels*, was carried out in 2010, followed by a follow-up to the previous study, *Testing and refining criteria to assess media literacy levels in Europe*, and the third study, still following the two previous ones, entitled *Assessing media literacy levels and the European Commission pilot initiative* (**Celot**, 2010; 2015; *EAVI*; *DTI*, 2011).

In Spain, important studies were also carried out to assess media literacy. The study *La competencia en comunicación audiovisual en un entorno digital: diagnóstico de necesidades en tres ámbitos sociales*, with the participation of the *Universidad Pompeu Fabra* (*UPF*), the *Universidad de Huelva* (*UHU*), and the *Universidad de Valladolid* (*UVA*), aimed at assessing the competences of media literacy in the contexts of communication professionals, compulsory education, and university education, through specific studies for each of them. The conceptual framework was based on studies by **Ferrés** and **Piscitelli** (2012), in which the authors developed a global view of media literacy, defining it as the domain of knowledge, skills, and attitudes related to six basic dimensions:

- language,
- technology,
- interaction processes,
- production and diffusion processes,
- ideology and values, and
- aesthetics.

For each dimension were defined indicators that correspond to one of two domains:

1) analysis, related to reception and interaction with the media, and

2) expression, associated to production skills (**Ferrés**; **Piscitelli**, 2012; **García-Ruiz**; **Ramírez-García**; **Rodríguez-Rosell**, 2014).

Within the scope of this large study, the research focused on compulsory education, entitled *La enseñanza obligatoria ante la competencia en comunicación audiovisual en un entorno digital*, stands out. The aim of this study was to evaluate the media literacy competences of children and young people attending Educación Infantil, Educación Primaria, Secundaria, and Bachillerato in Spain, considering their social context and its influence on the acquisition of these competences. The collected data were categorized into three levels: basic, medium, and advanced. The general results of this study indicate that children and young people are, for the most part, between basic and medium levels. Teachers are distributed equally across the three levels. Regarding families, although they recognize the great potential and opportunities offered by digital media, some concerns were pointed out regarding their use, namely issues related to the constant use of the mobile phone connected to the internet and the inherent dangers of this use, in particular the dissemination of images without permission (**García-Ruiz**; **Gozálvez**; **Aguaded**, 2014).

This study was replicated in the context of other European and Latin American countries (including Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Italy, Mexico, Peru, Portugal, and Venezuela) through the *AlfaMed* network, a Euro-American interuniversity research network on media competences for citizenship (e.g., **García-Ruiz** *et al.*, 2020):
http://www.redalfamed.org

In the Portuguese context, we highlight an exploratory study with 12th grade students, carried out by researchers from the *Centro de Estudos de Comunicação e Sociedade*, at the *University of Minho*, with the support of the *Gabinete para os Meios de Comunicação Social* and the *Rede de Bibliotecas Escolares* (**Pereira**; **Pinto**; **Moura**, 2015). This study aimed to know the media literacy levels of 12th grade students and to build and validate the respective assessment instrument. The analysis model was based on the definition presented by the European Commission, in the Commission Recommendation of 20 August 2009, as

> "the ability to access the media, to understand and critically assess the different aspects of the media and their contents and to create communications in different contexts" (*European Commission*, 2009, p. 10).

Were defined and assessed the dimensions of accesses and uses; understanding, analysis and evaluation; and participation and production (**Pereira**; **Pinto**; **Moura**, 2015).

The assessment instrument developed was an online questionnaire. A scale of 100 points was defined and as a result an average of 29.01 points was obtained. The results were grouped into three levels:

- level 1 covering students with below-average results (<29);
- level 2 constituted by the group of students who obtained a result between the average and the positive (>29.01 and <49.4); and
- level 3 constituted by the group of students who achieved positive values (≥49.5).

More than 50% of the sample was positioned at level 1, a negative result compared to the average, and only 5% of the sample obtained positive results, positioning itself at level 3 (**Pereira**; **Pinto**; **Moura**, 2015).

We also highlight the *Comedig* project (PTDC/CED-EDG/32560/2017), still ongoing, under the coordination of Armanda Matos, from the *Faculty of Psychology and Educational Sciences* of the *University of Coimbra*, whose main objective is

> "to carry out a diagnosis of the level of digital and media literacy competences of students and teachers at different levels of education and, based on the knowledge produced, to design educational resources and guidelines for intervention in the area of media education" (*Comedig*, 2020).

In order to contribute to the assessment of media literacy of children and young people, within the scope of the PhD in Education Sciences (*Faculty of Psychology and Educational Sciences* of the *University of Coimbra*), appears the research entitled *Media literacy competences: assessment, profiles and training proposals*, developed on the basis of the aforementioned *Comedig* project, which constituted the theoretical and methodological starting point of the investigation.

The work presented here intends to give an account of the main results of this research, more specifically, the study of diagnosis of media literacy competences of children and young people in the 4th, 6th and 9th grades of schooling and their training needs, and to present some suggestions for education in this field. It is thought that this study responds to what is considered a priority by different international entities (e.g., *European Commission* recommendation of 20.8.2009 on media literacy in the digital environment for a more competitive audiovisual and content industry and inclusive knowledge society, *EC*, 2009), which is the development of empirical research that help to define and consolidate criteria and standards for assessing media literacy of citizens, and thus to contribute to more informed action and to empower citizens through media education. The insufficient studies in this area, namely in Portugal, where research focused on assessing children's and young people's media literacy competences is scarce, justify the interest of this study, aiming at a better understanding and a more grounded intervention.

2. Material and methods

To achieve the objectives defined for the research, a non-experimental quantitative methodology was adopted. In this way, two studies were carried out:

- a preliminary study that consisted of the construction and analysis of the adequacy of assessment instruments – self-response questionnaires–, and
- a quantitative study with a sample of Portuguese children and young people, who completed the questionnaires previously elaborated and examined.

The analysis of data collected through the questionnaires was performed using the software *Statistical Package for the Social Sciences IBM* (*SPSS*) version 22. Descriptive statistical analysis was performed using a set of measures of central tendency (mode and mean) and measures of dispersion (frequency, standard deviation). Factor analysis procedures and calculation of Cronbach's alpha index and inferential statistics were also carried out for the analysis of correlations between variables and differences in means, namely Pearson correlation calculations, point biserial correlation and Spearman correlation, student *t* tests and Anova.

It should be noted that the data were collected before the covid 19 pandemic, between February and July 2019.

2.1. Participants

The target population consisted of children and young people in the 4th, 6th and 9th grades attending public and private schools in the central region of Portugal, in the districts of Coimbra and Aveiro. A non-probabilistic sample was defined, in a total of 400 children and young people between 8 and 17 years of age, distributed by the various stages of the study:

- Preliminary study with 89 participants. The study included
  41 4th grade students, 20 female and 21 male (M_{age} = 9.5),
  nine 6th grade students, four female and five male (M_{age} = 11.3) and
  39 9th grade students, 23 female and 16 male (M_{age}= 14.7).
- Main study with 311 participants.
  76 students from the 4th grade of schooling participated in the study, 42 females and 34 males (M_{age} = 9.3),
  112 students from the 6th grade of schooling, 57 females and 55 males (M_{age} = 11.5) and
  123 students from the 9th grade, 75 female and 48 male (M_{age} = 14.5).

2.2. Procedures and instruments

At first, questionnaires to assess media literacy competences were built, theoretically based on the concept defined in the *European Commission* recommendation (*European Commission*, 2009, p. 10) as

> "the ability to access the media, to understand and critically evaluate the different aspects of the media and its contents and to create communications in different contexts",

and also, the conceptual framework proposed by **Ferrés** and **Piscitelli** (2012), which presents a set of six dimensions that configure the concept of media literacy cited above.

The elaboration of the items was based on existing questionnaires, namely the instruments built by the *AlfaMed* network (**García-Ruiz** *et al.*, 2020), and also on the questionnaire built within the scope of the study by **Pereira**, **Pinto**, and **Moura** (2015).

Some key documents were considered, with the aim of complying with some recommendations made by authors of already published studies (e.g., **Pereira**; **Pinto**; **Moura**, 2015), related to the adequacy of the contents and formulation of the questions, considering the level of participants' education.

In this sense, the indicators defined for each of the dimensions of media literacy presented by the authors **Ferrés** and **Piscitelli** (2012) were considered, and the adequacy to the participants' school level was sought, based on the analysis of the following Portuguese curricular documents:

- *Referencial de educação para os media* (document that presents a framework for pedagogical work on the subject of media education from pre-school to secondary education) (**Pereira** *et al.*, 2014);
- *Programa e metas curriculares do ensino básico português* (**Buescu** *et al.*, 2015); and
- *Metas curriculares - Tecnologias de informação e comunicação - 7º e 8º anos* (**Horta** *et al.*, 2012).

Inspired by the analysis model that guided the study of **Pereira**, **Pinto**, and **Moura** (2015), the competences to be assessed were defined:

- Access and use: opportunities for accessing information and communication and competences in manipulating tools that imply this access and use;
- Analysis, comprehension, and assessment: ability to decode and classify content and critical understanding of the media and their messages –who produces, what, why, for what, by what means–;
- Production and participation: competence to create content for expression and communication of ideas through the media.

Two questionnaires were constructed, one for the 4th and 6th grades and another for the 9th grade. Both were made up of four sections, the first with questions related to the personal scope and sociodemographic data, and the remaining three with questions oriented towards the assessment of the above cited competences. The questions were mostly closed, in the form of multiple choice or using a Likert scale. Different types of questions were included, with the aim of overcoming some of the limitations referred in previous research (**Hobbs**, 2017), related to the preponderance of measures focusing on self-evaluation. With this aim, some questions asked participants about their media use and competences, other questions asked participants for knowledge about the media, and still other questions appealed to participants' critical understanding, through the analysis and reflection on different media texts (e.g., images and videos).

After the preliminary study, carried out to verify the adequacy of the questions and their contribution to achieve the objectives defined for the investigation, the questionnaires constructed were completed in the classroom context, online (using the *LimeSurvey* software) as well as in paper form, since some schools did not have sufficient resources for online application.

The lack of consensus in the literature around a single conceptual framework in the assessment of media literacy competences (**Potter**, 2010) was the main argu-

> The work presented here responds to what is considered a priority by different international entities, which is the development of empirical research that help to define and consolidate criteria and standards for assessing media literacy of citizens, and thus to contribute to more informed action and to empower citizens through media education

ment for the option of building media literacy assessment instruments for the sample of this study. Thus, it became imperative to study its psychometric properties, that is, its validity and reliability, to ensure the quality of the assessment instruments constructed (**Pilatti**; **Pedroso**; **Gutiérrez**, 2010). The study of the validity of the media literacy assessment questionnaires was carried out through factor analysis and the study of the reliability was carried out through the calculation of Cronbach's alpha index.

The 19 items of the 4th and 6th grades questionnaire and the 16 items of the 9th grade questionnaire were submitted to a factor analysis in principal components with varimax rotation. In both questionnaires more components were extracted than the dimensions that were theoretically defined, without a possible theoretical interpretation. The decision was taken to retain two components, the statistical and theoretically more adequate solution, since retention of three components (the three previously defined theoretical dimensions) also did not turn out to be interpretable. Thus, component 1 extracted corresponds to the dimension designated as "Use, production and participation", the result of the merger of the dimensions of "Access and use" and "Production and participation". This dimension includes questions related to knowledge and skills in handling technological tools, which allow users to produce and share content through the media. Component 2 kept its initial designation "Analysis, comprehension and assessment", and contains questions related to the ability to decode and classify content, to the critical understanding of the media and the media messages.

Regarding the 4th and 6th grades questionnaire, data adequacy for factor analysis calculation was performed using the Kaiser-Meyer-Olkin (KMO) measure, with a 0.8 value, above the recommended 0.60 value (**Kaiser**, 1974; **Tabachnick**; **Fidell**, 2013) and the significant Barlett sphericity test ($\chi^2(171) = 924.44$; $p < 0.01$), so factor analysis can be considered adequate for this data set (**Tabachnick**; **Fidell**, 2013).

The total variance explained by the two components extracted was 36.59%. Table 1 presents the matrix of the two components extracted from the analysis of principal components with varimax rotation.

The reliability study revealed Cronbach's alpha coefficient values of 0.65 for component 1 and component 2 presents a Cronbach's alpha coefficient of 0.67.

Regarding the 9th grade questionnaire, the adequacy of the data for calculating the factor analysis was performed using the KMO measure, with the 0.59 value, a value at the acceptable limit (0.6) according to **Tabachnick** and **Fidell** (2013) and the sphericity test of Barlett significant ($\chi^2(120) = 434.27$; $p < 0.01$), so factor analysis can be considered adequate for this data set (**Tabachnick**; **Fidell**, 2013).

The total variance explained by the two components extracted was 37.90%. Table 2 presents the matrix of the two components extracted from the analysis of principal components with varimax rotation.

Table 1. Matrix of two components extracted from the analysis of principal components with varimax rotation – 4th and 6th grades questionnaire (n = 177)

Items	Component 1	Component 2
Q18	**.80**	.21
Q19	**.77**	.11
Q20	**.46**	.55
Q34	**.33**	.25
Q35	**.41**	.18
Q40	**.66**	.08
Q41	**.78**	-.03
Q42	**.67**	-.01
Q21	.03	**.53**
Q22+23	.00	**.49**
Q24	.14	**.49**
Q25	.07	**.43**
Q 28	.30	**.58**
Q29	.33	**.52**
Q30	.04	**.27**
Q31	-.12	**.37**
Q32	.11	**.47**
Q33	.27	**.71**
Q39	.13	**.67**
% total variance	25.84	10.75

Table 2. Matrix of two components extracted from the analysis of principal components with varimax rotation – 9th grade questionnaire (n = 86)

Items	Component 1	Component 2
Q18	**.49**	.20
Q19	**.47**	.14
Q35	**.57**	.34
Q40	**.65**	-.41
Q41	**.70**	-.16
Q42	**.76**	-.37
Q21	-.01	**.36**
Q22	-.03	**.44**
Q25	.30	**.53**
Q28	.25	**.52**
Q29	.22	**.70**
Q30	-.06	**.82**
Q33	.38	**.39**
Q38	-.01	**.31**
Q39	-.22	**.58**
Q43	.01	**.51**
% total variance	16.65	21.25

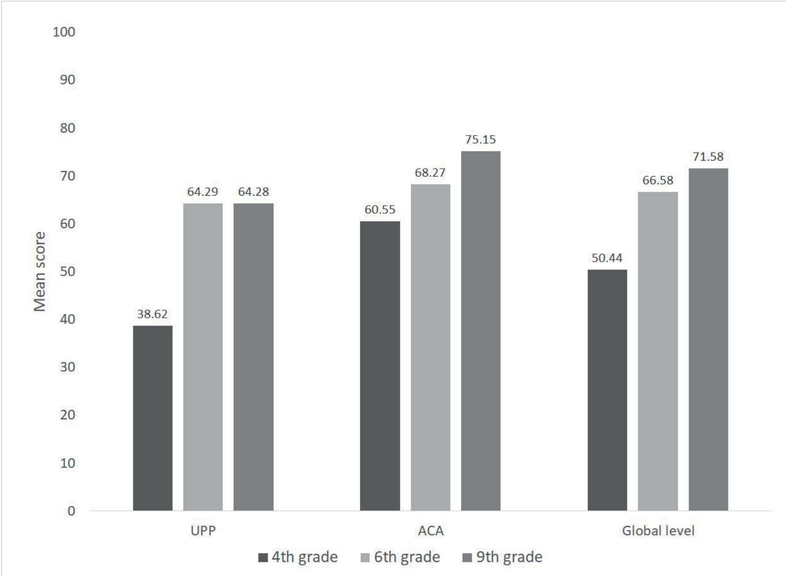
The reliability study revealed Cronbach's alpha coefficient values of 0.59 for component 1 and component 2 presents a Cronbach's alpha coefficient of 0.62.

It should be noted that all steps were taken to obtain the necessary authorizations to carry out the study in its various stages, namely with the *Direção-Geral da Educação*, from public and private schools and parents (authorization request and informed consent). All ethical requirements were followed, voluntary and anonymous participation was ensured, as well confidentiality of the data of all participants.

3. Analysis and results

The main results, presented on a scale from 0 to 100 points, point to an average score of the 4th grade participants, in the "Analysis, comprehension and assessment (ACA)" and "Use, production and participation (UPP)" dimensions of 60.55 and 38.62 points, respectively; the participants of the 6th grade presented a mean score in the ACA and UPP dimensions of 68.27 and 64.29 points respectively; 9th grade participants had a mean score in the ACA and UPP dimensions of 75.15 and 64.24 points respectively. Considering the global media literacy competences, the participants obtained a Global level (GL) of 50.44 points in the 4th grade, 66.58 points in the 6th grade and 71.58 points in the 9th grade.

These values are presented in the Graph 1.



Graph 1. Mean values by dimension and grade of schooling

Other results to be highlighted were those obtained by the study of the relation between the fact that the participants had addressed the media theme at some point in their schooling and their media literacy competences. It was found that, in the case of participants in the 4th and 9th grades, there is a statistically significant correlation concerning some dimensions of the media literacy competences considered.

Thus, with regard to the 4th grade participants, there seems to be a significant correlation between having already addressed the topic of media education at school and the Global level (GL) of media literacy (r= .257, p < .01) and also the variable ACA (r = .376, p < .05). To understand whether there were in fact differences between the averages of those who had or had not addressed this topic, a t test was conducted for independent samples. There were significant differences between the averages of those who have already addressed the topic in relation to GL and the ACA dimension. The average score on GL of students who at some point in their schooling addressed the topic (M = 52.11; SD = 10.25, n = 52) is significantly higher compared to students who did not address the topic (M = 46.80; SD = 7.18, n = 24), t(74) = -2.29, p = .025. The results regarding the ACA dimension were similar as it was found that students who had already addressed the topic (M = 62.75; SD = 8.07, n = 52) had a significantly higher average compared to students who had not addressed it (M = 55.80; SD = 9.25, n = 24), t(74) = -3.33, p = .001. The UPP dimension did not show significant differences in relation to students who have already addressed the topic (M = 39.69; SD = 18.04, n = 52) and those who have not addressed it (M = 36.29; SD = 12.68, n = 24), t(61.74) = .943, p = .349.

For the 9th grade, the correlation is statistically significant with GL (r = .284, p < .01). To understand whether there were in fact differences between the averages of those who had or had not addressed this topic, a t test was conducted for independent samples. The average of the GL variable of students who at some point in their schooling addressed the topic (M = 72.93; SD = 7.09, n = 57) is significantly higher in relation to students who did not address the topic (M = 68.74; SD = 5.68, n = 27), t(82) = 2.69, p = .009. There were no significant differences regarding the ACA variable between those who addressed (M = 75.94; SD = 7.89, n = 57) or not the topic (M = 73.01; SD = 7.07, n = 27), t(82) = 1.64, p = .104, as well as in relation to the UPP variable. The average of those who addressed the topic (M = 65.59; SD = 12.52, n = 81) is not significantly different from that of those who did not approach it (M = 62.00; SD = 8.07, n = 36), t(99.91) = 1.85, p = .067.

The relation between media literacy and the frequency of media used was also analysed. The results show no significant correlation with ACA dimension. However, there was a statistically significant correlation between the variables UPP and GL and the frequency of media used for the three years studied:

UPP: 4th grade r = .513, p < .01; 6th grade r = .468, p < .01; 9th grade r = .269, p < .01

GL: 4th grade r = .402, p < .01; 6th grade r = .327, p < .01; 9th grade r = .277, p < .01)

4. Discussion and conclusion

Analysing the results from a global perspective of the studies carried out, the "Analysis, comprehension and assessment" (ACA) dimension was the one in which the students participating in the study apparently obtained better results. About half of the participants of all the years of the present investigation obtained scores above the respective average. This result is supported by previous studies, such as the studies by **Zhang** and **Zhu** (2016) and **Costa**, **Sousa**, and **Tyner** (2019). However, analysing the results regarding some themes included in this dimension, it is important to emphasize that there were some difficulties related to the analysis and interpretation of languages (text, sound, and image) present in a media content (4th, 6th and 9th grades), with the understanding of the purpose of a media message (4th grade) and the lack of knowledge about the reliability of information (4th, 6th and 9th grades).

Regarding the "Use, production and participation" (UPP) dimension, it was the participant students of the 4th grade who obtained the lowest results. The 6th and 9th grade students were those who reported having more knowledge about the use of technological tools, an area where 4th grade students have more difficulties and less knowledge. These results agree with the study *La enseñanza obligatoria ante la competencia en comunicación audiovisual en un entorno digital*, with regard to the technology dimension included in the conceptual framework considered, which assesses knowledge about the functioning of technological tools for audiovisual communication and digital (**García-Ruiz**; **Gozálvez**; **Aguaded**, 2014).

The production and participation competences of the surveyed students proved to be very low and not very complex. There is a tendency for simple participation by pressing *like* or content sharing, as well as productions not very elaborate, where the highest percentages points were for the creation of a page in a social network, contrasting with low percentages of productions with a higher degree of complexity, such as creating podcasts or videos. These results are similar to those of the *EU Kids Online Portugal* study, where creative activities or civic participation showed almost residual values (it is worth noting the fact that this study only considers online activities) (**Ponte**; **Batista**, 2019) as well as to those of the study by **Zhang** and **Zhu** (2016) where the dimensions creation and communication, and civic participation were the ones that obtained the lowest results.

Thus, the results of the present investigation point to a need for training, generalized to the three grades studied, concerning the UPP dimension, with regard to the participation and production of media content. Training needs were also identified considering the ACA dimension, particularly in relation to the analysis and interpretation of languages present in media content and knowledge about information reliability.

It was identified, in the 4th grade participants, the need for training regarding the UPP dimension, in particular the use of digital tools, and in the ACA dimension in terms of understanding the objectives of media messages. Regarding the 9th grade students, the training needs on practices related to online security stand out.

In order to overcome the identified needs, we present some suggestions for intervention, such as the use of educative resources already available, as well as taking advantage of the framework and work possibilities already contemplated in curricular guiding documents, namely the Essential Learnings of the Portuguese subject (Portuguese curriculum guidance documents for planning, carrying out and evaluating teaching and learning) and some contents of the ICT subject. We also consider that it is extremely important to invest in developing critical thinking competences, as these competences are an imperative condition and strongly related to media literacy competences, as **Arke** (2005) shows in his studies. Thus, since the promotion of critical thinking must be, according to **Tenreiro-Vieira** and **Vieira** (2000), an act of conscious, explicit, and systematic teaching, the authors argue that it is necessary to apply a pedagogical strategy that guides teachers in planning activities, in particular those related to the construction or reformulation of activities that explicitly require the use of critical thinking competences. The **Ennis** Framework (1985) is pointed out as a possible teaching-learning strategy for this purpose. We underline the great importance of teachers' use of the aforementioned *Referencial de educação para os media*, as a central and guiding document to approach the theme of the media, within the scope of the Citizenship and Development component of the Portuguese curriculum.

With this study, we present here another contribution towards deconstructing the belief that digital natives have specific characteristics that give them more media literacy competences just because they were born surrounded by new technologies. The present investigation confirms that, effectively, the use of media by itself does not increase the critical dimension of media literacy competences. It should be noted that, in the 4th, 6th and 9th grades, it was found that there is no significant correlation between the frequency of use of the media and the ACA dimension, which corroborates what has already been exposed in the literature that shows that greater access and use does not itself imply greater competence, namely with regard to the critical understanding of media messages (**Buckingham**, 2009; **Buckingham** *et al.*, 2005; **García-Ruiz**; **Ramírez-García**; **Rodríguez-Rosell**, 2014; **Matos**; **Festas**; **Seixas**, 2016).

> The results point to a need for training, generalized to the three grades studied, concerning content production and participation. Training needs were also identified in relation to the analysis and interpretation of languages present in media content and knowledge about information reliability

We highlight another important result that confirms the importance of media education in the development of media literacy. We found that students who, at some point in their schooling, addressed media themes tend to have better levels of media literacy. It is therefore essential to reflect on the role of schools and teachers in media education.

Therefore, is essential to invest in a policy focused in the training of teachers in the media area, a topic that has not had the due importance in Portugal, neither in the initial training of teachers, nor in continuing education, although there are some slow advances (**Pinto**; **Pereira**, 2018). There are several relevant guiding documents in this area, namely *Think critically, click wisely! Media and information literate citizens* (**Grizzle** *et al.*, 2021) and the *Currículo Alfamed de formação de professores em educação midiática AMI (alfabetização midiática e informacional) na era pós-COVID-19* (**Aguaded** *et al.*, 2021).

In parallel with the school context, we also emphasize the importance of the role of parents and family in the development of media literacy in children and young people. Not only for the sharing of experiences that must occur, but also through parental mediation for a critical use of the media.

Thus, is extremely important to emphasize that digital natives should not be considered a population with good proficiency in using the media, in order to avoid the risk of undervaluing the training of young people in this area, and it is equally pertinent to emphasize the importance of teachers and parents/guardians.

Considering the context of the Covid-19 pandemic, and the fact that this work was largely carried out in the pre-pandemic period, we consider that its findings may assume particular relevance for the contribution they make to understanding the difficulties and challenges that were felt in educational contexts by students and teachers during the lockdown due to pandemic, as a result of the sudden virtualization of educational activities, and thus, to help envisage lines of action that contribute to overcoming those difficulties, and to prepare educational systems to respond to potential future crisis contexts, making use of what digital media can offer.

The research focused on remote teaching experiences during the pandemic revealed obstacles and difficulties associated with the abrupt migration to the digital environment, as well as opportunities to explore the new educational situations created. Some studies that aimed to know the perceptions of teachers at different levels of education about the challenges posed by online teaching, namely related to students' media and digital literacy skills, point to results that are in line with the main conclusions of our investigation, in what concerns to the weaknesses we found in the skills of critical analysis and interpretation of information, assessment of the reliability of information and media messages. In a comparative study carried out in Latin America (**Mateus** *et al.*, 2022), which aimed to understand the perspectives of basic education teachers on the opportunities and challenges resulting from the pandemic in terms of media education, the participating teachers point out as a priority, precisely, the promotion of students' skills to critically analyze the media, to understand media social role in informing about the world, skills that they consider essential to benefit from the opportunities they offer.

Another study carried out to characterize the digital and information skills of university students, before and during the pandemic (**Sales**; **Cuevas-Cerveró**; **Gómez-Hernández**, 2020), revealed that from the teachers' perspective, students do present a predisposition to use technology, although they reveal a lack of critical reflection skills, difficulties in searching, analysing and evaluating the veracity and adequacy of the information they find, results that are consistent with the difficulties that the students in our study revealed, namely in terms of assessing the reliability of the information. Moreover, teachers did not find improvements in terms of information and digital literacy, as a result of the experience of remote teaching during the pandemic, and they express their concern given the relevance of those skills, which in addition to being reflected in the academic training of students, are essential for their integral formation and the exercise of citizenship.

A more recent study to assess media literacy skills carried out with Portuguese primary and secondary school students (aged between 14-18), whose data already reflect the teaching experiences during the pandemic period, reveals results consistent with those obtained in our study, with students demonstrating difficulties in terms of production and sharing/ dissemination of content, as well as in terms of understanding the language of the media (*ERC - Entidade Reguladora para a Comunicação Social*, 2021).

Also, in line with the results of our study and with the conclusion that the training needs of digital natives should not be disregarded, a study on the adaptation to online teaching of early career teachers during the pandemic period extends the reflection to teacher training. The study authors concluded that the fact that younger teachers belong to the generation of digital natives does not guarantee that they have developed sophisticated digital skills (**König**; **Jäger-Biela**; **Glutsch**, 2020).

> With this study, we present here another contribution towards deconstructing the belief that digital natives have specific characteristics that give them more media literacy competences just because they were born surrounded by new technologies

In fact, the explosion of digital content and the vast amount of (des)information and fake news produced and put into circulation during the pandemic, giving rise to the concept of "infodemic" (**König**; **Jäger-Biela**;

Glutsch, 2020), have made it even more evident the importance of developing citizens' media literacy. Thus, the training needs of students and teachers that are inferred from our results as well as from the referred studies, focused on the pandemic period, converge on the importance of reinforcing a critical and reflective dimension in education for media literacy.

> It is extremely important to emphasize that digital natives should not be considered a population with good proficiency in using the media. It is equally pertinent to emphasize the importance of teachers' and parents/guardians

It is worth noting that we found that students who, at some point in their schooling, addressed media themes tended to have better levels of media literacy, which constitutes a factor of optimism regarding the possibilities of educational intervention in this domain, in line with studies that point to the same direction, developed during the pandemic, as is the case of a study carried out with students of English as a foreign language, in a virtual classroom, in the covid-10 lockdown period (**Bilotserkovets** *et al.*, 2021). The authors of this study demonstrated that it is possible to develop students' critical media literacy skills by carrying out creative activities of analysis and discussion of social media texts and using social media resources. No less relevant is the fact that this study demonstrates the importance and benefits of integrating intentionality into educational actions with regard to the promotion of media literacy, that is, of consciously, explicitly, and systematically (**Tenreiro-Vieira**; **Vieira**, 2000) incorporating media education objectives when teaching other subjects, and when using digital educational resources.

We would also like to draw attention to the interest of the present study in the area of research that focuses on the assessment of media literacy skills. Considering the scarcity of studies evaluating the media literacy of citizens, to which European entities have been drawing attention, this study offers a characterization of the media literacy skills of basic education students, which could serve as a reference for monitoring the evolution of post-pandemic media literacy skills, in addition to constituting a contribution to the development of media literacy assessment tools, necessary for future research.

Limitations

The rigor and reasoning based on solid assumptions that we intend to comply with in the development of this research did not eliminate the presence of some limitations and constraints, so the results must be interpreted considering these limitations.

In methodological terms, we refer to the sampling technique. The sample was collected by a non-probabilistic method, so there must be some care in terms of extrapolating the conclusions to the universe in question (**Hill**; **Hill**, 2009).

It is important to mention the difficulty in constructing the assessment instruments used, related to the existence in the literature of numerous definitions of the concept of media literacy and, therefore, a huge variety of assessment instruments. For this reason, we believe that there is, in fact, a need to reach a consensus around the conceptual framework of media literacy, in order to be able to carry out systematic assessments of these competences (**Potter**, 2010), and to compare results from a reliable and valid way (**Livingstone**; **Thumim**, 2003).

Future research

Although we have presented some answers to the questions that guided the research here described, many questions arise that we suggest for future investigations. It is essential to investigate teachers' media literacy competences; at the school and family/parental level, it would be important to know better how the issue of the media is approached. Yet another line of research that seems relevant to us would be to extend the assessment of media literacy competences to younger children of preschool age, as well as the development of specific programs to be applied in kindergartens.

Considering the context of the Covid-19 pandemic, and the challenges that it has posed to education, by intensifying and accelerating the integration of digital in educational practices, it is equally pertinent to develop new studies, with greater temporal distance from the Covid-19 pandemic, that allow monitoring the evolution of the media literacy skills of students and teachers at different levels of education, and how educational policies and initiatives seek to meet the needs and difficulties that this particular public health context has contributed to revealing.

In view of all this, we believe that this work will contribute to the evolution of knowledge and development on the subject of the media and influence researchers to study more about it..

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Metaverse and education: the pioneering case of *Minecraft* in immersive digital learning

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Abstract

The metaverse is presented as a possible new technological iteration for the Internet. The generation of virtual universes in which the physical and the digital converge raises the question of how education will be addressed in these new systems. We find, however, pioneering exercises such as *Minecraft: Education Edition*. This platform is a version based on the popular sandbox video game, which was originally created by a community of teachers. The aim of this research is to analyze and describe the idiosyncratic characteristics of *Minecraft* as an educational platform, framing it as one of the pioneering exercises in the metaverse. To this end, we have employed a methodology that combines Multimodal Discourse Analysis with Grounded Theory and the Constant Comparative Method. As conclusions, we observe how the *Minecraft* Education platform reinforces from its approach pre-existing aspects from the physical world, resizing them to adapt them to its connected digital environment. These are key elements such as the identity of the participants, their ability to act within the system, creativity through lessons as a guide to the educational objectives and the community as the backbone of the process. At the same time, it presents differential components, such as the use of avatars, the transition from textual literacy to multimodal literacy, game mechanics that boost creativity or transhuman capabilities that defy physical space-time. All in all, the platform is designed for teachers, parents and managers, to whom it offers a series of benefits. Therefore, the pedagogical action will depend on their judgment and execution, especially through the elaboration of lessons and worlds, the management of the sessions and their interaction in community environments. It is their responsibility to ensure that the educational experience is truly empowering or, on the contrary, that it ends up being governed by reproductive criteria linked to symbolic violence.

Keywords

Metaverse; *Minecraft*; Education; Literacy; Educommunication; Digital; Creativity; Empowerment; Virtual reality; Media literacy; Internet; Learning; Communication; Pedagogy; Videogames.

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1. Introduction

1.1. The metaverse: a new possible iteration of the Internet

On October 28, 2021, Mark Zuckerberg made a global announcement about the restructuring of his technology company, which is now under the Meta brand. Beyond a simple rebranding, his presentation described a projection of the company into the metaverse: "I want to share what we imagine is possible, the experiences you'll have, the creative economy we'll all build, and the technology that needs to be invented" (*Meta*, 2021).

The origins of this concept can be found in science fiction, with the novel *Neuromancer* (**Gibson**, 1984) as a reference. The term "metaverse" was then taken up in *Snow Crash* (**Stephenson**, 1992). Etymologically, it combines the prefix "meta" (from the Greek μετά, meaning "after" or "beyond") and the word "universe." **Lee** *et al*. (2021) define it as a virtual environment that blends the physical and the digital, facilitated by the convergence of Internet and Web technologies and extended reality (XR). **Park** and **Kim** (2022) refer to a three-dimensional virtual world in which avatars participate in political, economic, social, and cultural activities. Other authors, such as **Jaynes** *et al*. (2003), focus on a new relationship of the human being with space–time through a simulation of the senses.

Dionisio, **Burns** and **Gilbert** (2013) state that the challenge for the metaverse is to identify a formula for moving from a set of sophisticated but completely independent immersive environments to a "massive integrated network of 3D virtual worlds or Metaverse thus establishing a parallel context for human interaction and culture" (p. 28). In their research, they highlight advances in four areas: realism, ubiquity, interoperability, and scalability. **Lee** *et al*. (2021) detail the pillars for building the most advanced state of the metaverse, which they call surreality, in which the physical and virtual worlds eventually merge, representing the final stage of the coexistence of physical–virtual reality. They divide this along two dimensions: technological enablers with the network, the cloud, artificial intelligence, computer vision, blockchain, robotics, user interactivity, and extended reality; and what they call the ecosystem, consisting of avatars, content creation, virtual economy, social acceptability, security and privacy, and trust and accountability.

Far from establishing itself as a franchise product of a single company, the metaverse as a business has attracted interest or suspicion from the world's leading technology companies, extending from the openness of Microsoft CEO Nadella, positioning his divisions dedicated to work environments and gaming, to the skepticism of Musk: "I think we're far from disappearing into the metaverse. This sounds just kind of buzzwordy" (in **Dillon**; **Mann**; **Nicolle**, 2021). There is, in any case, a predisposition on the part of a large fraction of the big digital industries for the metaverse to play a significant role in technological evolution. For Zuckerberg (in **Newton**, 2021), "The metaverse is a vision that spans many companies –the whole industry. You can think about it as the successor to the mobile internet. And it's certainly not something that any one company is going to build."

1.2. The metaverse and education: background

The 1960s and 1970s saw the development of virtual reality (VR) technology. Its origin had a pedagogical character in the form of flight simulation for the aerospace–military industry. In the 2000s, a new technological leap occurred with the incorporation of multi-user virtual environments (MUVEs) and augmented reality (AR), which harmonize, in real time and with the users' collaboration, digital information with physical information through different technological platforms (**Barroso** *et al*., 2019).

The power of immersion in the educational setting, following **Dede; Jacobson** and **Richards** (2017), depends on designs that use factors such as action, the social, and the symbolic/narrative, as well as sensory stimuli. Immersion through action involves allowing the participant in an experience to initiate actions that have novel and intriguing consequences. In the case of the social, immersion is related to reasoning processes between people who take advantage of their environment to make decisions and act in virtual spaces. With narrative/symbolic factors, it is possible to trigger semantic associations through the content of an experience. Finally, sensory immersion allows, through peripherals, an enhanced integration of the senses into the virtual space.

Immersion in connected digital environments is one of the idiosyncratic potentialities of the metaverse that is most often emphasized by authors (**Jeon**; 2021; **Kye** *et al*., 2021; **Dede**; 2009). **Kye** *et al*. (2021) also highlight the generation of a new social communication space and the high degree of freedom, "expanding student autonomy in the learning process by providing experiences form content consumers to creators" (p. 11). Telepresence (**Gandolfi**; **Kosko**; **Ferdig**, 2020) and motivation through gamified formulas (**Park**; **Kim**, 2022) are also included in this.

In general, the wide variety of analyzed educational experiences integrated into these virtual spaces offer positive learning results (**Kanematsu** *et al*., 2014; **Sung** *et al.*, 2021). In this regard, **Márquez-Díaz** (2020, p. 270) points out the particularities of virtual worlds that make them attractive for students and teachers, as they allow ubiquitous learning to be combined with other forms of digital learning such as mobile, hybrid, and microlearning, where the traditional pedagogical model goes from being static to dynamic, so that the student becomes the center of the process, as in the inverted and collaborative classroom. However, **Kye** *et al*. (2021) also reveal some shortcomings, such as the processing of personal data, vulnerability to crime under the cover of anonymity, or identity problems and complex adaptations to the real world for certain types of profiles. **Ortega-Rodríguez** (2022), on the other hand, points out the shortcomings in teacher training and a lack of interdisciplinary collaboration between technology and pedagogy.

1.3. *Minecraft Education*: from global phenomenon to community of educators

Beyond the aspirational part of the metaverse, there are already some projects in which several of the defining qualities described above converge. Among these is *Minecraft*, one of the most popular since its launch in 2011. This leading position is endorsed by the data provided by **Nadella** (2021), which place the video game as one of the main platforms in the sector, with almost 140 million monthly active users and an increase of 30% year-on-year. In economic terms, this means that the creators have generated more than $350 million thanks to the more than one billion downloads and experiences in *Minecraft*. Nadella himself, in *Bloomberg* (2021), positions the idea of *Minecraft* as metaverse. This is not a novel axiom. Several authors report a direct technological, conceptual, semiotic, and functional relationship, either as a pioneering project (**Sweeney**, 2019) as one of the platforms of the metaverse (**Jeon**, 2021; **Rospigliosi**, 2021; **Shin**; **Yun**, 2022), or as a type of metaverse in itself (**Yun** *et al.*, 2021).

Tessler *et al*. (2017, p. 1553) define it as "a popular video game whose objective is to build structures, travel in search of adventure, hunt for food, and avoid zombies", considering it to be "an open research problem since it is impossible to solve the entire game with a single AI technique". The solution to advance in *Minecraft*'s general mode is to acquire skills as subproblems are solved. These skills can then be employed again when the player encounters similar subproblems. In addition to the survival mode, *Minecraft* also has a creative mode that offers the player an unlimited amount of resources without danger of death. In both modes, players have demonstrated great originality and creativity in their gaming experience. **Lastowka** (2011) understands that the purpose of playing *Minecraft* is to use the game as a creative tool. This creative action is augmented primarily by the participation and involvement of the community, which has generated a large amount of documentation, wikis, forums, tutorials, and shared diegetic worlds. Its initial partnership with *YouTube* and now with live streaming platforms such as *Twitch* has led to its being used, rather unexpectedly, as a platform for the creation of audiovisual stories. In this way, the creative possibilities of the game have exceeded the expectations for and functionalities of the program itself.

The original version of *Minecraft Education* arose from the interest of groups of teachers who saw the comprehensive potential for integrating this sandbox into educational purposes. They organized themselves through wikis and forums, and it was from this collaborative nucleus that the first pedagogical experiences and guides emerged. In 2016, Mojang Studios, together with Microsoft Studios, the owners of the license, presented the official version of *Minecraft*: *Education Edition*, integrating or deleting the content created by that initial community.

The use of video games as a learning tool in schools has increased in recent years (**Marín-Díaz**; **Morales-Díaz**; **Reche-Urbano**, 2019). On its website, *Minecraft*: *Education Edition* explicitly states that it "prepares students for the future by building skills such as creativity, problem solving, and systems thinking, fueling a passion for play" ["*prepara a los alumnos para el futuro, construyendo habilidades como la creatividad, la resolución de problemas y el pensamiento sistémico, alimentando la pasión por el juego*"] (*Microsoft*, 2022). In addition, meaningful learning, digital futures, and social–emotional skills are directly mentioned. **Alawajee** and **Delafield-Butt** (2021) report the benefits of the proposal in terms of increased motivation, language development and academic learning in subjects such as science or history. In **Sánchez-López**, **Bonilla-del-Río** and **Soares** (2021), it is specified that *Minecraft* is a versatile and open platform, and that its vision is linked to cooperation, problem-posing, and the search for solutions and cyber citizenship through project-based learning (PBL). In this regard, **Kuhn** (2018, p. 221) advocates that, when grounded in constructivist principles of learning, "the open-ended nature of play and collaborative approaches encourage student communication and context-based language use". In an analysis on the results of the project's integration into the classroom, **Callaghan** (2016) highlights that the ability to collaborate, as well as the role of the teacher, contribute to the creation of a more participatory and engaged learning environment for students with their own learning, while also obtaining concrete results. As discussed by **Hill** (2015, p. 380), such cooperation in combination with critical thinking and construction in a virtual world game environment also allows students to successfully integrate digital citizenship into an immersive learning space. **Niemeyer** (2015, p. 10), in turn, focuses on non-formal learning environments linked to Minecraft, in which participants collaborate, learning from each other and working together to achieve common goals. The issue of increased motivation and engagement is recurrent in the results of a large body of research (**Alawajee**; **Delafield-Butt**, 2021; **Callaghan**, 2016; **Baek**; **Min**; **Yun**, 2020). However, for **Ames** and **Burrel** (2017), the predominant culture in *Minecraft* has largely been defined by the Euro–American middle-class interaction norms established by early users, suggesting that the platform tends to marginalize later arrivals with other cultural norms and expectations. The platform also raises some suspicions regarding age appropriateness, safety, technology use, and the generalization of learning (**Alawajee**; **Delafield-Butt**, 2021).

The purpose of this paper is to analyze and describe the idiosyncratic characteristics of *Minecraft: Education Edition* as an education-oriented platform, framing it as one of the pioneering developments in the metaverse..

2. Methodology

For the extraction of the data in a first phase, multimodal discourse analysis (MDA) was applied, taking as a reference framework the model of **Pauwels** (2012, p. 247), which provides “the foundations of a multimodal framework for analyzing websites from both a medium-specific and sociocultural perspective” . MDA deals with the theory and analysis of semiotic resources and semantic expansions that occur in multimodal phenomena, taking into account the different media options and combinations available. This technique allows us to specifically address resources that are different from language, inter-semiotic expansions of meaning, and the resemantization of multimodal phenomena as social practices develop (**O’Halloran**, 2011, p. 120). This responds specifically to the multimodal nature of the *Minecraft Education* project and also facilitates the observation of intermodal relationships and their possible resemantization in the framework of the metaverse.

Table 1. Pauwels’ (2012) multimodal discourse analysis proposal

A MULTIMODAL FRAMEWORK FOR ANALYZING WEBSITES

1. Preservation of First Impressions and Reactions

- Categorization of ‘look and feel’ at a glance
- Recording of affective reactions

2. Inventory of Salient Features and Topics

- Inventory of present website features and attributes
- Inventory of main content categories and topics
- Categorize and quantify features and topics
- Perform ‘negative’ analysis: significantly absent topics and features

3. In-depth Analysis of Content and Formal Choices

3.1 Intra-Modal Analysis (fixed/static and moving/dynamic elements)

- Verbal/written signifiers
- Typographic signifiers
- Visual representational signifiers
- Sonic signifiers
- Lay out & design signifiers

3.2 Analysis of Cross-Modal Interplay

- Image / written text relations and typography-written text relations
- Sound / image-relations
- Overall design / linguistic, visual and auditory interplay

3.3 In-depth ‘negative’ analysis

4. Embedded Point(s) of View or ‘Voice’ and Implied Audience(s) and Purposes

- Analysis of POV’s and constructed personae
- Analysis of intended/implied primary and secondary audience(s)
- Analysis of embedded goals and purposes

5. Analysis of Information Organization and Spatial Priming Strategies

- Structural and navigational options and constraints (dynamic organization)
- Analysis of priming strategies and gate keeping tools
- Analysis of outer directed and/or interactive features
- Analysis of external hyperlinks

6. Contextual Analysis, Provenance and Inference

- Identification of sender(s) and sources
- Technological platforms and their constraints/implications
- Attribution of cultural hybridity

Following that author’s criteria regarding the possibility of adapting the model to select and coding the most significant parameters according to the research objectives (**Pauwels**, 2012), section 1 of this proposal was removed. Moreover, sections 4 and 6 were integrated into a descriptive sheet, while section 5 was incorporated into the inventory to provide greater clarity. To deepen the processing and grounding of the analysis with respect to the aim of the current work, grounded theory was applied in a second phase to arrive at an inductive theory on a substantive area (**Glaser**, 1992, p. 30), as well as the constant comparative method (CCM), which combines “the inductive coding of categories with a simultaneous comparison of all the units of meaning obtained” (**Glaser**; **Strauss**, 1967).

In this way, the information obtained was codified, while highlighting the most significant elements and a synthesis of the key points through memos. The codebook was defined following **Roberts**, **Dowell** and **Nie** (2019) on the basis of the results of the first phase of the analysis together with key elements extracted from a review of the scientific literature on the metaverse in education and analyses performed on the *Minecraft: Education Edition* platform (**Sánchez-López**, 2020). The *Atlas.ti* software was used for data analysis. Before the final processing, the final version of the coding was confirmed and validated by two external experts in the educommunication field. Returning to **Roberts**, **Dowell** and **Nie** (2019), we define codes and topics on the basis of detailed descriptions and restrictions on what can be included in each code:

Table 2. Codebook for the development of grounded theory and CCM

Code	Subcode	Definition
TE, technological enablers (**Lee** *et al*., 2021)		Integration of technological potentials for the improvement of teaching–learning processes in digital environments
	HM, hypermedia (**Sánchez-López**, 2020)	Use and integration of hypermedia, understood as the sum of hypertext plus multimedia, for the improvement of teaching–learning processes
	IT, interactivity (**Sánchez-López**, 2020)	Use and integration of interactivity, understood as the possibility of the user to be active in a world (and social environment) and that this responds to their actions, for the improvement of the teaching–learning processes
	VT, virtuality (**Sánchez-López**, 2020)	Use and integration of virtuality, understood as the generation of binary time–spaces for the improvement of teaching–learning processes
	TM, Narrative transmedia (**Sánchez-López**, 2020)	Use and integration of the expansion of narrative elements on multiple platforms for the improvement of teaching–learning processes
	CN, connectivity (**Sánchez-López**, 2020)	Use and integration of the connection between human nodes and algorithmic nodes for the improvement of teaching–learning processes
IL, immersive learning (**Dede**; **Jacobson**; **Richards**, 2017)		Use and integration of immersion for the improvement of teaching–learning processes
	AC, Actional Factor (**Dede**; **Jacobson**; **Richards**, 2017)	Formulas to allow the user to perform actions that have consequences in the system
	SC, Social Factors (**Dede**; **Jacobson**; **Richards**, 2017)	Formulas to generate relevant social interactions among users
	NF, Narrative Factors (**Dede**; **Jacobson**; **Richards**, 2017)	Formulas to promote associations of meaning on the basis of history and the content of the experience
	SF Sense Factors (**Dede**; **Jacobson**; **Richards**, 2017)	Formulas for the integration of the senses into a virtual space

Data collection for the sample and analysis were performed during the month of May 2022.

3. Results

3.1. F1. Multimodal discourse analysis

3.1.1. Main project data

Table 3. Main identifying data of *Minecraft: Education Edition*

Project name	*Minecraft: Education Edition*
Launch year	2016
Production company	*Mojang AB*, *4J Studios*, *Microsoft Studios*
Slogans	- Stories in the classroom - Reimagine education - Anyone can teach and learn with *Minecraft: Education Edition* - Learning twenty-first-century skills
Target audience	3-18+ years
Information and context	The project contains the core of the experience, which is an adapted version of the video game *Minecraft*, along with a whole construction around a Web platform in which the educational components are enhanced. *Minecraft: Education Edition* has just released a new organization of the website, which is based on four pillars: "Discover," "Get Started," "Resources," and "Connect." The origin of the Web platform lies in work carried out by a community of teachers who also had a *Mojang AB* license for the video game through the company Teacher Gaming.

3.1.2. Inventory of main characteristics

We now present a description of the elements that make up the main sections of the project.

3.1.2.1. *Minecraft: Education Edition*

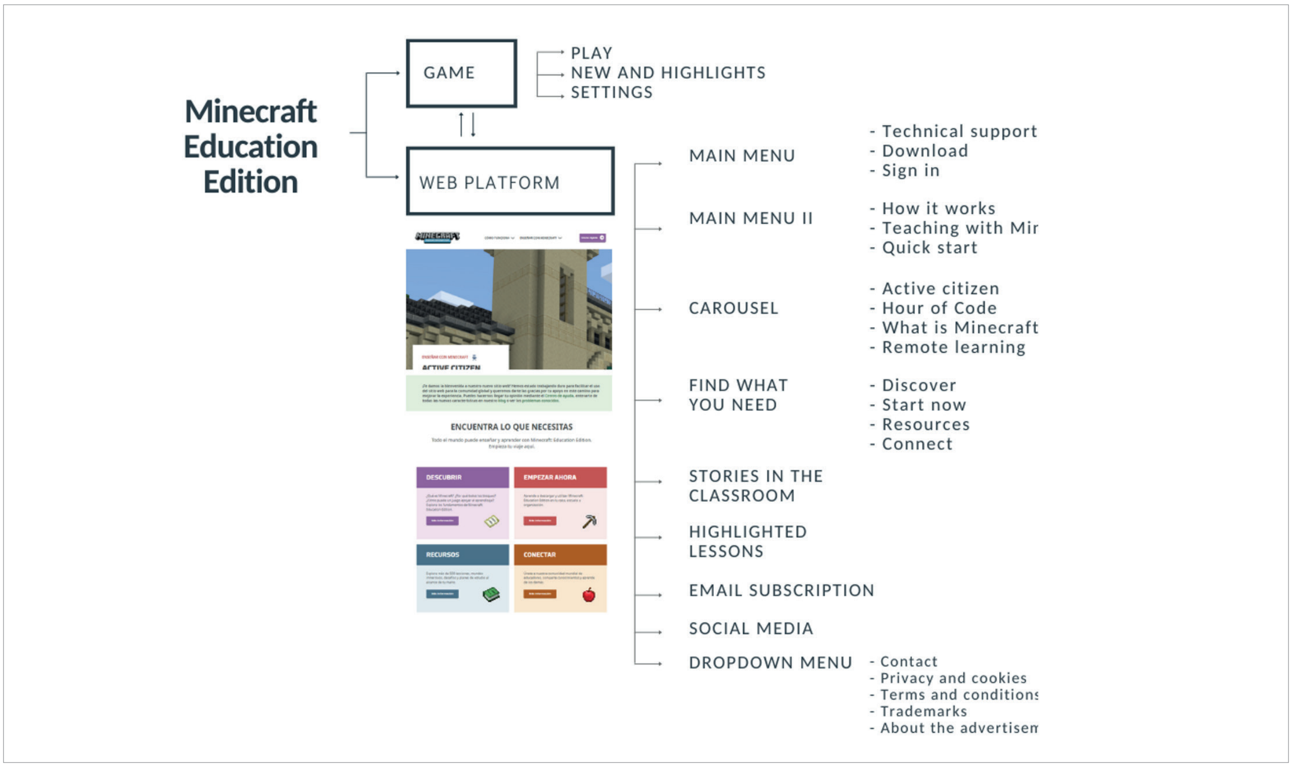

Figure 1. Structure of the *Minecraft: Education Edition* platform (*Microsoft*, 2022).

3.1.2.2. Web platform: main menu

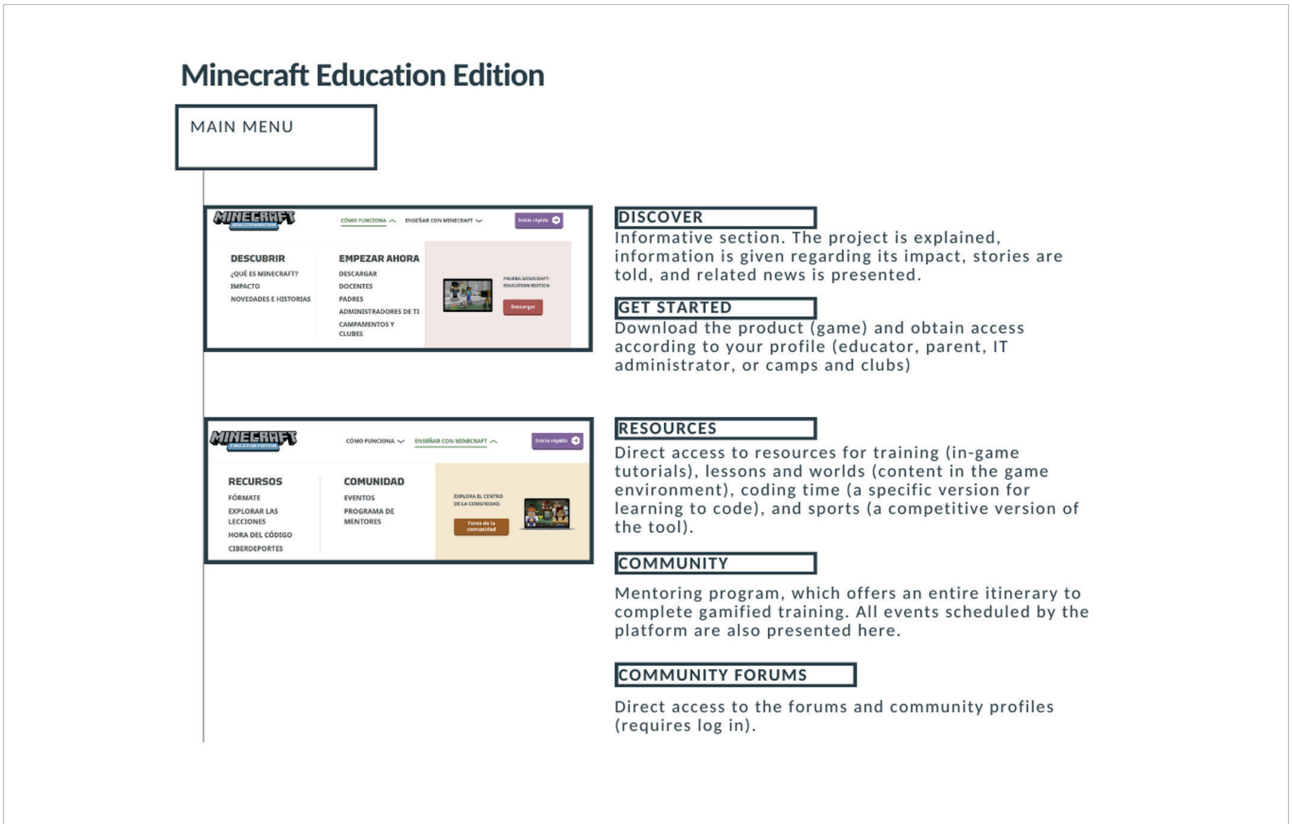

Figure 2. Elements that make up the main menu of the Web (*Microsoft*, 2022).

3.1.2.3. Game

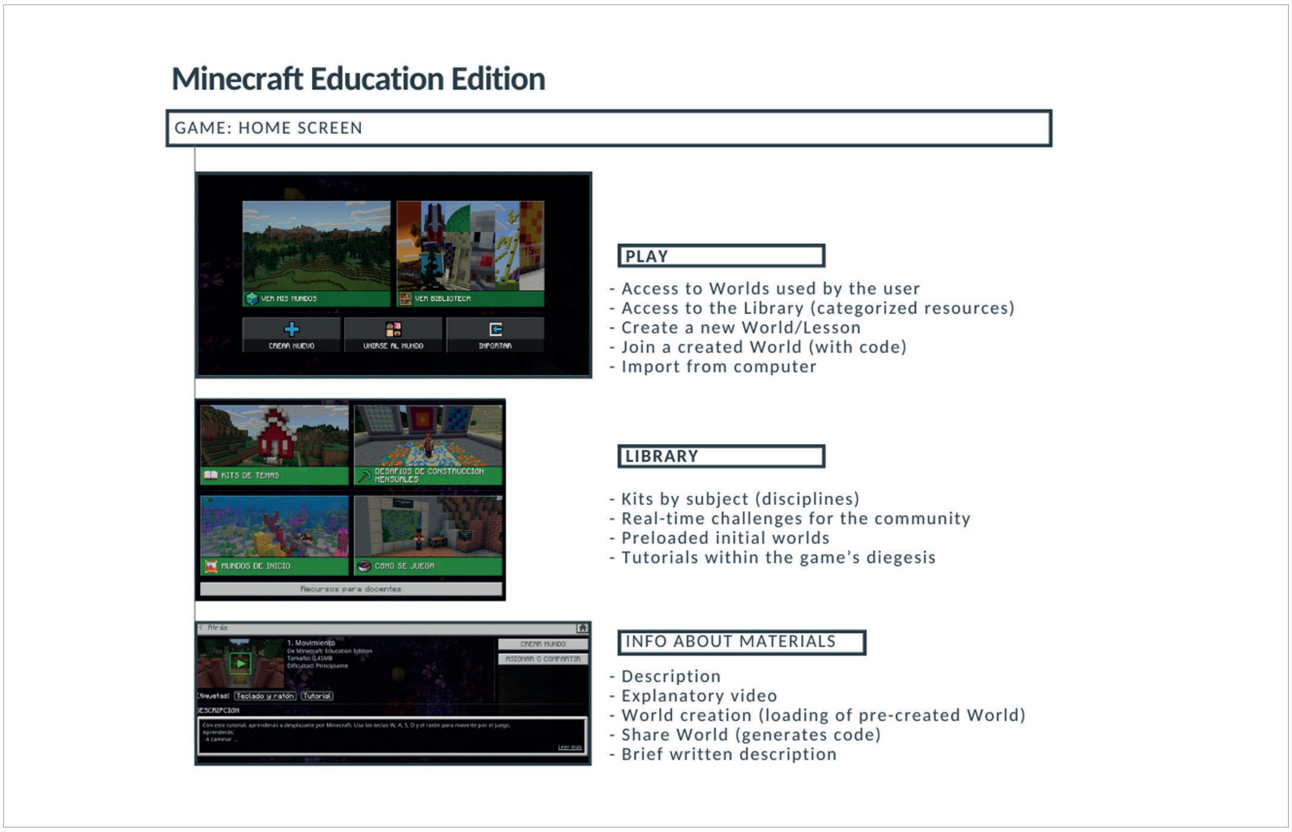

Figure 3. Main elements of the initial interface of the game (*Minecraft Education Edition*, 2022).

Figure 4. *Minecraft: Education Edition* game descriptors (diegesis) (*Microsoft*, 2022).

3.1.3. Intermodal analysis

This section describes the main characteristics of the signifiers that make up the content of the proposal, paying special attention to the game's diegetic universe.

Table 4. A synthesis of the signifiers, symbols, and metaphors in *Minecraft: Education Edition*

Verbal/written signifiers	The educational version introduces these into the game.
	A digital representation is used through: - Boards - Logbooks/portfolios - Non-playable characters (NPCs)
	They are editable. - The boards are informative/descriptive in nature. - NPCs incorporate a dramatic nuance. - Logbooks/portfolios allow the user to include their own writing.
	However, in the diegetic world, this loses importance in the face of the digital audiovisual representation.
	It continues to have significant weight specifically on the Web platform (in all its sections) and in the lesson descriptions.
Typographic signifiers	In the virtual environment of the game, the graphics exhibits its own (pixelated) esthetics.
	The Web platform uses a single representative typography, except for the logo.
Signifiers of visual representation	The game starts from an imitation of the reference world but introduces elements from the (already iconic) imagination of, and constructions by, the users.
	Pixelated blocks are its most defining feature. The objects have the same esthetic representation. These blocks are the raw material of the representations.
	The mimesis extends to biomes, day/night cycles, climatic changes, etc.
	It is dynamic: it changes depending on the World/lesson loaded and can be altered in real time. New signifiers can be created.
	The default perspective is first-person.
	The Web platform and game follow the same esthetic lines, albeit in different environments.
	The multimodal elements of the Web (videos, graphics, and images) share an esthetic universe.
Audio signifiers	The game has its own soundtrack. Minimalist music accompanies the player (depending on the world).
	A whole series of effects can be activated by the user through the avatar or the World in an independent manner.
Design signifiers	A universe with a shared graphic design on the Web and in the game.
	Elements representative of the real world in the game usually respect color analogies.
Metaphors	The universe and the actions in *Minecraft: Education Edition* could be considered metaphorical, although one might wonder about the meaning of this figure of speech in virtual contexts.
Symbols	The objects "imitated" in the virtual context have a symbolic value from the virtual–referential analogy.
	In the virtual environment, the symbol acquires the value of diegetic reality.
	The same symbolic representation is used on the Web platform, offering continuity.

3.1.4. Cross-media analysis

The following table presents a synthesis of the relationships between the multimodal components.

Table 5. Relationships between multimodal elements in *Minecraft: Education Edition*

Relationships between image/text and typography	- On the Web platform, there is an effort to reduce the importance of text, presenting very brief descriptions accompanied by images or videos. - The text still operates as a hyperlink. - These hyperlinks connect the Web platform and the game as well as the Web and game to the outside. - In the game, the text is integrated into the virtual environment, being substantiated in the diegesis. - In the presentation of lessons on the Web, more text is used.
Relationships between sound/image	- Minimalist music and images operate together in the construction of the universe. - Effects respond to the interactions of the avatars or the actions of the represented objects. - Fictional sound is generated for elements that do not exist in the reference world. - In the general navigation on the Web platform, no sound is used. - In the videos, overdubbed music and fake live vocals are used on most occasions.
General design/interactions between image, audio, and text	- The representations of virtual worlds are generated from the interaction between image, audio, and text, the latter being the least used. - Mechanics and interaction are incorporated into this triad for the generation of the experience. - In the loaded worlds, interactions occur beyond the action of the player/user. - On the Web platform, text has greater importance, but there is a trend toward reduction. - In the lessons, the proportions are reversed, with text gaining in importance.

3.2. Results of grounded theory and the constant comparative method

3.2.1. Technological enablers

3.2.1.1. Hypermedia

In the diegesis, the start menu offers limited options for direct access to the experience and settings (accessibility search). In the game experience, the hypermedia structure replicates the way the game works, with the addition of connectivity through NPC. The incorporation of predesigned experiences provides code-driven stepwise trajectories.

The hypermedia structure of the Web fulfills several key functions: positioning the products that make up the experience (Hour of Code, Active Citizen, and *Minecraft Education*), functions and services (Discover, Get Started, Resources, and Community), and facilitating accessibility and usability by presenting possible itineraries to users. It also splits the experience by profile: teachers, parents, IT administrators, and camps and clubs.

At the center of the hypermedia structure are the resources and the community. Each has its own space, but they are directly interrelated. The resources do not just present the lessons: they provide a roadmap for getting started, support, and tools to enhance teacher creativity. The community focuses on members, but also on gamified training.

Table 6. Key data about the hypermedia (HM) technology enablers code

HM code Use and integration of hypermedia, understood as the sum of hypertext plus multimedia, for the improvement of teaching–learning processes
The Web platform fulfills the functions of accessibility (focusing on support for new users) and usability (getting the most out of everything it has to offer). The game is accompanied by resources and the community. There is a combination of codes, prioritizing the combination of text and image and video with explanatory/informative uses. Esthetically, it is governed by the design of the game. The experiences predesigned by the platform's managers are a priority, and renewed on a seasonal basis. In the game's diegesis, it is worth highlighting the strategic use of NPCs as elements to hyperlink the experience with the outside world. In addition, this educational version incorporates its own mechanics to connect the experience between the physical and virtual worlds (camera, notepad, and panels).

3.2.1.2. Interactivity

Interactivity becomes a central axis of the platform. Without this, experiences do not develop. *Minecraft: Education Edition* offers multilayered and multilevel interactivity. On the Web platform, in addition to the conventional "click and go" interactions, there is a comprehensive reinforcement of the interconnection with the community, with a tracking system between profiles, comments, etc. (social). In the game, and from the center of the avatar as an identity representation, one can interact with objects (construction/deconstruction and crafting), with other players, and with NPC. The World Generator also enjoys a whole series of privileges for the construction of lessons and the administration of the other profiles. The educational version includes various tools that are specific to the project, viz. the camera, the logbook, and the panels. The former two provide a means of interaction between the virtual world and the physical world by enabling the transfer of images and comments from one environment to another.

Table 7. Key data about the interactivity technology (IT) enablers code

IT code Use and integration of interactivity, understood as the possibility of the user to be active in a world (and social environment) and that this responds to their actions, for the improvement of the teaching–learning processes
From its recreational base, the tool expands the possibilities of interactivity in the virtual environment of the game and the Web. One can note: - Community enhancer. System to enhance interaction between administrator profiles. - Narrative enhancer. Tools are incorporated to create a narrative to accompany the lessons. - Creative enhancer. Ability to build, destroy, and craft. - Agency enhancer. Protagonism through the avatar and the power to act and transform the Worlds (with separation of status). - Entertainment enhancer. Origin in the video game and its mechanics, although it will depend on the use of the Administrator. - Immersive social enhancer. Tools to encourage interaction between profiles in the virtual environment.

3.2.1.3. Virtuality

Minecraft: Education Edition combines two types of virtuality: a typical multimodal desktop interface (Web 2.0) and one close to virtual reality (immersive environments with telepresence and interactivity). The virtual Web generates a community space and a repository of resources with identity (with registration as a starting point).

In the case of the game, there are multiple worlds with a common base of physics, esthetics, and mechanics, although configurable and, above all, editable. The worlds are created by the administrators and can be modified by the students. Once the playable tutorials are completed, the platform is oriented toward synchronous lessons in a multiplayer environment with real-time interaction.

Table 8. Key data about the hypermedia technology (HM) enablers code

VT code Use and integration of virtuality understood as the generation of binary time–spaces for the improvement of teaching–learning processes
The recreation of an iconic (and, in this case, popular) virtual space is a marker of identity and affection for the project. From the centrality of the registry and the avatar, the participants assume a role in the experience (identity) and a presence in the environment. Their ability to create or transform the didactic experience brings them into the realm of agency and protagonism. Interactions with third parties in real time in the diegetic space give it a social character. *Minecraft*'s playable base, along with its open-ended nature, the quantity of doable actions and tools, and transhuman abilities (such as flying), offer an exponential creative base when it comes to approaching lessons. In addition, those responsible for the platform (*Minecraft: Education Edition*) also offer their own itineraries, usually generated in partnership with third parties, where the story (narrative) takes on special relevance.

3.2.1.4. Transmedia narrative

The construction of *Minecraft: Education Edition* starts from an appropriation of the fandom formed of the teachers who started using the game for didactic purposes. This offshoot was reacquired by the root company with Microsoft's purchase of Mojang.

Representing the vital center of *Minecraft*, the transmedia vectors have diversified with expansive development of the story (*Minecraft Realms*, *Minecraft Story Mode*, etc.), versions based on new hardware (VR, Hololens, etc.), and media reappropriations (*machinima* on *YouTube*, gameplay on *Twitch*, etc.).

In the *Education* version itself, a series of expansions have been introduced over time. The Hour of Code or Active Citizen versions of their Worlds offer major extensions with different purposes for the developing platform. In addition, each new world/lesson generated by the users can be considered to represent an expansion of the educational universe.

Table 9. Key data about the transmedia technology (TM) enablers code

TM code Use and integration of the expansion of narrative elements on multiple platforms for the improvement of teaching–learning processes.
The fandom of the main product (the *Minecraft* video game) draws part of its community to this educational version. The adoption of worlds by using the World Generators creates a role that goes beyond prosumer, entering into the dynamics of content creators (didactic), with this aspect being the essence of the platform. The platform thus puts its expansion into the hands of users by offering an immersive virtual environment and a whole series of tools. Regarding such transmedia relations, it is worth mentioning the interest of the platform itself and its authors in updating and expanding its universe, both with technological innovations (the incorporation of new functions, tutorials, and versions) as well as in relation to content and its diversifying didactic purposes (thematic deepening, code learning, etc.). Connections to third parties (companies and institutions) are also interesting, pointing to collaborations at a macro level (beyond the internal relations of the users).

3.2.1.5. Connectivity/socialization

The platform offers a twofold approach to enhance the connective experience: the Web, with a social environment for teachers similar to that of a social network but based on projects, and the diegetic game, based on interaction between avatars (the learning community as a whole) with chat and interactivity as the main tool for intercommunication, plus hyperlinks to the outside world through integrated links via NPCs.

Social networks themselves would also imply a connective expansion, but it is via external appropriation (unofficial uses) that more content is produced, and with higher rates of impact and interaction.

Moreover, the digital experience is transferred to the physical space, integrating a calendar of face-to-face activities both on the Web platform and in the video game interface.

Table 10. Key data about the technology connectivity (CN) enablers code

CN code Use and integration of the connection between human nodes and algorithmic nodes for the improvement of teaching–learning processes
The core of the development represents a connective basis in a meta-structure: On the first level, we find the connection between teachers on the basis of identity (registration) and projects. On the second level, that of the diegetic experience, the multiplayer environment, together with interactivity, enable a whole series of social relationships, with the avatar as a base. The platform and game make up a compact, integrating experience, operating without the need for third parties. The opening up to other Internet spaces occurs on a very ad hoc basis on the Web, and is made possible through the NPC links in the game (manageable by the World Generators). A physical layer is promoted over the virtual layer, with the programming and dissemination of events and community meetings.

3.2.2. Immersion for learning

We use the taxonomy of **Dede**, **Jacobson** & **Richards** (2017), to delve into the actantial, social, narrative and sensory factors presented by the Minecraft Education platform. The extracted data will allow us to identify its proposal as an immersive environment, one of the nuclear qualities of the metaverse and its associated phenomena.

3.2.2.1. AC code: actional

Agency is configured through identity. The introduction of the avatar enables what one could call a transreal identity and thus the nondirect translation of the physical subject to the virtual space.

Its prominence is reinforced by design options, such as the subjective plane, but above all through interactivity. In *Minecraft: Education Edition*, users are given the power to transform the diegetic universe and experiment with the ability to create, destroy, and craft. The pixelated blocks, in this sense, are not only esthetic elements that allow for recognition of and feelings in the world, but also behave as units of meaning. In their creation or destruction, they compose symbolic and metaphorical elements within the environment.

The platform offers skills that do not exist in the referential world, which can provide differentiated approaches to learning. In addition to transhuman abilities (flying, for example), there is a redimensioning of time (for skills such as building, cooking, farming, etc.) and space (teleportation).

Since it is the intervention of the users that ends up building the experience based on a world or lesson designed by the teacher, the design of the lessons or the establishment of objectives becomes especially importance, since these are the features that enable the participating community to operate in pursuit of an end.

3.2.2.2. SC code: social

Socialization in *Minecraft: Education Edition* operates on three interconnected levels: two official ones, along with a third aspect based on appropriation. The Web platform reinforces the community connection on the basis of projects through a system similar to that of social media (likes, shares, and comments). This sociability is based on an identity registry, and also offers a whole system of empowerment based on accompaniment and support (tutorials, forums, and technical help) and recognition (status through gamification).

In the virtual world, the multiplayer component, interactivity, and chat are the enhancing elements (enhancers), allowing the whole participating educational community to congregate in the same virtual space–time. The relationships developed between the profiles will depend to a great extent on the previous preparation work and the educational project generated by the teacher, parent, or IT manager (the profiles defined by the platform). There are no preconceived social rules. The only rules are established by physical and mechanical rules. In this sense, administrators enjoy a series of privileges that make them hyper-empowered users (superusers), with capabilities such as limiting functions, “physically” controlling the student body, placing physical barriers in the world, or muting profiles during sessions. In a way, this represents a type of self-regulation in which the teacher has an *auctoritas* that is reinforced by their privileges in the system.

In terms of external socialization (outside the platform), the Web offers the option of configuring personal networks from one’s account, although this dimension is not promoted. Indeed, *Minecraft: Education Edition* functions as a self-contained, integrative experience. However, this does not exempt it from containing the third aspect mentioned above, viz. the appropriation and creation of multichannel content by its users. A special confluence with external platforms such as YouTube, Twitch, and social networks is observed. Its use is often linked to mentoring (tutorials) or to the dissemination of personal creations and experiences.

The first differentiating factor of *Minecraft: Education Edition* that drives the generation of a community is the fandom surrounding the original video game. The popularity of the game and the recognition and empathy it generates thus extend toward the educational project.

3.2.2.3. NF code: narrative factors

Minecraft does not have a predetermined base story, but it does have a universe with its own laws and cycles (temporality, different spaces and biomes, etc.). Its audiovisual characteristics, together with its mechanics, make it an identifiable space–time, which favors the integration of the user into the diegetic space. The story is told through the users’ interaction with this universe, through has its own rules of operation.

This extreme freedom offered by the game can lead to chaos, which is why in *Minecraft: Education Edition* the lessons and worlds take on special relevance. Lessons indicate objectives, processes, and goals. The influence of PBL is clear in this regard. The worlds are the ones that provide the environments and the mechanics (if any) in which the lessons will take place. With the design of the worlds, a narrative is also being constructed.

The administrator, through their lessons and the recreation of the worlds, is the one who decides how to incorporate the narrative (as well as the dramatic) component. In this regard, there is a second factor to take into account: participants may alter the proposed storyline through their own actions (for example, by ignoring the administrator’s instructions).

In addition, the company responsible for *Minecraft: Education Edition* has continued to publish itineraries for worlds and construct lessons on very specific themes and objectives in which the story takes on a fundamental value ("Active Citizen," "Hour of Code," etc.).

3.2.2.4. SF code: sensory factors

The *Minecraft Education* experience introduces its participants to an immersive universe in which the protagonism resides mainly in an idiosyncratic, three-dimensional visual section (pixelated blocks), but which is also reinforced in a very significant way by the musical setting (with its own soundtrack) and effects. The experience does not so much pursue realism as recreate a universe of its own in which the avatars are introduced with a subjective perspective. When using virtual-reality peripherals, telepresence and the transition to a digital space are reinforced at the sensory (especially visual) level. However, this version has not achieved the same popularity as the screen-based version, suffering from various obstacles such as the price of the kit, the bulky nature of the hardware, or the prevailing feeling of dizziness during prolonged use.

Through peripherals (mouse, keyboard/control, screen, and speakers), a high level of immersion in the *Minecraft* universe is achieved, without any diegetic integration of the senses of touch, taste, and smell. This follows the dominant technological line of contemporary audiovisual developments. With certain peripherals, there is a representation of haptic experience through vibration. The evolution of devices and diegetic universes may lead us to ask whether, phenomenologically, there is a different sensory dimension in the digital–virtual realm.

4. Conclusions

Minecraft: Education Edition was one of the pioneering projects to integrate educational objectives into experiences before the introduction of the metaverse. **Nebel**; **Schneider** and **Rey** (2016, p. 362) point out that, originally, "the simple sharing of worlds, creations, modifications, lessons, and experimental setups between teachers and researchers around the world without strong software restrictions" was what boosted its unintended use as an educational tool.

The current analysis reveals some of the potential of *Minecraft Education* to drive learning in a connected immersive environment.

First, the suggestive force of its own universe is highlighted. In the diegesis, we find a recognizable world with the ability to attract the fandom of the original video game to an educational environment. The interactive multimodal composition of the space in which the action takes place is presented as a differentiated media layer with respect to traditional text, and what **Price** (2020) criticizes as "pedagogical practices and the assessment of students' work based on literary models common in educational structures". Literacy thus moves from textual literacy to three-dimensional multimodal mediation.

A connective layer is added through the Web to the diegetic universe, and in that connected structure, the developers highlight three of the elements that they intentionally aim to enhance via the platform: identity, agency, and community. The latter two coincide with the actional and social factors collected by **Dede**; **Jacobson** and **Richards** (2017) for a meaningful learning experience in an immersive environment.

The identity aspect is provided, firstly, by registration through the Web (with metadata from the personal account), and secondly, through the users' selection of a diegetic avatar. The avatar, as a representation of the individual in virtual space, acquires special relevance in their projection into the metaverse. **Park** and **Kim** (2022) point out that it is an ideal shape that projects an outward appearance and reflects the ego. They also explain that younger generations consider the social meaning of the virtual world as just as important as that of the real world, since they think that their identity in virtual space and in reality is the same. In the case of *Minecraft: Education Edition*, this may not be obvious. Indeed, it provides more of a fictionalized projection of the self in a divergent environment with respect to physical space, unlike what might happen with self-representation on social media.

This identification of the "I" is what facilitates agency in the first instance; moreover, it provides the capacity to act and modify the virtual world from a personal or personalized perspective. In this sense, the avatar has a whole series of abilities that allow it to transform the diegetic environment, such as building, destroying, crafting, etc. Here we see the importance of having the ability to transform the universe, i.e., to cause changes in the system, although this does not substantially imply a link with empowerment. Such power is strengthened or weakened through the design and implementation of lessons and worlds, as well as extra-diegetic interaction through the community and forums.

Another idiosyncratic feature of this capacity of an agent lies in the transhuman capabilities. These are actions such as flying or teleportation in space, which can add value regarding the physical limitations of the real world. This redefinition of the relationship with virtual space–time already offers interesting options today, such as time travel to a representation of past epochs within the virtual diegesis. Agency, considered strategically, translates the learner from the realm of reception to that of emirec or prosumer depending on the approach, in what **Hill** (2015, p. 380) determined as a participation "as prosumers in digital culture" since they contribute content themselves, in addition to consuming it, "which illustrates the constructivist theory applied to the concepts of information literacy". However, *Minecraft* currently limits this role by not proposing a base option for students to generate worlds or lessons.

The mechanics, capacity for advocacy, and social system define an approach oriented toward creativity in the very genesis of the platform itself. The association between gameplay in the field of video games and creativity is a phenomenon that has been researched by various authors (**Blanco-Herrera**; **Gentile**; **Rokkum** 2019; **Jackson** *et al*., 2012). On the platform, this is especially reinforced for administrators, who benefit from a whole armamentarium of virtual resources for the creation of Worlds. In this sense, the categorized hypermedia presentation of the community's work, the gamified social system of profiles, and the forum itself are presented as elements that value creative action, recognize the work done, and accompany individuals during their construction processes.

The general community in *Minecraft: Education Edition* is reinforced in the platform in three areas: identity and agency, projects (lessons and worlds), and accompaniment (support). In the beginning, the wiki and the forum reached a higher degree of interaction. Currently, the extra-diegetic priority space is given over to mentors (certified teachers), forums, lessons, and worlds. In the diegesis, an immersive MUVE is provided, together with the chat, thus enabling constant, real-time interaction between agents as well as between agents and the environment within the virtual space. However, this participatory environment does not imply, per se, that the learning process is effective. **Dede**; **Jacobson** & **Richards** (2017) specify that it is necessary to go a little further. In this case, they propose that, "by mastering complex knowledge and sophisticated skills, students learn well in a Plan, Act, Reflect (PAR) cycle" [*"al dominar conocimientos complejos y habilidades sofisticadas, los estudiantes aprenden bien en un ciclo a Planificar, Actuar, Reflexionar* (*PAR*)"]. They thus first prepare for an experience that involves doing something they want to master, then they attempt that performance, and finally, they evaluate what was actually achieved.

In this infinite procedural environment, and with the great capacity for individual users to interact with the universe, the option that has prevailed in *Minecraft: Education Edition* has been to grant privileges over the Worlds and over the participants to the senior profiles (IT, parents, and teachers), and to place the meaning of the experiences in the lessons. It is these, created by educators, that give meaning, objectives, and purpose; They set the rules to avoid chaos. The narrative of the lessons, along with their readiness in the reference world, is what establishes what **Lee**; **Zhou** (2021, p. 44) call "social acceptability" and "trust and accountability." In this sense, the figure of the administrator (IT, parents, and teachers) receives *potestas*, with the possibility of muting participants or moving them to certain points on the map. Depending on the administrator, a vertical and reproductive educational experience may be generated, or dialogic and horizontal criteria may be chosen for the sessions.

On the basis of this short reflection on our analysis, the criterion of immersion as an element that enhances learning, whose nuances are confirmed by nearly all the authors consulted (**Jeon**, 2021; **Kye** *et al*., 2021; **Dede**, 2009), is seen to be relative. **Dede**; **Jacobson** & **Richards** (2017) present it as a core element for motivation and learning in some respects but are also aware of its limitations. From our point of view, no such environment is more immersive than the real thing yet. The added value of learning from the metaverse will have to be built on its differentiating functionalities with respect to physical reality (such as connectivity between global communities, the creation of universes inspired by worlds that no longer exist, or telepresence, diegetic teleportation, and the ability to fly in the approach of *Minecraft: Education Edition*), beyond immersion and simulation.

From a technological perspective, *Minecraft: Education Edition* offers a whole series of tools that, with thoughtful execution, have the ability to drive well-defined objectives of the learning experience, especially if specifically designed to be executed within their ecosystem (to use the term used by **Lee** *et al*., 2021). Virtually all articles investigating the suitability of integrating *Minecraft* into educational spaces put forward arguments in favor of it (**Niemeyer**; **Gerber**, 2015; **Dezuanni**, 2018; **Callaghan**, 2016). However, it is pertinent to recall at this point **Kaplún** (2002), who pointed out the strong permanence of "the communicational conception of sender/message/receiver", warning of the possibility that, "if digested ideas continue to be deposited in those who do not know, no matter how progressive the content may seem, we will continue to contribute to authoritarian, vertical and unidirectional communication" (p. 24).

Identity, agency, creativity, and community suggest a line of educational development applicable to both metaverse and physical world logics. In the transition to a digital immersive reality, *Minecraft: Education Edition* (with the exception of special lessons created by the platform itself) leaves the power and authority over the educational process in the hands of teachers, parents, and IT managers, thus repeating the preestablished patterns in the physical world. This will therefore determine whether the teaching–learning dynamics are oriented toward what **Zimmerman** (2000, p. 43) calls "a different approach to develop interventions and create social change", or if, on the contrary, those same tools are used to maintain symbolic violence, understood as the imposition of meanings as legitimate in pedagogical action (**Bourdieu**; **Passeron**, 1979).

Regarding the limitations of this study, restricting the sample to a single platform is a disadvantage when it comes to extending the results to the metaverse. Moreover, MDA is not effective when it comes to gathering the opinions and ideas of a fundamental component such as that of the users (in this case, of the platform). Along these lines, a possible avenue for future research would be to expand the technique to include a questionnaire and a focus group to gather the opinions of users as well as to increase the sample to a greater number of platforms.

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Information and communication technology (ICT) skills and job satisfaction of primary education teachers in the context of Covid-19. Theoretical model

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Abstract

The Covid-19 pandemic has shown that educational systems must have an online component or even a substitute. However, the efforts for this necessary transition fall largely on the teaching staff, who have been forced to quickly adapt their activities to a virtual environment. In this study, a theoretical model for analyzing how teachers' information and communications technology (ICT) skills and the integration of these technologies influence the improvement of teaching and teacher job satisfaction is introduced. The model also pays special attention to the gender gap related to the use of ICT in teaching. At the empirical level, the model is validated on a sample of 257 Spanish primary school teachers, using the partial least squares (PLS) structural equation method. The results of the analysis show that, although the teachers' ICT skills help them improve their teaching activities, such skills do not have a direct impact on teachers' job satisfaction. However, teachers who integrate ICTs into their teaching activities not only improve their results and lighten their workload but also enjoy higher job satisfaction, which translates into more motivated and committed teachers. In addition, teachers' ICT skills influence job satisfaction in different ways depending on gender. Although, for female teachers, the integration of ICT increases their job satisfaction, the results show that, for male teachers, this integration should generate improvements in teaching to yield enhanced job satisfaction. As the main implication, it is recommended to invest in teachers' ICT skills, as these lead to enhanced efficiency and motivation and enable the change toward an ICT-based teaching model.

Keywords

Primary education; ICT skills; ICT integration; Improvement in teaching; Job satisfaction; Gender gap; Partial least squares; Mediating effects; Moderating effects; Covid-19; Coronavirus; Pandemics.

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1. Introduction

Social evolution implies the digitization of all areas of life. The profound evolution of information and communication technologies in recent years has resulted in the availability of tools that offer highly desirable advantages at the economic and social levels (**Barba-Sánchez**; **Arias-Antúnez**; **Orozco-Barbosa**, 2019). Events such as the Covid-19 pandemic have broken down barriers to the adoption of these technologies, such as the entry costs or resistance to change in organizations, and have irremediably led us to their implementation and use.

The educational sector is unfamiliar with this trend. The current conditions under the effects of Covid-19 pose a major challenge to the sector, which is leading to a change of model to adapt to the environment. In this regard, the pace of adoption of ICTs in the teaching process has soared. The responsibility for the success of this transition falls to a large extent on the teachers, who must face the challenge of adapting rapidly to the virtual environment.

In this sense, we believe that, to be able to be educated about how to accelerate the technological diffusion process, teachers need to have technological capacities, and this must be reflected in the classroom. Following this argument, in this paper, we opted for a novel measure based on the technological capacity of schools and teachers.

In this vein, many studies have considered the integration of ICTs into schools and their effect on students (**Kulik**, 1994; **Corbel**; **Gruba**, 2004); however, they have focused mainly on investment, that is, the acquisition of computers or educational software. The teachers' level of ICT skills is a fundamental issue since it allows them to generate an appropriate educational environment from a digital point of view (**Willis**; **Weiser**; **Smith**, 2016), in which valuable technological knowledge can be transmitted successfully to their students from an educational perspective (**Garmendia** *et al.*, 2021). Thus, the mere availability of ICT resources is not enough for students to benefit from them. Teachers must be able to integrate these technologies to reap the benefits of their potentialities in the educational process (**Kern**; **Warschauer**, 2000). In this vein, the teachers' efficacy in integrating ICT in their classes allows for the pedagogical use of such technologies, resulting in more integrative teaching, particularly in science, technology, engineering, and mathematics (STEM) subjects (**Chai**, 2019). In addition, beyond relevant advantages such as time savings or improved service quality, ICT skills can also lead to key long-term indirect benefits such as job satisfaction (**Murphy**; **Adams**, 2005). For this reason, one of the main current concerns in the educational field is how teachers can acquire computer knowledge to improve their teaching activities and student learning while adapting to the digital world (**Son**, 2004).

In an environment characterized, on the one hand, by a plethora of possibilities and cost savings offered by technological development (**Barba-Sánchez**; **Arias-Antúnez**; **Orozco-Barbosa**, 2019) and, on the other, by the need to update the curriculum of education organizations with tools that steer the educational process toward a digital environment post Covid-19, a response from teachers is necessary to adapt the educational model in such a manner that ICT skills are configured as a key factor (**Özgür**, 2020). Success in identifying the most appropriate technologies as well as their implementation and correct use will depend on teachers and their knowledge of this type of technology. These ICT skills not only ease teaching and administrative tasks (**Sahito**; **Vaisanen**, 2017; **Suárez-Rodríguez** *et al.*, 2018) but also help deal with the new cohorts of digital native students who, despite having access to a multitude of technological resources, lack the skills for educational or work use (**Kennedy** *et al.*, 2008; **Garmendia** *et al.*, 2021). Besides, the use of ICTs ensures that the education provided by teachers is more suited to a demanding and increasingly ubiquitous digital environment, as they improve efficiency (e.g., reducing their burden of administrative work and facilitating contact with parents) and allow teachers to remain effective in educating children in various settings with different levels of presence.

However, in an educational system characterized by the teachers' lack of technological knowledge (**Kovarik** *et al.*, 2013; **Chai**, 2019), the expectations regarding teachers' effective use of ICTs in the educational process results in increased pressure on them, which can lead to decreased motivation due to lack of knowledge and skills and, even, to suffering the well-known teacher's technostress (**Tarafdar** *et al.*, 2015).

In this sense, teacher job satisfaction plays a crucial role in the quest for solutions to adapt to digital change. Teacher job satisfaction improves important aspects such as motivation, degree of involvement, and commitment as well as performance. High levels of motivation allow teachers to reduce stress, thus maintaining levels of mental health. Furthermore, this facilitates the learning of new skills, such as ICT skills (**Pepe**; **Addimando**; **Veronese**, 2017). Therefore, a teacher satisfied with their work will be able to better adapt to changes, maximizing their efficiency and the effectiveness of their work. Thus, job satisfaction could make the difference in the effective steering of the educational system toward the needs of the digital society.

Due to the challenges faced by primary education in the current context, it is necessary to delve into the factors that affect both the normal development of teaching activities and the teacher job satisfaction, particularly with regards to the ICT requirements arising from the Covid-19 environment. Thus, our work focuses on analyzing teachers' ICT skills and, especially, on the integration of ICTs in their teaching activities, which is our main contribution. Furthermore, we also focus on the improvement in teaching enabled by the ICT skills and their integration, as well as on the relationships between all of these and the teacher job satisfaction.

Finally, the existing literature identifies a gender gap persistent over time in STEM education (**Stearns** *et al.*, 2020). Such a gap can also be identified in the technological training of teachers of both genders (**Konan**, 2010; **Tafazoli**; **Parra**; **Abril**, 2017). However, the empirical evidence is not conclusive (**González**, 2012). In this regard, our paper provides further empirical evidence on the possible existence of this gender gap and its significance in the field of ICT integration in education.

We believe that ICT skills enable teachers to effectively integrate technologies into their educational environment and, consequently, improve both their professional performance and also the learning outcomes of their students, including students' ICT skills. Thus, we pose the following research questions:

1. Are the ICT skills of primary teachers related to improvement in teaching, both with regards to the learning outcomes and the administrative aspects related to teaching?

2. Do teachers' ICT skills, the integration of ICTs in the teaching process, and the improvement in teaching influence teacher job satisfaction?

3. Is there a gender gap in the teachers' ICT skills? And, if so, does this influence ICT integration, teaching improvement, and job satisfaction?

The remainder of the work is structured as follows: We first review the literature on the relevant concepts and discuss their relationships. Then, the third section describes the methods, the fourth presents the results, and in the last section, the results are discussed, then conclusions are presented.

2. Literature review

2.1. ICT skills, ICT integration, and teaching improvement

ICT skills can be defined as the

> "interest, attitude and ability of people to properly use digital technology and communication tools to access, manage, integrate and evaluate information, build new knowledge and communicate with others to participate effectively in society" (**Martin**; **Grudziecki**, 2006, p. 251).

It has been reported that teachers' ICT skills lead to improvements in the work environment, especially in regard to the coordination and improvement of communication with parents and colleagues but also to the learning outcomes (**Pepe**; **Addimando**; **Veronese**, 2017).

Research shows that teachers with high levels of ICT knowledge tend to make more extensive use of such technologies in their teaching activities (**Willis**; **Weiser**; **Smith**, 2016) and, thus, can improve their teaching (**Kulik**, 1994). Improvement in teaching encompasses, on the one hand, the learning outcomes, in that students learn more and faster when teaching is supported by the use of ICT (**Kosakowski**, 1998; **Kreuzer**, 2001) and, on the other, also improvements in the ICT skills of students.

Additionally, based on their ICT skills, teachers will be able to reap the benefits of technology to improve coordination with colleagues and school management (**Özgür**, 2020). Such skills allow them to perform administrative tasks faster (**Sahito**; **Vaisanen**, 2017), facilitate interactions with parents through telematic channels (**Suárez-Rodríguez** *et al.*, 2018), and help them increase control over their work, which yields higher levels of self-efficacy and enhancement of the work environment (**Ang**; **Soh**, 1997).

Finally, ICT skills help teachers improve their pedagogical competences. For example, regular access to the Internet facilitates more comprehensive skills and competences in the teaching process (**Warschauer**; **Knobel**; **Stone**, 2004), enabling "just-in-time" and individualized learning, easing research, and facilitating empirical investigation (**Warschauer**, 2008). Therefore, having ICT skills leads to improvements in teaching, and based on this, we propose our first hypothesis:

H1: The ICT skills of primary teachers have a positive influence on improvement in teaching.

However, the teachers' ICT skills and the necessary materials at school, i.e., hardware and software, is a necessary but not sufficient condition for students to leverage the potential of the ICTs for the educational process. For this to happen, teachers and students must use ICTs in their teaching activities (**Kern**; **Warschauer**, 2000). In this sense, ICT integration refers to the use of technological resources in education, the implementation of teachers' technological knowledge in their teaching activities, and the adaptation of such activities to take advantage of the potential offered by technology (**Senik**; **Broad**, 2011).

Technological development grants teachers the possibility of improving student performance through the effective integration of ICT, not only in planning teaching but also in the design and development of teaching materials and evaluation activities (**Kim**; **Hannafin**, 2011; **Vandeyar**, 2015; **Özgür**, 2020). For students, the integration of ICTs allows them to control their learning by improving interaction, collaboration, and communication among classmates and with teachers, which often makes traditional educational methods obsolete (**Kosakowski**, 1998). This, therefore, reflects the combination of pedagogical and content knowledge with technological knowledge (**Willis**; **Weiser**; **Smith**, 2016) and is considered a key aspect to achieving the necessary adaptation of education to the current and future social, political, and economic challenges (**Hall**, 2001; **Tafazoli**; **Parra**; **Abril**, 2017).

Furthermore, the effective integration of ICT has very desirable effects on the educational process. As commented previously, the effective use of ICT not only facilitates teaching (**Warschauer**; **Knobel**; **Stone**, 2004) but also has positive effects on student learning (**Corbel**; **Gruba**; 2004) and on the increase of the ICT skills of students (**Kreuzer**, 2001), as well as on their preparation for the professional environment (**Goktas**; **Gedik**; **Baydas**, 2013). In this vein, the effective implementation of ICT technologies in the teaching process helps improve the interpersonal relationships of teachers with students, with their peers, and with parents (**Suárez-Rodríguez** *et al.*, 2018; **Özgür**, 2020). Therefore, we propose the following hypotheses:

H2: Teachers' ICT skills have a positive influence on ICT integration.

H3: ICT integration has a positive effect on teaching improvement.

An adequate level of ICT skills grants teachers the capability to identify technological resources valuable to the educational process (**Rilling** *et al.*, 2013). In this regard, teachers who perceive themselves as competent users of ICT are more prepared for ICT integration and are more likely to incorporate these resources into the teaching activities (**González**, 2012; **Willis**; **Weiser**; **Smith**, 2016). It is, thus, necessary for teachers to develop their ICT skills to be able to introduce such technologies into the educational process appropriately (**Tafazoli**; **Parra**; **Abril**, 2017). Thus, the improvement of teaching depends on whether teachers with sufficient ICT skills can effectively integrate these skills into their teaching activities. Hence, the following hypothesis is introduced:

H4: ICT integration mediates the relationship between teachers ICT skills and improvement in teaching.

2.2. Teacher job satisfaction and ICT

Job satisfaction can be defined as a pleasant emotional state that results from the perception that work allows the achievement of desirable job values (**Locke**, 1969). This conceptualization of job satisfaction is commonly used in the literature (e.g., **Ma**; **MacMillan**, 1999; **Ho**; **Au**, 2006) and constitutes the basis for other definitions (**Skaalvik**; **Skaalvik**, 2019).

In the case of teachers, job satisfaction refers to their affective reactions to their work and their teaching role (**Skaalvik**; **Skaalvik**, 2010). In this sense, teachers' satisfaction with their profession has profound effects on the quality of their teaching and the general functioning of their educational centers (**Ostroff**, 1992), as well as student performance (**Griffin**, 2010). Also, teacher job satisfaction is associated with high levels of commitment (**Gersten**, 2001), reduced work stress (**Klassen**; **Chiu**, 2010), and improvements in teaching performance (**Pepe**; **Addimando**; **Veronese**, 2017) and, hence, is a highly desirable aspect, especially in environments characterized by dynamism and uncertainty.

Teachers with sufficient ICT skills will benefit from increases in their competence and self-confidence in their abilities (**Murphy**; **Adams**, 2005). Thus, they will be able to adapt to the digital environment that surrounds them and develop their activities more efficiently. Hence, ICT skills provide teachers with a solid foundation for their professional identity (**Abtahi**; **Motallebzadeh**, 2016). This, in turn, results in increases in their job satisfaction (**Ang**; **Soh**, 1997). Thus, the following hypothesis is introduced:

H5: Teachers' ICT skills exert a positive influence on their job satisfaction.

As mentioned above, ICT integration improves the performance and self-efficacy of teachers in their teaching activities (**Murphy**; **Adams**, 2005). This improves their commitment and motivation levels (**Sahito**; **Vaisanen**, 2017), which, in turn, leads to improved job satisfaction. Additionally, ICT integration also facilitates interactions with colleagues, students, and parents, which helps improve interpersonal relationships and the work environment (**Ang**; **Soh**, 1997). Therefore, it has a positive effect on teacher job satisfaction (**Pepe**; **Addimando**; **Veronese**, 2017). Hence, we introduce the following hypothesis:

H6: ICT integration has a positive effect on teacher job satisfaction.

Furthermore, aspects related to improvement in teaching, such as improved communication with students (**Oliver**; **Corn**, 2008), increased control over student's learning, the possibility of collaborative research and work (**Kosakowski**, 1998), or increased participation (**Tasir** *et al.*, 2012), enhances the relationship between student and teacher. This helps teachers avoid both interaction problems with students, which is a main source of teacher stress (e.g., **Spilt**; **Koomen**;

Thijs, 2011, or **Pepe**; **Addimando**, 2013), and class management problems (**Wubbels**; **Brekelmans**; **Brok**, 2006). In addition, improvements conducive to strengthening relationships with the rest of the teachers improve the work environment (**Ghenghesh**, 2013), which also has a positive effect on the levels of teacher job satisfaction (**Castro** *et al.*, 2015). Hence, the aspects that improve teachers' interpersonal relationships, whether with classmates, parents, or students, play a key role in teacher satisfaction (**Skaalvik**; **Skaalvik**, 2011; **Pepe**; **Addimando**; **Veronese**, 2017). Thus, based on these arguments, we propose the following hypothesis:

H7: The improvement in teaching has a positive effect on teacher job satisfaction.

However, the availability of ICT skills seems to have an indirect impact on teacher job satisfaction, dependent on ICT integration and the improvement in teaching. As mentioned above, beyond merely having ICT skills, teachers must implement such skills effectively in the teaching process, which leads to improvements in teaching. In turn, both the integration of ICTs and improvement in teaching lead to improved job satisfaction. Therefore, for ICT skills to generate increased job satisfaction, technologies must be implemented effectively and the teaching process must have been improved. On this basis, we propose the following hypotheses on the mediation effects on teacher job satisfaction:

H8: ICT integration and improvement in teaching mediate the relationship between the ICT skills and teacher job satisfaction.

H8a: ICT integration mediates the relationship between the ICT skills and teacher job satisfaction.

H8b: The improvement in teaching mediates the relationship between the ICT skills and teacher job satisfaction.

H8c: ICT integration and improvement in teaching mediate the relationship between the ICT skills and teacher job satisfaction.

H8d: Improvement in teaching mediates the relationship between ICT integration and teacher job satisfaction.

2.3. ICT and the gender gap in primary teaching

The literature confirms the existence of a gender gap in the use of technologies in general (**Cai**; **Fan**; **Du**, 2017), and in the teaching field in particular (**Van-Braak**; **Tondeur**; **Valcke**, 2004; **Tafazoli**; **Parra**; **Abril**, 2017). In this line, **Bencheva** and **Kostadinov** (2019) recommend the integration of ICTs, not only to reduce this gender gap but also to foster ICT careers across both genders, given the scarcity of this type of professional in the current labor market (**Botella** *et al.*, 2019).

In the field of teaching, it has been observed that young female teachers with high levels of training have greater ICT knowledge than older, more experienced teachers with lower levels of training (**Konan**, 2010). In this vein, **Mathews** and **Guarino** (2000), and **Abtahi** and **Motallebzadeh** (2016) identify higher levels of ICT skills in male teachers than their female counterparts. However, to date, no consensus exists on the effect of gender on ICT skills in the field of teaching. Thus, authors such as **González** (2012) find that male teachers who are more experience and work in applied subjects –hard-skills subjects– are more reluctant to use ICTs in class than female teachers, especially those who have medium experience and work in less applied subjects –soft-skills subjects. Therefore, we propose the following set of hypotheses:

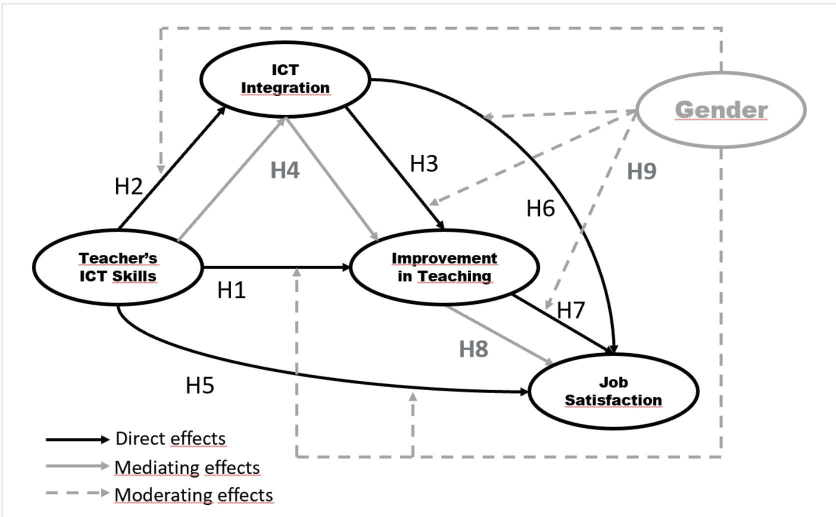

Figure 1. Research model

H9: A gender gap exists in the direct relations of the model.

H9a: A gender gap exists in the relationship between ICT skills and improvement in teaching.

H9b: A gender gap exists in the relationship between ICT skills and ICT integration.

H9c: A gender gap exists in the relationship between ICT integration and improvement in teaching.

H9d: A gender gap exists in the relationship between the ICT skills and teacher job satisfaction.

H9e: A gender gap exists in the relationship between ICT integration and teacher job satisfaction.

H9f: A gender gap exists in the relationship between improvement in teaching and teacher job satisfaction.

In summary, Figure 1 depicts the set of relationships hypothesized in the proposed research model.

3. Methods

3.1. Data collection, sample, and analysis techniques

To examine the relationships between ICT skills, ICT integration, and improvement in teaching, as well as the relations between all the latter and job satisfaction, we gathered information by means of personal interviews with a sample of Spanish teachers. This method was chosen over surveys completed autonomously by the teachers to avoid validity problems (**Meade**; **Craig**, 2012; **Edwards**, 2019).

A total of 334 interviews were conducted during the 2019-2020 academic year. With a population of 232,030 primary teachers (*Spanish Ministry of Education and Professional Training* [*MEFP*], 2020), this represents a sampling error of 5.36% ($p = q = 0.5$) at a 95% confidence level (Table 1). Given that the Spanish educational system allows teaching at different levels (primary, nursery, and lower secondary school), we considered responses from teachers active only in primary education to avoid biases driven by the age of the students. Thus, the final sample consisted of 257 observations. To confirm the validity of this sample and subsequent ones (**Barclay**; **Thompson**; **Higgins**, 1995), the required minimum sample size was calculated. Hence, the most complex multiple regression in the proposed model (Figure 1) must be found, that is, the greatest number of paths directed to a dependent variable, which in our case is 3. Subsequently, the minimum sample size required must be checked in the power tables provided by **Cohen** (1992), which in our case is 76 observations, with a statistical power of 0.80 and a significance level (α) of 0.5. Finally, to analyze the gender gap in the model, the sample has been divided into two groups according to gender. Thus, the original sample is split into two subsamples of 117 (men) and 140 (women) observations. The subsamples also meet the required minimum size.

Table 1. Technical data of the empirical study

Characteristics	Survey
Target universe or population	Spanish primary teachers
Sampling units	Teachers
Sampling size	257
Sampling error/confidence level	5.36%/95%
Fieldwork data	2019-2020 academic year

Table 2. Sample by gender and age

Age (years)	Male	Female	Total
< 30	13	16	29
30-39	30	34	64
40-49	48	54	102
50-59	26	32	58
60-64	0	4	4
> 64	0	0	0
Total	117	140	257

Once the validity of the sample size was confirmed, Table 2 compiled the distributions of the sample by gender and age.

To test the hypotheses, structural equation modelling (SEM) has been applied, as it is especially recommended to test mediation hypotheses (**Nitzl**; **Roldán**; **Cepeda**, 2016). Specifically, we used the partial least squares (PLS) technique with the *SmartPLS 3.2.9* software (**Ringle**; **Wende**; **Becker**, 2015). In addition, to analyze the differences driven by gender groups, the invariance of its measurements must be made using the measurement invariance of composite models (Micom) (**Henseler**; **Ringle**; **Sarstedt**, 2016). After verifying that the differences are not due to the measurement model, we applied multigroup analysis of partial least squares (PLS-MGA) to evaluate the significance of the difference by gender of the estimated parameters (path coefficients) (**Sarstedt**; **Henseler**; **Ringle**, 2011).

3.2. Measures

The variables employed in the study are described in this section. Each item, including its full name and indicators, is explained in Annex 1.

ICT skills

We drew on the scale of **Almerich** *et al.* (2016), which consists of 32 items related to the teachers' knowledge about the management and use of computers, basic computer applications, the use of the Internet, presentations, and multimedia applications as well as other communication tools. For each item, teachers responded on a five-point scale, with endpoints of 1 = null and 5 = expert.

ICT integration

The scale of **Almerich** *et al.* (2016) was also used to measure ICT integration. The scale draws on 11 items related to the frequency of use of ICT tools for the design and planning of teaching activities, and the frequency of communication with the school community. For each item, teachers responded on a five-point scale, with endpoints of 1 = never and 5 = always.

Improvement in teaching

We draw on a seven-item scale adapted from **Skaalvik** and **Skaalvik** (2007). The scale addresses the positive effect of ICTs on student instruction and motivation, cooperation with colleagues and parents, and administrative tasks. Responses were given on a five-point scale (from 1 = never to 5 = always).

Job satisfaction

We used the scale of **Pond** and **Geyer**, (1991), which comprises six items addressing how they feel about their current job. All items were measured on a five-point Likert scale.

Gender

Following the most commonly agreed approach (**Abtahi**; **Motallebzadeh**, 2016; **Tafazoli**; **Parra**; **Abril**, 2017), gender is considered a dichotomous variable (male and female).

4. Results

Before analyzing the structural model, the reliability and validity of the measurement model were tested. Given that all the constructs are reflective, the individual reliability of the items is evaluated first. Based on this, four items of the "Teacher's ICT Skills" scale were discarded, as their values were below the 0.708 threshold (**Hair**; **Sarstedt**; **Ringle**, 2019), namely, skillTIC5-6, skillTIC16-17, skillTIC24-25, and skillTIC31-32. This is natural because scales measuring ICT quickly become obsolete and must be adapted. Then, construct reliability was tested through the Cronbach's alpha, Dijkstrqa–Henseler's rho_A, and the composite reliability and was confirmed, as all values were above the 0.7 threshold (Table 3). Subsequently, the convergent validity of the constructs was also verified through the average variance extracted (AVE), with values above 0.5 in all cases (Table 3). Finally, the discriminant validity of the constructs was also confirmed through the heterotrait–monotrait (HTMT) and Fornell–Lacker criteria (Table 4).

Table 3. Reliability estimates and convergent validity of the measurement model

Construct[1]	**Cronbach's alpha**	**Dijkstrqa–Henseler's rho_A**	**Composite reliability (CR)**	**Average variance extracted (AVE)**
ICT integration	0.911	0.916	0.925	0.532
Improvement in teaching	0.878	0.880	0.905	0.576
Job satisfaction	0.852	0.886	0.884	0.565
ICT skills	0.956	0.959	0.960	0.501

[1]All constructs are estimated in mode A.

Table 4. Discriminant validity[1] of the measurement model based on Fornell–Larcker and $HTMT_{0.85}$ criteria

Construct	**ICT integration**	**Improvement in teaching**	**Job satisfaction**	**ICT skills**
ICT integration	**0.730**	*0.719*	*0.389*	*0.686*
Improvement in teaching	0.648	**0.759**	*0.365*	*0.547*
Job satisfaction	0.384	0.361	**0.752**	*0.236*
ICT skills	0.650	0.509	0.235	**0.708**

1. Elements on the diagonal (in **bold**) are the square root of the variance shared between the constructs and their measures (AVE). Values in *italics* above the diagonal elements are $HTMT_{0.85}$ values. Values below the diagonal elements are the correlations between constructs.

To evaluate the structural model, we first check for collinearity problems among the constructs through the variance inflation factor (VIF) values. All the values are below 2, well below the maximum of 5 set in literature (**Hair**; **Sarstedt**; **Ringle**, 2019). The goodness of fit has been verified through the standardized root mean square residual (SRMR), whose values are less than 0.08 (**Benítez** *et al.*, 2020), and so has the significance of the path coefficients through the bootstrapping process (10,000 subsamples) based on the confidence interval percentiles (**Aguirre-Urreta**; **Rönkkö**, 2018).

As observed in Table 5, the results reveal that teachers' ICT skills do not influence job satisfaction significantly (H5: $\beta = -0.055$; $p > 0.05$), although the effect on the implementation of ICTs is positive and significant (H2: $\beta = -0.650$; $p < 0.001$). However, teacher job satisfaction is positively and significantly affected both by ICT integration (H6: $\beta = -0.288$; $p < 0.01$) and by the perceived improvement in teaching resulting from using ICTs (H7: $\beta = -0.202$; $p < 0.05$). Furthermore, both the teachers' ICT skills and the use of ICTs in the classroom have a positive and significant influence on the improvement in teaching activities (H1: $\beta = -0.151$; $p < 0.05$; H3: $\beta = -0.550$; $p < 0.001$, respectively).

Table 5. Direct effects on endogenous constructs

Construct	**Direct effect**[1]	***t*-value**[2]	***p*-value**[2]	**PCI**[2]	**Explained variance (R^2)**	**f^2**
Job satisfaction (R^2 = 0.171)						
H5: ICT skills	–0.055	0.779	0.436	[–0.191, 0.088]	–0.013	0.002
H6: ICT integration [b]	0.288	3.424	0.001	[0.125, 0.458]	0.111	0.044
H7: improvement in teaching	0.202	2.348	0.019	[0.028, 0.364]	0.073	0.028
Improvement in teaching (R^2 = 0.434)						
H3: ICT integration [b]	0.550	10.345	0.000	[0.448, 0.656]	0.357	0.309
H1: ICT skills	0.151	2.502	0.012	[0.029, 0.268]	0.077	0.023
ICT integration (R^2 = 0.422)						
H2: ICT skills [a]	0.650	18.571	0.000	[0.580, 0.717]	0.422	0.731

EC = endogenous construct; CV = control variable; PCI = percentile confidence interval.
1. Paths from hypothesis assessed by applying a two-tailed test at a 5% significance level [2.5%, 97.5%].
2. Bootstrapping based on n = 10,000 bootstrap samples.

As Table 5 shows, the R^2 values of all the endogenous constructs are above the 0.10 threshold (**Falk**; **Miller**, 1992). In particular, the R^2 values of improvement in teaching and ICT integration are above 0.33, and thus, the explanatory power of the model is relatively moderate (**Chin**, 1998). Regarding the individual contribution of the constructs (Table 5), ICT integration is the one that contributes the most to both job satisfaction (0.111) and improvement in teaching (0.357). However, ICT integration is not possible in the absence of ICT skills (0.422). This is confirmed when the degree to which ICT skills contribute to explaining the R^2 of ICT integration is calculated (f^2 = 0.731). The size of the effect is relatively high according to **Cohen** (1992; $f^2 \geq 0.35$). Finally, the size of the ICT integration and ICT skills effects on improvement in teaching as well as that of the latter on teacher job satisfaction are all moderate ($0.15 \leq f^2 < 0.35$), while the rest are weak.

> Effective ICT integration leads to enhanced teaching results, lower workload and increased job satisfaction

With regards to the mediating effects, Table 6 shows the total effects of the ICT skills on improvement in teaching (H4) and job satisfaction (H8a, b, and c), in addition to those of ICT integration in job satisfaction (H8d). In all cases, the total effects are greater than the direct effects, which indicates the existence of mediation or indirect effects (**Sarstedt** *et al.*, 2014). Following **Nitzl**, **Roldan**, and **Cepeda** (2016), significant partial mediation relationships are confirmed between ICT skills and improvement in teaching through ICT integration (H4: $\beta = -0.358$; $p < 0.001$) and between ICT integration and job satisfaction through improvement in teaching (H8d: $\beta = -0.111$; $p < 0.05$). The assessment of the indirect effects of ICT skills on job satisfaction through ICT integration (H8a: $\beta = -0.187$; $p < 0.01$), improvement in teaching (H8b: $\beta = -0.030$; $p > 0.05$), and both together (H8c $\beta = -0.072$; $p > 0.05$) confirm a total mediation, given that, as previously commented, the direct effect is not significant (H5: $\beta = -0.055$; $p > 0.05$). Furthermore, the size of the indirect effects calculated through the variance-accounted-for index (VAF) explains more than 70% of the total effect in some cases (Table 6).

Table 6. Summary of mediating effect tests

Hypothesis	Total effect path (*p*-value)[1]	Direct effect path (*p*-value)[1]	Indirect effects		
			Path (*p*-value)[1]	PCI[2]	VAF (%)
H4: ICT skills → ICT integration → improvement in teaching	0.509 (0.000)	0.151 (0.012)	0.358 (0.000)	[0.281, 0.448]	70.33
H8a: ICT skills → ICT integration → job satisfaction	0.235 (0.000)	−0.055 (0.436)	0.187 (0.001)	[0.082, 0.305]	79.57
H8b: ICT skills → improvement in teaching → job satisfaction			0.030 (0.101)	[0.001, 0.072]	12.77
H8c: ICT skills → ICT integration → improvement in teaching → job satisfaction			0.072 (0.030)	[0.010, 0.140]	30.64
H8d: ICT integration → improvement in teaching → job satisfaction	0.399 (0.000)	0.288 (0.001)	0.111 (0.026)	[0.015, 0.212]	27.82

PCI = percentile confidence interval.
1. Paths from hypothesis assessed by applying a two-tailed test at a 5% significance level [2.5%, 97.5%].
2. Bootstrapping based on n = 10,000 bootstrap samples.

Next, we checked the moderating effects of gender using a permutation-based multigroup analysis (**Chin**; **Dibbern**, 2010). We draw on the measurement invariance of composite models (Micom) approach to ensure the quality of the measurement model. This involves three steps (**Henseler**; **Ringle**; **Sarstedt**, 2016): configural invariance (step I), compositional invariance (step II), and full measurement model invariance (step III). Given that the items used in each construct, the data treatment, and the algorithm setting are the same, the configural invariance of the constructs is ascertained. Regarding step II, the compositional invariance is assessed by obtaining non-significant permutation *p*-values (Table 7). Finally, in step III, the equality of composite means and variances is calculated, except for ICT integration, for which the variance across male and female groups was not equal. Once the partial measurement invariance has been confirmed (**Cheah** *et al.*, 2020), group differences can be identified through the Micom path coefficients (Table 7).

Table 7. Measurement model invariance assessment based on a Micom approach

Measurement model	Compositional invariance assessment		Full measurement model invariance assessment			
	Original correlation	0.05	Mean difference (F-M)	Confidence interval	Variance difference (F-M)	Confidence interval
ICT integration	0.999	0.997	−0.089	[−0.239, 0.251]	0.313	[−0.306, 0.310]
Improvement in teaching	1.00	0.995	0.111	[−.237, 0.243]	−0.139	[−0.370, 0.368]
Job satisfaction	0.983	0.973	−0.166	[−0.244, 0.239]	−0.121	[−0.499, 0.492]
ICT skills	0.999	0.997	0.204	[−0.248, 0.250]	0.168	[−0.289, 0.268]

The results are based on a two-tailed permutation test at a 5% confidence level [2.5%, 97.5%]. F = Female, M = Male.

As displayed in Table 8, significant differences between male and female teachers have been found with regards to how ICTs influence their job satisfaction. While ICT skills positively influence the job satisfaction of male teachers, it has a negative influence on female teachers. However, ICT integration has a clear positive influence on female teachers and a slightly negative influence in the case of male teachers. Finally, results show that the influence of improvement in teaching on job satisfaction was stronger for male teachers than for female teachers.

> To a large extent, the responsibility of the necessary development of a virtual teaching model falls on the teachers

Table 8. Permutation-based multigroup analysis for path coefficients and indirect effects

Hypothesis	Path coefficients (Male)	Path coefficients (Female)	Path coefficients difference (M-F)	Permutation *p*-values	Hypothesis supported?
H9a: ICT skills → improvement in teaching (H1)	0.081	0.188	–0.107	0.390	No
H9b: ICT skills → ICT integration (H2)	0.724	0.598	0.127	0.066	No
H9c: ICT integration → improvement in teaching (H3)	0.575	0.570	0.005	0.964	No
H9d: ICT skills → job satisfacción (H5)	0.265	–0.228	0.493	0.001	Yes
H9e: ICT integration → job satisfaction (H6)	–0.061	0.474	–0.534	0.001	Yes
H9f: improvement in teaching → job satisfaction (H7)	0.454	0.020	0.434	0.015	Yes

Multigroup test based on 5,000 permutations; two-tailed test at a 5% significance level [2.5%, 97.5%]. M = Male, F = Female.

In summary, the hypotheses proposed in our theoretical model were empirically supported with the exception of H5, H8b, and H9a, b, and c. Figure 2 summarizes the standardized regression coefficients and the proportions of the explained variance (R^2) as a whole. In this case, the verified model explains more than 40% of the variance of ICT integration and improvement in teaching and more than 17% of job satisfaction.

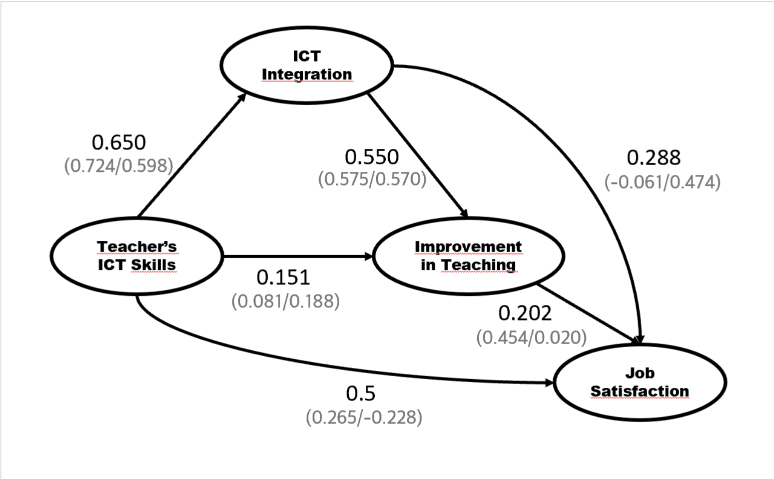

Figure 2. Structural model results

5. Conclusions and discussion

This paper presents an analysis of the ICT skills of primary teachers along with the integration of such skills in their teaching activity and the effect of this on their job satisfaction. The justification for this study stems from the necessary transition to an ICT-based teaching model capable of meeting the needs that Covid-19 has imposed (**Özgür**, 2020). Furthermore, one of the main contributions of this study is the empirical analysis of the positive effects of ICTs on different teaching activities, namely instructing and motivating students, cooperating with colleagues and parents, and carrying out administrative tasks. Traditionally, the focus has been put almost exclusively on how ICT integration affects student results (**Corbel**; **Gruba**, 2004), ignoring the possible positive effects on the rest of the teaching tasks (**Skaalvik**; **Skaalvik**, 2007; **Snoek**; **Dengerink**; **Wit**, 2019).

The results of the analysis are aligned with literature in that (**Kovarik** *et al.*, 2013; **Chai**, 2019) the ICT knowledge of primary school teachers is limited, and this may hamper the adaptation of the educational model to a teaching environment based on ICT. However, teachers seem to be aware of the potential of such technologies for their teaching activities, a key factor for adapting the educational model to the environmental needs (**Özgür**, 2020). The empirical study concludes that ICT skills have a key influence on the integration of ICT. This, in turn, eases teaching tasks in general, leading to increased job satisfaction (Table 2). Thus, teachers' ICT skills are confirmed to be of utmost importance (**Willis**; **Weiser**; **Smith**, 2016) as a necessary condition for the digitization of education, but not sufficient alone, as the integration of ICT is necessary for it to be effective (**Kern**; **Warschauer**, 2000).

Another novelty, compared with previous studies, is the core role of the improvement in teaching as a mediator between both teachers' ICT skills and ICT integration and job satisfaction (Figure 2). Beyond validating this argument and in line with literature (**Sahito**; **Vaisanen**, 2017; **Suárez-Rodríguez** *et al.*, 2018; **Özgür**, 2020), the model indicates that ICT integration helps teachers coordinate with colleagues and parents, reducing the administrative workload and improving the work environment. In turn, this results in improvements in the teaching process, in students' learning, and in teacher job satisfaction. Therefore, the effective integration of ICTs into the teaching process is a key factor for adapting teaching to the challenging environmental conditions effectively. However, as shown in Table 6, having ICT skills does not improve teacher job satisfaction per se, and in the case of female teachers, it even has a negative effect (Table 8).

> Teacher job satisfaction plays a crucial role in the quest for solutions to adapt to digital change

Additionally, this study contributes to the discussion on the gender gap in the use of technology in general (**Stearns** *et al.*, 2020), and ICTs in particular (**Botella** *et al.*, 2019), with a novel focus on primary school teachers. The results suggest that gender differences regarding how technology affects job satisfaction exist. In case of female teachers, job satisfaction is affected through the improvement in teaching derived from the use of technology; in the case of male teachers, the mere use of technology produces job satisfaction.

Because ICT skills yield greater job satisfaction in male teachers regardless of the effective integration of ICT in their daily teaching practice, our results pose a plausible explanation as to why previous studies identify higher levels of ICT skills in men than women (i.e., **Konan**, 2010; **Abtahi**; **Motallebzadeh**, 2016). However, owing to the more traditional female behavior models focused on the other rather than on the self (**Cai**; **Fan**; **Du**, 2017; **Botella** *et al.*, 2019), female teachers find a higher degree of satisfaction in the usefulness of the ICT skills for their teaching activities through the effective integration of ICTs. In any case, our model does not explain the results obtained by **González** (2012), in which age and the type of subject determine the gender gap. In this sense, a future line of research should incorporate these variables along with gender, to analyze whether the age gap and/or branch of knowledge is more relevant than the gender gap when it comes to having ICT skills and the integration of ICTs within the teaching field.

These findings have several implications for practitioners and academics. Schools and public authorities must foster the acquisition of ICT skills by teachers for them to integrate these skills into all of the teaching tasks. In addition, ICTs can be a source of job satisfaction in the educational field, hence, in line with **Murphy** and **Adams** (2005), ICTs pose a way to improve teachers' motivation, their degree of involvement and commitment, and their job performance in general. Finally, we contribute to the open debate on the gender gap in education, refuting the idea that differences exist between male and female teachers regarding their ICT skills or their ability to integrate such skills into their teaching activities and rather focus the gap on the motivations that drive each group.

Limitations and future research

Regarding the topic just discussed, future research efforts are needed to analyze in depth these motivations as antecedents of job satisfaction, as well as the commitment and degree of implication that such satisfaction has on teachers and their job performance.

Moreover, another line of future research that would enrich the results obtained in this work is related to the analysis of the technostress consequences, following the recommendations of **Tarafdar** *et al.* (2015). In the current work, the positive effects of ICT integration in the different aspects of the primary teaching activities are analyzed. However, the analysis does not address the possible negative effects of the lack of ICT skills or insufficient ICT integration, such as the well-known technostress. This is magnified by the current environment heavily marked by the Covid pandemic (**Ratten**, 2020), and therefore, we acknowledge this as a limitation of our research.

Further limitations to our research stem from the non-inclusion of other possible moderating variables, such as age or the subject taught by the teachers, as mentioned before. Additionally, the geographical scope is limited to a single country, Spain. To ensure the generalizability of the results, it would be helpful to expand this research to other countries.

Finally, the study focuses on primary education, thus limiting the applicability of the results. This raises the question of whether the conclusions of our study could be extrapolated to other educational levels (e.g., secondary school, vocational training, undergraduate studies, and graduate studies) and even whether teachers at these other levels face different problems not included in our model. In this sense, future research would need to collect empirical evidence on other educational levels.

> ICT skills support teachers to improve their teaching and administrative tasks, thus enhancing their teaching

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7. Annex. Items

Items
Job satisfaction (**Pond**; **Geyer**, 1991)
If you had to decide all over again whether to take the job you now have, what would you decide?
If a friend asked if he/she should apply for a job like yours with your employer, what would you recommend?
How does this job compare with your ideal job?
How does your job measure up to the sort of job you wanted when you took it?
All things considered, how satisfied are you with your current job?
In general, how much do you like your job?
Teacher's ICT skills (**Almerich** *et al.*, 2016)
I can handle the windows and dialog boxes/drop-downs of the computer's operating system.
I work with files and folders (create, copy, move, delete, etc.).
I install software on the computer.
I do computer and disk maintenance (check for errors, defragment, and uninstall programs, etc.).
I install and configure hardware components and/or peripherals (printer, sound card, etc.).
I know how to install, configure, and maintain a local network system, such as wi-fi.
I create and edit plain text documents (margins, text and paragraph formatting, tab stops, etc.).
I know how to edit tables and images, using the options that the word processor allows me (border, size, fit with the text, etc.).
I do advanced configuration of text documents (sections with different orientations [vertical and horizontal], columns, headers and footers, footnotes, indexes and tables of contents, etc.).
I create a spreadsheet in which I organize the data, use formulas and functions to perform the calculations, and insert charts from the data.
I create multiple spreadsheets where data is related, edit custom charts, and set multiple sheets to print as one document.
I create simple databases (records, fields, and data), and I know how to use them.

I know how to create and design databases with forms and reports and how to use them.
I know the basic information search strategies (type of content, index topic, etc.) necessary to use informative multimedia applications.
I have a good command of advanced information search systems in documentary bases.
I use digital photography and video cameras to obtain quality audiovisual resources.
I use audio equipment for the recording and composition of sounds.
I know how to use specific graphic and audio design software to obtain quality audiovisual resources.
I make a simple presentation fundamentally with text and some autoshapes.
In presentations, I know how to use images that I have previously reduced, retouched, etc.
In presentations, I use animated gifs and sounds that I have previously recorded and edited.
I know how to use object animation and transitions between slides, and I include interactivity by creating links between them.
I am able to make a presentation that includes audiovisual resources, such as images, videos, narration recording, etc.
I develop simple educational multimedia applications using semi-open or open programs (*Clic*, *HAM*, *Babel*, etc.).
I create multimedia applications using programming languages or authoring systems (*Toolbook*, *Authorware*, etc.).
I know how to access and navigate the internet (access a certain page, use hyperlinks, etc.).
I know how different search engines work to locate information on the internet, and I know how to create favorites folders.
I know how to obtain resources on the internet (open access programs, databases, materials, etc.) and store them properly.
I know how to use email (send and receive email, attach files to emails, create my address book, organize emails in folders, etc.).
I know how to use other forms of communication (discussion forums, chats, distribution lists, videoconference, etc.).
I know how to make simple web pages using a web page editor or by writing HTML code directly.
I know how to design and develop quality web pages in which different internet resources are integrated, using different tools that allow me to integrate static and dynamic images in web pages (graphic design) and sounds.
ICT integration (**Almerich** *et al.*, 2016)
I take into account technological resources in the selection of curricular materials.
I evaluate the technological resources that can be beneficial for the teaching process.
I design curricular materials using technological resources.
I use technology as a means to carry out training activities related to my specialty and the use of ICT in the classroom.
I design learning situations in which I can use ICT.
I create a classroom environment where technology resources are a fully integrated component.
I use technological tools as an instrument for student evaluation.
I use various assistive technologies and/or educational software appropriate for students with diverse educational needs.
I design, coordinate, and participate in the use of technology as a collaborative form and communication between the entire educational community (parents, students, etc.).
I participate in research and innovation projects dealing with the use of different technological resources in the classroom.
I take into account the ethical and legal problems arising from the use of technological resources.
Improvement in teaching (**Skaalvik**; **Skaalvik**, 2007)
Improve student learning
Facilitates coordination between teachers
Reduce my administrative workload
Facilitates interactions with parents
Improve the work environment with colleagues
Facilitates teaching
Improve my job satisfaction

Concurrences and divergences between Spanish infotainment comedy professionals and audiences

Inmaculada-Concepción Aguilera-García

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Abstract

Infotainment comedy is the branch of infotainment that mixes current affairs content with comedy. "Infotainment" is a relatively new term, first cited by Krüger (1988); as a television trend, academics agree that it must have existed much earlier, with English-language examples such as *Saturday Night Live* (*NBC*, 1975) or *That was the week that was* (*BBC*, 1962). In Spain, the roots of infotainment lie in *Caiga quien caiga* (*Telecinco*, 1996), a precursor to satirical pseudojournalism (García-Avilés, 1999). Nowadays, there are programs that present current affairs with comedy, as in the case of *El intermedio* (*La Sexta*, 2006) or *Todo es mentira* (*Cuatro*, 2019). Owing to the continuous evolution of formats and their complex definition and classification by academics and professionals, it is worth considering whether audiences also interpret the different programs in different ways depending on their elements, given that they depend on an "intuitive understanding" (Reinemann *et al.*, 2011; Otto *et al.*, 2017) that stems from the habit of repeated consumption. This article presents the results of a reception study contrasting Spanish infotainment comedy professionals and their audiences to assess whether their impressions of these shows are similar or if, on the contrary, their hybrid nature is so changeable that they have come to interpret them in a very different way. The methodology involved ten discussion groups with a total of 87 viewers and 13 interviews with professionals from four programs: *El intermedio*, *Todo es mentira*, *Ese programa del que usted me habla* (*La 2*, 2019), and *La resistencia* (*Movistar+*, 2018). According to the statements collected, the results revealed that audiences and content creators show more points of divergence than concurrences, which means that the messages are interpreted differently from how they were intended.

Keywords

Infohumor; Infocomedy; Infotainment; Humor; Television; TV; Audiences; Programs; Audiovisual experiences; Critical reception; Media studies; Professional ethics.

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1. Introduction

1.1. Spanish audiences and infotainment comedy

Infotainment comedy is a subgenre of infotainment that presents current affairs content with elements typical of comedy, satire, or stand-up comedy. The term “infotainment” was first cited by the German researcher **Krüger** (1988) as the result of the convergence of news and entertainment. Therefore, infotainment comedy is the branch of infotainment that seeks to entertain while offering a critical reflection of current affairs. In Spain, the impact of the economic, political, and health crisis of the past few years has led citizens to become increasingly interested in this format, which translates into television programs that are “closer to entertainment” [“*más cercanas al entretenimiento*”] (**Domínguez-Quintas** and **Arévalo-Iglesias**, 2020, p. 526), as is particularly evident on “new channels” [“*nuevos canales*”] such as *La Sexta* and *Cuatro*, which offer schedules with “their own identity” [“*señas de identidad propia*”] (**Montero-Díaz**; **Martín-Jiménez**, 2020, p. 423).

Spanish research in the field of infotainment has focused on the analysis of content and professional practices, but not as much on audiences’ motivations for watching these television formulas. Some have focused on the quality of these shows in the eyes of the public (**Guerrero**; **Etayo**, 2015), while others focus on a context of overall assessment of programming (**Artero** *et al.*, 2010). Both approaches are interesting for broadcasters, since they can make alterations to their programming from a “fundamentally economic perspective” [“*perspectiva fundamentalmente económica*”] (**De Mateo**; **Bergés**, 2009, p. 24), to the extent that, “out of the amount of suggestions that viewers send every day, approximately 20% end up becoming content for these shows” [“*del volumen de sugerencias que los espectadores envían cada día, aproximadamente el 20% acaban convirtiéndose en contenidos para estos espacios*”] (**Ortells-Badenes**, 2012, pp. 215-216).

In this way, current Spanish infotainment comedy shows build loyalty among large audiences of all ages. Owing to their multiscreen consumption and active participation, these audiences are considered “citizen-viewers” [“*ciudadanos-telespectadores*”] (**Rosique-Cedillo**, 2013, p. 221), being “the ‘critical mass’ of the new scene born of the information society” [“*la ‘masa crítica’ del nuevo escenario nacido en la sociedad de la información*”] (**Morera**, 2017, p. 117). This television consumption, in addition, is intertwined with the new information and entertainment practices on the Internet, which “enhance the processes of hybridization in the field of political communication” [“*potencia los procesos de hibridación en el campo de la comunicación política*”] (**Chadwick**, 2013, cited in **Casero-Ripollés** *et al.*, 2014, p. 45). At the international level, **Gray** *et al.* (2009) acknowledge that, although satirical television content is intended to give citizens a better “ability to watch the political process at work,” it often achieves the opposite effect and “attract[s] more ridicule than ardent viewers” (p. 3). Similarly, some research corroborates the blurring of the boundaries between fiction and regular news found in shows such as satirical news programs, which has been quantitatively tested both in long-running American programs such as *The Daily Show* (*Comedy Central*, 1996) and more recent shows such as *Last Week Tonight with John Oliver* (*HBO*, 2014), which are characterized by their hybrid nature and by the inclusion of opinion (**Brugman** *et al.*, 2021).

These programs have an effect on viewers, giving meaning to the messages according to their personal context (**Alonso-Alonso**, 2011, p. 8), since “the audience is situated on the border of two spheres as important as economics and politics” [“*la audiencia se establece en la frontera de dos ámbitos tan relevantes como el económico y el político*”], and whoever is part of the audience “is, primarily, a consumer of the media, and, secondarily, a potential consumer of everything else” [“*es, en primer lugar, consumidor de medios de comunicación, y, en segundo lugar, potencial consumidor de todo lo demás*”] (**Callejo**, 2001, p. 24), keeping in mind that current affairs may come with a side of social and ideological values that are liable to be internalized by the population. After all, **Igartua** (2021) states that “the study of reception processes involves analyzing the ‘black box’ of psychological processes that explain why media effects occur” [“*el estudio de los procesos de recepción supone analizar la ‘caja negra’ de los procesos psicológicos que explican por qué se producen los efectos mediáticos*”] (pp. 49-50), to which **Carpio** (2008) adds that “humor lends itself very well to being an attractive discourse” [“*el humor se presta muy bien a ser un discurso atractivo*”], because “it is witty, at the same time twisted and direct, it is pleasant and engaging, it is original in its ideas but with the ability to synthesize points, making them easy to understand” [“*es ingenioso, a la vez que retorcido y directo, resulta agradable y simpático, es original en sus planteamientos pero con capacidad de sintetizar sus argumentos, haciendo que sean de fácil comprensión*”] (pp. 13-14).

There are external conditions to these formats that come to alter their reception, such as the “digital divide” [“*brecha digital*”] (**Castells**, 2004), since the age of the viewers and the means they use to consume programs influence effectiveness, tracking, participation, and expectations (**Aguilera-García**, 2021a). Young people, for example, tend to be regular and interactive Internet consumers, following these shows on their social networks (**Zamora-Martínez**; **González-Neira**, 2022), but are passive when it comes to television (**Fernández-Planells**; **Figueras-Maz**, 2012, p. 196), whereas “older profiles, especially retirees and those from other spheres, hardly understand the effective possibilities of or have access to second screens or interactive media” [“*los perfiles de más edad, especialmente jubilados y de otros ámbitos, difícilmente conocen las posibilidades efectivas ni acceden a las segundas pantallas o a los medios interactivos*”] (**Alonso** *et al.*, 2016, p. 188). On the other hand, the act of “viewership” [“*televidencia*”] is not limited to the time one is in front of the screen during the broadcast but rather continues to correspond with a “habit to spend free time and that its meaning is highly social to the extent that each member of the audience is a participant in a certain culture" ["*práctica para pasar el tiempo libre y a que su significado es altamente social en la medida en que cada miembro de la audiencia es partícipe de una cultura determinada*"] (**Orozco**, 1996, p. 40). If we add to this concept the current means of multiscreen consumption (**Teso-Alonso**; **Piñuel-Raigada**, 2015) or of social networks and digital platforms (**Rodríguez-Breijo** *et al.*, 2018), we find a continuous audience over time that can reflect, or share their insights, on any program, anytime and anywhere.

> With infotainment comedy, it is necessary to assume that what is being seen belongs to the comic–satirical realm to catch irony and criticism

1.2. Spanish infotainment comedy professionals

Academics trace the roots of infotainment in Spain to *Caiga quien caiga* (*Telecinco*, 1996), considered the "precursor of satirical pseudojournalism" ["*precursor del pseudoperiodismo satírico*"] (**García-Avilés**, 1999). In his book on the program, its first director, Edu Arroyo, acknowledges that these "English-language neologisms" ["*neologismos anglosajones*"], referring to the hybrid formats of information and humor, "are created for the use and enjoyment of workers, convinced of their supposed professional competence" ["s*on creados para uso y disfrute de los trabajadores, convencidos de su supuesta competencia profesional*"] (**Salgado**, 2010, p. 60). However, infotainment comedy shows such as *El intermedio* (*La Sexta*, 2006) emerge upon the appearance of economic and political crisis as a response to the main problems that concern Spaniards (*CIS*, 2020), and they "have been placed as the reference point for political satire, picking up the baton of another program hosted by 'El Gran Wyoming,' *Caiga quien caiga*" ["*se ha colocado como el espacio de referencia de sátira política, recogiendo el testigo de otro programa conducido por El Gran Wyoming,* Caiga quien caiga"] (**Capilla**, 2015b, p. 9). The study by **Valhondo-Crego** and **Berrocal** (2020) compares the content from *El intermedio* and the newspaper *El País* and concludes that, with regard to how news is narrated, "*El intermedio* relies on a group of presenters that allows diverse emotional identification, ranging from empathy with the serious presenter to laughter with the transgressive jokester, within a classic structure" ["El intermedio *se apoya en un grupo de presentadores que permite la identificación emocional diversa, que abarca desde la empatía con la presentadora seria hasta la carcajada con el bufón transgresor, dentro de un esquema clásico*"] (p. 859).

In this type of program, there are different levels of respect for the truth (**King**; **Elliott**, 2010), in line with the so-called fictional pact ["*pacto ficcional*"] of **Eco** (1996): just as readers need to accept the conditions of the narrator to be able to become immersed in the fantasy of the universe about which they are reading, with infotainment comedy, it is necessary to assume that what is being seen belongs to the comic–satirical realm to catch irony and criticism. That is, it shows that the viewer has become accustomed to this "assiduity of blending, to its impunity, and does not ask for explanations, or even clemency, for the psychological nakedness of the characters of the facts" ["*asiduidad de mezclas, a su impunidad, y no pide explicaciones, e incluso clemencia, por el desnudo psicológico de los protagonistas de los hechos*"] (**Marín-Lladó**, 2012, p. 97).

As some research maintains, "infotainment programs can be presented both by journalists and by regular hosts of entertainment programs" ["*los programas de infotainment pueden ser presentados tanto por periodistas como por conductores habituales de programas de entretenimiento*"] (**Pérez-Latorre** *et al.*, 2014); this has led to their being seen as "mixed" formulas (**Soler**, 2013) owing to the contradiction between journalism and television, to the point that there is not consensus among academics as to how to define and classify them (**Aguilera**, 2021b). Perhaps that is why initially the communicators working in infotainment stirred up some resentment, since "in every public sphere, institutions try to model some minimum levels of consensus and maximum levels of criticism" ["*en toda esfera pública, las instituciones intentan modelar unos niveles mínimos de consenso y máximos de crítica*"] (**Valhondo-Crego**, 2011a, p. 269). They were branded as clowns and provocateurs, as with *Caiga quien caiga* as a program or Jordi Évole, who has become one of the leading communicators in Spain, as the presenter on the original *Salvados* (*La Sexta*, 2008). It should not be forgotten that, as assistant director of *Buenafuente* (*Antena 3*, 2005; *La Sexta*, 2007), the program that launched him onto the national stage, "Évole was popular with the program's audience because of his character, 'The Troublemaker,' a supposedly unscripted critic who interrupted the program sitting among the audience to stir up trouble" ["*Évole era conocido para la audiencia del programa por su personaje, 'El Follonero', un supuesto crítico espontáneo que interrumpía el programa sentado entre el público para crear polémica*"] (**Capilla**, 2015a, p. 33). However, over time, revelations such as those made by Évole, and the worsening of the economic and political crisis, have highlighted citizens' media requirements, both for knowledge and for entertainment, as previously discussed by **Kapuscinski** (2005, p. 34), much as **Alonso** *et al.* (2016) argue that "participants with an activist profile propose a utopian image of society in which there are no journalists" ["*los sujetos con perfil activista plantean la imagen utópica de una sociedad sin periodistas*"] (p. 188), or, at least, one that steers clear of classical journalism.

> The news component of infotainment comedy has the ability to document an event, synthesize it, and even make it more comprehensible

Certainly, some features of satire seem far removed from those of journalism, but they are used in infotainment comedy as methods or tools to transmit useful information, produce pop culture (**Aguilera**, 2019), or simply communicate. In its beginnings, "the label of satire" ["*la etiqueta de sátira*"] did not have to be humorous: "Furthermore, classical satire was instructive and predicated to its viewers about morality from a higher and somewhat melancholic position" (**Keighron**, 1998, cited in **Valhondo-Crego**, 2011a, p. 262). With good reason, "humor serves to create bonds of both closeness and distance [...] by being contextualized and adapted by the participants it works as a negotiation tool, as well as helps to shape the process of social identity" ["*el humor sirve para crear lazos tanto de cercanía como de lejanía […] por lo que contextualizado y adaptado por los participantes funciona como una herramienta de negociación, así como contribuye a configurar el proceso de identidad social*"] (**Martínez-García**, 2009, p. 229). It is this complicity and shared understanding with the viewer that guarantees the success of a joke about an informative fact, assuming that the public is active and intelligent enough to capture it (**Valhondo-Crego**, 2011b), although, owing to its subjectivity, it is difficult to determine whether this meeting of the minds is always effective. After all, for this to work, it would be necessary to guarantee the comprehension of the joke by anatomizing it, in principle a "disastrous" ["*nefasta*"] idea since "dissecting humor is an interesting operation in which the patient usually dies" ["*diseccionar el humor es una interesante operación en la cual el paciente generalmente muere*"] (**Asa-Berger**, 1976, cited in **Carpio**, 2008, p. 17).

> While newsworthiness is dependent on current affairs, the sensationalism that accompanies an event can last as long as it arouses the curiosity and interest of the population

2. Methodology

The data presented in this paper are from a study of audience reception to which a qualitative methodology was applied. In one arm of the study, we conducted discussion groups with viewers of Spanish infotainment comedy programs, selecting participants with diverse socioeconomic profiles, educational backgrounds, and media habits, chosen solely on the basis of their sex and age in regard to "homogeneity criteria" ["*criterios de homogeneidad*"] (**Suárez-Ortega**, 2005, p. 77), to determine whether the audience for these programs has different feedback tied to gender ideas and/or prejudices, or their generational perceptions, the latter being related to whether they use new technologies. Both aspects could affect how audiences internalize both the form and content of these television shows in that they feature communicators of both sexes and strive to adapt to current transmedia and multiscreen habits. In this vein, there are similar studies such as those of **Rodrigo-Alsina** *et al.* (2016) and **De-Casas-Moreno** *et al.* (2018), which define various age groups, or that of **Llanos** and **Ferré-Pavia** (2020), which proposes three axes to determine whether sexist representation of women in programs exists. Regarding the guide applied in the discussion groups, although there was a script indicating the points to be addressed in different dialogs and debates, in contrast to the dynamic of a focus group, we let participants talk instead of directing the conversation (**Callejo** *et al.*, 2009).

In the other arm of the study, in-depth interviews were conducted with professionals working in this type of program, which provided a contrast when compared with the insights of the audience, to clarify identified trends and delve further into the issues of relevance. In this line, other reference works in the field of professional consultation are also noted, such as those of **Gascón-Vera** and **Marta-Lazo** (2018), **Pérez-Pereiro** (2007), and **Meléndez-Malavé** (2005), which make tangible the need for qualitative interviews to delve into the nuances of humor, since these communicators are located "halfway between the artist and the informer" ["*a caballo entre el artista y el informador*"] (p. 365).

The discussion groups were composed of viewers aged 18 years and older, separated into two age groups: one designated as "young" ["*joven*"], from 18 to 35 years of age, and the other as "mature" ["*madura*"], 35 years of age and older. Thus, we analyzed the statements of 87 people in ten discussion groups: 42 in the "young" age range, of which 21 were women and 21 were men, and 45 in the "mature" age range, of which 17 were women and 28 were men. The sample size of each discussion group ranged from eight to ten participants, and they were arranged in different combinations depending on the sex and age of the participants so that there were groups of only young participants, mature participants, women, or men, as well as mixed groups.

In-depth interviews were arranged with 13 television professionals, representing four programs:

- from *El intermedio* (*La Sexta*, 2006), director Carmen Aguilera, production coordinator Raúl Mangas, head of production Diego Santos, editor María Avizanda, scriptwriter Paco Páez, presenter El Gran Wyoming, and presenter Sandra Sabatés;
- from *Todo es mentira* (*Cuatro*, 2019), director José-Antonio Lavado and scriptwriter Javier López-Martín;
- from *Ese programa del que usted me habla* (*La 2*, 2019), assistant director Epi Martín and presenter María Gómez; and
- from *La resistencia* (*Movistar +*, 2018), scriptwriter Victoria Martín, and contributor Alberto Casado. It was of particular value that they had work experience in other television formats.

El intermedio and *Todo es mentira* were studied in depth, as both are the most noteworthy infotainment comedy shows in the Spanish scene at the moment, *El intermedio* being the oldest, with 16 years on the air, and *Todo es mentira* being the more recent and up-and-coming. In turn, *Ese programa del que usted me habla*, which in 2019 had a time slot competing with *El intermedio* and *El Hormiguero* (*Antena 3*, 2016), stayed on the air for barely a few months, even with outstanding presenters and comedians. *La resistencia* has a format more similar to pure comedy; however, it was taken

Figure 1. From top to bottom, left to right: *El intermedio*, *Todo es mentira*, *Ese programa del que usted me habla*, and *La resistencia*.
Source: *Atresplayer.com*, *Cuatro.com*, *Rtve.es*, and *Movistar.es*, respectively.

into account because it was frequently mentioned by young audiences as a way to learn about contemporary personalities (**Gascón-Vera**, 2020; **Aguilera-García**, 2020). At the same time, the two professionals from this program who were interviewed, Victoria Martín and Alberto Casado, have also been on and/or are on infotainment comedy, television, and radio shows, or on *YouTube* channels.

The greater presence of professionals from *El intermedio* in the sample compared with those from the other shows is justified by the fact that the statement of a single expert was considered sufficient for filming, production, and writing, whereas for the other roles, at least two professionals with the same occupation, a man and a woman, were compared to address the gender perspective.

In both discussion groups and interviews, the script questions revolved around four segments: the evolution of infotainment comedy and its presence in audiovisual consumption nowadays; an evaluation of the professional work performed by the communicators on these shows to transmit complex information; the assignment of topics, roles, and leadership, which may be dependent upon the sex of the infotainment comedy professional; and the handling and incitement of controversy regarding boundaries and liberties in humor about topical issues.

3. Results

3.1. Concurrences between viewers and content creators

After analyzing the experiments conducted with the discussion groups of viewers and with the interviews with audiovisual professionals, it is worth drawing attention to some issues on which both parties concurred. Regarding the extent to which the audience's impressions correspond with the intentions of infotainment comedy content creators, one can cite the following results:

- Most of the viewers and professionals consulted believed that an infotainment comedy program cannot inform in the same way as a news program. These formulas are consumed alongside news programs; however, this does not mean that infotainment comedy programs are not sometimes preferred to other informative shows and that, therefore, some audiences use them as news programs, or as a first point of contact with current affairs:

  > "Actually, I am not really up to date with everything, twenty thousand things happen that I do not know about and then a little ray of sunlight peaks through that makes me see a bit of the outside world, and I would say that might be these two programs, one is that of Risto Mejide, *Todo es mentira*, and that of Wyoming, *El intermedio*" ["*Efectivamente no estoy puesto al día de todo, suceden veinte mil cosas de las que no me entero y entonces llega un rayito de luz que me hace percibir un poco de fuera, y digamos que puede ser estos dos programas, uno es el de Risto Mejide*, Todo es mentira, *y el de Wyoming*, El intermedio"] (Man, 29 years old).

  Based on the statements collected, this situation tends to apply when the viewer has a very busy schedule, such as students preparing for state examinations, healthcare workers, or hospitality professionals. Their television consumption usually occurs at the end of the day, which coincides with the broadcasting of infotainment comedy programs since, chronologically, these are aired after news items are broadcast on conventional news channels. News programs are broadcast three times per day, two of these occurring just before the two infotainment comedy programs being studied: *Todo es mentira* airs after the midday news on *Cuatro*, and *El intermedio*, after the nightly news on *La Sexta*. Some of the participants revealed that their first contact with television, and even with the daily news, happens when the news programs have ended or are ending; hence, they might hear about a topical issue for the first time through *Todo es mentira* or *El intermedio*, but this is not the most common situation because they also can also use the Internet:

  > "As a general rule, he [Risto Mejide] explains things that I have already heard about from Ana Rosa's program or from *24 Horas*, or from the news that I get on my cell phone" ["*Por norma general, él [Risto Mejide] desarrolla cosas que yo ya me he enterado por el programa de Ana Rosa o por el* 24 Horas*, o por las noticias que me van entrando por el móvil*"] (Woman, 60 years old).

> The remarkable thing is that the skill of the communicator not only comes to be admired by audiences but also can evolve into an ability to convince their audience of certain ideas

> "What we see [on *El intermedio*] is because we choose the news item and the sketch that makes it attractive, for me, the truth is that the rest of the program ... I heard during the day" ["*Lo que vemos [de* El intermedio*] es porque seleccionamos la noticia y el sketch que hace bonito, a mí la verdad que el resto del programa… Lo demás lo he escuchado durante el día*"] (Man, 51 years old).

The professionals, in the same way, understand that these programs are not able to inform in the same way as a news program, and they do not attempt to do so. However, they recognize that the news component of infotainment comedy has the ability to document an event, synthesize it, and even make it more comprehensible. Thus, infotainment comedy can act as an interpretive genre. This is why content creators are not surprised that some people may first learn about current affairs through shows such as *El intermedio* or *Todo es mentira*:

> "For many people our news reporting is the first time they've heard about something all day, although we do not expect it to be the first time that people have heard it, we give them greater insight" ["*Para mucha gente la noticia que damos es la primera vez que la escucha a lo largo del día, aunque no contamos con que vaya a ser la primera vez que la gente la escucha, nosotros le damos una mayor visión*"] (Javier López-Martín, scriptwriter from *Todo es mentira*).

> "We have an impressive journalistic writing team, with a lot of experience. In other words, the journalistic weight of the newsroom is very good, and the level of writing and of the script is splendid. That is, there is no other program where you find scriptwriters who are capable of reading *The New York Times* editorial and then making a joke." ["*Tenemos un equipo de redacción periodística impresionante, con mucha experiencia. O sea, el peso periodístico de la redacción es muy bueno, y el nivel de escritura y de guion que hay es espléndido. Es decir, no hay otro programa donde encuentres guionistas que sean capaces de leerse el editorial del* New York Times *y luego hacer un chiste*"] (Carmen Aguilera, director of *El intermedio*).

- For audiences and professionals, infotainment comedy programs depend entirely on the news. Viewers and content creators understand that it makes no sense to watch an infotainment comedy show days after its broadcast, unless something very significant happens in a specific episode. Audiences recognize that, in terms of delayed viewing, it is more common to watch excerpts or specific incidences from the infotainment comedy shows because, if they miss a program, it is more practical to follow the news through other channels:

> "For example, to watch it in clips it is true that Twitter made a compilation of the best videos from *El intermedio* and I thought it was funny. I said 'that's funny.' But for me to watch maybe a program from three days ago today, I don't see much sense in that either" ["*Por ejemplo, para verlo en fragmentos sí que es verdad que Twitter sacó una recopilación de los mejores videos de* El intermedio *y me hizo gracia. Dije 'qué gracioso'. Pero ponerme a ver a lo mejor un programa de hace tres días hoy, pues tampoco le veo mucho sentido*"] (Man, 25 years old).

Content creators understand that their viewers are governed by this principle, which is tied to the idea of immediacy and instant satisfaction from **Rincón** (2011). Thus, communicators assume that, when the audience watches them outside the live broadcast, it will be for other factors related to the comic or controversial aspect of the show, not so much to follow the news, since while newsworthiness is dependent on current affairs, the sensationalism that accompanies an event can last as long as it arouses the curiosity and interest of the population. In this sense, professionals understand that they must play with both aspects to find their niche audience:

> "We couldn't do pure entertainment because you compete against *El Hormiguero* and you're going to kill yourself, and we couldn't do a humorous news program as such because you go up against *El intermedio*. So, what we tried to do was to walk a line between both worlds, because then in the end there were sections that were a little more timeless, there were interviews, because collaborators like Javier Cansado, Antonio Resines, did not talk about current affairs. So, we tried to pursue a course that did not clash with either *El intermedio* or *El Hormiguero*" ["*Nosotros no podíamos hacer entretenimiento puro porque compites contra* El Hormiguero *y te vas a matar, y no podíamos hacer un informativo como tal de humor porque ibas contra* El intermedio*. Entonces, nosotros lo que intentábamos hacer era seguir una línea entre ambos mundos, porque luego al final había secciones un poquito más atemporales, había entrevistas, porque los colaboradores como Javier Cansado, Antonio Resines, no hablaban de actualidad. Entonces, nosotros intentábamos seguir una línea que no chocara ni con* El intermedio *ni con* El Hormiguero"] (Epi Martín, deputy director of *Ese programa del que usted me habla*).

Additionally, the proliferation of infotainment comedy programs in Spain has an exponential relationship with cases of political corruption, for both audiences and professionals. Viewers state that the success of an infotainment comedy show depends on the political reality and the social tension that may derive from it, since they believe that people require more humor when reality is more complex and dramatic, something that professionals corroborate:

> "[Luis] Bárcenas was an incredible turning point, and a point of no return for us. The audience doubled and in the following years, with the scandals that have occurred, well, they have been very good to the program. The people who have started followed us have been loyal, and then, during the second half of its life, the program has enjoyed big audiences and a lot of fame, as well as many awards" ["*[Luis] Bárcenas fue un punto de inflexión brutal, y un punto de no retorno para nosotros. Se dobló la audiencia y los siguientes años, con los escándalos que ha habido, pues han venido muy bien al programa. La gente que se ha ido incorporando se ha ido fidelizando, y,*

entonces, la segunda mitad de vida que lleva el programa es con mucha audiencia y con mucho renombre, con muchos premios también"] (Raúl Mangas, production coordinator from *El intermedio*).

- Viewers and professionals express similar impressions regarding how infotainment comedy spaces are seen as balanced hybrids between current affairs and comedy content, as well as opinion. In these terms, audiences may come to identify presenters as opinion leaders, to the extent that certain specific political groups, parties, or ideologies may identify with them. Audiences and professionals agree on this issue, with the exception that the former emphasize that this identification occurs mainly with ideologies, and content creators attribute it more to the professional skill of the communicator in question:

  "I don't like [Wyoming] on *El intermedio*. I have seen him for example on *No te metas en política*, which comes out only on *YouTube*, and it was also half comedic, also geared toward the left, but there you hear him talk and I love it, on *El intermedio* I do not like the role he has" ["*[Wyoming] no me gusta en* El intermedio*. Lo he visto por ejemplo en* No te metas en política, *un programa que sale solamente por YouTube, y que también era medio cómico, también enfocado a la izquierda, pero ahí lo escuchas hablar y me encanta, en* El intermedio *es que no me gusta el papel que hace*"] (Man, 56 years old).

  "He is a very intelligent guy, a guy who conveys messages, who knows how to communicate well, who has been on screen for many years too, he is well known. Let's just say that people, a lot of people, trust his judgment. That's why he's an opinion leader." ["*Es un tío muy inteligente, un tío que transmite, que sabe comunicar bien, que lleva muchos años en pantalla también, es conocido. Digamos que, la gente, mucha gente, confía en su criterio. Por eso es un líder de opinión.*"] (Paco Páez, scriptwriter from *El intermedio*).

  The only exception was El Gran Wyoming, who stated that he did not see himself as an opinion leader:

  "On this program they do really identify us with what we say, in fact, even though the script is not mine, I sometimes have to explain that twenty times –right?– that I do not necessarily agree 100%. In some cases there are things I would not say, in others I would say much more" ["*En este programa sí que nos identifican mucho con lo que contamos, de hecho, aunque el guion no es mío, yo a veces tengo que explicar eso veinte veces, ¿no?, que yo no coincido necesariamente al 100%. En algunos casos hay cosas que no diría, en otros diría muchísimo más*"] (El Gran Wyoming, presenter on *El intermedio*).

- Infotainment comedy addresses different levels, sources, or issues of current affairs, which represents something positive for audiences in that it gives them different perspectives than those voiced in a news program. For professionals, this translates into creative freedom and giving their show an "empathy" ["*empatía*"] factor that classic formats lack:

  "If you analyze the running order from a day of program of *El intermedio*, then it will surely be very balanced or will be very similar to the running order of a news program, but the difference is this, that we not only tell the news, but then we give it that twist, right? We give that humor that helps [the viewer] in some way digest the news in a different manner" ["*Si tú analizas la escaleta de un programa de un día de El intermedio, pues seguramente estará muy equilibrado o será muy parecido a la escaleta de un informativo, pero la diferencia es esa, que nosotros no solo contamos la noticia, sino que luego le damos esa vuelta, ¿no?, le metemos ese humor que ayuda a digerir de alguna manera las noticias de otra manera*"] (Sandra Sabatés, presenter on *El intermedio*).

  "I'm a journalist, but I don't look down on entertainment. What happens is that you have to do entertainment well, and you have to make entertainment with values, and you have to make entertainment in which people are not treated badly, are not disrespected, are not yelling. I mean, you can laugh, and you can talk about topics you never thought you'd talk about." ["*Yo soy periodista, pero no desprecio el entretenimiento. Lo que pasa es que hay que hacer entretenimiento bien, y hay que hacer entretenimiento con valores, y hay que hacer un entretenimiento en el que la gente no se trate mal, no se falte al respeto, no se chille. O sea, se puede uno reír, y se puede hablar de temas que nunca pensaste que hablarías*"] (María Gómez, presenter on *Ese programa del que usted me habla*).

  This type of "empathizing" ["*empatizar*"] with programs is continuously highlighted by viewers, who often not only make it a condition for continuously following shows but also, if they find it absent, might make it an excuse to stop watching them entirely:

  "[Wyoming] tries to empathize with a person who is watching the show and not just be informative, throwing one news item after another at you" ["*[Wyoming] intenta empatizar con una persona que está viendo el programa y que no sea solamente informativo lanzándote una noticias detrás de otra*"] (Man, 34 years old).

  "If you empathize, if you enjoy what you're watching, and you don't feel attacked by it. Then you say 'flip, I like this guy'" ["*Si empatizas, si lo que estás viendo te agrada, y no te agrede. Entonces tú dices 'contra, me gusta este tío*'"] (Man, 57 years old).

3.2. Divergences between audiences and professionals

Just as viewers and content creators concur on various issues when discussing infotainment comedy programs, points of discrepancy between them also arise. These divergences appear not only in the relationship that should exist between the professionals' intention and the final product that reaches the audiences but primarily in matters expressly related to the interpretation of the programs and with the reception of their messages. Between the different experiences, aspects stand out that, although acknowledged by audiences and professionals alike, each group explains, expounds upon, and justifies in a different way, as indicated below:

- One of the most striking issues on which audiences and professionals do not usually concur is the perception of improvisation. The viewers consulted often doubted whether presenters like El Gran Wyoming or Risto Mejide improvise or if, instead, are following a script. This is not as much an issue of ignorance about the work routines of television programs, which they suspect are complex, as being influenced by the experience of watching the role played by the presenters and collaborators, recognizing that it is difficult to know when El Gran Wyoming or Risto Mejide is reading, acting, or improvising.

  Whenever viewers doubt their own impression of a presenter, they reason that this is a product of the professional's skill, which they consider a talent, regardless of whether or not they identify with that person. The remarkable thing, in any case, is that the aforementioned skill of the communicator not only comes to be admired by audiences but also can evolve into an ability to convince their audience of certain ideas:

  > "Not to mention he has a gift [Wyoming]. Everyone has a gift and that is his, he is born to be this way, he is ironic, he is funny without having to read the script, which he reads for sure, but he has a different style, he has different manner" ["*Aparte de que tiene un don [Wyoming]. Cada uno tiene un don y él es suyo, le nace ser así, es irónico, es gracioso sin tener que leerse el guion, que se lo lee seguro, pero tiene otras formas, tiene otra manera*] (Woman, 40 years old)

  On the other hand, when it comes to viewers doubting whether or not there is a script behind the presenters' speech, professionals were clearly surprised. In the case of El Gran Wyoming, he almost always follows the script prepared by the editors and scriptwriters of *El intermedio*; in that of Risto Mejide, although he also has a script developed by the editorial staff of *Todo es mentira*, the dynamics of the roundtable are governed more by freedom and dialog; and in comedy programs such as *La resistencia*, the ability to improvise is also considered a virtue:

  > "That is what is intended, that is, that it does not seem scripted, it is really what we are trying to do. Though you also would have to be a little naïve to think that Wyoming improvises all of that, that he improvises so well" ["*Es lo que se pretende, o sea, que no parezca algo escrito, realmente es lo que se intenta. Aunque también hay que ser un poco ingenuo para pensar que Wyoming improvisa todo eso. Que improvisa así de bien*"] (Paco Páez, scriptwriter from *El intermedio*).
  >
  > "As a scriptwriter that is very gratifying, sometimes when it happens live, when he speaks, well, like a person reading, although Wyoming does it well, sometimes it is still a bit robotic. In *Todo es mentira*, it is true that things are a bit more chaotic [...] These are two ways of working. I think that they are both very good. I don't think one is better than the other" ["*Eso como guionista es muy gratificante, a veces puedes pecar de que luego en directo, cuando habla, pues queda una persona leyendo, aunque Wyoming lo hace bien, a veces queda un poco robótico. En* Todo es mentira*, es verdad que se vive un poco más en el caos [...] Son dos formas de trabajar. A mí me parece que las dos están muy bien. No creo que haya una por encima de la otra*"] (Javier López-Martín, scriptwriter from *Todo es mentira*).
  >
  > "David Broncano is not a person who can just read [off a script]. In fact, for me, the monologue on *The Resistance*, even though the scriptwriters are fantastic and they write phenomenally, I think it's the worst. I think when David truly shines is when he improvises, when he is totally free and things seem to come out organically." ["*David Broncano no es una persona que pueda estar leyendo. De hecho, para mí, el monólogo de* La resistencia*, a pesar de que los guionistas son fantásticos y de que lo escriben fenomenal, creo que es lo peor. Creo que cuando de verdad David brilla es cuando improvisa, cuando es totalmente libre y las cosas parece que surgen orgánicas*"] (Victoria Martín, scriptwriter from *La resistencia*).

- The idea that caused the most discrepancies between viewers and professionals, and even among professionals and among viewers, is the profile of infotainment comedy audiences, or, at least, who might be the target audiences for these shows. According to the statements collected from viewers, the age group that most enjoyed infotainment comedy is between 30 and 50 years old, and young women were the ones who assess and critically analyze it the most. However, the profile of infotainment comedy viewer that we can establish as a result of the discussion groups conducted is one thing and the sensations and impressions that the participants expressed when discussing said profile are another.

  > The idea that caused the most discrepancies between viewers and professionals, and even among professionals and among viewers, is the profile of infotainment comedy audiences, or, at least, who might be the target audiences for these shows

  Some viewers tend to associate this with the political ideology of the program or the network. Other participants hesitated to guess even in terms of age. Either way, to them, the audience profile for infotainment comedy depends on political trends:

"Maybe they also do that to gain an audience that later in a few years will no longer be there. Like now, a colleague said that there are older people who do not watch that program [*El intermedio*], maybe what they are trying to do with that is to capture a younger audience that within, I do not know, seven years, will be more mature and continue watching them. Because maybe they will still have the same ideology" ["*A lo mejor eso lo hacen también para ganarse una audiencia que luego en unos años no sigue habiendo. Igual que ahora, el compañero ha dicho que hay personas más mayores que no ven ese programa [*El intermedio*], a lo mejor lo que intentan con eso es captar a un público más joven que dentro de, no sé, siete años, sean más maduros y sigan viéndoles. Porque a lo mejor siguen siendo de la misma ideología*"] (Woman, 21 years old).

The professionals interviewed also tended not to agree when it came to identifying the profile of their target audience. Even relying on audience share studies, or data from *Kantar Media* and *Barlovento Comunicación*, which indicated that a middle-aged male profile was the primary consumer of these shows, content creators recognized that today it is practically impossible to define their target audience:

"We have studies of who watches us, and who watches us the most, but it is true that depending on the topics there is no exact profile, because depending on the topics we address that profile may vary. [...] We do not have an exact type of viewer who always watches us, but we vary a lot, we have a very wide range, which is also one of the advantages of the program" ["*Tenemos estudios de quién nos ve, y de quién nos ve más, pero es verdad que dependiendo de los temas no hay un perfil exacto, porque dependiendo de los temas que tratemos ese perfil puede variar. […] No tenemos un espectador tipo exacto que siempre nos ve, sino que variamos mucho, tenemos un abanico muy amplio, que es también una de las ventajas del programa*"] (José Antonio Lavado, director of *Todo es mentira*).

- Audiences and professionals also did not concur regarding the level of influence that certain leading figures can have. Audiences believe that loyalty to an infotainment comedy show depends entirely on its presenter –usually one, around whom all the other aspects, be they collaborators and the team in general or the guests or topics addressed, revolve. Their image is the program's image, and their opinion is the program's opinion:

"I think the presenter in this case is the essence of the program [*Todo es mentira*], if Risto Mejide or Marta Flich were not there, the program itself would not make much sense to me, because their purpose is to criticize the entire political, economic, and social landscape" ["*Creo que el presentador en este caso es la esencia del programa [*Todo es mentira*], si no estuviera Risto Mejide o Marta Flich yo no le encontraría mucho sentido al programa en sí, porque es que lo que quieren es criticar todo el panorama político, económico y social*"] (Man, 18 years old).

Professionals, in contrast, believe that a program is the product of teamwork. They recognize the influence of their presenters, and when they talk about them, they extoll their virtues to explain why they are the most noteworthy feature of the format, and why they have been for years. However, the daily routines of an infotainment comedy editorial team involve the coordination of so many people that professionals argue that the success of a show lies in its staff:

> Viewers assume that there are large teams behind *Todo es mentira* and *El intermedio*, but they still maintain that the entire program revolves around Risto Mejide or El Gran Wyoming, respectively

"The whole team would be around a hundred people. Coordinating all of that is quite complicated, getting all of that to work like clockwork is complicated, getting all of that to produce an internal communication code is complicated, but we have been doing it for many years" ["*El equipo total seremos unas cien personas. Coordinar todo eso es bastante complicado, que todo eso funcione como un engranaje es complicado, que todo eso genere un código de comunicación interno es complicado, pero llevamos muchos años*"] (Diego Santos, head of production from *El intermedio*).

This reality does not reach audiences. Viewers assume that there are large teams behind *Todo es mentira* and *El intermedio*, but they still maintain that the entire program revolves around Risto Mejide or El Gran Wyoming, respectively:

"Once in a while I watch *El intermedio* and I am pleasantly surprised that it is still a very fresh program, I mean, so many years, and yet there are like small innovations that make the program always feel current and of a type of humor that is still the same, because, well, in the end the star is always El Gran Wyoming, but it seems that he does not age" ["*De vez en cuando veo* El intermedio *y me sorprende para bien que sigue siendo un programa muy fresco, o sea, tantos años, y sin embargo hay como pequeñas novedades que hacen que el programa siempre sea actual y de un tipo de humor que es parecido, porque, bueno, al final el protagonista siempre es el Gran Wyoming, pero parece que no envejece*"] (Man, 45 years old).

Likewise, the creators acknowledge the draw that their lead presenters have for audiences as long as each person facing the camera plays their assigned role well. This clear awareness of teamwork for professionals comes into contradiction when it is the content creators themselves who set the tone for the topics, the shots, and the script, making the presenters the focal point of the program:

> "Let's say it's a product, a format where there's a presenter and then a journalist. I'll call it an 'infoshow' because it mixes information with a show. In this case, the 'show' is provided by Risto and Wyoming, the information is provided by Sandra Sabatés and Marta Flich. [...] But let's say the information is given by a journalist, or at least someone in the role of a journalist." ["*Digamos que es un producto, un formato donde hay un presentador y luego un periodista. Yo lo llamo infoshow porque se mezcla información con show. En este caso el show te lo aportan Risto y Wyoming, la información te la aportan Sandra Sabatés y Marta Flich. […] Pero digamos que la información la da un periodista, o por lo menos alguien en el papel de periodista*"] (Javier López-Martín, scriptwriter of *Todo es mentira*).

- As for whether there are differences between men and women working in infotainment comedy, most of the viewers consulted remember the image of these professionals more than their professional work, which often results in a highly superficial interpretation of their messages:

> "If you watch the entire program of *El intermedio*, or if you watch the entire program of Marta Flich, it is just the opposite, in my opinion, being *La Sexta* in this case, or more progressive, the work that Sandra Sabatés does I think is nominal" ["*Si ves el programa entero de* El intermedio*, o si ves el programa entero de Marta Flich, justamente es todo lo contrario, para mí, siendo* La Sexta *en este caso, o más progresista, la labor que hace Sandra Sabatés creo que es testimonial*"] (Man, 49 years old).

In turn, this poses an additional problem with respect to confusing some presenters with others, even when they are performing different tasks, since audiences find it difficult to distinguish their roles:

> "I noticed it when there was one who was kind of Asian, who was very cute. [...] Another one who was very beautiful, too, who was not Asian. Beatriz Montañez. But that was a long time ago" ["*Yo lo veía cuando había una que era como oriental, que era monísima. […] Otra muy guapa también que no era oriental. Beatriz Montañez. Pero esa hace ya tiempo*"] (Woman, 48 years old).

Professionals, on the other hand, think that the roles played by each communicator are clearly differentiated, and often they are not even aware of the perception that audiences have about the presenters themselves:

> "Well, I think that, with Beatriz Montañez, of course, the role she had in *El intermedio* back then, compared with the role I have in *El intermedio* now is very different. [...] When I arrived, the role was already much more journalistic, much more serious than what Beatriz could do at the time. Still, I imagine that comparisons have been made. Honestly, I don't know" ["*Bueno, yo creo que, con Beatriz Montañez, claro, el papel que hacía ella en* El intermedio *de entonces, con el papel que yo hago en* El intermedio *a día de hoy es muy diferente. […] Cuando yo llegué, el rol ya era mucho más periodístico, mucho más serio que el que podía hacer Beatriz en su momento. Aun así, me imagino que habrá habido comparaciones. Sinceramente, lo desconozco*"] (Sandra Sabatés, presenter on *El intermedio*).

Regardless of whether the image perceived by audiences corresponds to that which the content creators have designed for each presenter, professionals and audiences recognize that a considerable part of each communicator's projected image corresponds as much to what the top brass wishes to assign to that person as to their own personality:

> "Viewers can tell when one program is more involved than another in capturing or retaining audiences through platforms and social networks, to create engagement, as compared with others who may use them only to repost content"

> "I don't like [Sandra Sabatés]. I am very clear about that. Because she doesn't speak to me. I, for example, am a very passionate and approachable person, so then if I am watching a news story, where really new programs are not usually very accessible, but if what I am watching, does not resonate with me, what difference does it make? What she does bring is the news element that is part of *El intermedio*, but I think she could be very easily replaced by another person. And in fact they have already replaced one with the other" ["*A mí no me gusta [Sandra Sabatés]. Yo es que soy muy clara con esto. Porque a mí no me transmite. Yo por ejemplo soy una persona muy pasional y cercana, entonces si estoy viendo una noticia, que realmente los informativos no suelen ser muy cercanos, pero si a mí lo que estoy viendo, no me llega, ¿en qué se diferencia? Que sí que lo que aporta es la connotación informativa dentro de lo que es* El intermedio*, pero yo creo que es muy sustituible por otra persona. Y de hecho ya se ha sustituido una por otra*"] (Woman, 21 years old).

> "It just so happens that on television there tend to be more men and on social networks there are more women, but that is just it; when you think of *El intermedio*, you think of Wyoming, and when you think of the other, you think of Risto, because they are people who usually say things that cause more controversy, just like if you think of *Zapeando*, for me Cristina Pedroche comes to mind" ["*Se ha dado la coincidencia que en televisión suelen ser más hombres y en redes sociales son más mujeres, pero es eso, cuando tú piensas en* El intermedio*, piensas en Wyoming, y cuando piensas en el otro, piensas en Risto, porque son personas que suelen decir cosas que causan más controversia, igual que si piensas en* Zapeando *a mí se me viene a la cabeza Cristina Pedroche*"] (Woman, 19 years).

- The attention paid to social networks by the audience does not correspond in the same way with professionals. The majority of shows have accounts on *Twitter*, *Facebook*, and *Instagram* and constantly post videos and comments. Viewers can tell when one program is more involved than another in capturing or retaining audiences through platforms and social networks, to create engagement, as compared with others who may use them only to repost content:

  "I understand that our program can be watched live, it can be watched later, a recording can be watched, it can be watched on a smartphone, it can be watched on a tablet, it can be watched on a computer. We have social networks, where there are also people who post them, in any case you can watch it without extra effort" ["*Entiendo que nuestro programa se puede ver en directo, se puede ver en diferido, se puede ver grabado, se puede ver en el móvil, se puede ver en la tableta, se puede ver en el ordenador. Tenemos redes sociales, que también hay gente que las lleva, en todos los casos se puede ver sin ningún tratamiento adicional extra*"] (Diego Santos, head of production from *El intermedio*).

  That being said, some of the participants consulted did affirm the importance of social networks in promoting certain programs or personalities from the media landscape through their accounts, especially when the recipient was a person with a very busy schedule, as in the case of a student preparing for state examinations:

  "About the people who share and everything 'Jordi Évole, and so on'. Recently, the day before yesterday, I saw that someone had shared a video of Jordi Évole, but I don't even know what it was about because I didn't even stop to look at it. I have no idea" ["*De la gente que comparte y eso 'Jordi Évole, tal'. Hace poco, anteayer, vi que alguien había compartido un video de Jordi Évole, pero no sé ni lo que ponía porque ni me paré a seguir. No tengo ni idea*"] (Woman, 29 years old).

  This type of viralization, or act of sharing content without contextualizing through social networks, is the main reason why a person who does not usually watch television associates communicators from the news field, such as Jordi Évole, with work more typical of infotainment comedy, to the extent that the videos that reach them can be comic or entertainment and, conversely, why comedians like David Broncano and his colleagues from *La resistencia* trigger debate about current issues. In the latter case, according to the viewers' statements, this is because *La resistencia*, in particular, has more interactive social media accounts that invite its audience to leave comments:

  "The matter of *La resistencia*, which is the one I like the most, or *Late motiv*, because I also like Raúl Cimas a lot, his humor and everything, and on Instagram, from what I have seen so far, they repost short things, and I do like to watch it, but it's unusual, well yes, sometimes I do comment on the things they post" ["*El tema* La resistencia*, que es el que más me gusta, o de* Late Motiv*, porque también me gusta mucho Raúl Cimas, el humor que tiene y tal, y en Instagram, de lo que ya he visto, recuerdan cositas cortas, y sí me gusta verlo, pero es raro, bueno sí, algunas veces sí le pongo algún comentario a las cosas que ponen ellos*"] (Man, 56 years).

  Young viewers appreciate the comedy program *La resistencia* mainly because, despite belonging to a pay-TV network, it is openly shared on *YouTube*. These features that the creators of *La resistencia* post for them convey to the audience a sense of wanting to care for them as an audience that goes beyond the social media involvement that infotainment comedy programs such as *El intermedio* and *Todo es mentira* have:

  "Broncano draws a lot from modern life, and draws a lot also from having made content that's super easy to access. But also that a lot of *La resistencia* is uploaded to *YouTube*, that must also really be taken into account, that you then watch the program for 20 minutes on *YouTube* for free, so that is a way to gain a strong audience" ["*Broncano arrastra mucho de la vida moderna, y arrastra mucho también de haber hecho un contenido que llega súper fácil. Pero también que gran parte de* La resistencia *se sube a* YouTube*, eso también hay que tenerlo muy en cuenta, de que tú luego te ves el programa en veinte minutos en YouTube en abierto, entonces eso es hay una manera de ganar público brutal*"] (Man, 22 years old).

  This idea has been deliberately considered by the professionals from *La resistencia*, who understand that their potential audience is in a young age sector; in contrast, those of *El intermedio* and *Todo es mentira* believe that young people will not follow them as much as older viewers owing to scheduling issues and the difficulties in following current affairs content, whereas entertainment and comedy shows that address current issues put the audience's comfort, in terms of both access as well as ease of understanding the topics addressed, first:

  "Middle-aged people; and then there are younger people who are drawn to the program for its humor and for its relation to Dani Mateo, for example. But yes, I think middle-aged people, from 40 up, watch us. From 40 and I would say even retirees. That is, people, let's say, who come from analog TV, but who are very interested in politics and news" ["*Gente de mediana edad; y luego hay gente más joven que se acerca al programa por el humor y por lo que tiene que ver con Dani Mateo, por ejemplo. Pero sí, yo creo que nos ve gente de mediana edad, a partir de cuarenta para arriba. De cuarenta y yo diría que incluso jubilados. O sea, gente, digamos, que viene de la tele analógica, pero que está muy interesada en la política y en la información*"] (María Avizanda, editor from *El intermedio*).

  "*Sé lo que hicisteis* barely talked about politics, and *Ese programa del que usted me habla* talked about it, but in a very light way. There was never an ugly joke about anyone or anything. It's not like *El intermedio* [...] I think *Sé* *lo que hicisteis* was pure entertainment and that of *La 2* was also intended to be entertainment” [“Sé lo que hicisteis *casi no hablaba de política y* Ese programa del que usted me habla *hablaba, pero de una manera muy light. Nunca hubo un chiste bestia contra nadie ni nada. No es como* El intermedio *[…] Creo que* Sé lo que hicisteis *era puro entretenimiento y el de* La 2 *también pretendía ser de entretenimiento*”] (Alberto Casado, contributor from *La resistencia*).

> From the audiences’ point of view, humor serves news by facilitating its understanding and assimilation; in contrast, from the professionals’ point of view, current affairs content would serve as an excuse or pretext to make comedy and, consequently, to attract audiences

With regard to infotainment comedy shows’ use of social networks, two issues can be seen: on the one hand, the interchange, or feedback, can occur between audiences and professionals, in which the space for interaction is on the program’s social network accounts. This issue can be related to expectations towards a program, and we see that, in most cases according to the statements collected, audiences use it more to find out about the program and its team than out of a desire to contribute ideas or talk to the presenters.

The second aspect is related to the impact of what is shared on the Internet. We have mentioned that the ability to empathize with these programs is an idea shared between audiences and professionals, but both differ in the means of expressing it. For content creators, especially the program *Todo es mentira*, social networks are the main vehicle for debate and social mobilization in that they encourage participation through them:

> “We initiate open debates partly out of media humility [...] I think it’s also interesting that it is not just us, it’s not unidirectional. And even if we are not going to compile all the opinions expressed later, let people give their opinion, let them record it on paper, or rather, digitally, because they are tweets, and because they are capable of thinking” [“*Nosotros lanzamos debates abiertos un poco por humildad mediática […] Creo que también es interesante que no solo seamos nosotros, que no sea unidireccional. Y aunque luego no vayamos a recoger toda esa opinión que se genera, que la gente opine, que la ponga en papel, o sea, en digital, porque son tweets, y que sean capaces de pensar*”] (Javier López-Martín, scriptwriter from *Todo es mentira*).

The audiences consulted, on the other hand, do not share this idea, first, because they do not usually participate through them, since, in most cases, they do not even check them to follow the programs, and second, because they are convinced that a program’s ability to have a social impact lies once again in a presenter or collaborator’s ability to convince:

> “[Dani Mateo] Sometimes I do like him and sometimes I don’t. There are things he says on social networks and so on that sometimes I do not like, to tell the truth. In addition to my not liking them, they create a lot of controversy” [“*[Dani Mateo] A veces sí me gusta y a veces no. Hay cosas que dice en redes y tal que a veces no me gustan, la verdad. Más que no me gustan, que crean mucha polémica*”] (Woman, 22 years old).

- Another point on which professionals and audiences seem to disagree is about the future of the infotainment comedy format. The viewers consulted believe that humor will remain in the media as people have always needed it in their lives as a society; hence, they believe that infotainment comedy programs will last as long as people need audiovisual content that stimulates their intelligence and critical mind:

> “If Wyoming wasn’t on the show it would be, I don’t know, like a news program, right? That just gives you the news items, period, one after another and that’s all. And I don’t know, he brings, in one way, a critical aspect, and also a comic one. So, of course, it engages people more because of that.” [“*Si no estuviese Wyoming en el programa sería, no sé, como un telediario, ¿no? Que simplemente te dan las noticias, punto, una detrás de otra y fin. Y no sé, le aporta, por una parte, un punto crítico, y también cómico. Entonces, claro, engancha más a la gente por eso*”] (Woman, 23 years old)

For this reason, for the viewers consulted, the survival of infotainment comedy depends on the themes and focuses proposed. Depending on how each program evolves regarding its format, sooner or later it will end for audiences and be replaced by another that brings something different:

> “[With *El intermedio*] It’s the same base they used in *Caiga quien caiga*. Actually, and what happened to the other program is happening, it’s getting to the point where it no longer has anywhere to go. In fact, that’s why Usun Yoon was taken off and they’ve been taking off personalities.” *[“[Con* El intermedio*] Es la misma base que utilizaban en* Caiga quien caiga*. En realidad, y está pasando lo que le pasó al otro programa, está llegando un momento que ya no tiene por dónde tirar. De hecho, por eso se quitó a Usun Yoon y han ido quitando personajes*”] (Man, 51 years old).

The professionals, on the other hand, are divided. Some believe that the end of their program’s life will be linked to their host’s tenure. Others prefer to think that the proposed format is more important. And this clash of views can occur within the same program, case of *El intermedio*:

"The future of *El intermedio*? I don't know. Let's see, for me there is a determining factor, which is that this program is Wyoming. So, the program is going to last as long as he wants it to last. The day he chooses to stay home, we will have to do another program." ["*¿El futuro de* El intermedio*? No lo sé. A ver, para mí existe un condicionante, que es que este programa es Wyoming. Entonces, el programa va a durar hasta que él quiera que dure. El día que él opte por quedarse en su casa, habrá que hacer otro programa*"] (Raúl Mangas, production coordinator from *El intermedio*).

"Wyoming will at some point stop doing it, and when Wyoming is done, well, either someone will replace him or the program will end. I imagine that someone will replace him, and if it works out, he will continue, and if it does not work out, then they will give it a try, but I do not know if the public will accept a new personality who is not Wyoming" ["*Wyoming en algún momento dejará de hacerlo, y cuando se acabe Wyoming, pues, o le sustituirá alguien o se acabará el programa. Imagino que le sustituirá alguien, y si funciona, seguirá, y si no funciona, pues se probará, pero no sé si el público aceptará una figura nueva que no sea Wyoming*"] (Paco Páez, screenwriter of *El intermedio*).

"I think it's important that there are programs like this. That, beyond the fact that there is news, that the current affairs can be told and that satire and criticism and denunciation are brought in, which is good for our democratic well-being too, ey, and as citizens" ["*Yo creo que es importante que haya programas de este tipo. Que, más allá de que haya informativos, que se pueda contar la actualidad y que se tire de la sátira y de la crítica y de la denuncia, que es bueno para nuestra salud democrática también, eh, y como ciudadanos*"] (Sandra Sabatés, presenter on *El intermedio*).

4. Conclusions

From the results obtained based on the statements collected in the discussion groups with audiences and in the interviews with professionals from Spanish infotainment comedy programs, two sets of conclusions were found:

On the one hand, audiences and professionals diverge more than they concur when discussing infotainment comedy. They concur in the way they interpret certain aspects of the infotainment comedy genre, in the same way as both parties clearly identify the two area that compose it; however, to the extent that content creators develop a product and it reaches their audiences through different channels and platforms, sometimes not associated with the live shows, the implications may be different, as well. In this way, the intentions of infotainment comedy professionals do not always correspond to the impressions made on their audiences, or to what the latter internalize about infotainment comedy.

On the other hand, the concept of infotainment comedy changes significantly depending on whether it is approached from the point of view of content creators or from that of audiences, because, for professionals of this type of formula, information is the basis on which to build entertainment and/or comedy whereas, from the perspective of the receiver, the binomial of information and humor is a matter of its usefulness in informing, understanding, and comprehending current issues while at the same time, acting as entertainment. To put it another way: from the audiences' point of view, humor serves news by facilitating its understanding and assimilation; in contrast, from the professionals' point of view, current affairs content would serve as an excuse or pretext to make comedy and, consequently, to attract audiences.

Thus, it can be seen that both audiences and television professionals can talk about the same audiovisual product, in this case, infotainment comedy, insofar as they identify the different combinations of its components, in line with the "intuitive understanding" of **Reinemann** *et al.* (2011) and **Otto** *et al.* (2017). However, it has been concluded that certain deontological gaps in the genre (**López-Martín**, 2020) or this same creative freedom of content creators (**Salgado-Losada**, 2010) can produce different conceptions about their formulas, which translates into a conflict of expectations (**Aguilera-García**, 2021a), as well as into contradictory definitions on the different branches of infotainment (**Lahva**, 2009, cited by **Reinemann** *et al.*, 2011) that only ongoing research in the field of audiences can clarify, while their impressions reach the professionals of the television medium.

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Disinformation and hate speech toward female sports journalists

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Abstract

As well as democratizing access to information and strengthening active audiences, the internet also fosters the manipulation of news and the propagation of false and violent content. Although disinformation and hate speech are not new phenomena, they are now expanding out of control, with women, including journalists, among their targets. The aim of this study is to establish the characteristics and magnitude of this problem and determine how it affects Spanish female sports journalists while carrying out their professional activities in the world of sports, a field where male supremacy is evident. This study seeks to identify the most frequent situations where this problem occurs, the types of harassment observed, the profile of the perpetrators, and above all, the consequences for the professional and personal life of these female professionals. A mixed-methods approach is used to measure the extent of this problem and determine the experience and opinion of female sports journalists using an anonymous questionnaire. This qualitative approach is reinforced by in-depth interviews with female sports journalists who have been victims of hate speech. This dual approach enables the identification of paradigmatic models of a cognitive-behavioral nature, with findings that reveal disturbing figures. Indeed, 89.6% of the professionals participating in this study stated that they had been victims of hate speech and other forms of harassment, both through social networks as well as in their work environment, principally questioning their work capacity or mentioning their physical appearance. The profile of the perpetrators was revealed, as well as the perception that this type of aggression is a common practice that can lead to self-censorship. This situation requires that urgent measures be implemented to address this problem, such as the addition of media literacy and gender training to the educational curriculum.

Keywords

Hate speech; Bullying; Disinformation; Journalism; Media; Communication; Social networks; *Twitter*; Gender; Sports; Football; Media literacy.

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1. Introduction

Internet subcultures take advantage of the current media ecosystem to manipulate news and spread hateful ideas and messages, to increase disinformation and radicalize society (**Kahan**, 2013). Disinformation is not a new phenomenon (**Burnam**, 1975; **Galdón**, 1994), and nor is hate speech. Indeed, one does not have to look beyond the twentieth century to see its use in Germany by Nazi officials, in the United States by the *Ku Klux Klan*, or during the Bosnian War or Rwandan Genocide, always with the aim of intimidating, oppressing, or inciting hatred or violence (**Bertoni**, 2007) according to the gender or social group to which its victims belong (**Kaufman**, 2015).

The report by **Marwick** and **Lewis** (2017) on disinformation and manipulation addresses various aspects of hate speech and establishes its main perpetrators, their objectives, and how they operate. Internet trolls, characterized by a deliberately offensive discourse, are key in this regard because their discourse targets minorities, and women in particular, being based on highly sexist notions of victory and domination (**Phillips**, 2015). Among such so-called hate groups and ideologs, one can highlight "Manosphere," a group of blogs and fora composed of men's rights activists (MRAs), which also includes antifeminists, androphiles, and sexist cavemen [*paleomachistas*]. A recent study on Manosphere warns of its continued radicalization (**Horta-Ribeiro** *et al.*, 2021).

Social networks, especially *Twitter*, constitute the main forum from which this type of discourse and other violent content emerge, owing to its projection and emotional potential (**Klinger**; **Svensson**, 2018; **Van-Dijck**; **Poell**, 2013). It is worrying that such wide exposure to violence, especially among young people, leads to its inevitable normalization (**Yudes-Gómez**; **Baridon-Chauvie**; **González-Cabrera**, 2018; **Nagle**, 2018), partly because ideologies are the main motivating force behind its authors, often combined with other important objectives such as money, status, or attention (**Marwick**; **Lewis**, 2017).

The Internet's power as a vehicle for spreading violent and hateful communication to millions of people, as already warned by **Pollock** (2006), has consequences for the professional life and career of the victims and can also directly incite physical violence (**Miró-Llinares**, 2016). **Segado-Boj** and Díaz-Campos (2020) advocate the need for social media companies to become involved in flagging such content and warning users of inaccurate or false material as a measure to stop this viscous circle.

This is a complex and constantly evolving social phenomenon that has also focused on female journalists. *Unesco* (**Posetti** *et al*., 2020) addressed this problem in a study on online violence against female journalists conducted with the *International Centre for Journalists*. It concluded that 73% of the consulted professionals declared that they had suffered violence in their work environment, in 20% of cases identifying it as abuse or physical attacks. This report reveals that such violence ranged from hate speech to threats of sexual or physical violence, leading to self-censorship or (in extreme situations) leaving the profession.

1.1. Hate speech and disinformation

> This research is innovative and important as it delves into the reality of hate speech and harassment of female sports journalists in Spain and outlines the most important measures to be taken

Hate speech is a type of harmful content that directly incites or attacks a person or a group of people on the basis of their identity characteristics, origin, religion, or sexual orientation (**Yin**; **Zubiaga**, 2021). New technologies and social networks have led to an increase of hate speech, understood as offensive communication that conveys an ideology of hatred through the use of stereotypes (**Chetty**; **Alathur**, 2018) and constitutes a serious problem in many countries since it is detrimental to certain groups of people (**Mondal** *et al.*, 2018).

Since the 2016 U.S. election, online disinformation has joined hate speech and other forms of harmful content such as those created to intentionally mislead (**Tandoc**; **Lim**; **Ling**, 2017; **Pielemeier**, 2020) and which are of great concern given their impact on media credibility (**Fernández-Torres**; **Almansa-Martínez**; **Chamizo-Sánchez**, 2021). Other authors (**Wardle**; **Derakshan**, 2017; **Ireton**; **Posseti**, 2018; **Giachanou**; **Rosso**, 2020) talk rather about disinformation or false information, created with the intention of deception as well as misinformation, which is used to harm a person. **Quandt** (2018) uses the concept of dark participation to refer to hateful comments, forum manipulation, and fake news fabrication.

In any case, as pointed out by **Westlund** (2021), social media platforms have lowered the threshold for individuals, groups, and organizations to express their hatred toward someone or something in a coordinated manner. Negative judgments and beliefs about a social group are the motivating element (**González-Gavaldón**, 1999) with the aim of harassing, intimidating, and encouraging brutality against its victims (**Cohen-Almagor**, 2011), thereby exacerbating social tensions and inciting attacks with serious consequences that strengthen the relationship between speech and hate crime (**Cohen-Almagor**, 2018). Data from the *Hate Crime Survey* published by the Spanish *Ministry of the Interior* (**López-Gutiérrez** *et al.*, 2021) reveal that this type has increased remarkably. More than 50% of participants had received insults or threats on social networks (27% because of their sex or gender), although only 10% filed a complaint.

In this sense, social networks have the ideal characteristics for increasing the risk of criminal conduct, including hate crimes (**Tamarit-Sumalla**, 2018), making it necessary to ensure more efficient judicial mechanisms to protect victims from such acts (**Piñeiro-Otero**; **Martínez-Rolán**, 2021).

1.2. Women, journalists, and sport

At the beginning of the last century, Pierre de Coubertin, the creator of the Olympic Games, stated that women could only participate in the event for "crowning the winners with garlands"; however, women managed to compete in the 1900 Olympics in Paris. In the 2021 Tokyo Olympics, a historic figure was reached, with 49% participation, albeit not reflected proportionally in the media. In this regard, **Fink** (2013) demonstrates that differential media coverage negatively impacts audience perceptions of women's sport and female athletes and stresses that many such images portray highly sexualized athletes. Other authors agree that, although reported, they are underrepresented and stereotyped (**Kane**, 2013; **Rangel-Amo**; **Ramírez-Alvarado**, 2018; **Garrido**; **Zaptsi**, 2021).

Major sporting events provide an opportunity to showcase female athletes for their abilities and achievements and to promote equality. However, media malpractice, which highlights their physical appearance, stereotypes, or features such as delicacy or fragility, enhances discrimination (**Kaskan**; **Ho**, 2016; **Solmirano**, 2021) and promotes aggressions against them (**Allen**; **Frisby**, 2017).

Female journalists, as well as female athletes, are trying to make their way in a field where male supremacy is evident. **Peschiera-Chanamé** (2016) welcomes the fact that women have filled professional positions, thus weakening stereotypes, even though they remain far from achieving equality and professional recognition. Women, in addition to their underrepresentation in the news, remain far from management and content decision-making positions, which are occupied by men in two-thirds of cases (**Perianes-Paín**, 2019).

Sports journalism has a male voice and refuses women positions of responsibility, deeming them to have less understanding of the sports world (**Pedraza**, 2012). This androcentric vision of this field, which prevails in many journalistic companies (**Rojas-Torrijos**, 2010) that favor physical appearance in the selection process, leads female journalists to become targets of informative manipulation, threats, and attacks in their workplace simply because of their gender. It is therefore crucial to delve deeper into the causes and consequences of gender discrimination for female professionals in sports journalism at different levels, not only personal or professional but also relational, organizational, and social. In this scenario and faced with a clear lack of scientific work addressing this problem, this research is innovative and important as it delves into the reality of hate speech and harassment of female sports journalists in Spain and outlines the most important measures to be taken.

1.3. Research objectives and questions

Considering the aforementioned journalistic context and theoretical framework, it is necessary to identify the problem of disinformation and hate speech toward female sports journalists in order to delineate its scope. To do this, we sought the experience and opinion of journalists working in this field, both women and men, as this was the most direct way to address an issue that has yet to be studied methodically. Specific cases are also examined, through the direct testimony of the victims, in order to identify paradigmatic models, mainly of a cognitive-behavioral nature, that will allow the research community to address future work on this subject.

Thus, this study focuses on the following research questions (RQs):

RQ.1: What are the formal characteristics of hate speech toward female sports journalists?

RQ.2: What is the level of knowledge or awareness of this problem among the professional community?

RQ.3: What are the prevailing situations for, and who are the perpetrators, of hate speech?

RQ.4: What are the consequences for the personal and professional lives of the affected female journalists, and what measures can be taken?

2. Methods

A mixed methodology is applied, combining a quantitative and qualitative perspective, since this approach adds depth to the analysis by starting from complex research questions. It was designed to explore the extent of knowledge and the approach taken by information professionals regarding the object of study and is based on an anonymous survey, a quantitative technique widely used in the social sciences (**Ander-Egg**, 1993), complemented by in-depth interviews that enable the collection of reliable information on the problem and broaden the qualitative approach of the research by investigating issues related to categories of analysis that are not directly observable, such as the thoughts or feelings of those who have direct experience of the analyzed problem (**Miller**; **Barry**, 2016), thus helping to understand their individuality (**Robles**, 2011). This analysis method, fully consolidated and applied in research in the social sciences (**Morris**, 2015), can provide wider perspectives and insights.

2.1. Materials

Both the questionnaire and the script used for the interviews were designed to meet the research objectives of studying the characteristics, situations, subjects, and consequences of misinformation and hate speech. Table 1 presents the contents of both methodological tools.

The questionnaire was implemented as a *Google Forms* form, given the versatility and accessibility of this platform. It consisted of 37 questions, 15 based on a Likert scale to assess the level of concern regarding hate speech, its frequency, the environments enabling its occurrence, and the professional and personal consequences for victims.

> In this research, focused only on Spain, the participation of 88 journalists was achieved, of whom 56 were men while 32 were women. All they recognize the existence and seriousness of the problem

Nonprobabilistic sampling was used for both methodological instruments, with the participants being selected at the discretion of the researchers and not randomly, considering that the questionnaire was aimed specifically at sports journalists. The sampling for the interviews was conducted with quotas, since the participants were chosen according to their traits and qualities, from different media, as well as considering their specialization in different sports disciplines. Peer analysis was performed on the results, while thematic analysis was performed for the interviews.

The survey was distributed and the interviews conducted during July and the first half of August in 2021. This method was chosen as it is more affordable and less intrusive while still being responsive (**Bernard**, 2013). It was sent to associations and professional bodies of Spanish journalists for internal distribution among sports journalists, as well as direct distribution among sports editors and related communication offices. Special emphasis was placed on reaching the important sports newspapers, such as *Marca* and *AS*, as well as radio stations and programs specialized in sports such as *Radio Marca*, *El Larguero*, *El Partidazo de COPE*, *Tiempo de Juego*, and *Radiostadio*, among others. Specialized television channels, such as *Teledeporte*, as well as sports-themed television programs such as *Jugones*, *Deportes Cuatro*, *Estudio Estadio*, *El Chiringuito de Jugones*, and *El Desmarque*, were also of special interest.

The researchers applied certain basic principles and ethical standards to ensure that no subjects would suffer any disadvantage by participating in the survey and interview, ensuring the anonymity of the respondents and obtaining full consent from the interviewees.

The survey was completed by 85 professionals, most of them men (65.9%). The highest percentage of participants (84.7%) were editors, broadcasters, hosts, and contributors, while the others held management positions. Of these, the majority worked on the radio (44.7%), followed by national and privately owned television stations and specialized newspapers.

The average age of the participants ranged from 31 to 50 years old, and their educational level was high: only 7.1% had no university education, while 68.3% had completed a bachelor's or master's degree. They also had a high level of expertise in sports, with 61% have specific studies, while they had also accumulated vast experience, with 41.2% having worked in the sector for longer than 20 years. However, this great expertise does not mean that they did not produce other content, which was the case for 74% of them.

Table 1. Survey and interview contents

Anonymous questionnaire, 37 questions	
Section 1 (11 questions)	These questions were used to determine variables such as the gender, age, and level of journalism education of the respondents, the type and scope of the media or company where the respondents work, their position/status, and their professional relationship.
Section 2 (15 questions)	All the questions in this section assessed the degree of agreement (Likert scale) with each statement made, focusing on the research topic and investigating the knowledge about and concern regarding the presence of hate speech and other types of aggression toward female journalists in the field of sports: the frequency of aggressions according to the type of media and company, social networks, sports practices, and type of aggressions. It also addresses the reactions of victims and their environment (complaints/impunity of the perpetrator) and the most common situations (work or sports environment).
Section 3 (11 questions)	These questions aimed to draw a profile of the perpetrator and to establish the main consequences for the personal and professional life of the victims, as well as to establish measures to solve the problem.
In-depth interviews, 27 questions	
Section 1 (6 questions)	These questions addressed the characteristics of hate speech and the personal situations experienced in relation to the problem: the target of the aggressions (gender identity, sexual orientation, ideology, physical appearance, sexual connotation, etc.); the type (harassment, threat, defamation, etc.) of the attacks, how they proceeded, and differences in the current situation with respect to their beginnings in the profession.
Section 2 (9 questions)	The second section focused on the scenarios of hate speech and other harassment situations (the media in which they occur the most, the role of social networks, or the sports discipline where these situations are most common). It also explored whether this situation can be extrapolated to other women involved in sports, and whether the profile of the perpetrator and the identity of the victim (in the case of men) is known, or whether working in sports increases the possibility of becoming a target of such situations.
Section 3 (12 questions)	The main objective of this section was to determine whether hate speech and situations of harassment and bullying have conditioned the professional and personal lives of the interviewees: the support they have found from their environment, whether they reported it or not, and whether they have even thought of leaving sports journalism. Finally, we sought their opinion on freedom of expression and on the consequences for perpetrators of hate speech and other forms of harassment or aggression, as well as the measures they would implement to prevent it.

The interviews were conducted as 90-minute telematic sessions with each of the participating female journalists, following a semistructured script with questions tailored to the stated objectives. With the consent of the participants, the sessions were recorded for subsequent transcription. Three prestigious journalists with extensive professional careers participated, thus capturing their experience, reflection, and analysis on the problem, as well as its variation in recent years. These three journalists gave their consent to be included in the investigation owing to the importance of the subject matter addressed. It was especially difficult to obtain in-depth interviews, which logically requires the identification of the interviewee, which is why the inclusion of these three interviews in this research is particularly relevant to the study.

- Journalist 1: Carme Barceló Crespo. Professional experience: 36 years as a sports journalist. Columnist of the *Sport* newspaper and director of the *Sport&Style* supplement. Contributor to the *AtresMedia* program *El Chiringuito de Jugones*, and of the digital portal *The Luxonomist*.
- Journalist 2: Pilar Casado Biesa. Professional experience: 25 years as a sports journalist. Chief sports editor of the *COPE Network* and basketball narrator at *MoviStar+*.
- Journalist 3: Carmen Colino Colino. Professional experience: 27 years as a sports journalist. Editor-in-chief of *Diario AS*, manager of *Verticals*, and contributor to the *AtresMedia* program *El Chiringuito de Jugones*.

One of the greatest difficulties with this research was to achieve the participation of victims of hate speech or other types of aggressions, even when they considered it to be necessary, which increases the value of the three in-depth interviews carried out, out of the ten requested from journalists who acknowledged being victims. Some of the most frequent justifications included feelings of embarrassment or fear of misunderstanding or reactions from their peers. However, although the number of interviews obtained for this research is lower than originally intended, its importance in examining aspects that could not otherwise be analyzed and in obtaining descriptions, details, and nuances that would be unfeasible using other methodological tools should be emphasized.

In order to better understand the difficulty in this research, it is important to note that the global survey conducted by *Unesco* (2020) on violence against journalists included 901 participants from 125 countries (an average of 7.2 participants per country). Meanwhile, in this research, focused only on Spain, the participation of 88 journalists was achieved (for the two methodological instruments used), of whom 56 were men while 32 were women. This ratio corresponds to the greater presence of men in sports newsrooms, while this level of participation allows the established objectives to be achieved. These findings raise the specter of a serious reality and allow deeper investigation into the problem of misinformation, hate speech, and harassment that affect women in this group of professionals.

3. Analysis of results

Although it is not advisable to generalize (**Hernández-Rodríguez**, 2004), the results obtained do allow for an evaluation of the situation, as well as the establishment of behavioral models and possible measures (**Abreu**, 2012). The most alarming result, which clearly demonstrates the seriousness of this problem, is that 89.6% of the female professionals participating in this study claim to be or to have been victims of hate speech and harassment.

3.1. Survey

The survey overwhelmingly confirms the problem of hate speech and harassment toward female colleagues among the participating professionals or, in the case of women, as direct victims of it. In total, 92.8% were somewhat concerned about the presence of hate speech toward female sports journalists, understood as any kind of instigation to discrimination, hostility, or violence, thereby acknowledging the problem, compared with 7.2% who do not believe it exists, the majority of whom are men. In addition, 99.7% of those who do acknowledge the problem state that it occurs on a regular or very regular basis.

Situations of hate speech occur in all types of media and platforms (Fig. 1); however, social networks are the main channel where it is found. According to more than half of the professionals consulted, specialized sports websites and portals

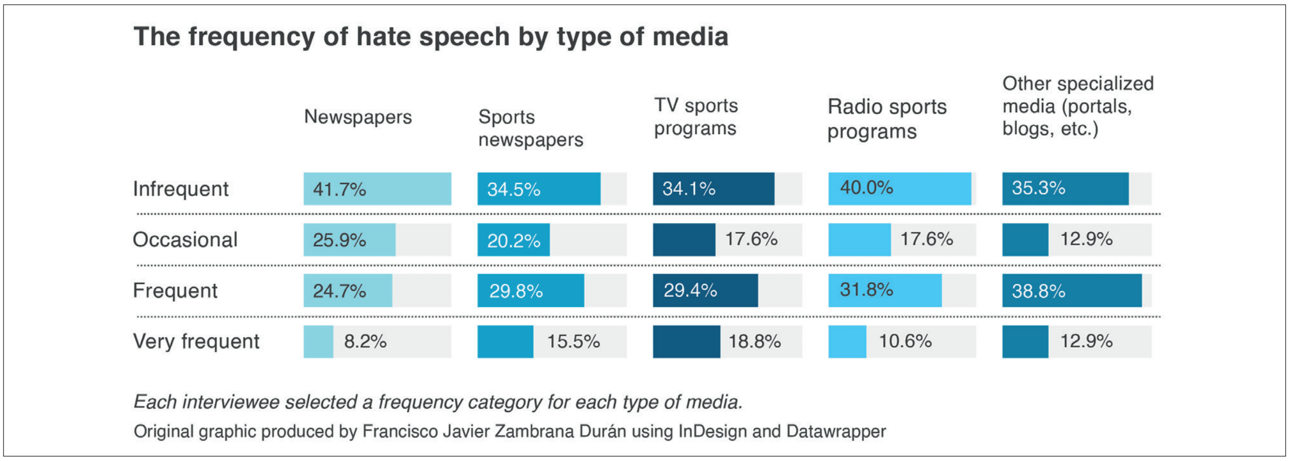

Figure 1. The frequency of hate speech by type of media

account for most harassment against female sports journalists. Among the traditional media, the highest number of cases was found for television, followed by sports newspapers, while the general press is the least affected by this problem.

According to 72.9% of the professionals consulted, social networks are the main setting for hate speech against female sports journalists (Fig. 2). Overall, *Twitter* is the most worrying platform: 98% consider that, according to their experience, this platform is the venue for the highest number of cases, followed in decreasing order by *Instagram* (16.7%), *Facebook* (13.3%), and *TikTok* (6%).

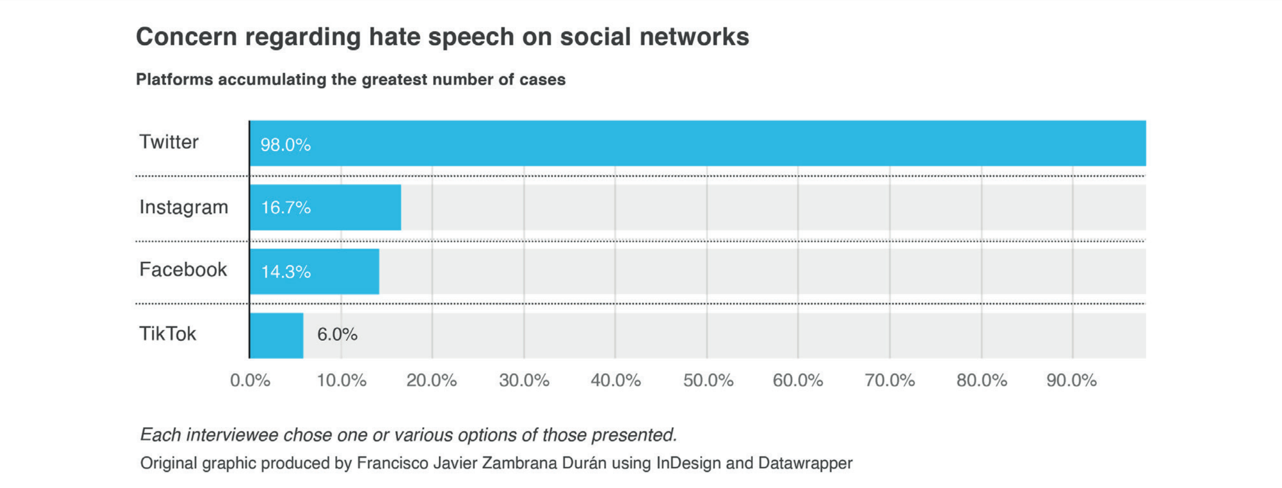

Figure 2. Concern regarding hate speech on social networks

A total of 44.7% stated that a very large number of sports journalists report being victims of hate speech through any of these platforms. For women, this number was much higher, with 71.6% having been attacked in some way. However, we note that this phenomenon also significantly affects men, reaching 28.4%, as hate speech mainly focuses on professional rather than gender-related characteristics. Moreover, victims of hate speech report serious consequences for their personal and professional lives. Female journalists mainly feel coerced by such harassment or the propagation of false content; however, some also fear for their jobs (8.2%) or believe that they are in physical danger (4.1%).

3.1.1. Constant harassment, both directly and in the workplace

The data obtained illustrate the severity of hate speech, manipulation, and harassment against female sports journalists (Fig. 3). Of the studied professionals, 89.6% acknowledged being victims, to a greater or lesser degree, of whom 47.1% claimed to suffer from it continuously. The situations they face are very varied and mainly involve cases of misogyny, discrimination, insults, and harassment as well as reported cases of hostility, defamation, threats, and sexist comments, although no physical aggression was reported. These are not isolated cases: most of them are victims of misogyny (76.9%), but they also suffer from other types, such as discrimination or harassment.

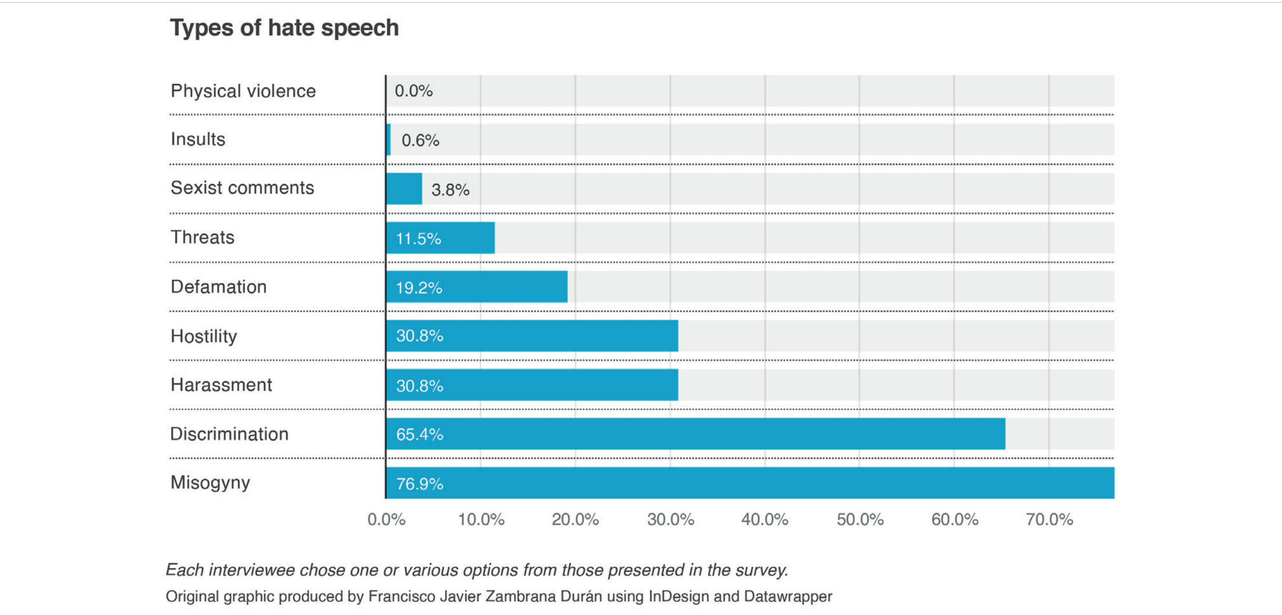

Figure 3. Types of hate speech

According to the victims, the aim of the perpetrator is to discredit them professionally. Their intelligence is repeatedly questioned, while remarks on their physical appearance or of a sexual nature are also made. Social networks were identified as the most common scenario, being indicated by 78.1% and accounting for almost one-third of cases. However, it is also concerning that 34.4% of journalists claimed that these cases of harassment and discrimination also take place directly, and in the workplace. Moreover, this is an environment in which understanding, support, and solidarity may not always be found, as 40% of the victims faced this trauma alone, while the remaining 60% did receive support from colleagues or the company. However, only 13% of them were encouraged to report the incident. Even if sympathetic, the majority (44.8%) dismissed the seriousness of the incident. These data are consistent with the widespread perception of the journalists (74.1%) who participated in the study regarding the impunity surrounding hate speech and other aggressions endured by female sports journalists.

The problem varies across the sports sector and is not caused by the same perpetrators (Fig.4). The data reveal that such aggression is more severe in mainstream sports. In total, 97.6% believe soccer to be the sport with the highest number of cases, followed by basketball and motorsport.

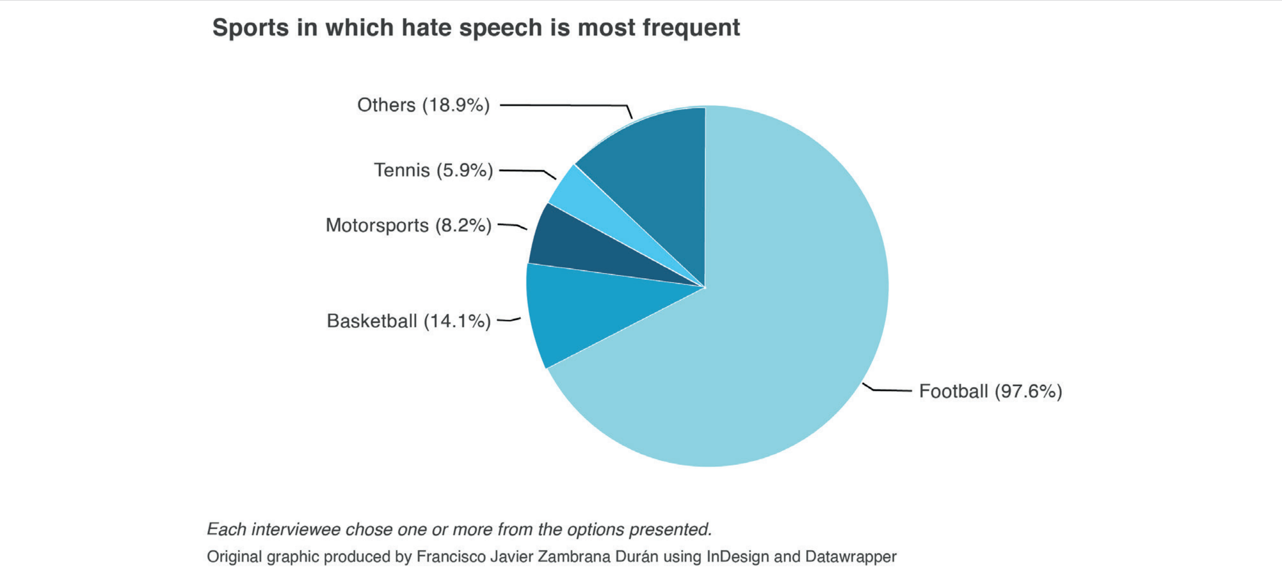

Figure 4. Sports in which hate speech is most frequent

The study data also establish the profile of the perpetrators, corresponding to a man between 40 and 65 years old in 85.4% of cases. Women accounted for 14.6% of the total, being on average under 40 years of age. Most of them are sports fans, with 80% of the perpetrators belonging to this group, with a prevalence of soccer fans. However, the high percentage of perpetrators from journalism and sports management circles, in addition to athletes themselves, is no less serious (Fig. 5).

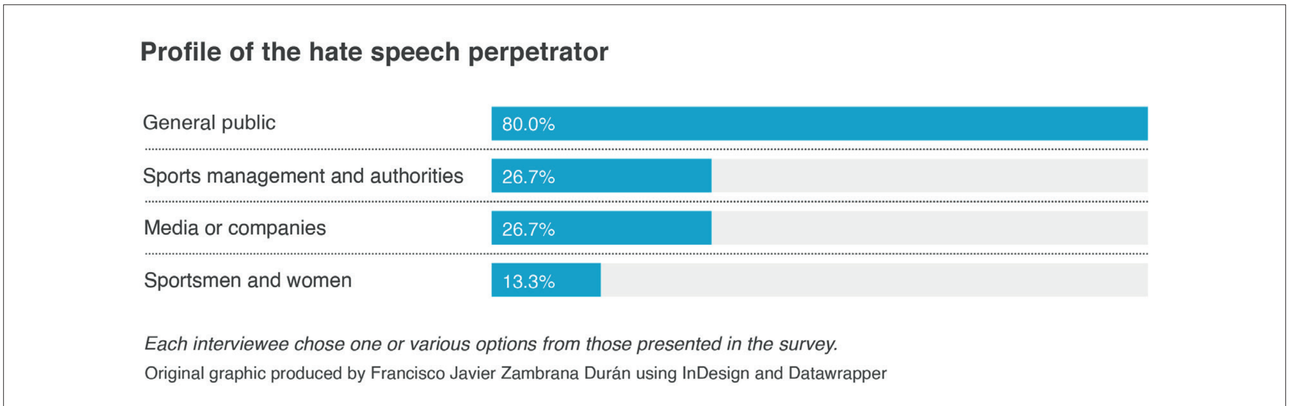

Figure 5. Profile of the hate speech perpetrator

Of the professionals who participated in the study, 67% were directly aware of cases related to hate speech toward a female colleague. Insults, contempt, discrimination, and even some cases of physical violence stand out as the most frequent cases. Almost 27% of the observers did not react or did not think it was serious when they witnessed it, despite being aware of the problem. The rest did encourage the victim to report the incident or reproached the perpetrator. Of these journalists, 86.1% believed that the attacks suffered by their female colleagues are based on false news that seeks to discredit them professionally and personally, while 78.8% considered that disinformation and false and hateful content against women in sports are the main triggers for such situations.

Aggression suffered by female sports journalists, both through social networks and directly, was identified in this research as a critical issue that requires urgent solutions. In an open question about the different measures to be implemented to improve this situation, almost all of the respondents (93.5%) opted in the first place for education as the main route for solving this problem, especially through media literacy and training in gender issues.

Figure 6 shows a list of solutions, where second place is taken by an urgent need to amend legislation so that cases of hate speech can be treated as punishable crimes, potentially leading to imprisonment in the most severe cases. Regarding the high incidence of the problem on social networks, the respondents considered that this could be easily solved by means of mandatory registration to ensure real identification and prevent perpetrators from hiding behind false accounts. No differences between the responses of men and women were observed regarding the suggestions made.

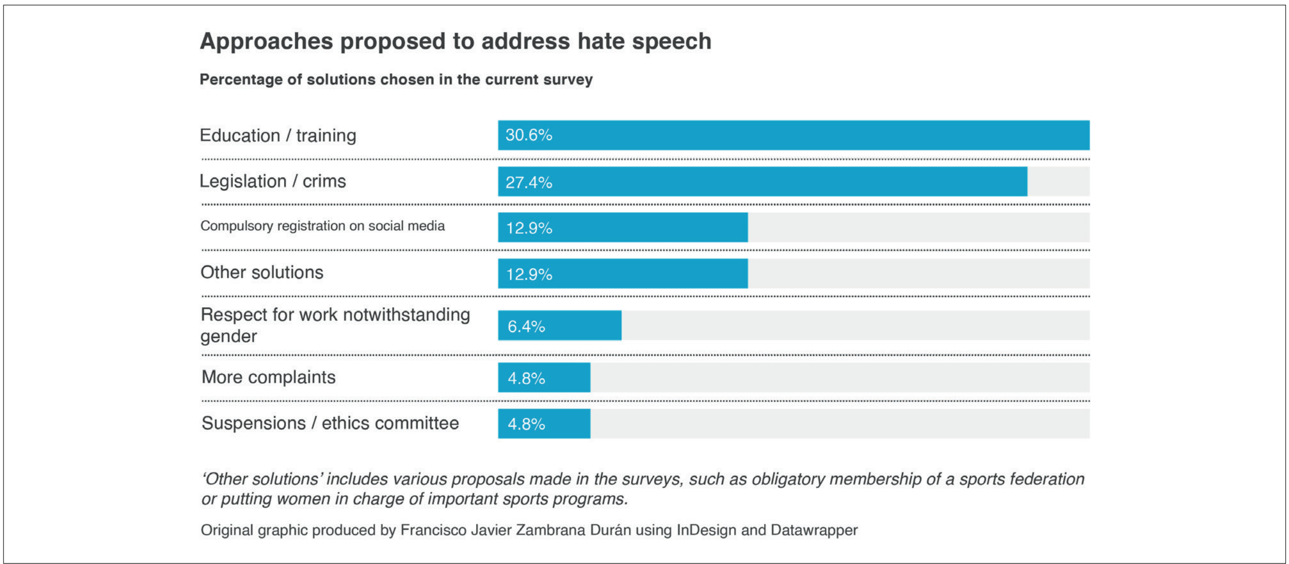

Figure 6. Approaches proposed to address hate speech

3.2. In-depth interviews

Hate speech and situations of intimidation and harassment toward female sports journalists were found in all the reflections, evaluations, and actions reported in the interviews conducted. Carmen Barceló (I1), Pilar Casado (I2), and Carmen Colino (I3) openly declared that they were affected by such situations, reporting them at the time to the authorities or on social networks. Barceló presented two complaints to the Mossos d'Esquadra regarding death threats and constant harassment, also extending to her relatives. Colino made a complaint at a delicate moment for her owing to accusations made against her in relation to the death of a first-degree relative. Casado, on the other hand, filed a complaint for hate speech against a third person. All these actions took place on social media. These three journalists, who are highly regarded in their professional field, agreed to share their experience as victims and to reflect on the problem and its solutions.

3.2.1. Characteristics, perpetrators, and consequences of hate speech

The journalists interviewed identified two main reasons triggering hatred speech: preference for a sports team and being a woman.

> "They assume that I support the opposing team; very overt speeches at certain times, such as when there is rivalry between Barça and Madrid" ["*Dan por hecho que tengo los colores contrarios; discursos muy manifiestos en momentos determinados, como cuando hay una rivalidad Barça-Madrid*"] (E2).
>
> "They attack us for being women in an eminently male world, where we have yet to make our mark" ["*Atacan por ser mujer en un mundo eminentemente de hombres, en el que aún no hemos puesto los dos pies*"] (E1).

Both agreed that hate speeches are loaded with sexual discrimination and utter misogyny. Physical appearance, sports training, and sexual connotations are the main focus of the messages they receive, loaded with foul language:

> "Fat, asshole, fucker, sellout" ["*Gorda, gilipollas, cabrona, vendida*"] (I3).
>
> "Bitch; go to the kitchen; you're an old woman" [*Puta; vete a la cocina; eres una vieja*"] (I1).
>
> "You have no idea, go scrub..." ["*No tienes ni idea, vete a fregar…*"] (I2).

The types of hate speech received first-hand include insults, contempt, malicious intent, and hostility. Harassment and threats are also practices referred to by two of them (I1 and I3).

> "I have been followed in the street and even insulted by some parents." ["*En la calle me han seguido y hasta algún padre me ha insultado*"] (I3).

Aggressions have taken place mainly through *Twitter*. Colino believes that this social network did not evolve as it was supposed to owing to the presence of hate speech:

> The standard profile of the perpetrator, is a man between 40 and 65 years old and a fan of mainstream sports

> "I think that is the reason why it has not grown more, even though *Twitter Spain* has great professionals" ["*Creo que por ello no ha crecido más, aun cuando Twitter España cuenta con grandes profesionales*"] (I3).

These women also reported cases in which hateful actions have been direct, during visits to specific locations or when working for a specific media outlet. Two of them reported receiving anonymous letters (I1) or telephone calls (I3).

There was a disparity regarding the rest of the media as a vehicle for hate content. Barceló believed that the same applies to all media, while Casado considers television to be the main source of hate speech given its high penetration and visibility, characteristics that Colino also highlights, although she specifies:

> "More hate messages are concentrated on social networks, not on TV itself; it's important to differentiate" ["*Concentra más mensajes de odio en redes sociales, no en la propia televisión; es importante diferenciarlo*"].

All three women are aware of instances of aggression against female colleagues, mostly those who cover soccer. These situations are similar to those they experienced themselves, although with major sexual connotations owing to their younger age. They agree that, the greater the visibility of the journalist, the more hate speech they receive.

Their long experience indicates that hate messages remain the same, while only their power of propagation and viralization have changed through social networks, with savage attacks on professional or physical aspects, as Colino points out:

> "Times have changed, but not the modus operandi, and we all have this hate speech in mind, in one way or another" ["*Han cambiado los tiempos, pero no el modus operandi y todas tenemos presente ese discurso de odio, de una manera u otra*"].

Barceló notes that media coverage was infinitely lower prior to the Internet, but she was "looked at strangely" ["*miraban raro*"] on the field and her presence was questioned, occasionally requiring a trainer to certify her as an accredited journalist at a match.

In this way, they experienced many situations at the beginning of their career in which their professionalism was questioned owing to their gender or when they received sexist insults. Casado believes that fans were more polite back then and argues that there is a social component, not just a sporting one:

> "It is not an isolated element, but it is a faithful reflection of the society they belong to" ["*No es un elemento aislado, sino que es fiel reflejo de la sociedad a la que pertenecen*"].

She believes that roles in sports journalism have always existed. Thus, female sports presenters or sportscasters are lacking. Barceló points out that we are moving in the right direction toward equality "that does not yet exist" ["*que no existe aún*"], while Colino stresses that there is a deep Spain that "stigmatizes women a lot" ["*nos estigmatiza mucho*"] and hinders any progress.

They consider social networks to represent an evolution, a development that, however, also suffers from drawbacks, such as anonymity or fake profiles, which make it difficult to file complaints. Casado believes that anonymity should be mitigated by requiring registration with an identity card, "not just an email address" ["*no solo un email*"]. She believes that social networks have encouraged hate crime by becoming "anything goes" ["*todo vale*"]:

> "We entered like a bull in a china shop, and many journalists have closed their accounts as a result of the consequences" ["*Hemos entrado como elefante en cacharrería y muchos periodistas, a raíz de las consecuencias, han cerrado sus cuentas*"].

She notes the overexposure of private life, which provides arguments and data that encourage hate crimes. Colino stresses that journalists must be very careful with the content they publish and the language they use, since "they are under the microscope" ["*nos miran con lupa*"].

Football, as a result of the greater number of fans, is the sport where hate speech is most prevalent. Barceló claims to receive hate speech to a greater extent than a journalist who covers rhythmic gymnastics or swimming, and underlines:

> "Racism and homophobia in the world of football has become a very serious issue" ["*El racismo y la homofobia en el mundo del fútbol se ha convertido en un fenómeno gravísimo*"].

Casado considers herself lucky regarding her followers:

> "Following the social media boom, I switched to covering basketball, which has a more peaceful fan base" ["*Con el boom de las redes sociales pasé a cubrir baloncesto, que cuenta con una afición más pacífica*"].

> Hate speech also affects their male colleagues focused mainly on arbitrary, political, or ideological issues rather than physical characteristics

However, she points out that this issue concerns not only fans but also society as a whole, even though hate speech is often channeled through sports.

According to all three of them, this situation can be extrapolated from female sports journalists to include female referees and athletes, especially female soccer players. Barceló points out that there is a certain stigmatization of girls who play football:

> According to 72.9% of the professionals consulted, social networks are the main setting for hate speech against female sports journalists. Overall, *Twitter* is the most worrying platform

> "They have had to jump many barriers. The opposite happens with a boy; he has the support of his family, while a girl footballer is considered to be a lesbian" ["*Han tenido que saltar muchos muros. Con un chico sucede todo locontrario, cuenta con el apoyo de su familia, mientras una niña futbolista supone que se crea que es lesbiana*"].

Although there are athletes who suffer hate speech, Casado believes that they receive it to a lesser extent than sports journalists.

The journalists also outlined the profile of the person who delivers hate speech. Although anonymity prevails, it is clear that men over 40 years old ("although there are also women" ["*aunque también hay mujeres*"]) and young people predominate. Casado considers that there is "a tremendous degree of cowardice" ["*un grado de cobardía tremendo*"] behind this anonymity. They are aware that hate speech also affects their male colleagues: "they are told outrageous things" ["*les dicen auténticas barbaridades*"] (I2), focused mainly on arbitrary, political, or ideological issues rather than physical characteristics. This is a distinguishing element in the recurrent hate speech against women.

> "They don't shout 'hey gorgeous' or 'you are hot' to my male colleagues; they are not jeered at in the same way, despite having the same exposure as me" ["*A mis compañeros no les gritan 'guapo' o 'qué bueno estás', no los jalean teniendo la misma exposición que yo*"], explains Barceló.

These female journalists express their concern about the increasing number of women being affected by such messages. While the main perpetrators are men, some insults to female referees come from women. Barceló believes that this happens because the patriarchal culture injects these messages into women themselves: "It is unbelievable that one woman should send another one home to scrub" ["*Es alucinante que una mujer mande a fregar a otra*"]. Colino also states that there are tremendous messages from women and reflects that:

> "We should be very proud to be free, to exercise a certain profession, to move forward" ["*Tenemos que estar muy orgullosas de ser libres, de ejercer una determinada profesión, de avanzar*"].

Casado and Colino believe that this type of situation is also found in other areas of journalism.

> "The same must happen to female political journalists; if you express your opinion about the opposition, you will be insulted in the same way" ["*A las periodistas que cubren política debe pasarles lo mismo; si opinas de la oposición van a insultarte de la misma forma*"] (I2).

In soccer, Barceló believes that criticism in the world of soccer is destructive:

> "There is no constructive criticism as in other areas of journalism. The same hate speech would not be produced in cultural, scientific, economic, or other journalism because there is a different consumer profile" ["*No existe crítica constructiva como en otros ámbitos del periodismo. El mismo discurso de odio no se produciría si me dedicase al periodismo cultural, científico, económico u otro porque hay otro perfil de consumidor*"].

Regarding the consequences of hate speech, the three journalists have been affected by it, although they try to ignore it. Colino states that it can do a lot of harm, not only to them but also to their family and friends. All three have always felt supported when they experienced these issues. Casado's private life has not been affected:

> "I try to be cautious to avoid certain comments" ["*Intento tener cuidado para no dar lugar a determinados comentarios*"].

Barceló does not share some ideas on social networks:

> "Not because of coercion but because I do what I do and it does not really pay off" ["*No por coacción sino por dedicarme a lo que me dedico y porque no me suma*"].

Self-censorship did not apply in her case:

> "All my life I have fought for freedom of expression, and in my home I have been lucky enough to think and say what I wanted. That's why I'm a journalist" ["*Durante toda mi vida he luchado por la libertad de expresión y en mi casa he tenido la suerte de pensar y decir lo que he querido. Por eso soy periodista*"].

Colino has felt constrained when it comes to showing a photograph or expressing her opinion. She always tries to stay under the radar so as not to be recognized:

> "I used to reply to everyone, but now only to those who express themselves with respect and constructive criticism" ["*Antes contestaba a todos, ahora solo a aquellos que hablan desde el respeto y aportan*"].

None of them have considered leaving sports journalism due to hate speech.

> "You have to be there fighting; if not, there would be no female boxers, soccer players. We must be there because others will come after us, and we have to do it for them" ["*Hay que estar ahí luchando, no habría entonces mujeres boxeadoras, futbolistas. Debemos estar porque detrás vienen otras y hay que hacerlo por ellas*"] (I1).

> "It would set a bad example for the new generations. Every career has its problems" ["*Mal ejemplo daría a las nuevas generaciones. En todas las profesiones hay problemas*"] (I3).

The use of hate speech in the name of freedom of expression is a serious matter for them.

> "There is a limit: insults, disrespect, intolerance, xenophobia, homophobia, violence...; and this is where the law must step in and protect people" ["*Hay una frontera: el insulto, la falta de respeto, la intolerancia, la xenofobia, la homofobia, la violencia…; y es aquí donde debe intervenir la ley y proteger*"] (I1).

> "Freedom of expression has its limits; one's freedom ends when another's begins. It's a very fine line" ["*La libertad de expresión tiene límites, la libertad de uno acaba cuando comienza la de otro; es una frontera muy fina*"] (I2).

> "Freedom of expression is one thing; libertarianism is another" ["*Una cosa es la libertad de expresión y otra, el libertinaje*"] (I3).

They consider it urgent to establish a legal framework to regulate hate speech and to put an end to the laxity of penalties and the impunity with which perpetrators act, which encourages these practices.

According to all three journalists, combating hate speech and disinformation requires adequate school training and, above all, a good home education, which cannot be provided by schools: we must educate in equality and respect. Casado defends that beliefs acquired within the family are very important, but recognizes that reversing the current situation will require a lengthy process.

Table 2. Main features of hate speech, according to the interviewed female journalists

Hate speech is fraught with sexual discrimination and misogyny.
Physical appearance, competence in sports matters, and sexual connotations are the main focus of the messages that female sports journalists receive.
Two of the interviewees stated that they had suffered harassment and direct threats, as well as anonymous messages and telephone calls.
Hate messages have not changed over time, but their power of propagation and viralization through social networks has, with savage attacks on professional or physical aspects.
They are aware of cases of other female colleagues who have been assaulted, mostly those who cover soccer.
According to the interviewees, a social component is involved in these situations, not only a sporting one, which faithfully reflects society.
This situation can be extrapolated from female sports journalists to female referees and athletes, especially to female soccer players.
The standard profile of the perpetrator is that of an adult male over 40 years old.
These journalists have always felt supported when they experienced situations where hatred was present.
None of them have considered leaving sports journalism owing to experiencing hate speech or threats.
The use of hate speech in the name of freedom of expression is a serious matter for them.
In addition to implementing legal measures, combating hate speech and disinformation requires adequate school training and, above all, a good home education, which cannot be provided by schools.

4. Discussion and conclusions

The present study on disinformation, hate speech, and harassment toward female sports journalists in Spain has allowed us to deepen investigation into this problem, learn about its characteristics, propose possible solutions, and outline the profile of its main perpetrators. It has also corroborated previous studies that analyzed hate speech on social media (**Chetty**; **Alathur**, 2018; **Mondal** *et al*., 2018; **Van-der-Wilk**, 2018; **Piñeiro-Otero**; **Martínez-Rolán**, 2021). This research provides important insights and reveals extremely concerning figures. Indeed, 89.6% of the female journalists participating in this study had experienced violence at work, half of them continuously. Multiple research findings on the importance of hate speech toward female journalists are therefore empirically validated, such as the most recent *Unesco* study on violence against female journalists. However, despite data collection limitations, the indicators suggest that their incidence is higher in sports journalism.

Hate speech and harassment against female sports journalists are widely known among professionals, who perceive this to be a social problem. There is no strong opposition to this problem, but rather an unacceptable tolerance toward those who practice it, as well as a lack of sympathy and support for those who suffer from it. Minimizing the importance of many hate speech cases reflects how the dominant patriarchal culture within this area of society leads to the normalization of situations of aggression and harassment, masked as admiration for physical traits: allusions and comments of a sexual or stereotyped nature are common.

> 89.6% of the female journalists participating in this study had experienced violence at work, half of them continuously

The main objective of violence against female journalists is, however, to damage their professional reputation and undermine the free practice of journalism (**Posetti**, 2020) by questioning their level of intelligence and manipulating data to damage their credibility, objectives identical to those of disinformation (**Wardle**; **Derakhshan**, 2017; **Tandoc**; **Lim**; **Ling**, 2017). Manipulated messages about female journalists become potential triggers for aggression and harassment, proving the increasing connection between disinformation and hate speech and crimes.

Manipulated messages about female journalists become potential triggers for aggression and harassment, proving the increasing connection between disinformation and hate speech and crimes

This is a serious social problem that many victims suffer in silence. This decision is clearly influenced by the social environment that tends to downplay this phenomenon, as well as the impunity that characterizes these actions, reflected by the low percentage of complaints filed. The fear of misunderstanding, rejection, and even possible consequences at work, as well as the refusal of many journalists to participate in this study, confirms all this.

Hate speech is defined in the Spanish criminal code as an offence of incitement to hatred, violence, or discrimination, and its dissemination through "media accessible to a considerable number of people" ["*soportes accesibles a un número considerable de personas*"], such as the media and social networks, is an aggravating factor. Determining whether such an offense has been committed has the difficulty of potentially clashing with the fundamental right of freedom of expression, a difficulty that may hinder the willingness to report it. For this reason, adequate regulations to dissuade criminal behavior, encourage reporting, and protect victims are needed to address this problem fully.

The relevance of *Twitter* as the social network that spreads the most fake news and hate speech has also been confirmed in this study (**Moreno**, 2019). As previously reported by **Piñeiro-Otero** and **Martínez-Rolán** (2021), *Twitter* proves to be a particularly toxic and hostile territory for female journalists, especially considering how violence is expressed. Other platforms, such as *Instagram*, *Facebook*, and *TikTok*, do not have as much impact despite their significant percentages, and neither do traditional media, except for television. However, from this latter media, further hate speech is developed and fostered owing to the importance generally attached to the physical appearance of female journalists.

It is evident that social networks, with predetermined design options that multiply their potential, have direct consequences regarding the dissemination of violent content (**Harju**; **Huhtamäki**, 2021). In the case of *Twitter*, in particular, the results reveal a general concern regarding the possibility of interacting anonymously, which allows users to use false identities. The solution requires specific regulation to mitigate its effects, end the current impunity, and ensure the safety of female journalists in any situation. These initiatives should consider the participation of social media companies and warn citizens of the presence of hateful content (**Segado-Boj**; **Díaz-Campo**, 2020), in addition to reporting them.

Soccer, the main mass sport, accounts for the greatest production of hate speech toward female journalists, with fans as its main vehicle. This behavior reveals a sexist and discriminatory social and cultural reality that is still justified as normal. The profile of the perpetrators mostly corresponds to a man, although there are also cases of female perpetrators. Misogyny also exists among women and is a frequent cause of harassment against female journalists (**Miranda-Bustamante**; **Agudelo-Vizcaíno**, 2021), primarily from female fans and, to a lesser extent, female coworkers. The purpose of such misogyny is the same as that of other forms of misogyny, that is, to discourage women and exclude them from the public sphere (**Lumsden**; **Morgan**, 2018) by questioning their professional worth.

The standard profile of the perpetrator, a man between 40 and 65 years old and a fan of mainstream sports, should not distract us from the high incidence of harassment against female journalists within companies themselves and from sports managers and athletes. It is precisely in these immediate surroundings where the victim remains reluctant to report the problem. Empathy tends to decrease when the aggression takes place in our own environment owing to the potential impact it may have, as opposed to when it takes place through social media, for example, where everyone, in some way, is also a potential target.

The cultural and social roots of hate speech warrant the consideration of media and gender literacy education as the most effective tool to address it. It is therefore essential to provide citizens with tools that will enable them to develop a critical mindset regarding questionable information, understanding how the media works and how to use social media responsibly. As pointed out by **Aguaded** and **Romero-Rodríguez** (2015), this will also serve to counteract passivity, reluctance, and even naivety in the reception of messages. The importance of media literacy in ending this vicious circle requires its urgent inclusion in the educational curriculum.

Female journalists are emotionally affected by harassment, fake news, and other forms of hate speech, but it also harms their personal and professional reputation and even their work and safety, ultimately restricting their freedom of expression. The findings of this study support sociocultural and behavioral models that account for discrimination, harassment, and hate speech against women in their historically male-dominated workplace.

On the basis of the results obtained, the guidelines proposed to alleviate this problem coincide with those of **Baya** (2019) in their three main areas of focus: law, technology, and education. Regulatory measures are needed to discourage such criminal behavior and protect victims; technological measures involving social media companies; and educational measures to enable the development of citizens' training in media consumption and gender issues.

> The importance of media literacy in ending this vicious circle requires its urgent inclusion in the educational curriculum. Also, anonymity should be mitigated by requiring registration with an identity card in social networks

As already stated by **Piñeiro-Otero** and **Martínez-Rolán** (2021), it is essential to exert stricter control over hate speech and misogyny. We believe that combined efforts with the ultimate goal of addressing the problem of disinformation and hate speech are essential today and should be introduced as a priority measure on government agendas. Overcoming this problem requires the involvement of not only social network executives and managers but also the three branches of government, supranational organizations, and the general public. Nowadays, it is crucial to provide countries with judicial mechanisms to protect victims of hate crimes, as well as the development of a manual or good practice guidelines for the management of social media. All these guidelines will not only improve the profession of journalism but also contribute to improving relations between the stakeholders involved in sports communication.

This study offers new lines of research to be undertaken in the future, such as monitoring this issue, assessing whether there has been progress or setbacks in this area, as well as extensions to neighboring countries. This will enable an assessment of how cases of hate speech and harassment affect female sports journalists and how this problem should be addressed.

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Influence of government communication on risk perception. An analysis based on the context of the sixth wave of Covid-19 in Madrid

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Abstract

Risk theorists have frequently discussed the discursive construction of risk perception. In particular, the effect of media consumption on increasing the subjective perception of risk has been highlighted. Not much is known about how government communication affects citizens' impressions and attitudes in this area, something that this research seeks to address. During the sixth wave of Covid-19, triggered by the emergence of the Omicron variant, government discourse shifted from initial concern to what has become known as the "influenzaisation" paradigm, an attempt to normalise the disease. Based on the results of a survey carried out in January 2022 amongst 664 citizens of the Community of Madrid, we sought to demonstrate, using binary logistic regression (BLR) models, to what extent the degree to which the citizens of Madrid internalised the government's thesis of "influenzaisation" was related to a lower perception of risk. Similarly, the aim is to show whether agreement with the "influenzaisation" thesis also favoured positions that were less inclined to restrictions, so that government communication succeeded in reducing the social demand for measures. Finally, the study evaluates the predictive character of ideology on levels of risk perception and attitudes towards restrictive measures. The findings indicate that acceptance of the "influenzaisation" story led to a lower perception of risk and, as a consequence, reduced support for restrictive measures among those most exposed to this thesis. The discursive articulation of risk in government communication becomes a central element of crisis management and the strategic formulation of "risk de-escalation" or "post-risk" messages.

Keywords

Risk; Covid-19; Coronavirus; SARS-CoV-2; Pandemics; Perception; Discourse; Risk communication; Government communication; Crisis communication; Political communication; *Influenzaisation*; Restrictions.

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1. From the state of alarm to "influenzaisation": changes in governmental discourses during the sixth wave of Covid-19

On 26 November 2021, the *World Health Organisation* (*WHO*) met to assess the emergence of a new variant of Covid-19, B.1.1.529, better known as Omicron, which was described as a "variant of concern" (*WHO*, 2021). The origins of this new variant appeared to be in South Africa. It was there that Dr. Angelique Coetzee became aware of its existence when she observed a patient with a different clinical picture to the one caused by the Delta variant (*BBC News mundo*, 2021). Initial data provided by the *WHO* indicated that Omicron carried an increased risk of reinfection and a potential for transmission never seen before, despite vaccination. However, evidence gathered by Coetzee and the teams treating the first patients infected with this variant showed that Omicron had rather mild symptoms and effects (potentially low hazard).

Shortly after the existence of Omicron became known, several countries took firm decisions that reopened a restrictive framework for action. Governments' fear of making mistakes similar to those experienced during the first wave led all EU states to ban travel to and from Southern Africa on 26 November, as did the United States, the United Kingdom and Israel (**Gómez**; **Sevillano**, 2021).

While the first measures taken by governments could re-activate a sense of high risk and danger, messages soon began to try to lower the level of alert. Joe Biden declared on 29 November that Omicron was cause for "concern but not for panic" (**Monge**, 2021). News reports during the first days of December were consistent with this discourse. On 9 December, *El País* stated that, if the mildness of the symptoms caused by Omicron is confirmed, its mass transmission

> "'could become good news', as the coronavirus would become a 'seasonal flu or cold-like pathogen'" (**Linde**, 2021).

The thesis of the so-called "influenzaisation" began to appear in the media in a social context marked by the exhaustion of the citizenry after almost two years of restrictions and on the verge of celebrating the Christmas holidays. Moreover, just a few weeks earlier, on 27 October 2021, the *Spanish Constitutional Court* had annulled some aspects of the second state of alarm, which was extended from 9 November 2020 to 9 May 2021, in its *Ruling nº 183/2021* (in July it had already declared several aspects of the first state of alarm unconstitutional).

While doubts about the severity of the new variant were at the centre of the first days of the sixth wave, the first doses of paediatric vaccines were received in Spain on 13 December and two days later they began to be administered. Likewise, the cumulative incidence (CI) continued to rise after the December long weekend break. According to data from the *Health Alerts and Emergencies Coordination Centre* (*Ccaes*) from the *Ministry of Health*, the 7-day CI (CI7D) on 10 December was 164.33 in Spain (77,977 cases diagnosed in the last 7 days).
https://www.sanidad.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov/situacionActual.htm

One month earlier, on 10 November, the CI7D was only 35.82 (16,996 cases). On 17 December, the CI 7D was already 424.07 (201,225 cases).

Faced with the unstoppable increase in cases, with record daily figures, on 19 December, the president of the Spanish government, Pedro Sánchez, appeared from Barcelona and announced the extraordinary and telematic convening of the regional *Presidents Conference* for the 22nd with the aim of adopting, as he declared, new measures (*Cadena SER*, 2021, 1m 46s). Sánchez, who until then had kept a low profile in relation to the new variant, indicated that the cumulative incidence of these days warned of

> "a real risk to the health of our compatriots and, consequently, demands that we intensify our actions in the face of the spread of the virus" (*Cadena SER*, 2021, 1m 11s).

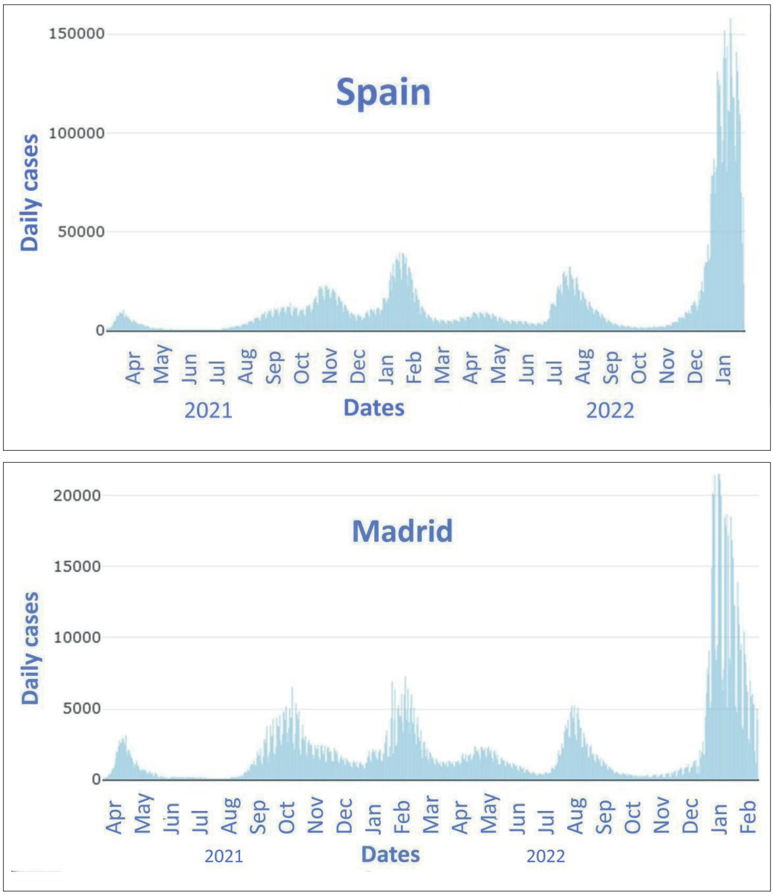
In the hours prior to the *XXV Conference of Presidents*, the different regional governments began to consider new restrictions that they would later present to this cooperation body. On 21 December, at least seven territories of different political stripes had already called for the return of mandatory face masks outdoors. In turn, Catalonia called for the nationwide implementation of the curfew already in force in its region, as well as the closure of nightlife and the generalised reduction of capacity and personal gatherings. The dissenting voice was once again that of Madrid. Its president, Isabel Díaz Ayuso, declared that she was not going to change the health strategy in her community. Furthermore, she took the opportunity to request a relaxation of the quarantine criteria, leaving everything to the massive implementation of antigen tests (*RTVE*, 2021).

It seemed, then, that the scenario of previous months was repeating itself. Faced with a rise in cases, most regional governments called for tougher measures and the only dissent was expressed by Isabel Díaz Ayuso, who preferred to opt for a "self-care culture" and minimal public intervention, and was totally opposed to increasing the level of restrictions

(**Díaz-Ayuso**, 2021). The president of the Community of Madrid sent a message of "calm" in the hours before the *Conference* (*Europa Press*, 2022): everything should continue as before, there was no reason to apply more restrictions.

It was in this atmosphere that the day of the *25th Conference of Presidents* arrived. At its conclusion, a new appearance by President Sánchez took place in which, in the end, no announcement of restrictive measures for the whole country was made, except for the return of the mask to the outdoors. Sánchez worked hard to make it clear that we were in a wave of a different nature that should not worry us as much as others and where no invasive measures were needed, thanks to the success of the vaccination campaign. The idea that it was necessary to learn to live with the virus began to take shape, and the communication objectives focused on demonstrating the effectiveness of vaccines, preventing a new alteration of normality from compromising people's confidence in vaccination as the best guarantee for the end of the pandemic. In that appearance Sanchez literally said:

> "We all have the traumatic memory of March last year when the virus burst into our lives in a tragic way, and we all feel the fear of returning to that situation, I understand it, but we are not in March 2020 nor are we in Christmas 2020, and if we are not, it is because Spaniards have been vaccinated" (*RTVE* 2021, 2m 27s).



Graph 1. Epidemic curve in Spain and Madrid. Daily cases April 2021-January 2022.
Source: *Ministry of Health*, *Health Alerts and Emergencies Coordination Centre*.
https://cnecovid.isciii.es/covid19

Díaz Ayuso's position of not changing the health strategy in the face of the sixth wave ended up prevailing in the whole country. If we consult the restrictions in force during Christmas in the different territories, some that had been very tough in previous stages of the pandemic, such as Castilla y León, did not approve either a curfew or a Covid passport requirement. Neither did other regional governments of different political stripes such as Castilla-La Mancha or Extremadura. In no territory were curfews imposed, except in Catalonia and certain municipalities, depending on the number of inhabitants and their CI. Only in Galicia was a restrictive regulation established for meetings between non-cohabiting partners in public spaces after 2 a.m. (**García**, 2021).

On 29 December, President Sánchez appears again to review the year 2021 and the two years of the legislature. In this speech, the thesis that "we have to learn to live with and understand the virus" (**Marcos**, 2021) is already openly expressed. It is stated that "we must persevere with our strategy" (*El Mundo*, 2021, 8m 30s), i.e. not to change course for Omicron. According to Sánchez, one of the main pillars of this strategy would be the vaccination campaign and "personal protection with the use of masks" (*El Mundo*, 2021, 8m 50s). Actions relating to the reduction of social contact, the limitation of parties and events, or mobility, are eliminated.

After the holiday period, once the possibility of harmonious coexistence with the virus (normalisation) has been established based on accumulated experience and the decrease in lethality associated with the high vaccination rate, the President of the Government expressly proposed treating Covid-19 as an endemic disease, under the same parameters as ordinary influenza. On 10 January, the day millions of Spanish children go back to school, Pedro Sánchez gives an interview on *Cadena SER*'s *Hoy por hoy* programme in which, in addition to announcing the purchase of hundreds of thousands of oral antivirals from *Pfizer* and defending the fact that we cannot continue to ask for efforts from a society that has responded so favourably to vaccines, he says:

> "we have to evaluate the evolution of Covid towards an endemic disease" (*Cadena SER*, 2022, 2m 26s).

At one point in the interview, the journalist Àngels Barceló expressly asks him

> "are we heading towards the influenzaisation of the pandemic?" (*Cadena SER*, 2022, 3m 35s),

or in other words, to stop counting cases and stop testing, and Sánchez replies that "we have been working on it for weeks" (*Cadena SER*, 2022, 3m49s). The end of the exceptionality. On the same day, 10 January, *El País* published that "Spain is finalising a system to monitor Covid like the common flu", putting an end to the "exhaustive notification of cases" (**Linde**, 2022). A few days later, *BBC News* states that the influenzaisation strategy, a new paradigm in the treatment of Covid-19, is being led by Spain and wants to be exported to the rest of Europe (*BBC News*, 2022).

> The importance of the perceptive dimension of risk makes communication essential to consider how the intervention of political and media messages can alter, diminish or accentuate the citizenry's sensations in the face of a specific phenomenon

At the same time that *Moncloa* began to speak of "influenzaisation", this same framework was conveyed by the Madrid Regional Government, a discursive convergence that had not previously occurred in almost two years of the health crisis. On 13 January, the Deputy Minister of Public Health of Madrid, Antonio Zapatero, gave an interview in which he said that it would be possible to assimilate the coronavirus to influenza in spring and ruled out a new wave after Omicron (**Belver**, 2022). Previously, in November 2021, he had stated that in Madrid there was already "herd immunity", which is why he argued that they had entered "this new phase of coexistence with the virus" (*Onda Madrid*, 2021). Almost two months before the "influenzaisation" thesis was advocated from the central government, one of the main health officials of the Community of Madrid was already arguing that the cumulative incidence (CI) should cease to be the relevant indicator of the evolution of the disease, to focus exclusively on "patients admitted to hospitals" (*Onda Madrid*, 2021). Stop counting cases, start counting only serious cases, as a first stage of normalisation.

If we leave aside the chronological account of governmental discourses during the sixth wave and take a brief look at the communication strategies that institutions have maintained throughout this health crisis in Spain, the role that experts assumed in the transmission of the message, a way of legitimising the harsh measures of confinement and paralysis of "large sectors of the economy" (**Crespo**; **Garrido**, 2020, p. 16), stands out. Governmental communication in our country generally sought permanent technical-scientific endorsement and was oriented, in the early stages of the coronavirus, towards major measures to intervene in social behaviour to save lives and avoid health collapse. In a context of uncertainty never seen before, the Spanish government was forced to establish, with the leading role of experts, "constant communicative spaces" for the provision of information through daily press conferences, and also had to face throughout the process "intra-territorial tensions" derived from our system of distribution of competences (**Castillo-Esparcia** *et al.*, 2020, pp. 2-3).

The success of government crisis communication strategies seems to be largely related to aspects such as combating misinformation, maintaining credibility or translating measures in accordance with social norms -such as solidarity- that facilitate compliance with decisions (**Hyland-Wood** *et al.*, 2021). During the first state of alarm, governments promoted actions of permanent information and individual responsibility to protect the common good, empowered experts to gain credibility and tried to justify exceptional regulations on the basis of the priority position of the right to health. After the end of this first stage, and especially with the advance of the vaccination campaign, as the severity of the disease was reduced in a large part of the population, an ideological-partisan divide began to appear, pitting the government against the opposition and different regions against Moncloa. The initial consensus on the need for measures began to be replaced by the classic ideological debate between individual freedom and state intervention.

2. Risk communication and risk perception: from classical theory to new debates arising from Covid-19

The concept of "risk society" includes an extensive reflection on the relationship between risk perception and risk production (**Beck**, 2019, p. 66). For Beck, the "risk society" breaks with the culture of visible or material need, so that these risks are not easily evident in an immediate and univocal reality (**Beck**, 2019, p. 67). The condition of risk is predominantly perceptual, making the "instruments of risk-defining domination" central to the struggle to conceal or expose risks, a struggle to warn or displace the consequences of the invisible threat (**Beck**, 2019, p. 68).

The importance of the perceptive dimension of risk makes communication, or the discursive construction of risk, essential to consider how, in situations that objectively constitute a risk, the intervention of political and media messages can alter, diminish or accentuate the citizenry's sensations in the face of a specific phenomenon. According to **Farré-Coma** (2005, p. 108), risk perception derives from processes of "structural mediation" of the information ecosystem. In this regard, recent research has found a higher perception of risk about SARS-CoV-2 among those who were most exposed to and followed news and information content about the pandemic (**Mora**; **Melero**, 2021). Similar evidence was obtained by **Muñiz** (2011) for the case of AH1N1 influenza in Mexico, linking higher risk perception to consumption of certain media and interpersonal conversation about the issue.

The subjective condition of risk means that it "cannot be distinguished from the perception of risk" (**Farré-Coma**, 2005, p. 104) because there is no threat other than that which the subject has internalised and assumed, regardless of whether it is more or less certain. Considering that risks are constructed in discourse and as a product of perception, risk communication is aimed at shaping or adapting behaviour by conveying that there is a hypothetical risk or, in crisis contexts, a manifest risk that merits preventive action (**Riorda**, 2011). The absence of risk communication would seek just the opposite, to lower the belief about the impact and extent of the threat.

> The risk perception helps to explain positions in favour of individual constraints and does so in the expected sense

In the specific field of government action, risk communication aims to raise awareness and reduce the vulnerability of the potentially sensitive public to an emergency or event (**Riorda**; **Fontana**, 2016). The *WHO Department of Infectious Hazards Management* (*IHM*) specifies that risk communication aims to ensure that groups that may be most negatively impacted by the emergency "understand and take appropriate protective measures" by mitigating behaviours that increase vulnerability with information (*WHO*, 2018, p. 9). A clear example of this type of communication was the action developed in March 2020 by Downing Street under the slogan "Stay home-Protect the *NHS*-Save lives". The communication management of vaccination campaigns has also become a paradigmatic model of risk communication, in particular, because of the effect of the infodemic and initial vaccine confidence problems in some countries (**Warren**; **Lofstedt**, 2021).

For personal protection measures to be taken, or for the recommendations of the authorities to be followed, it is indispensable that there is an undeniable or sufficient awareness of the risk. Recent research has shown that risk perception influences the adoption of protective behaviours (**Bruine-de-Bruin**; **Bennett**, 2020). Therefore, a longitudinal study of perception levels can explain different collective behaviours and their outcomes on health indicators of disease impact, especially when assuming that risk perception is critical in the early stages of such a health emergency (**Wise** *et al.*, 2020). However, it is noteworthy that most of the research on risk perception has so far been conducted on environmental catastrophes and not so much on infectious diseases, with some exceptions such as swine flu, Ebola or avian influenza, hence there are no fully robust theoretical models of these scenarios (**Dryhurst** *et al.*, 2020).

In the SARS-CoV-2 pandemic, the main actions of governments have been directed at limiting social contact and ensuring the use of masks, but compliance with these recommendations or restrictions weakened as the exceptionality dragged on due to the difficulties of some citizens in making visible the true severity of the disease and the likelihood of contagion (**Joslyn** *et al.*, 2021, p. 599).

It is evident from the above that compliance with regulations aimed at curbing infection may be closely linked to an understanding of the effects of the disease and its likelihood of occurrence. This perception may be influenced by other variables, such as the citizen's ideology or partisan sympathies. Thus, in the United States, although Republicans and Democrats had similar levels of risk perception, the former tended to develop less protective attitudes and support for restrictions (**Joslyn** *et al.*, 2021).

These findings hinder the direct connection between risk perception and the development of responsible behaviour, in a context of strong politicisation of apparently technical and non-ideological public health measures (**Druckman** *et al.*, 2021). Even the more right-wing position of individuals has been linked to less vaccine-friendly attitudes (**Paul** *et al.*, 2021) or the combination of populist and radical right-wing positions with opposition to mandatory vaccination (**Juen** *et al.*, 2021). Not only partisan affection is a variable to be taken into account, belief in the importance of public intervention (a classically differentiating ideological aspect) and cultural values related to attitudes of prosocial solidarity can specifically explain a higher perception of risk and a higher propensity to follow certain preventive measures (**Dryhurst** *et al.*, 2020). Already in classic works on risk perception theory, the presence of cultural biases that generate selective attention to threats depending on individuals' lifestyles has been noted (**Wildavsky**; **Dake**, 1990), which connects with the ideological or belief perspective mentioned above.

Other authors, working on the basis of the Italian case, and without analysing differences by ideology, although they did analyse territorial differences (level of affectation by region), concluded that the greater the awareness that the country was facing a complex and dangerous situation, the more uncertainty increased and the greater the support for hard restrictions (**Motta-Zanin** *et al.*, 2020). Individuals' support for government decisions depended to a large extent on their perception of risk, with the degree of knowledge of the context playing a role. It is possible to find some notes on differences in risk perception, not so much related to the classic variables of information exposure or knowledge of the situation, but rather to socio-demographic variations or specific positions concerning the physical space in which the subject is located. In Germany, a study revealed that women were more concerned about Covid-19 than men and that people felt very safe at home or outdoors, but very unsafe in restaurants, in shops and on public transport (**Gerhold**, 2020). According to the same study, contrary to what one might initially think, older people showed a lower perception of risk than younger people, as measured by the estimated probability of infection (**Gerhold**, 2020), because, although older age groups are those who may suffer the worst consequences of infection, their lifestyle habits also distance them from activities that increase the likelihood of infection.

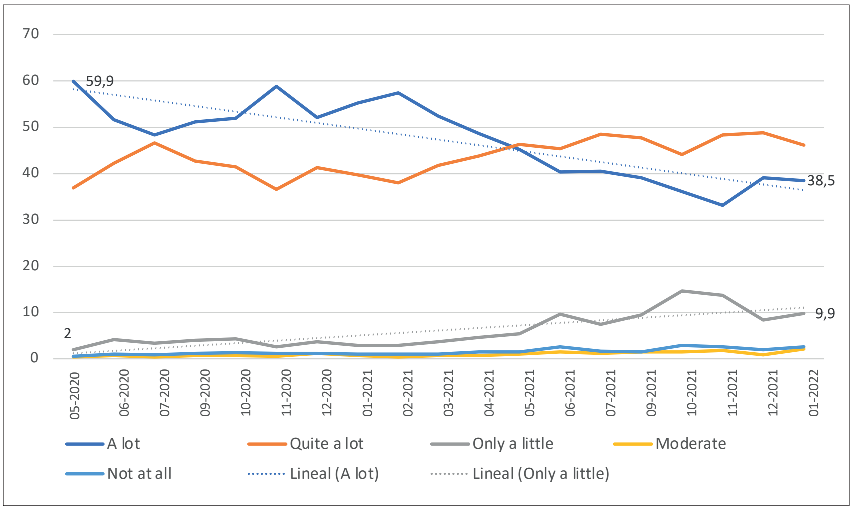
Interestingly, lower risk perception does not correspond to lower anxiety (**Gerhold**, 2020, p. 6). Although in the above-mentioned study the elderly were not the most at risk, they were the most fearful of Covid-19. The individual and probabilistic sense of risk does not correspond exactly to the fear of the effects of the disease (danger). Someone may feel very much at risk of infection, aware of the implications of his/her lifestyle, but may not have a deep fear of the consequences of becoming ill, which he/she has been able to relativise, or which in his/her case are minor.

The terms risk perception and hazard perception, as a way of explaining behaviours and attitudes towards the pandemic, have been used interchangeably (synonymous treatment) in specialised studies. Some authors argue that both the probabilistic dimension and the consequences of the disease are factors that are part of the same construct that allows us to measure risk perception as an umbrella idea. Nevertheless, based on the components of the Health Belief Model, "susceptibility-vulnerability" can be separated from "severity" (**Rosenstock**, 1974; **Moreno-San-Pedro**; **Gil Roales-Nieto**, 2003; **Green** *et al.*, 2020). Taking these two elements we propose to distinguish risk perception from hazard perception, and their measurement on separate but related scales. The first concept explains how close a subject feels to risk (fear of the possibility of taking it on). The second concept is more concerned with the understanding of the individual consequences of risk as danger.

3. Objectives, methodology and working hypotheses

The arrival of the sixth wave of the pandemic has provoked a remarkable paradox in Spain. Despite being the most contagious phase of all those that had occurred so far, and which initially caused an intense sensation of risk and danger, as the days went by it was described in government communication as the least dangerous and a new discursive framework was initiated that sought to normalise the health situation ("learning to live with the virus"). In some media reports, the Omicron variant, the protagonist of this sixth wave, was even described as the trigger for the end of the pandemic. Whether it was due to the exhaustion of the population in the face of the measures restricting individual freedoms, or to the need for a recovery of economic activities, in just a few weeks, the national government, in parallel to the communication of scientific groups and the media, reduced the level of alert and, therefore, also accelerated the reduction of the perception of the risk that this sixth wave represented for the population as a whole.

This decline in Spaniards' concern about the effects of the pandemic had been slowly but gradually taking place since 2021, coinciding with the progress of the vaccination campaign. According to data from the *Centro de Investigaciones Sociológicas* (*CIS*), in May 2020, 59.9% of Spaniards were very concerned about the coronavirus crisis. In April 2021 this figure was 48.7%, and in January 2022 it was lower than at the beginning of the pandemic (38.5%).



Graph 2. Evolution of the levels of concern (%) about the coronavirus crisis among Spaniards (April 2020-January 2022).
Source: based on the *CIS* series L.2.02.06.003

This research attempts to explain the factors that accelerated during this sixth wave the decrease in risk perception among citizens and the "normalisation" of the pandemic between the first days of December 2021 and January 2022, which also led to lower social demand for restrictive measures aimed at fighting the pandemic. In particular, we wonder:

RQ1: How does the degree of citizens' agreement with government discourses of "influenzaisation" affect their perception of risk in the face of the sixth wave of the coronavirus? What other factors explain individual and societal perceptions of risk?

RQ2: What elements help us to understand the different positions of citizens on restrictive measures? Do ideology and the assumption of the "influenzaisation" thesis influence the favourable or unfavourable disposition towards these measures?

In order to answer these research questions, it is necessary to pose a system of relationships that seeks to determine explanatory elements of the articulation of social perceptions of the pandemic based on three hypotheses:

HP1. A higher degree of agreement with the governmental thesis of "influenzaisation" –high internalisation of the dominant governmental discourse in wave 6– is related to a lower perception of risk, i.e. as the individual takes on board the governmental discourse, his or her subjective perception of risk is reduced. The latter would confirm that political communication becomes what **Beck** (2019, p. 68) calls "instruments of risk-defining domination".

HP2**.** Agreement with the governmental thesis of "influenzaisation" favours positions that are less inclined to restrictions. Political discourse shapes social demand for public intervention.

HP3. Ideology is a predictor of levels of risk perception and of the citizens' position on the need for restrictive measures. Pandemic management is a positional issue rather than a technical or cross-cutting issue.

> Government communication and political discourse have a significant influence on individuals' perception of risk in the context of a health crisis

In order to carry out this research, data from the demoscopic study "The sixth wave of the pandemic in the Autonomous Community of Madrid", designed and implemented by the *Knowledge Transfer Group Laboratorio de Comunicación Política* (*Labcom*) of the *University of Murcia*, were used (full details of the study can be found at the following link:
https://www.cemopmurcia.es/estudio-6a-ola-de-la-covid-en-la-comunidad-de-madrid

The fieldwork, conducted between 18 and 29 January 2022, was carried out using a combination of the computer assisted web interviewing (CAWI) online interview procedure, and computer assisted telephone interview (CATI) for household telephone and mobile phone interview procedure. For the fieldwork using the CAWI procedure, a double snowball strategy was implemented after sending the questionnaire to university professors and a viralisation strategy in social networks through organic traffic and paid segmentation. The sample is made up of 664 respondents, the universe being the Spanish population over 18 years of age residing in the Autonomous Community of Madrid.

The Community of Madrid has been taken as the universe because of the peculiar position of its regional government regarding the restrictions on individual liberties throughout the pandemic, which clashed directly with the position of the national government, and deviated from the position of other autonomous governments, both of the *Spanish Socialist Workers' Party* (*PSOE*) and the *Popular Party* (*PP*), and also of the nationalist governments in the Basque Country and Catalonia. However, during the sixth wave, the regional government's position remained along the lines of easing the restrictive measures, which the Spanish government eventually agreed to after the *Conference of Presidents* held at the end of December.

The sample is representative of the population under study in terms of sex, age and habitat, differentiating, in the latter case, residents in the capital from residents in the rest of the municipalities of the Community of Madrid. The representativeness of the sample is the result of a filtering process of its initial composition (768 cases), using as a reference framework the data from the continuous census of the *National Statistics Institute* (*INE*). The elimination of cases from the initial sample responded to the time criterion, with the cases obtained last being eliminated. The overall results of the survey have to be interpreted by taking into account a sampling error of ±3.9% for a confidence level of 95.5% and P = Q. Of the 664 people in the working sample, 52% were women and 48% men, aged between 18 and 98 years (M=50.78, SD=17.44). A structured, closed questionnaire with few questions was used as an adaptation to the administration model, and a pre-test was carried out on 40 people to solve interpretation problems. The internal consistency of the indicators used was also assessed.

To test the hypotheses, binary logistic regression (BLR) has been used as an analytical technique to examine which factors influence two opposing phenomena. In this case, two regression models are tested:

Model 1 (BLR). Perception of risk= Perception of danger+Discourse+Ideology+Age+Sex+Education+Habitat+Occupation.

Model 2 (BLR). Position versus constraints= Risk perception+Danger perception+Discourse+Ideology+Age+Sex+ Education +Habitat+Occupation.

The operationalisation of the dependent and independent variables incorporated in the two models is as follows:

DV (1). Perception of risk. Respondents were asked whether they were more or less afraid of losing a family member, friend or acquaintance and whether they were more or less afraid of becoming ill. With these two items, an additive index was constructed, ranging from 1 "minimum risk perception" to 5 "maximum risk perception". Good internal consistency is obtained in the indicator, according to the correlations within it (α=0.748). To consider the variable as a dependent variable, it is dichotomised by taking a value of 0 when the index ranges between 1 and 2.5, and a value of 1 when the index ranges between 2.51 and 5.

DV (2). Position on restrictions. Respondents were asked to rank themselves on a scale of 1 to 10, with 1 meaning they were in favour of no restrictions and 10 meaning they were in favour of governments regulating social contact to limit transmission of the virus. For the regression model the variable is dichotomised taking the value (0) when the scale is 1-5, and value (1) when the scale is 6-10.

In turn, the following variables are incorporated as independent explanatory variables:

IV (1). Perception of danger, asking respondents whether they believed that the sixth wave was much more dangerous, significantly more dangerous, equally dangerous, significantly less dangerous or much less dangerous than previous waves (this measurement is based on a comparative reflection that makes it possible to assess the real significance of the current perception of danger and avoids previous contextual bias).

IV (2). Degree of agreement with the influenzaisation discourse, for which an additive index (α=0.627) was constructed from a scale where 1 was "do not agree at all" and 5 was "strongly agree", with the following four statements:

1) Economic reactivation is a priority right now and therefore restrictions limiting productive activity must be reduced, even at the risk of taking longer to limit the spread of the coronavirus.

> 2) Stopping our lives in 2020 was the right decision, but now we have to completely return to normal. We will have to take risks, including deaths, but we need to get our lives back.
>
> 3) The new variant of the coronavirus called Omicron is more seasonal flu-like and therefore less dangerous, although more contagious.
>
> 4) Full-spectrum vaccination significantly increases the security against coronavirus infection and allows a large part of our traditional way of life to be restored.

IV (3). Risk perception (applicable to Model 2), according to the above operationalisation: additive index from two items ranging from 1 «minimum risk perception» to 5 «maximum risk perception».

Finally, different control variables (CV) are used in the analysis: participants' ideological self-placement (measured on a scale from 1 "left" to 10 "right"), a highly relevant variable whose influence needs to be estimated in all the proposed relationships (according to HP3); gender (0 "male"; 1 "female"); age on a scale; habitat (0 "Rest"; 1 "Capital"); level of education (0 " Other education"; 1 "University") and occupation (0 "Not working"; 1 "working").

4. Analysis of results

4.1. Madrid residents' perception of risk in the sixth wave: descriptive analysis and explanatory models

As reviewed in the second section, research on risk perception has focused either on the conditions of the individual, from an essentially socio-demographic understanding (elements that explain particular feelings about an actual or potential threat), or on the effect of media exposure (it is generally assumed that media discourse and high media consumption increase risk perception). However, despite the emphasis on the constructivist perspective of risk, insufficient attention has been paid to the role of government communication in this phenomenon, or, in other words, how governments can install and uninstall different impressions in the citizenry in the face of similar risk conditions.

Our HP1 suggests that a higher degree of agreement with the governmental thesis of "influenzaisation" is related to lower risk perception in the individual. Before testing this relationship, it is useful to describe how the sample performs on each of the variables that make up HP1. In this research, interviewees were allowed to express their perceptions of the risk of the sixth wave in comparison to those same perceptions in the past. Respondents were asked how closely they felt today about the possibility of getting sick or the fear of losing a friend, family member or acquaintance compared to the same feeling during the initial phases of the pandemic, particularly during the first state of alarm (March-June 2020).

For 51.7% of those interviewed, their fear of getting sick was much or much less today than they remember feeling at the beginning of the pandemic. For 17.8% it was just the opposite, they were more afraid of getting sick now, and for 30.4% their fear was the same as in the past. Regarding the possibility of a death caused by the disease in their immediate environment, for 53.2% of respondents, their fear of losing a family member, friend or acquaintance was much or much less today than they remember feeling at the beginning of the pandemic. 16.0% were now more afraid of losing someone close to them and for 30.9% their fear was the same as it had been in the past. Men, younger people, working respondents and those living in Madrid are more strongly in favour of considering that the possibility of becoming ill or losing someone close to them due to Covid-19 is lower than in the past (they have a lower perception of risk).

To analyse the degree of agreement of the interviewees with the "influenzaisation" discourse, it is necessary to recall that this discursive framework is based on two main messages. On the one hand, the reactivation of the economy, which is a discourse that ties in with the demands of the electorate ideologically further to the right, was one of the communicational levers used by President Díaz Ayuso during the toughest stages of the pandemic and during her electoral campaign for the regional elections of 4 May 2021, based on a discourse of "freedom" (**Zanotti**; **Turnbull-Dugarte**, 2022). On the other hand, the idea that it is necessary not only to revive the economy but also to revive social life –especially for the young– and thus avoid the effects of restrictions and the exceptional nature of the pandemic on mental health since it would begin to be legitimate to assume certain risks and costs.

The discursive framework of the need not to introduce further restrictions to reduce the impact of the pandemic on the economy convinces half of the respondents. 34.6% support the idea that

> "economic reactivation is a priority and therefore restrictions limiting productive activity should be reduced, even at the risk of taking more time to limit the spread of the coronavirus",

compared to 39.0% who agree little or not at all with this argument (24.8% "more or less agree" with this idea). The other part of the speech, which focuses on the fact that

> "Omicron is more like seasonal flu and therefore less dangerous, even if more contagious", is supported by 48.7% compared to 27.8% who do not agree or strongly disagree.

This message is further reinforced by the idea that

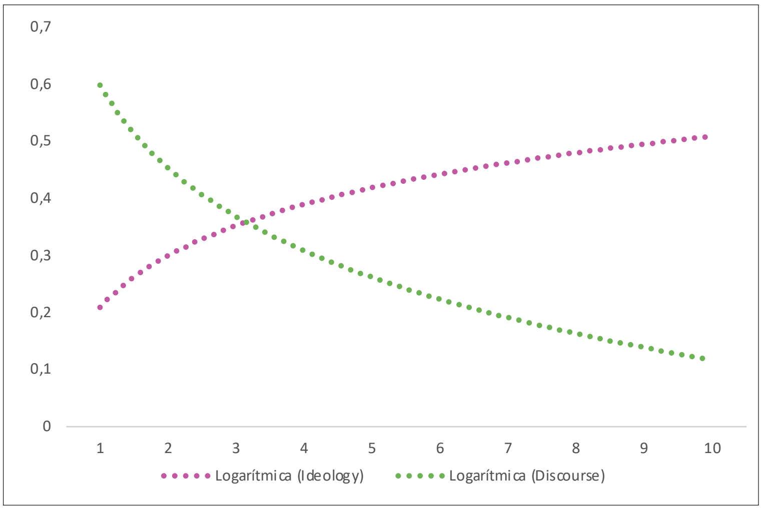
> "full-spectrum vaccination considerably increases safety against coronavirus infection and allows us to regain a large part of our traditional way of life (social contact, leisure activities...)",

with 68.5% supporting this argument compared to a mere 13.8% who disagreed. In general terms, and although the economic argument is less transversal, the messages related to the character of Omicron and vaccination achieved a strong installation among the citizens of Madrid before the end of January 2022.

Table 1. Binary logistic regression models to explain risk perception

	Model 1a		Model 1b	
VI_ Perception of danger	0.841	***	0.903	***
VI Discourse	-0.261	**	-0.371	**
VI_ Ideology			-0.142	***
VI_Age	0.005		0.001	
VI_Sex	0.371	*	0.384	*
VI_Habitat	-0.472	**	-0.526	***
VI_Education	-0.638	***	-0.611	***
VI_Ocupation	0.299		0.158	**
Constant	-1.432	*	-1.509	*
-2 log. of plausibility	710.954		649.683	
R2 Cox & Snell	0.199		0.219	
R2 Nagelkerke	0.269		0.295	

Note: * p≤0.1; ** p≤0.05; ***p≤0.01



Graph 3. Probabilities of the effect of ideology and influenzaisation discourse on risk perception

Men, younger people, those ideologically more to the right, people who work and those who live in the city of Madrid took up the discourse of "influenzaisation" more resolutely, which, although a product of the national government's discursive management, was in line with the theses maintained by the president of the Community of Madrid for this sixth wave and, in general, for the entire period of the pandemic. Only the commitment to vaccines behaves differently in relation to ideological identification, with a concentration of anti-vaccine respondents among those identified with more right-wing positions.

Knowing these data, the BLR model No. 1 (see Table 1) allows us to address relevant explanations of individuals' levels of risk perception. Note that risk perception as DV has been dichotomised in the model from the median of the distribution. Some of the most interesting conclusions are obtained by finding that the degree of agreement with the governmental discourse of "influenzaisation" significantly and negatively influences the perception of risk (the greater the agreement with the discourse of "influenzaisation", the lower the perception of risk), which confirms the relationship proposed in HP1 (see Graph 3). This shows how government communication and political discourse have a significant influence on individuals' perception of risk in the context of a health crisis, a variable (the perception of risk) that reacts to the messages installed by the public authorities, the legitimised issuers of the social definition of risk. In this sense, the perception of risk cannot be dissociated from the political elite's capacity not only in the media but also in discourse, to shape moods that link the subjective analysis of reality.

In turn, within what is theoretically consistent, higher hazard perception influences higher risk perception, a result that is not necessarily to be expected the other way around. Less predictable is the relationship between this variable and several fundamental socio-demographic characteristics in the structural division of the population such as habitat, education and gender (with different levels of significance): being a woman, from an area other than the capital and not having a university education increases the probability of expressing a higher perception of risk.

Derived from the results of model 1b shown in Table 1, it can be concluded, along with the above, that ideology is a predictor variable of risk perception levels, as hypothesised in HP3. Graph 3 shows that similar to the position on the "influenzaisation" discourse, the further to the left the individual is positioned, the smaller the likelihood of low-risk perception. These data differ from those obtained by **Joslyn** *et al.* (2021) for the United States, where, in principle, no differences could be established between risk perception according to the ideology (conservative or liberal) of the citizens, even though behaviour in the face of the pandemic did show a relevant divergence according to ideology or party affinity.

4.2. Position of Madrilenians towards restrictive measures in the sixth wave: descriptive analysis and explanatory models

Having analysed the influence of political discourse on the orientation of social perceptions of risk, which for our purposes should be defined as "risk defining capacity" on the part of governments, the next logical level is to question why it is in the interest of governments to modulate levels of risk perception. Risk communication theory tells us that its effects are aimed at raising awareness and avoiding vulnerable behaviour (**Riorda**; **Fontana**, 2016). On the other hand, the strategic objective of "de-escalation of risk" or "post-risk" communication –how to restore normality to communities that have been subjected to a high degree of exceptionality– has not yet been defined. We theorise that in this scenario, the aim is to raise awareness of "non-risk" so that people stop believing that restrictive measures are necessary or that the absence of such measures does not generate a lack of protection and insecurity (the demand for intervention falls because the relevance of the intervention taking place in a favourable scenario is not assumed). Regarding these assumptions, the aim is to find out whether the citizens who were most receptive to the government's discourse of "influenzaisation" were also the least supportive of restrictive measures (HP2), in short, whether the demand for intervention policies is also sensitive to the discourse (as was the perception of risk).

Initially, an exploratory examination of the distribution of results on the scale of support/rejection of restrictive measures shows that the average position of all respondents about restrictions is 6.03, with 45% of the population occupying the first five positions on the scale (those most favourable to the existence of no restrictions) and the remaining 55% being more favourable to restrictive measures. At the extreme ends of the scale, 15% support no restrictions at all (bands 1-2), with 18% opting for less radicalism by placing themselves in bands 3-4.

With regard to the segmentation of the results by sex, age groups, ideology and habitat, as shown in Table 2, there is evidence of polarisation in the opinions of the different groups regarding their position on the restrictions. Men, the youngest (under 44), those on the right of the ideological spectrum, those who work and those who live in the capital are the most likely to hold positions of less control and restriction. Ideology seems to play an important role in this case as a predictor of the individual's position. Thus, among groups further to the left, the average for this question is 7.72, while the average for those further to the right of the ideological spectrum is 3.03.

Analysing now the result in Table 3 of the two BLR models on the respondents' position on constraints, it is found that risk perception helps to explain positions in favour of individual constraints and does so in the expected sense (consistent with findings such as those of **Bruine-de-Bruin**; **Bennett**, 2020). However, the same is not true for the perception of danger, which does not show a statistically significant relationship with the position on constraints. The exclusion of the "risk perception" variable from the model would introduce significance to the "hazard perception" variable with a b of 0.304 and a Nagelkerke R2 of 0.512, indicating that both variables, risk perception and hazard perception, are helping to explain virtually the same phenomenon.

The model tested also shows that ideology is a predictor variable of the position on restrictive measures to regulate social contact (HP3), something that was already intuited in the previous descriptive analysis: the further to the right the respondent is, the less favourable he or she is to restrictions, which is consistent with the discourse that the president of the Community of Madrid has maintained since the beginning of the pandemic. The inclusion of ideology in the model significantly increases the capacity to explain the dependent variable (position on restrictions) and allows us to highlight how the ways of fighting the pandemic in Spain have ceased to be technical orientations and have become part of the worldviews and values of the citizenry, in such a way that the anti-interventionist impulse of the right in the Community of Madrid as opposed to a left that is prone to public control of social life, explains the politicisation that health measures, which should have been of a scientific-technical nature, have reached.

Table 2. Differences in position on the scale of support/rejection of restrictive measures according to sex, age, habitat and ideology

		Average	Standard deviation	N valid
Sex	Man	5,44	3,10	316
	Woman	6,57	2,77	343
Age	18-24	5,55	2,59	55
	25-44	5,28	2,83	185
	45-64	5,79	3,12	245
	65 and over	7,33	2,66	174
Habitat	Capital	5,74	2,99	352
	Rest	6,36	2,94	307
Ideology	Far left	7,72	2,58	137
	Left	6,74	2,61	173
	Centre	5,65	2,82	191
	Right	4,25	2,52	77
	Far right	3,03	2,60	36
	NA/DK	5,27	3,19	45

Table 3. Binary logistic regression models to explain pro-constraint positions

	Model 2a		Model 2b	
VI_ Risk perception	0.322	***	0.416	***
VI_ Danger perception	0.146		0.136	
VI Discourse	-1.646	***	-1.476	***
VI_Ideology			-0.347	***
VI_Age	-0.002		0.003	
VI_Sex	0.301		0.240	
VI_Habitat	-0.098		-0.126	
VI_Education	0.209		0.324	
VI_Ocupation	-0.722	***	-0.607	**
Constant	4.852	***	5.323	***
-2 log. of plausibility	611.351		511.035	
R2 Cox & Snell	0.326		0.391	
R2 Nagelkerke	0.437		0.524	

Note: * p≤0.1; ** p≤0.05; ***p≤0.01

Perhaps the most relevant finding derived from the results of Table 3, in relation to HP2, is that of the effect of the "influenzaisation" discourse on the position in favour of restrictions (the more this government-installed discourse is adopted as one's own, the more support for restrictive measures that should be adopted by those same governments is reduced). The demand for public intervention no longer depends exclusively on an individual's ideology or subjective analysis of contextual risk, but particularly on the way in which government communication activates frameworks of understanding.

> The perception of risk cannot be dissociated from the political elite's capacity not only in the media but also in discourse, to shape moods that link the subjective analysis of reality

Furthermore, non-parametric analysis of Kendall's tau-b correlations shows that there is also a statistically significant inverse relationship between influenzaisation discourse and risk perception (-0.224) and hazard perception (-0.487). In short, the model indicates that HP2 is fulfilled, and allows us to identify a sequential effect according to which, if greater acceptance of the influenzaisation story leads to lower risk perception and lower levels of risk perception reduce support for restrictive measures, then the new governmental discourse would have the effect of reducing the social demand for measures and avoiding discredit due to a not very proactive attitude in this sense. The ability of government communication to guide risk perception, and the effect of risk perception on citizens' positions on measures, make the discursive articulation of risk a central element of crisis management.

5. Discussion of results and conclusions

For more than a century we have been discussing with empirical contributions the influence of communication campaigns on the opinions and attitudes of the citizenry. The Covid-19 pandemic has allowed social scientists and communication scholars to verify these effects. Throughout these lines, we have maintained that the discourse generated by the political elites in Spain, taking as a case study the population of the Community of Madrid during the sixth wave of Covid-19, which is synthesised in the "influenzaisation" thesis, has had a significant effect in reducing citizens' perception of risk and in relaxing their attitudes towards restrictions. It must be recognised, however, that the case of the Community of Madrid, although crucial –due to the previous role played by its autonomous government, the influence of Díaz Ayuso's singular discourse on the population and the very importance of this community in the country as a whole– may entail a certain bias. This bias derives precisely from those characteristics that make the case relevant and decisive. Assuming the above, our results should be complemented and contrasted with comparative studies between different regions and with others at the national level.

In this research, we show that government communication and, specifically, President Sánchez's new speech in December 2021, which coincided in part with the argument that Díaz Ayuso had defended for the Community of Madrid, played a fundamental role in citizens' attitudes towards the perception of risk. Thus, in a situation of high incidence caused by the new Omicron variant, the use of political messages and their reproduction in the traditional media ecosystem and on social networks were related to an alteration in the perceptions of the citizenry regarding the pandemic in general, and in particular regarding the consequences of the new variant, reducing the feeling of risk, bringing the citizenry closer to positions of less demand for restrictive measures and, as a collateral effect, reducing the willingness for the new vaccination (third dose and child vaccination).

Our research tests the impact of government communication on the citizenry in a time of heightened uncertainty. Risk communication had a significant influence on the behaviour of citizens at the beginning of the confinement. This pattern remained more or less stable for just under two years, aiding social control through selective isolation and restriction measures. However, in December, the implementation of a message that focused on reducing the impact of the sixth wave reduced the sense of risk, which was also helped by high vaccination rates, lower mortality rates and confidence in the effectiveness of self-care measures.

Acceptance of the "influenzaisation" story led to a lower perception of risk and, as a consequence, reduced support for restrictive measures among those most exposed to this thesis. The new governmental discourse achieved its goal of reducing the demand for measures, which had both strong economic and social impact, and thus avoided discrediting governments for not being proactive enough. The ability of government communication to guide risk perception throughout the pandemic, and the effect of risk perception on citizens' positions on government-imposed measures, make the discursive articulation of risk a central element of crisis management.

Future lines of research should delve deeper into the capacity of government communication to influence the perceptions of the citizenry in a scenario of potential risk, and how public opinion will depend on this success in the face of measures that restrict or attempt to guide certain behaviours. It also opens up the possibility, firstly, of continuing to discuss with new data the receptiveness of audiences to government discourses in the risk

> The degree of agreement with the governmental discourse of "influenzaisation" significantly and negatively influences the perception of risk (the greater the agreement with the discourse of "influenzaisation", the lower the perception of risk)

de-escalation phase and, secondly, of replicating predictive models such as those presented here for other risk scenarios, be they health, environmental, technological or public safety. By replicating these models, it would be possible to test whether in different types of risk the influence of government communication is equally decisive or which variables condition the perception of audiences.

> The ability of government communication to guide risk perception, and the effect of risk perception on citizens' positions on measures, make the discursive articulation of risk a central element of crisis management

Finally, our study demonstrates the connection between ideology and levels of risk perception, in line with **Wildavsky** and **Dake** (1990) or **Dryhurst** *et al.* (2020), and also the ability of ideology to explain the position towards constraints. In Spain, as in other countries around the world, the management of the pandemic became a positional issue that went beyond the technical and "common sense" to enter the realm of values and partisan struggle. This evidence poses a new challenge for crisis and risk communication –and management– studies. Understanding of risks and willingness to follow technical recommendations are mediated by ideological battles and polarised contexts that could challenge any governmental coping strategy if left unchecked.

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Culture of information and information exchange in a public hospital: a study based on the information orientation model and social network analysis

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Abstract

The structures of hospitals have evolved to make them centre on patients and their pathologies, with care procedures that are both interprofessional and interorganisational. This has given rise to work environments made up of teams obliged to collaborate in their problem-solving, with an essential focus on proper collaborative information behaviour (CIB). The aim was to study this behaviour in a clinical service of a hospital in relation to two aspects: information culture (IC) and the exchange of information. This entailed designing a two-part descriptive study. The first step was to administer a survey based on the information orientation model to know more about the service's IC. The second phase focussed on the exchange of information from the perspective of an analysis of social networks. The main characteristic of IC was its proactive nature, especially in the use of information to improve one's own work (mean = 4.58) and to respond to changes and new developments relating to work (mean = 4.18). The factor that least characterised IC was control, particularly in relation to knowledge of the objective of the activity itself (mean = 2.67) and the dispersion of information about hospital processes (mean = 2.64). On social networks, factors contrary to an interprofessional CIB were identified, such as homophily and low reciprocity in terms of relationships. In practice, the results identified a need to reinforce the perception of information as a resource, the proper use of which benefits job performance at both an individual and group level. A need to reinforce flows of internal hospital-related information was likewise evident. From a theoretical and methodological point of view, a useful tool is made available for diagnosing the collaborative information behaviour of an organisation and designing strategies to improve it.

Keywords

Collaborative information behaviour; Social network analysis; Information culture; Health care personnel; Hospitals; Information Orientation; Information use; Information exchange; Information flows.

1. Introduction

Most hospitals have transformed themselves in recent decades, by moving from specialism-based structures to others that make patients and their pathologies the centre of interest. This approach to treatment is both interprofessional (involving different groups of professionals) and interorganisational (involving different organisations or organisational units) (**Axelsson** *et al.*, 2014). The health systems of many European countries have evolved along similar lines, adopting an approach to healthcare that seeks to integrate the activities of various disciplines, professionals, departments and organisations (**Antunes**; **Moreira**, 2011). In the case of Spain (where administration of the health system is devolved to the country's autonomous regions), health plans have made such comprehensive care part of their strategy (e.g. **Ruiz-Fernández**; **Rabadán-Asensio**; **Fernández-Ajuria**, 2013). This has led in many cases to changes at the organisational level, including such initiatives as the "clinical management units" of the *Health Service of the Basque Country* (2019). These entities are organised for the purposes of comprehensive public healthcare. They bring the required resources together, regardless of their position in the management structure.

This transformation in healthcare has in practice led to an approach involving work environments made up of multidisciplinary teams obliged to collaborate with each other, from their complementary perspectives, in order to solve complex problems; based largely on the efficient use and exchange of information. Proper collaborative information behaviour (CIB), understood as the behaviour of people working together in their use of information, has proved to be vital in this respect. It entails identifying a need for such information, conducting the corresponding search, and then recovering and exchanging it, before finally evaluating, synthesising and giving meaning to the information found (**Karunakaran**; **Reddy**; **Spence**, 2013). All of these tasks rely to a great extent on the prevailing organisational and information-related culture of the work environment. However, neither this strategic approach nor the rules that derive from it, which imply a need for such CIB, inevitably have to bring about changes in the practices, norms or values of those involved, in terms of their use and exchange of information. Indeed, and despite the existence of a regulatory framework, many practices that prevent collaboration can be maintained, including for example the restriction of information flows to people from a single group or professional area. The results of a recent survey are revealing in this respect. It rated ineffective interprofessional communication as the second-highest risk affecting the quality of care and patient safety in Spanish hospitals (**Gordo** *et al.*, 2021). If we are to harmonise a regulatory framework that focuses on patient-centred care and on the manner in which work teams contribute to it, we need to observe the characteristics of CIB and its influence on the efficient use of shared information.

In terms of research, it was in around the year 2000 that the first studies explicitly dedicated to CIB began to appear, extending the dominant individual perspective into the study of information behaviour. The phenomenon has been addressed in different areas since then, including studies involving software design teams (**Fidel** *et al.*, 2004), members of the military (**Prekop**, 2002), students (**Hyldegård**, 2009), virtual communities (**O'Connor**, 2013), academics (**Given**; **Willson**, 2015), farmers (**Ndumbaro**; **Mutula**, 2017) and politicians (**Riley**; **Allen**; **Wilson**, 2022). There are however few studies carried out from this perspective in a health context. Two of the most relevant pieces of research are those carried out by **Reddy** and **Dourish** (2002) and **Reddy** and **Spence** (2008) in two hospital departments: intensive care and accident and emergency respectively, which also led to the development of a theoretical model based on their observations (**Reddy**; **Jansen**, 2008). These researchers concluded that CIB tended to occur when there was a breakdown in information flows, usually because the information concerned was unavailable, incorrect, incomplete or supplied to the wrong person. On the other hand, they did identify four triggers for changing from individual to collaborative behaviour, where the exchange of information was essential. These triggering factors were:

- the greater complexity of problems involving information;
- difficulty in accessing information immediately;
- lack of experience or knowledge of the issue concerned; and
- the fragmented nature of the information that was available.

Various studies have meanwhile shown that these practices are derived from individual characteristics and interactions within the group, conditioned in turn by the prevailing informational culture (IC). This is characterised by a series of values and beliefs relating to the search for, use of and management of information, which are different for each organisation (**Oliver**, 2008; **Widén**; **Hansen**, 2012).

It is in this context that our research is situated, with the aim of gaining knowledge of the CIB of the employees of the clinical service of a specific Spanish hospital. It is carried out from two complementary perspectives: the IC aspect (understood to be the most-immediate social context in which these professionals carry out their work), and from the perspective of the exchange of information that takes place among them as they perform their healthcare-related activities. We will now go on to examine the conceptual foundations that guided the design of our research.

2. Information culture (IC)

Choo *et al.* (2008) define IC as the values, standards and practices that underlie and determine how information is used and managed. It is the pattern of collective behaviours and attitudes that express an organisation's orientation vis-à-vis information (**Davenport**; **Prusak**, 1997). IC is therefore the set of norms and beliefs adopted by the members of an organisation regarding the value and use of information likely to have a bearing on CIB in such organisations. Certain cultures will thus favour proper CIB, while others have characteristics that make it difficult on the grounds of being difficult to identify. In this sense, one of the models that turned IC into an operational concept is that of **Marchand**, **Kettinger** and **Rollins** (2002), now known as "information orientation". It covers three areas related to the use of information:

> Multidisciplinary teams must collaborate to solve complex problems

- technologies;
- information management;
- behaviour regarding the use of information.

The first two lie within the formal dimension of the organisation, while the third is informal; but all three have a decisive bearing on IC.

When it comes to promoting the efficient use of information as a resource, **Marchand**, **Kettinger** and **Rollins** (2002) propose that IC should be characterised by the adoption of certain values and collective practices. These take shape in six dimensions:

1) integrity: "the use of information in a reliable way and based on principles at the individual and organisational level" (p. 121);
2) formality: "a willingness to use and rely on institutionalised information from informal sources" (p. 122);
3) control: "the extent to which information relating to performance is continually presented to people in order to let them manage and monitor their own performance" (p. 123);
4) transparency of information: "openness in communication and the disclosure of information regarding errors, failures and mistakes" (p. 124);
5) exchange of information: "the willingness to provide information to others in an appropriate and collaborative way" (p. 124); and
6) proactive use of information: "an active concern about how to use information and obtain new information, along with a desire to implement useful information" (**Marchand**; **Kettinger**; **Rollins**, 2002, p. 125-126).

The "information orientation" model has enjoyed a long trajectory in the field of business organisation management, but it has been applied to a lesser extent in the context of documentation, with hardly any studies in the health field (**Nordsteien**; **Byström**, 2018). Various pieces of research have used these six dimensions to characterise and operationalise the social and informational context of organisations. This is the case in the work of **Choo** *et al.* (2006), which carried out research into the management of IC at a Canadian law firm, where exchange, proactivity, transparency and formality were dominant features of its IC; and also **Choo** *et al.* (2008), which focused on the ties between culture and the use of information in the same firm, as well as in a public health agency and at an engineering company. The health agency and engineering company shared proactivity and exchange as characteristic features of their IC, but differed in a third aspect: transparency (the health agency) and integrity (the engineering company). In addition to Choo and his collaborators, **Lauri**, **Heidmets** and **Virkus** (2016) investigated the cultural factors that had the greatest impact on problem-solving at 3 Estonian universities, identifying integrity, proactivity and formality as dominant characteristics of their IC. Finally, the research of **Barbosa** and **Gonçalves** (2017) examined information behaviour and values at a Brazilian airfreight company. In this case, the factors that characterised the organisation's culture were: exchange, formality and control. All these studies started with a quantitative approach based on the administration of surveys. This contrasts with the research of **Nordsteien** and **Byström** (2018), which used focus groups and observation to examine the involvement of recently recruited Norwegian healthcare professionals in information practices in a new work environment. All aspects of the information orientation model were identified, but integrity was a dominant feature in this case.

3. The exchange of information

Understanding IC to be the immediate context in which information is used, **Davenport** and **Prusak** (1997) consider the exchange of information to be one of the behaviours that are decisive for building a healthy information culture. In this sense, one of the angles from which their research has been approached is that of social network analysis (SNA). SNA is based, from a theoretical point of view, on the idea that people's behaviour is conditioned more by their ties and the networks in which they participate than by personal norms and attributes (**Haythornthwaite**; **Wellman**, 1998). SNA seen in this light focuses on the patterns of relationships between actors observing the availability of tangible resources (such as money) or intangibles (such as information) and the exchange of these resources (**Haythornthwaite**, 1996). SNA can thus be used to study the exchange relationships or information flows (ties) established between the members (nodes or actors) of a social network. Expressed in another way, this research focuses on individuals as the nodes of a network based on a social group that establishes a set of relationships (**González-Teruel**; **Andreu-Ramos**, 2013).

SNA has a long tradition in the context of health research, but it was in the 1990s that it experienced a strong boost. **Chapman**, **Verdery** and **Moody** (2022) attribute it to various factors, such as

- the HIV epidemic and the need to know its transmission processes;
- the risky sexual behaviour on the part of adolescents; and, finally,
- the increased use of text-based and software tools that facilitated the search for, collection and analysis of the data concerned.

Scientific production on this issue has continued to increase since then, leading to numerous systematic reviews focused on various aspects of SNA, such as:

1) the way in which the social networks formed within health organisations contribute to the quality of patient care and treatment (**Cunningham** *et al.*, 2012; **Bae** *et al.*, 2015; **Blacklock** *et al.*, 2022);

2) the process by which various health interventions are linked to the use of networks (**Perkins**; **Subramanian**; **Christakis**, 2015; **Smit** *et al.*, 2020) or changes in such organisations (**Chambers** *et al.*, 2012);

3) the dynamics of social networking between healthcare workers and patients (**DuGolf** *et al.*, 2018);

4) the types of networks that are configured in a healthcare setting (**Poghosyan** *et al.*, 2016); and, finally,

5) the characteristics of social networks that influence communications established in a healthcare environment (**Braithwaite**, 2010; **Long**; **Cunningham**; **Braithwaite**, 2013; **Tasselli**, 2014; **Sabot** *et al.*, 2017; **Glegg**; **Jenkins**; **Kothari**, 2019; **Benton** *et al*., 2015).

4. Methodology

In order to achieve the proposed objective, a descriptive study was carried out in a clinical service of a Spanish public hospital offering level-three care, reflecting the tendency of hospital organisations to conform to an interprofessional and interorganisational framework. Its functional structure consisted of seven interprofessional clinical units designed for the care of groups of related pathologies, made up of 28 physicians sub-specialised in these pathologies and one coordinator per unit. The service also employed nursing staff (20) and nursing assistants (17) not attached to any particular unit, but rather to the outpatients' department or the hospital's wards. Each of these two areas was run by a head clinician, with a head of service in charge of the structure as a whole. The 65 persons employed by the service constituted the reference population.

The study was divided into two parts.

a) The first of these used a questionnaire, along with the gathering of sociodemographic data and information on the characteristics of the service's IC. Its design was based on the six dimensions of the information orientation model of **Marchand**, **Kettinger** and **Rollins** (2002) and the survey that they developed to study the perception of the business performance of senior managers, as well as the adapted version of **Choo** *et al.* (2006; 2008) to ascertain the IC of various organisations based on the practices and values included in the model. The signatories of this research translated both questionnaires into Spanish, and adapted the questions to the specific environment of the hospital. The resulting questionnaire was made up of 22 statements grouped according to the six dimensions mentioned above: integrity (5 items), formality (4), control (4), transparency (3), information exchange (3) and proactivity (3) (see Appendix 1). For each of these 22 statements, respondents had to assess their agreement on a scale of 1 (totally disagree) to 5 (totally agree). A pilot trial was conducted before the questionnaire was administered. This used a sample of individuals with the same profile as that of the reference population, but from another hospital. They answered the questionnaire individually and, once completed, a researcher was also able to collect information on their perception of various aspects of it. Specifically, and with reference to **Cea-D'Ancona** (2004), it was found that the questions were understood and had an adequate vocabulary, that the instructions were adequate and did not need clarification, that they followed a logical sequence, that they offer the planned responses with sufficient variability and that they offered a significant overview of each dimension of IC. With all this information to hand, the definitive questionnaire was drawn up. Analysis of the information collected in this part of the study entailed calculating the frequency of the different sociodemographic variables involved, as well as the mean and standard deviation of the scores assigned by respondents in accordance with their level of agreement with the statements referring to IC. *SPSS* software was used throughout this stage.

> Information culture determines how information is used and managed

b) The second part of the study was focused on examining the exchange of information among employees of the service, from the point of view of SNA. This involved the use of a second questionnaire containing a name generator (i.e. a list of the names of all the people employed by the service). Respondents were then told to identify up to a maximum of five colleagues whom they frequently approached, in a workplace setting, to ask for information. This information was used to analyse the characteristics of the network, the centrality of respondents (social network nodes) in information flows, and groups within the social network. *Ucinet* and *Gephi* software was used for this purpose.

Network characteristics: centrality, flows and groups

The social network characteristics calculated were: size, density, diameter and average path length, as well as the direction and reciprocity of ties. "Size" refers to the number of nodes that make up the network, while "density" is the ratio of actual ties to possible ones. Given the limited choice of five persons per respondent, the maximum number of possible

> The exchange of information is one of the behaviours that are decisive for building a healthy information culture

ties was 275. The density of a network gives an idea of the probability of information being disseminated within that network, so the greater the density, the greater the likelihood of dissemination. On the other hand, the diameter of a network is the length of the longest geodesic distance between pairs of nodes throughout that network. We define "geodesic distance" as the length of the shortest path between two nodes (**Knoke**; **Yang**, 2020). "Average path length" is meanwhile the mean number of ties on the network's shortest possible routes (i.e. the mean of geodesic distances between nodes). These measurements reflect the efficiency of the transfer of information within that network, in such a way that in networks with a high density, geodesic distances are normally small, suggesting that information can travel fairly quickly (**Hanneman**; **Riddle**, 2011). Finally, we observed the direction of ties between professional categories and their levels of reciprocity. These data highlight the flows of information between network nodes.

Centrality of nodes

The second aspect of the social network to be studied was the centrality of nodes. This refers to the prominence or visibility of each node for the rest of the nodes in the network, and their involvement in the relationships so established (**Knoke**; **Yang**, 2020). These were information exchange relationships, in our case. As there is no single measure of "centrality", we have to use complementary factors to observe the prominence of nodes. This research used four: degree, closeness, betweenness and eigenvector. We decided in advance that the main actors would be those with a relevant position in at least three of the four measurements. The degree of a node is thus defined as the number of ties connecting it to other nodes. On networks with directional ties, like the one studied here, a distinction is made between in-degree and out-degree. "Closeness" refers to the speed with which an actor can interact with other actors on the network, whether directly or indirectly through intermediaries. It is based on the distance of one node from the others, considering the shortest of all possible paths (geodesic distance). A high closeness value indicates the presence of many short paths, implying quick communication with others; while a low value denotes long distances between one node and the others, and slow transmission of messages (**Knoke**; **Yang**, 2020). "Betweenness" refers to the influence or intervention of an actor in information exchange relationships, and is therefore the measure of how actors connect on the geodesic path between pairs of actors who are not directly connected (**Knoke**; **Yang**, 2020). The eigenvector weighs up each of the nodes with direct ties to an actor based on centrality. It evaluates that actor's influence or popularity in such a way that a high score means that an actor is connected to many nodes that also have high scores (**Knoke**; **Yang**, 2020). In other words, the actor concerned is in a highly favourable position to disseminate or access information.

Modularity

The final aspect of the social network to be observed was modularity. This is one of the procedures used in SNA to detect communities. It is based on the relationship between the ties within a partition with those outside that partition, compared in turn to an expected value for ties established at random (**Freeman**, 2011). **Knoke** and **Yang** (2020) explain it as follows:

> "If the observed number of lines is no greater than random, modularity is zero, and thus network partitioning into meaningful subgraphs is not possible. As modularity approaches a maximum of one, a network is characterized by a strong community structure with higher-than-random intragroup ties and sparse intergroup connections."

The respective questionnaires on IC and the service's social network were administered simultaneously, either in person or online (using *Google Forms*). Before responding to the questionnaires, respondents read and signed an informed consent covering the objectives of the study, a description of its methodology, the approximate time needed to complete the form and information on their voluntary, anonymous and confidential participation. The design of the research was approved by the *Ethics Committee* of the authors' academic institution.

5. Results

5.1. Respondent characteristics

Of the 65 persons employed by the service at the time of the study, 55 (84.6%) completed the questionnaires. They included 12 nursing assistants, 19 nurses and 24 doctors. Broken down by sex, 37 (67.3%) were women and 18 (32.7%) men. In terms of age, most respondents (38.3%) were between 46 and 55 years old. Only two respondents were under 25. All university graduates holding a postgraduate qualification were to be found among the doctors, with the sole exception of one graduate nurse. All other members of staff had studied only to higher secondary or diploma level. Finally, and applying to all respondents, average years of professional experience amounted to 18.5 years, with 63.3% having worked in the service for ten years or less, and only 18.2% for over 15 years (see table in Appendix 2).

5.2. Information culture (IC)

Table 1 shows the mean scores, based on the extent of agreement with the statements in the IC questionnaire, ranging from a value of 1 for "totally disagree" to 5 for "totally agree". The scores generally indicate respondents' agreement with most of the items relating to the dimensions of proactivity, formality, exchange of information, transparency and integrity. Firstly, the dimension that most characterised the IC of service was proactivity, with a high degree of agreement with all the statements (table 1, items 20 to 22). Regarding formality, this reflects respondents' agreement with the importance of information supplied formally, although a small proportion also took informal sources into account (items 6 to 8). On the point of information exchange, there was a lower level of agreement on the items referring to the sharing of information with other hospital departments (item 18, mean=3.18) and other health services (item 19, mean=3.04). In the case of transparency, the lowest level of agreement was with the statement regarding a climate of openness and confidence in sharing information on mistakes (item 14, mean=3.27). When it came to integrity, there was less agreement with the statements in items 3 to 5, reflecting how some respondents believed that information was given to legitimise decisions already made, or that information was withheld for the possessor's own benefit or, in particular, that information was used for personal advantage.

The dimension that characterised IC the least was control. There was a degree of agreement above the midpoint of the scale regarding the statement on the use of internal information to improve one's work (item 11, mean=3.44). However, there was disagreement on the statement regarding access to information on the organisation's operation and results (item 10, mean=2.82), knowledge of the objective of the activity itself (item 13, mean=2.67) and ease in gaining knowledge on processes and the people who carry them out (item 12, mean=2.64).

Table 1. Information culture of the hospital service being studied

Dimensions	**N**	**Mean**	**DE**
Integrity			
1. The integrity of service employees allows information to be shared.	55	3.73	0.804
*2. Inaccurate information is often distributed deliberately.	55	4.09	0.967
*3. Information is often supplied in order to justify decisions already made.	55	3.07	1.086
*4. Possessors of information often keep it to themselves.	55	3.35	1.174
*5. People commonly take advantage of information for their own benefit.	55	3.35	1.174
Formality			
*6. Greater trust in informal sources than formal ones.	55	3.71	1.066
*7. Wide use of informal sources, even when formal sources exist and are credible.	55	3.38	1.130
*8. Use of informal sources of information in order to verify and improve the quality of formal ones.	55	3.76	1.170
9. Trust in the quality of formal information.	55	3.64	1.060
Control			
10. Receipt of information on the operation and results of the hospital and its service.	55	2.82	1.203
11. Use of hospital information to improve one's own work.	55	3.44	1.118
*12. Diffuse and difficult-to-obtain information on processes and people who carry them out.	55	2.64	1.078
*13. You know what you have to do, but the objective of the activity itself is unknown.	55	2.67	1.139
Transparency			
14. A climate of openness and trust is encouraged for the exchange of information regarding mistakes.	55	3.27	1.079
15. Information concerning mistakes is shared.	55	3.47	0.920
16. Information on mistakes is used to solve problems.	55	3.89	0.936
The exchange of information		**3.55**	
17. Information is exchanged with employees of the service.	55	4.42	0.658
18. Information is exchanged with employees of other services.	55	3.18	1.292
19. Information is exchanged with employees of other healthcare centres.	55	3.04	1.453
Proactivity			
20. The search for information on changes and trends relating to work.	55	3.84	1.135
21. The use of information to respond to changes and new developments relating to one's own work.	55	4.18	0.884
22. The use of information to improve one's own work.	55	4.58	0.567

*Items whose responses have been inversely encoded. They should therefore likewise be interpreted in reverse.

5.3. Social network

General characteristics

The replies of the 55 respondents who answered the questionnaire revealed the existence of 238 out of 275 possible ties, corresponding to a density of 0.86; a figure close to the 1 considered to be the maximum density (86.5% of possible ties, given the design of the survey). On the other hand, the diameter of the network was 8; a high value, considering its size. However, the average path length was 3.2, meaning that, on average, information had to go through another two nodes in order to connect one pair of nodes (table 2).

Most of the 238 ties (62.2%) were established between respondents belonging to the same professional group, i.e. between nursing assistants or nurses or between doctors; an issue reflected in the position of the nodes on the social network (fig. 1 to 5). Around a quarter of ties (26.5%) were between nursing assistants and nurses or between nurses and doctors. There were only three ties between nursing assistants and doctors. Only 11.3% were ties between doctors and nurses, and between nurses and nursing assistants, with just four ties established between doctors and nursing assistants. Finally, 62 ties (26.1% of the total) were reciprocal. Most of these (40) were between nodes belonging to the same group.

Table 2. General characteristics of the overall social network

Number of nodes	55
Number of ties	238
Theoretical maximum density	1
Actual density	0.86
Network diameter	8
Average path length (geodetic distance)	3.2
Reciprocity	0.261

Centrality

Table 3 shows the mean, maximum and minimum values obtained for the four measurements of centrality.

Table 3. Measurements of centrality

	Mean	Maximum	Minimum
In-degree	4.30	21.00	0
Betweenness	0.03	0.19	0
Closeness	0.03	0.33	0.27
Eigenvector	0.17	1.00	0

Table 4 includes the nodes of the social network that gave values equal to or greater than the mean for each measurement (see Appendix 3 for a list of the 55 nodes).

Table 4. Nodes on the social network with positions relevant to centrality

Informant/ node	In-degree	Informant/ node	Betweenness	Informant/ node	Closeness	Informant/ node	Eigenvector
E19	21	**E19**	0.19	**E3**	0.36	**E7***	1
E7*	17	**F9**	0.18	**F9**	0.35	**F9**	0.9
F12*	15	**A2**	0.11	**E2**	0.35	**F12***	0.8
F9	14	**F8**	0.11	**E18**	0.34	**E19**	0.7
E12	11	**F2**	0.10	**E5**	0.34	**F21***	0.7
F16*	11	**F12**	0.08	**E15**	0.34	**F16***	0.7
F21*	11	**E7***	0.08	**E6**	0.34	**E17**	0.7
E17	8	**F21**	0.07	**A5**	0.33	**F17***	0.6
E18	8	**F5**	0.07	**E13**	0.33	**F24**	0.6
F17*	8	**E14**	0.06	**A1**	0.33	**F8***	0.5
F8*	8	**E18**	0.06	**E19**	0.33	**F14**	0.4
E16	7	**F11**	0.05	**A4**	0.33	**E18**	0.4
F24	7	**E12**	0.05	**A12**	0.32	**E12**	0.3
A5	6	**F16**	0.05	**A2**	0.32	**E14**	0.2
E14	6	**E17**	0.05	**E1**	0.32	**E11**	0.2
E11	5	**E16**	0.04	**F16***	0.32		
E13	5	**F23**	0.03	**E8**	0.32		
A10	4	**F24**	0.03	**A7**	0.32		
A6	4	**A1**	0.03	**F21***	0.32		
A8	4	**A10**	0.03	**A8**	0.32		
E15	4			**E4**	0.32		
F14	4			**E7***	0.32		
F20	4			**E14**	0.32		

* Holding a position of responsibility.

**Values above average; the shaded 20% obtained the highest value.

a) Degree

The mean in-degree was 4.3 (nursing assistants: 2.3; nurses: 5.5; doctors: 4.5). Of the 55 nodes, 23 reached this value or a higher one, of which 11 were within 20%, with the highest in-degree (Figure 1). This latter group consisted only of nurses and doctors, with no nursing assistants. The highest in-degree (E19=21 y E7=17) was achieved by two nurses with a service record of between 11 and 15 years, with one of them holding a post of responsibility. A doctor with a post of responsibility was placed immediately below this (F12 = 15), followed by another assigned only care-related tasks on

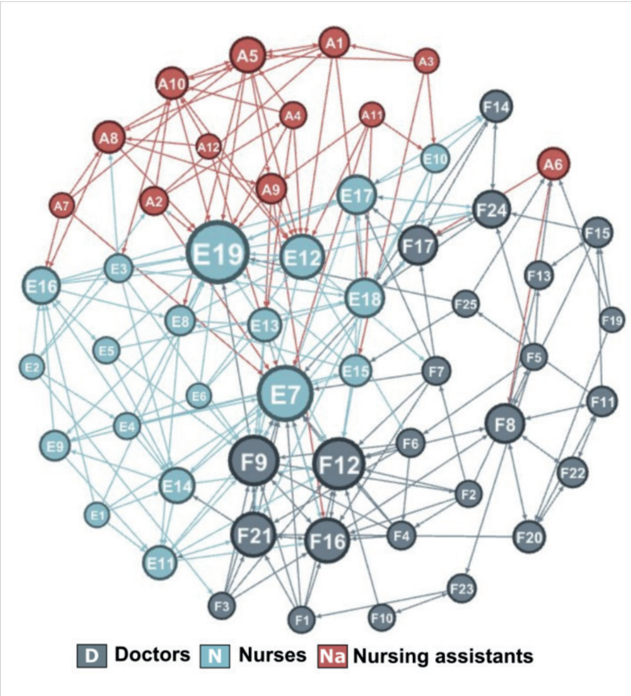

Figure 1. The overall social network, weighted according to the in-degree of its nodes

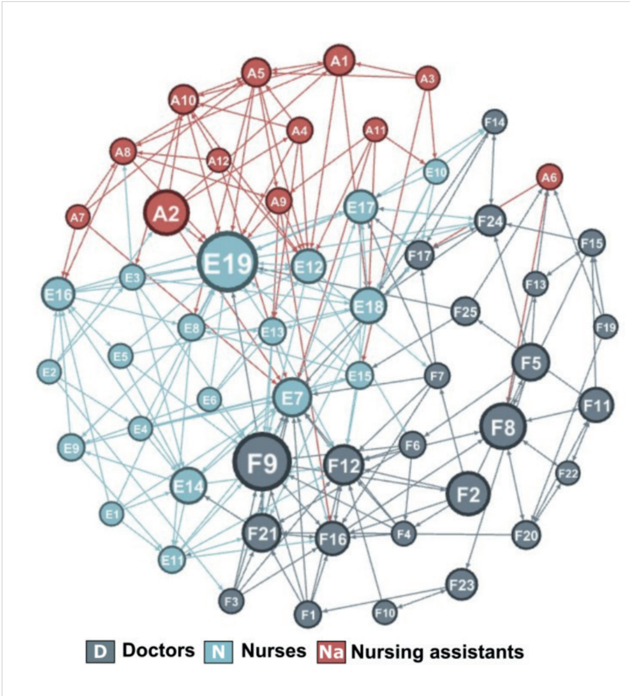

Figure 2. The overall social network, weighted according to the betweenness of its nodes

the hospital's wards (F9 = 14). Three nodes had an in-degree of 11: one nurse (E12), who was one of the longest-serving employees of the service, and two doctors (F21 and F16), each with a post of responsibility and, in the case of F21, one of the longest-serving doctors. The latter four nodes, with an in-degree of ≥ 8, were two nurses belonging to the same unit (E17 and E18) and two doctors; one of them the unit coordinator, the other with a position of managerial responsibility (F8 and F17).

b) Betweenness

The mean betweenness value was 0.03 (nursing assistants: 0.02; nurses: 0.03; doctors: 0.04). Of the 55 nodes, 20 reached this value or a higher one, of which 11 were within 20%, with the highest betweenness (seven of them were likewise in the 20% with a higher in-degree). This latter group contained six doctors, four nurses and one nursing assistant (Figure 2). The maximum betweenness value was 0.19, which was obtained by the same nurse with the highest in-degree (E19), followed by a doctor (F9), likewise with a prominent position in the degree ranking. These were followed by a nursing assistant (A12=0.11) with fewer than five years' service and two doctors (F8=0.11 and F2=0.10). Most of the remaining nodes within the 20% of highest betweenness likewise occupied a relevant position with regard to in-degree. There were just two nodes in the betweenness ranking that did not also appear in the degree ranking: one doctor (F5) and one nurse (E-14), both of whom worked on the hospital's wards. It should be noted, in addition to the relevant betweenness positions, that 11 nodes obtained a value of zero in this respect, meaning that 11 nodes did not participate in any of the shorter paths that linked pairs of nodes on the network.

c) Closeness

The mean closeness value was 0.3 (nursing assistants: 0.31; nurses: 0.32; doctors: 0.28), with a maximum of 0.33 and a minimum of 0.27, i.e. very similar values that also denote short distances between nodes. Eleven nodes stood at 20%, with a value greater than the rest. Only three of them had already obtained a relevant position in the betweenness or degree. Furthermore, eight of the eleven were nurses and three were nursing assistants, with just one doctor in the group. We should stress, with regard to this measurement, that the low-value nodes correspond to six doctors and one nursing assistant (F10, F23, F19, F22, F15, A6, and particularly F13). They appear at peripheral locations in the graphic representation of the social network (Figure 3). Furthermore, all of them worked in the outpatients' department.

d) Eigenvector

The mean eigenvector value was 0.2 (nursing assistants: 0.01; nurses: 0.2; doctors: 0.2). Of the 55 nodes, 15 reached this value or a higher one, of which 12 were within 20%, with the highest in-degree (fig. 4). All of the above were nurses or doctors; none were nursing assistants. Most of the nodes highlighted on the basis of this measurement also stood out with respect to the previous measurement of centrality (except for nodes F14 and F24). Furthermore, six of the twelve most relevant individuals in this case also held posts of responsibility. In this sense, the highest eigenvector was obtained by a node (E7 = 1) that had already obtained higher values in terms of degree and betweenness. It corresponds to a nurse with a coordinating role in their professional group. It is also worth noting that 33 nodes on the network (60% of the total) obtained a value of zero in this respect (Figure 4).

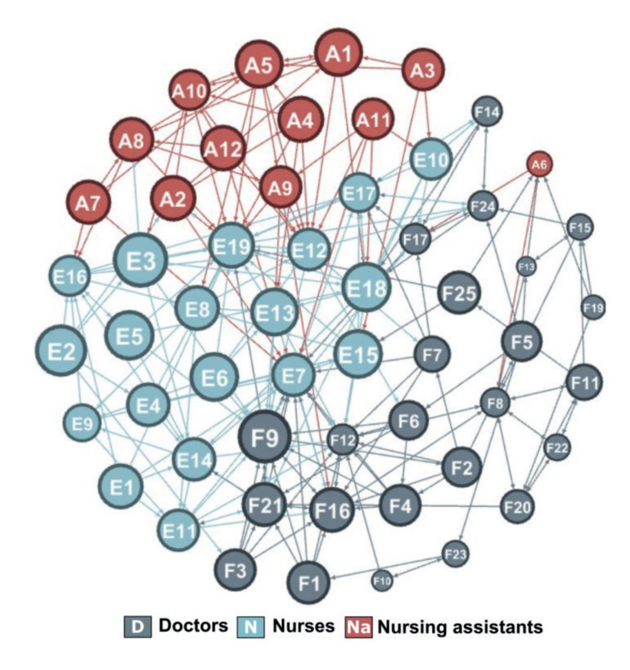

Figure 3. The overall social network, weighted according to the closeness of its nodes

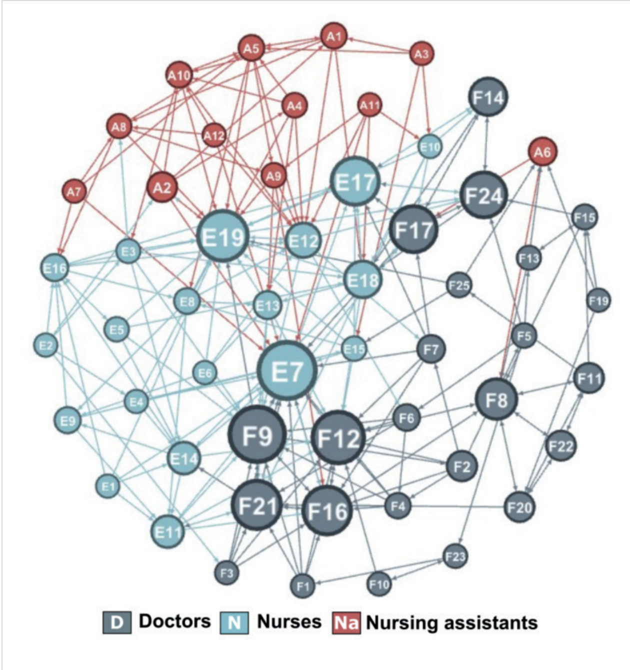

Figure 4. The overall social network, weighted according to the eigenvector of its nodes

Based on the previous four measurements, the nodes present in the most relevant group (the top 20%) that figured in at least three of those measurements (i.e. the most central within the context of this research, highlighted in the table in Appendix 2) totalled seven. Four of these (F8, F9, F12 and F21) were doctors, of whom three held some position of responsibility, along with three nurses (E7, E18 and E19), one with a post of responsibility. It should also be noted that two nurses and one doctor (E18, E19 and F19) achieved relevant degrees of centrality (in the highest 20%) in the four measurements, without occupying any position of responsibility in the department's organisation chart.

Modularity: groups on the social network

Figure 5 shows the department's social network. It makes a distinction between the five groups identified through modularity analysis.

Firstly, group 1 was the largest, consisting of ten nursing assistants and five nurses, all from the hospital's wards; with no doctors. One member of the group (E19) was one of the most-central nodes on the network.

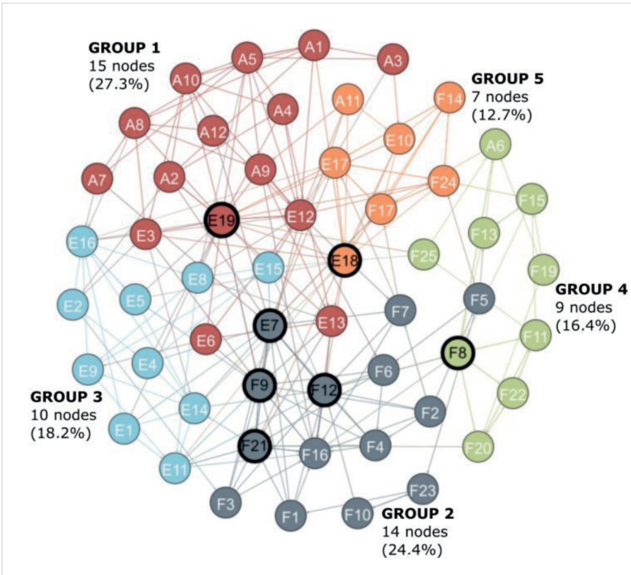

Fig. 5. The overall social network of the department, based on the group to which its nodes belong (the seven most-central nodes are outlined in black)

Group 2 consisted of 14 nodes. All but one of them (E7) were doctors employed exclusively or partly on the hospital's wards. The doctors included one of the service's managers, and four members stood out for their centrality on the network (E7, F9, F12, F21).

Group 3 consisted of ten nurses employed on the hospital's wards, with no doctors or nursing assistants. None of them had a degree centrality in the top 20%.

Group 4 consisted of nine doctors and one nursing assistant, employed almost exclusively in the outpatients' department. Only one node (F8) stood out in terms of at least three measures of centrality.

Finally, group 5, with seven nodes, was the only one made up of representatives of the three professional groups: doctors, nurses and nursing assistants. All the doctors were part of the same healthcare unit, as were two of the nurses. The third nurse also performed treatment-related tasks in this unit on occasions. Just one node (E18) was among the most prominent in terms of centrality.

6. Discussion

The objective of this research was to study the collaborative information behaviour (CIB) of the members of the clinical service of a hospital organised around patient care and the treatment of medical conditions. For this organisation to be effective, collaboration is necessary wherever there are flows of information between interprofessional teams. In this sense, the results showed an information culture (IC) conducive to this in five of the six dimensions. Nevertheless, some specific aspects of these five dimensions showed room for improvement.

> The dimension that characterised information culture the least was control

In first place, although the service's IC was generally characterised by its integrity, the fact that some respondents perceived an incomplete use of information is something that could harm the climate of trust necessary for its effective use, and even affect the dimensions of formality and transparency (**Marchand**; **Kettinger**; **Rollins**, 2002). Despite this, the dimension of formality stood out for being favourable to this effective use of information, as stated by **Marchand**, **Kettinger** and **Rollins** (2002), since the preferential use of formal sources is a desirable value. It is to be hoped that organisations will go to informal channels of information to verify the reliability of formal information, or to complement the formal information available.

Transparency was likewise a value that contributed to an IC favourable to the effective use of information. We should however not forget that some respondents did not perceive this integrity in relation, for example, to the existence of a climate of openness towards the exchange of information regarding mistakes made at work. This aspect of the model of **Marchand**, **Kettinger** and **Rollins** (2002) signifies a difficulty for collective learning, and it is a result that **Choo** *et al*. (2008) attributed to the predominance of a competitive environment. In our case, it could be due to the consolidation process in which the staff members were immersed and/or a fear of being questioned. It is in any case an aspect that would need more research, given that it can be more problematic in health organisations due to the important impact that it may have on patients' health (**Stevens**; **Hulme**; **Salmon**, 2021; **Gordo** *et al*., 2021). In similar studies carried out in a health context, it is indeed a feature that undoubtedly characterises the culture of the organisation concerned (**Nordsteien**; **Bystrom**, 2018).

On the other hand, the exchange of information and proactivity were also favourable for an effective use of information. Regarding the exchange of information with colleagues in the service, results are consistent with the information-handling habits of medical staff (**Younger**, 2010). However, the lack of communication beyond the service itself should be addressed, as it runs counter to what is expected of an organisation with an interprofessional and interorganisational structure that favours free flows of information. One danger arising from such habits might be a loss of external information relevant to job performance, in a group whose very cohesion could turn it into a small world isolated from its surroundings (**Kadushin**, 2013). The proactive use of information was the dimension best perceived by respondents in all its aspects.

Finally, the dimension of control was the only one of the six that would not fully characterise the IC of the service. According to **Marchand**, **Kettinger** and **Rollins** (2002), it is a result that might harm the organisation, as performance can only be improved if you know what situation you are in, as well as knowing the role that it plays in fulfilling the collective mission. It might also hinder collaborative work, as ignorance of the results obtained would prevent job performance being adapted to the achievement of the entire team's shared mission.

If the various dimensions of the information orientation model allow the organisation to be characterised in terms of its IC, SNA completes this impression by identifying established flows of information. The general characteristics of the social network thus revealed favourable aspects of a well-connected group, such as high density and short average path length, in comparison to previous studies of similar networks (**Chan** *et al.*, 2017). The network's diameter was relatively large for its size however, indicating the relative isolation of some of its nodes.

On the other hand, analysis of the ties between the nodes of the social network revealed two significant factors. The first was the phenomenon of homophily, or the tendency to establish ties between similar nodes on a network (**Kadushin**, 2013). This was reflected in the direction of these ties, which in most cases were established among equals. This is shown in the graphic representation of the network, where the three groups of well-differentiated professionals appeared and, finally, in the configuration of four of the five groups identified in the study of modularity and consisting of a single group of professionals. This phenomenon has already been documented in a healthcare setting (**Cunningham** *et al.*, 2012; **Bae** *et al.*, 2015). The opinion of **Blacklock** *et al*. (2022) is that it could create barriers in hospitals, along with silos of information and redundant information, among certain groups of employees, while also giving rise to different norms and values conditioned by the individuals with influence in that group. There is however also documented research showing an absence of this homophily (**Shoham** *et al.*, 2016; **Schweighoffer**; **Reeves**; **Liebig**, 2020); a phenomenon generally attributed to the interprofessional nature of the groups observed. Conversely, it could be deduced that in our case there is no necessary fluidity of communication among doctors, nurses and nursing assistants, which would go against

> The absence of truly interprofessional work is corroborated by observing the reciprocity of ties

the notion of proper CIB. Indeed, only one of the groups identified in terms of modularity (group 5) was made up of actors from the three professional groups; a reflection of the fact that there is a truly interprofessional work dynamic in this group, which favours the multidirectional exchange of information. In opinion of **Bae** *et al.* (2015), this would be the ideal model; unlike the rest of the groups made up solely of staff from one of the three collectives.

> Most of the actors with the best centrality scores are rated for their in-degree and betweenness

The absence of truly interprofessional work is corroborated by observing the reciprocity of ties, where low reciprocity (26.1%) could be evidence of a hierarchical structure, in the opinion of **Borgatti**, **Everett** and **Johnson** (2018). In this way, and from a functional point of view, the attention of the service focuses on groups of related pathologies, although the homophily and reciprocity data indicate that structures were maintained in which work was organised by professional category. This fact could translate into bottom-up information flows, and not those based on the achieving of common goals regardless of status. This is a pattern of information exchange that **Wahn** (1987) observed in highly hierarchical work teams in the health sector, where the doctor decided what was to be done and the other health professionals did it.

Along with the characteristics of the network and the relationship between its nodes, the centrality measurement allowed us to identify the most prominent or visible service employees from the point of view of information flows. In this way, those with the best centrality scores were, on the one hand, people with roles of responsibility; a situation already documented in similar studies (**Martínez-Ariño**; **Salas-Torrent**, 2009; **Patterson** *et al.*, 2013), reflecting the formal structure of management or its organisation chart. On the other hand however, it was also possible to identify people who, while not assuming positions of responsibility, had an advantageous position in the social network being studied. In this case, their respective positions did not respond to their positions in the formal organisation chart. This might be attributable to their seniority, as stated by **Naccarella** (2009), or to some personal characteristic such as accessibility, empathy or professionalism. In any case, and from the point of view of structuring a proper CIB, making these employees visible would allow us to organise truly collaborative work among peers. Furthermore, actors with higher centrality scores can be attributed key roles in creating resilient organisations, as highlighted by **Bertoni**, **Saurin** and **Fogliatto** (2022).

On the other hand, most of the actors with the best centrality scores are rated for their in-degree and betweenness, characteristics submitted to them thanks to their linking role at the information level on the workplace social network, with a capacity to intervene in and even control a large part of the information that circulates on the network, as well as to connect the three professional groups. This is especially significant in the case of nursing staff (an aspect already documented in similar studies), where they go so far as to assume the role of a bridge between patients and relatives (**Creswick**; **Westbrook**; **Braithwaite**, 2009; **Martínez-Ariño**; **Salas-Torrent**, 2009; **Patterson** *et al.*, 2013; **Shoham** *et al.*, 2016). In short, and as stated by **Long**, **Cunningham** and **Braithwaite** (2013), a dense, cohesive network with intermediaries between groups is the ideal structure for the transmission of information. We should however not forget that an excessive dependence on such actors can lead to the group being isolated from other groups in their absence.

Finally, we come to the other side of the coin with regard to these central actors, where two instances of isolation were identified; an issue that was already evident at a general level when determining the diameter of the social network. The first was the situation in which the members of a unit were physically separated from other teams. In this sense, analysis of closeness highlighted the most isolated nodes corresponding to a specific group (group 4). The results are thus in line with what **Heng**, **McGeorge** and **Loosemore** (2005) previously pointed out, in the sense that the geographical distance of a group of actors belonging to the same network seemed to influence their lack of communication, in this case the physical distance between the outpatients' department and the hospital's wards. The second instance of isolation was seen in the low centrality scores, on all counts, of the nursing assistants. This was not surprising, as they were the respondents least referred to as reference names when requesting information. This situation could be evidence of a potential loss of circulating information on part of the social network, which is in line with the hierarchical way of working and the structure described above.

We could therefore say, on the whole, that the hospital service studied had a series of conditions that favoured collaborative work. These were, at the IC level, proactivity, formality, information exchange, transparency and integrity and, at the social network level, high density and connectivity. There were however other characteristics that reflected factors likely to hinder such collaborative work: in relation to the IC, the control dimension and, specifically, the fact that there is no perception of easy access to the information generated within the hospital. From the point of view of the social network, the phenomenon of homophily and the low reciprocity of relationships pointed to a hierarchical structure that would not favour information flows among professionals or between organisational units.

Despite having been able to identify both the strengths and weaknesses of this organisation in relation to its CIB, there are limitations (as in any research). We should emphasise in this respect that despite having reached a high response rate, we must not forget the 15.4% who did not participate and who, if they had, might possibly

> The organisation of the service studied is the result of a series of strategic and political mandates to configure patient-centred care on the basis of collaborative work

have changed the results significantly, taking into account also that the sample population was so small. Any reading of the results should therefore consider that there is a proportion of potential respondents whose perception of the values and practices that constitute the service's IC is unknown. We also do not know what role, if any, they would assume in the network of information exchange relationships, as their participation is not reflected. There are likewise other complementary analyses that could have enriched the results presented here, such as of the relationship between the IC and the network of information exchange relationships, or the exploitation of other variables, like the gender of respondents and its impact on both aspects of CIB. These are issues which, together with research into other dimensions of the IC and the inclusion of other social network measurements, constitute lines of work to be addressed in the future.

7. Conclusion

The organisation of the service studied is the result of a series of strategic and political mandates to configure patient-centred care on the basis of collaborative work. In practice, most of the observed factors favour this; but there are others that do not. We therefore need to adopt a critical perspective and analyse those factors that interrupt flows of information, or which are likely to do so in the future. In this sense, it is paradoxical that it is the control dimension that least characterises the information culture (IC). It is at management level that strategy and policy are implemented, but also management that should supply information regarding the organisation's functioning and results. But this is not what happens, or at least the respondents do not perceive it. Furthermore, although facilities have been provided to allow people to collaborate at an organisational level, the results mostly reveal a hierarchical structure run by certain collectives. There is also a small proportion of people who are suspicious of a full use of information, preferring to use informal sources. They do not perceive a climate of openness and trust, and there is generally no communication beyond the department. These are aspects which, despite some of them being minority issues, can ultimately hinder quality healthcare. They therefore need to be addressed, so that the strategic lines and practices of the work teams are in tune with each other.

Beyond the bounds of practice, studying IC on the basis of the information orientation model and the exchange of information with SNA methodology has allowed us to identify intangible aspects of an organisation that give rise to an inadequate collaborative information behaviour (CIB), in a context that requires teamwork and, to a large extent, shared decisions. Integrating these two approaches, initially from two different areas, proves beneficial when addressing research-related problems in a third area: the study of CIB in a specific area, in this case a hospital service. There is thus useful tool for any organisation whose objective is to promote collaborative work. It works by identifying strengths, as well as the weaknesses that must be addressed to create them. It therefore provides a useful theoretical and methodological framework for observing organisations which, even if they do configure their structure to achieve this collaboration, contain members who continue to adopt habits of communication that are more in line with the hierarchical structures of the past than with this new configuration.

> The centrality measurement allowed us to identify the most prominent or visible service employees from the point of view of information flows

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9. Appendixes

Appendix 1. Questionnaire on information culture

Each item was assessed on a scale of 1 (totally disagree) to 5 (totally agree).

Integrity

1. The strong integrity of the people I work with allows sensitive information to be shared.
2. People at my place of work often knowingly supply inaccurate information to their superiors or colleagues.
3. It is common among the people I work with to provide information to justify or legitimise decisions only after they have been made.
4. Among the people I work with, it is normal for them to keep information for themselves.
5. It is common among the people I work with to take advantage of information for personal benefit.

Informality

6. I trust informal sources of information (e.g. colleagues) more than formal ones (such as reports, memos, specialist texts etc.)
7. I use informal sources of information even when formal sources exist and are credible.
8. I use informal sources of information to verify and improve the quality of formal ones.
9. I trust the quality of formal information, and do not need to rely on informal sources.

Control

10. I receive information periodically on the operation of, and results achieved by, the hospital and my department.
11. I use the information I obtain about performance and results to improve my own work.
12. Information is so widely dispersed around the hospital that it is difficult to know the processes involved and who carries them out.
13. The staff of the hospital and the department know what to do, but are unaware of the ultimate goal and the significance of their activity.

Transparency

14. A climate of openness and trust is fostered in the hospital and my department for the exchange of information on possible errors affecting workplace performance.
15. The people I work with regularly openly share information about possible errors affecting workplace performance.
16. The people I normally work with use information about errors or mistakes to address problems constructively.

The exchange of information

17. I often exchange information with the people I work with.
18. I often exchange information with employees of other departments.
19. I often exchange information with colleagues from other hospitals or health centres.

Proactivity

20. I go outside the hospital services and departments to actively seek out relevant information on changes and trends related to my work.
21. I use information to respond to changes and new developments relating to my work.
22. I use information to improve patient care in particular and my work in general.

Appendix 2. Characteristics of informants

		Nursing assistants	Nurses	Doctors	Total	%
Gender	M	1	6	11	18	32,7
	F	11	13	13	37	67,3
	Total	12	19	24	55	100
Age	<25	1		1	2	3,6
	26-35		2	10	12	21,8
	36-45	5	3	3	11	20,0
	46-55	5	9	7	21	38,2
	56-65	1	5	3	9	16,4
	Total	12	19	24	55	100
Highest degree earned	Degree/Diploma	12	18		30	54,5
	Bachelor's degree		1	15	16	29,1
	Doctorate			9	9	16,4
	Total	12	19	24	55	100
Professional experience (years)	0-5	1		7	8	14,5
	6-10	2	2	4	8	14,5
	11-15	1	2		3	5,5
	16-20	4	2	4	10	18,2
	21-25	1	4	6	11	20,0
	26-30	2	5		7	12,7
	31+	1	4	3	8	14,5
	Total	12	19	24	55	100

		Nursing assistants	Nurses	Doctors	Total	%
Years in the service	0-5	5	6	8	19	34,5
	6-10	4	6	6	16	29,1
	11-15	3	6	1	10	18,2
	16-20			5	5	9,1
	21-25			2	2	3,6
	26-30		1		1	1,8
	31+			2	2	3,6
	Total	12	19	24	55	100

Appendix 3. Centrality and group of the 55 nodes

Node/informant in the top 20% of at least 3 centrality measures.
Node/informant in the top 20%.
Node/reporter with a score equal to or above the mean
* Node / informant holding a position of responsibility.

Informant/Node	In-degree	Betweenness	Closeness	Eigenvector	Group
A1	3	0,03	0,33	0	1
A2	2	0,11	0,32	0	1
A3	0	0	0,31	0	1
A4	1	0,01	0,33	0	1
A5	6	0,02	0,33	0	1
A6	4	0	0,25	0,1	4
A7	0	0	0,32	0	1
A8	4	0,01	0,32	0	1
A9	3	0,01	0,31	0	1
A10	4	0,03	0,31	0	1
A11	0	0	0,31	0	5
A12	0	0	0,32	0	1
E1	0	0	0,32	0	3
E2	0	0	0,35	0	3
E3	2	0	0,36	0	1
E4	1	0	0,32	0	3
E5	1	0	0,34	0	3
E6	0	0	0,34	0	1
E7*	17	0,08	0,32	1	2
E8	3	0,01	0,32	0	3
E9	3	0	0,29	0	3
E10	2	0	0,31	0	5
E11	5	0,01	0,31	0,2	3
E12	11	0,05	0,31	0,3	1
E13	5	0,01	0,33	0,1	1
E14	6	0,06	0,32	0,2	3
E15	4	0,01	0,34	0	3
E16	7	0,04	0,31	0,1	3
E17	8	0,05	0,3	0,7	5
E18	8	0,06	0,34	0,4	5
E19	21	0,19	0,33	0,7	1

Informant/Node	In-degree	Betweenness	Closeness	Eigenvector	Group
F1	1	0,01	0,31	0	2
F2	1	0,1	0,3	0,2	2
F3	1	0	0,31	0	2
F4	2	0	0,31	0	2
F5	1	0,07	0,3	0	2
F6	2	0,01	0,3	0	2
F7	2	0	0,29	0	2
F8*	8	0,11	0,26	0,5	4
F9	14	0,18	0,35	0,9	2
F10	1	0	0,23	0	2
F11	3	0,05	0,29	0,1	4
F12*	15	0,08	0,27	0,8	2
F13	2	0	0,22	0	4
F14	4	0	0,26	0,4	5
F15	3	0,01	0,25	0	4
F16*	11	0,05	0,32	0,7	2
F17*	8	0,02	0,27	0,6	5
F19*	0	0	0,24	0	4
F20*	4	0,02	0,28	0,1	4
F21*	11	0,07	0,32	0,7	2
F22	3	0	0,25	0,1	4
F23	2	0,03	0,25	0	2
F24	7	0,03	0,26	0,6	5
F25*	1	0,02	0,31	0	4

Twitter interaction between audiences and influencers. Sentiment, polarity, and communicative behaviour analysis methodology

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Abstract

Twitter is one of several social networks with the highest numbers of users in Spain. In spite of this, how are communicative relationships developed in the digital environment among influencers who have emerged on the Internet? These personalities have a stronger influence on children and young people than traditional celebrities. The aim of this work is to study the communicative interaction generated on the profiles of Spanish influencers with the most followers on *Twitter*, based on the number of content items generated and the responses they receive from users. The polarity and sentiment conveyed by these communications have also been analysed. By processing publications in real time using machine learning based on sentiment analysis, 48,878 tweets and retweets from five influencers were studied over a period of 40 days. The results show that the publications reached nearly 200 million followers, and despite being fourth in terms of the number of followers, @IbaiLlanos is the influencer who leads the conversations on *Twitter* with the highest number of tweets, retweets, and audience share. Among the most popular topics, sporting events stand out. This study has also confirmed that the most frequently stated emotion is surprise, and that positive messages prevail over those that are negative and neutral with regard to polarity. Nevertheless, the linear regression data has verified that the main trend is toward publishing negative messages, with a lower statistical correlation, which is a behaviour that might possibly be duplicated on other social networks.

Keywords

Twitter; Audiences; Influencers; Sentiment analysis; Parasocial interaction; Polarity; Emotions; Communication; Social networks; Social media; Hashtags; Theoretical advance; Methodology.

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1. Introduction

One of the main activities carried out by users on social networks continues to be the following of influencers. According to data provided by *IAB Spain* (2022), 53% of internet users follow this type of account. In fact, 22% of those who have a profile on *Twitter* engage in this activity. Moreover, it is one of the most widely used social networks, trailing only behind *Instagram*, *YouTube*, *Facebook* and *TikTok*, mainly among individuals aged 12-17 (78%).

Twitter has become an important tool for sharing opinion and information among its members (**Ali** *et al.*, 2020). Moreover, this channel gives a voice to celebrities whose tweets become news, along with more intimate, personal information than other intermediaries can provide (**Bond**, 2016; **Kowalczyk**; **Pounders**, 2016). In addition, it is fundamental for trending, virality of content, and the development of online dialogue (**Jain**; **Sinha**, 2020). From the follower's perspective, **Stever** and **Lawson** (2013) differentiate between the big fans who perceive *Twitter* as a direct connection to their favourite celebrity and, on the other hand, the less intense followers who see this channel as a diversion related to something or someone else who they like.

Measurements of these relationships have been analysed from different approaches, although **Riquelme** and **González-Cantergiani** (2016) report that the most frequent are associated with tracking users and the responses posted by them, as well as the content creators themselves. This paper examines the *Twitter* accounts of the Spanish influencers who have the largest followings among teenagers and young adults based on sentiment analysis, a technique developed in recent years and reported in the related literature (**Sailunaz**; **Alhajj**, 2019; **Chang**, 2019; **Lahuerta-Otero**; **Cordero-Gutiérrez**, 2016; **Bae**; **Lee**, 2012, among others).

The study of emotion on social networks allows for an in-depth understanding of the attitudes and feelings of their users (**Arce-García**; **Orviz-Martínez**; **Cuervo-Carabel**, 2020). This research has taken a new approach by analysing the behaviour generated by main Spanish influencers and trying to gain a deeper understanding of the emotional discourse therein and the resulting polarisation. Along these lines, the topics that interest the followers of these influencers have been examined, based on an analysis of the most frequently appearing hashtags, the purpose of which is to classify the thematic content.

Through sentiment analysis, this study is especially relevant due to its contribution to understanding the emotions expressed by users, as well as the topics that arouse the most interest. Moreover, it goes one step further in providing an overview of the trends observed through the parametric technique of linear regression, which helps to predict behaviour patterns.

2. State of the issue

2.1. Activity and behaviour of influencers. Strategies to achieve popularity in social networks

Numerous research studies related to communication and marketing have attempted to describe the characteristics of an influencer, a key player in the daily use that teenagers make of social networks (**Lou**; **Kim**, 2019). In the comparison between this figure and celebrities offered by **Gräve** (2017), we find one of the defining features of influencers: their effectiveness on social networks and, consequently, the fact that they are considered part of the community.

Starting from this point, the classification of micro influencers and macro influencers established by **Berne-Manero** and **Marzo-Navarro** (2020), among others, has been set forth, with the latter being defined as those with more than 100,000 followers who are perceived as professionals, and whose content is more trustworthy. For their part, the micro influencers have a number of followers in the range of 1,000-50,000, whom followers find to be more approachable and friendly. The status of the figures in our study is even higher, as they are defined by **Lowe-Calverley** and **Grieve** (2021), and **Zarei** *et al.* (2020), among others, as mega-influencers, having more than one million followers.

In this relationship with users, **Santamaría-de-la-Piedra** and **Meana-Peón** (2017) conclude that influencers tend to be respectful of the opinions and comments raised by their audience, although **Fernández-Muñoz** and **García-Guardia** (2016) note that having a larger number of followers is not linked to a higher level of interactivity. **Campbell** and **Farrel** (2020) provide some characteristics of the influencers focused on marketing that may be adaptable to the sentiment analysis addressed in this research: their specialization in determined topics, a large number of coincidences with their followers that results in similar interests with them, and their tendency to generate a close bond with their viewers derived from a continuous communication.

On the other hand, **Loria** *et al.* (2020) offer two novel, additional characteristics regarding influencers in video games: their influence on followers is consolidated over time, and they are strategically positioned, generally speaking. This is combined with the gradual creation of communication codes that foster an increase in followers by empathising with their way of expressing themselves (*Autocontrol*, 2020). Regarding the generated empathy, **Kim**, **Kim** and **Collins** (2021) recommend that influencers should post self-disclosures that are more personal and emotional rather than professional and descriptive, as the former have a more positive effect on followers and lead to greater engagement.

In the specific case of *Twitter*, **Alp** and **Öğüdücü** (2018) identify them according to the speed of reaction (time elapsed between the publication of a tweet until it receives a retweet), the number of topics they deal with, level of activity (number of active days and average number of daily tweets), and finally, authenticity, which is focused on the degree of originality of the content they publish. Based on these assumptions, the authors observe that the most high-impact influencers are characterised by faster reaction times. Moreover, they focus on fewer topics, yet post a large number of tweets that are mostly original. Regarding this last point, **Kowalczyk** and **Pounders** (2016) agree that the authenticity shown by influencers on *Twitter* is positively associated with a larger following among users. However, this unique aspect of comments is also related to popularity on other social networks such as *Instagram* (**Casaló**; **Flavián**; **Ibáñez-Sánchez**, 2020).

> As one of the most influential social networks in today's world, *Twitter* allows content to be viralised, creates trends and drives online conversions

Along the same lines, **Lahuerta-Otero** and **Cordero-Gutiérrez** (2016) have found that influencers use a small number of words (but more hashtags), they follow a large number of users, and they state their opinions clearly. **Mueller** and **Stumme** (2017) make the further comment that content which is more familiar to followers leads to greater recognition, and they also state that the popularity of a person on *Twitter* is associated with the number of tweets posted. However, other studies (**Wallner**; **Krigslein**; **Drachen**, 2019; **Jain**; **Sinha**, 2020) clarify that popularity is not connected to the number of retweets, which is in line with the concept of authenticity mentioned above, although these authors point out that the most influential figures receive many Likes. For that reason, research by authors such as **Edelmann** (2017) or **Bossen** and **Kottasz** (2020), concludes that users are more inclined to click on Like rather than post replies or comments.

2.2. Parasocial interaction and sentiment analysis

The parasocial phenomena of interaction and relationships share a common origin, as they were first proposed by **Horton** and **Wohl** (1956) and later developed in the academic literature. In order to differentiate between the two concepts, the study by **Dibble**, **Hartmann** and **Rosaen** (2015) is essential. Based on previous work, these authors propose interaction as a false sense of relationship that only occurs during viewing, while a true parasocial relationship occurs over the long term, even though it starts with interaction.

From the perspective of our analysis, the closest parasocial phenomenon is considered to be that of interaction. In effect, it is a matter of observing the reactions of users to certain content. This study has not included whether this impact lasts longer than the viewing itself, nor how it affects the routines and decision-making of users. While it is true that many of those who use content published by the influencers analysed in this research are likely to be regular followers, we cannot assume that the interactivity generated by this content involves a parasocial relationship.

From this point on, **Stever** and **Lawson** (2013) have shown that sharing one's own personal tastes has an impact on such interaction. However, authors such as **Krause**, **North** and **Heritage** (2018) and **Hwang** and **Zhang** (2018) clarify that the user's interest in this type of relationship comes from an attempt to compensate for their own lack of personality and low self-esteem, which is much more acute among adolescents and young people.

With regard to the choice of channels used to establish contact, **Bond** (2016) has found a generally stronger impact of this phenomenon on *Twitter* than on other networks, although teenagers prefer to follow their favourite characters on *Instagram* and *Facebook*. Nevertheless, a positive attitude from influencers, which includes posts of engaging and interactive content, is linked to a stronger desire among users to imitate the figures they follow (**Ki**; **Kim**, 2019). In a comparative study by **Kreissl**, **Possler** and **Klimmt** (2021) between *let's* players and conventional celebrities, the authors discovered that parasocial interaction is similar in both cases, yet in the case of the former, it is based more on interactivity generated rather than idolatry toward the figure. Along the same lines, **Khajeheian** and **Kolli** (2020) note that the representation on *Twitter* of a certain game (*Pokemon Go*) encouraged conversation between users and players. When re-tweeting by fans is added to the mix, the main consequence is the reinforcement of parasocial interaction with the heightened perception that users identify influential figures with their friends in real life (**Kim**; **Song**, 2016). In addition to other fields, this concept is used in marketing for the promotion of certain brands by influencers (**Jiménez-Castillo**; **Sánchez-Fernández**, 2019).

The relationships between followers and influencers has also been addressed in the academic literature through sentiment analysis. Indeed, sentiment analysis was defined by **Liu** (2017) as the computational study of moods, affection, and emotion. **Sánchez-Rada** and **Iglesias** (2019) have added user reaction to this metric. Therefore, if one bears in mind that the bond of parasocial interaction is characterized by the different degrees of affection and emotion aroused, in our case by the content of an influencer, its measurement through sentiment analysis is considered pertinent and appropriate.

In this regard, **Chang** (2019) proposes a model of influence based on sentiment generated. He notes that more posts on topics related to everyday life result in more support from followers, while controversial posts that cause conflict result in an emotional reaction from users, yet they also lead to a higher number of negative comments.

Using a similar approach, **Sailunaz** and **Alhajj** (2019) have shown that the emotional sign perceived in a tweet (positive or negative) mostly generates the same sentiment in followers' comments, a result that coincides with those previously found by **Berger** and **Milkman** (2012), **Bae** and **Lee** (2012) and by **Drescher** *et al.* (2018), in relation to their research on the publication of content on *Twitter* referring to the video game Destiny. Finally, the perspective based on lexical discourse analysis applied by **Ishtiaq** (2015) is noteworthy as well. This author notes that on this social network, nouns often show a neutral sign that can be modified by adjectives, while verbs are the greatest intensifiers of sentiment polarity and are usually reinforced by adverbs.

The application of sentiment analysis enables the in-depth study of the opinions that Internet users express through the content they share on social networks, and consequently, the parasocial interaction generated. Studying polarity and emotion provides knowledge about their opinions, which can influence the perspective and decision making of other users (**Cho**, 2018). Thanks to its amplification, sentiment analysis explores the polarity of posts, which can be positive, negative, or neutral, as well as the feelings involved, which can be surprise, happiness, anger, sadness, fear, dislike, or neutral (**Hernández-Ruiz**; **Gutiérrez**, 2021; **Nemes**; **Kiss**, 2021; **Vizcaíno-Verdú**; **Aguaded**, 2020). In addition to applying Human Language Technology (HLT), upon which sentiment analysis is founded, the present study links its findings to quantitative techniques through the statistical study of the linear regression model that has allowed us to examine the behavioural patterns of users.

3. Objectives

The interaction of adolescents and young people is mediated by digital technology and social networks (**Nesi**; **Choukas-Bradley**; **Prinstein**, 2018; **Anderson**; **Jiang**, 2018; **Suárez-Álvarez**; **García-Jiménez**, 2021). As such, the aim of this paper is to gain knowledge regarding the communicational interaction generated by *Twitter* postings in relation to the most widely followed influencers in Spain. Such interaction has been analysed through opinion mining, machine learning, and sentiment analysis, which has allowed us to study the opinions, polarity, and emotion generated by users on social networks (**Cardoso** *et al.*, 2019, **Vizcaíno-Verdú**; **Aguaded**, 2020). The magnitude of the postings has also been studied, which includes the volume of tweets and retweets, the audience, which shows the impact of the communications, and the number of Likes. We have also investigated the content by studying the most frequently repeated topics labelled with hashtags, as well as the polarity and emotion of the underlying sentiments of *Twitter* comments.

The questions addressed by this research are the following:

Q1. What is the volume of posts generated on *Twitter* in relation to the influencers with the most followers?

Q2. What is the audience with regard to the conversations that are monitored on *Twitter*?

Q3. Which influencer receives the most Likes?

Q4. What are the most recurrent topics determined by the hashtags addressed in the postings?

Q5. What is the predominant polarity and emotion in the publications?

Q6. Are behaviour patterns predicted in the polarity of posted messages?

4. Methodology

A quantitative methodology has been applied through machine learning, opinion mining, and sentiment analysis using natural language processing (machine learning) (**Dridi**; **Recupero**, 2019). The research is organised in two stages. The first focuses on the selection of influencers for the time period studied, and the second phase is directed at the analysis of tweets and retweets, hashtags, and sentiment.

The sample selection criteria have been established based on the fact that the sample units (influencers) are known for their activity on social networks, and not for other professional reasons, and they have more than 1 million followers on their *Twitter* account, which makes them mega-influencers on this social network (**Fernández-Prados** *et al.*, 2021; **Lowe-Calverley**; **Grieve**, 2021; **Zarei** *et al.*, 2020).

To identify them, we have consulted the VII Study on *Facebook*, *Twitter*, *Instagram*, and *LinkedIn* users in Spain (2021), carried out by the consultancy firm known as *Social Media Family*, which analyses personal and professional *Twitter* accounts according to the number of followers, whether their profiles are active and verified (with daily or monthly access to the platform), and their professions. Following the sample selection, the research focuses on accounts and organisations that have emerged from social networks as gamers, streamers, or any other profession that has appeared in the digital environment. To confirm the number of followers, as well as their importance, we have used the socialblade.com tool, which has allowed us to categorise influencers by using filters in order to confirm their importance. As shown in Table 1, the results display the influencers, the identified profession, and the number of followers registered on the last day of the research, which shows oscillations due to their continuous activity. The selected time period was 40 days, from 23 May to 3 July 2021.

Table 1. Influencers

Accounts	Profession	Number of followers (in million)
@Rubiu5	Gamer	16.8
@vegetta777	Gamer	7.9
@mangelrogel	Gamer	6.8
@IbaiLlanos	Streamer	4.6
@bysTaXx	Gamer	4.2

In the second stage of the research, we worked with the *GPLSI Social Analytics* application of the *University of Alicante* which, through *Twitter* APIs and Human Language Technology (HLT), identifies and extracts mentions and facts that appear in different types of texts (**Hernández-Ruiz**; **Gutiérrez**, 2021).
https://socialanalytics.gplsi.es

In conformance with the definition of analysis application, semantic enrichment has been carried out on the basis of open, connected data for opinion mining and the detection of sentiment analysis. In this way, the polarity of expressed opinions (positive, negative, and neutral) is obtained by means of natural language processing, text analysis, and computational linguistics in order to systematically extract, quantify, and study emotional status and subjective information.

> Influencers are recognized for their efficiency on social networks, and adolescents view them as key players in their daily use of social networks

There has been no discrimination of any words or expressions in order to obtain a complete, in-depth analysis of the publications made during the time frame studied.

The results have been analysed using the *Real Statistics Resource Pack*, which offers greater potential for statistical analysis. Tukey's Honestly Significant Difference post-hoc test (HSD) has been applied in order to compare the means of the levels of a factor after rejecting the null hypothesis, and the Anova test of variance has also been performed, which compares variances between means through the integrated study of social and behavioural science data (**Judd**; **McClelland**; **Ryan**, 2017).

This has been supplemented with the exploitation of data using the statistical modelling technique of linear regression ($Y = \beta 0 + \beta iX + \varepsilon i$), through the analysis of a response variable in relation to the independent variables (**Court**; **Williams**, 2011), in order to understand and predict the behaviour of the followers of the profiles analysed, which confirms that the closer the correlation value is to 1, the stronger the relationship.

4.1. Coding of variables

In order to study the variables, we reviewed the works of **Hasan** *et al.*, (2018), and **Sailunaz** and **Alhajj** (2019), who have examined sentiment and emotion on *Twitter* through opinion mining, as well as **Nemes** and **Kiss** (2021), who have analysed sentiment and polarity on *Twitter* in relation to COVID-19. The study has also been complemented with work by **Berger** and **Milkman** (2012), who investigated the way in which emotion increases the virality of content, and **Vizcaíno-Verdú** and **Aguaded** (2020), who have examined the sentiment of children's accounts on *Instagram*. Measurements developed by the *GPLSI Social Analytics* platform have been used as well.

In analysing the magnitude of the postings, the following parameters have also been considered:

- The number of publications, calculated by summing the tweets and retweets in which influencers are mentioned.
- The number of authors, defined as the social network users who have mentioned one of the influencers' accounts in their postings with at least one tweet or retweet.
- The audience, considered to be the total number of followers of the authors who have named one of the influencers on *Twitter*.
- Ranking by number of likes.

In terms of content, the following aspects have been examined:

- The hashtags that are most widely used by authors that mention the influencers.
- The polarity classification of posts with sub-variables (positive, negative, and neutral), which has been performed by looking at the measurements analysed by the platform, as well as by considering the work of **Ahmad** and **Aftab** (2017) and **Gopi** *et al*., (2020) in their research on *Twitter* polarity.
- The feelings of anger, surprise, happiness, sadness, fear, dislike, and neutrality, which the selected organisations generate in their conversations on this social network, have been studied according to the classification offered by the sentiment analysis platform.

5. Results

A total of 48,848 publications (tweets + retweets) corresponding to the monitoring period from 23/05/2021 to 3/07/2021 have been tracked using the tool that analyses and makes predictions about the state of social opinion.

5.1. Magnitude of the publications on *Twitter*

Even though @IbaiLlanos is the second influencer with the fewest followers (4.6 million), it can be observed that he is the one who leads in the number of publications on *Twitter* with 46,122 tweets and retweets, followed by @Rubius5 with 1,682 publications (tweets and retweets). The rest do not exceed 500 posts. As for the number of authors who mention the influencers analysed in their publications, 26,059 comment on @IbaiLlanos, and 1,066 mention @Rubius5 (Table 2).

Table 2. Volume of publications

Account	Tweets + retweets	Authors	Audience
@IbaiLlanos	46,122	26,059	175,598,411
@Rubius5	1,162	1,066	14,132,438
@vegetta777	375	242	7,542,822
@mangelrogel	356	252	2,161,129
@bysTaXx	343	212	1,158,697

> Professionalization of content is associated with the credibility, consolidation, and strategic positioning of social media influencers

The audience of the five accounts studied reached nearly 200 million (199,917,388), of which 175,598,411 belonged to @IbaiLlanos, 14,132,438 to @Rubius5, and 7,542,822 to @vegetta777. The evolution of the audience reveals that during the period of time studied, three high peaks were observed in the case of the influencer with the most followers (@IbaiLlanos), which corresponded to the following days: 23-05-2021, 06-06-2021, and 16-06-2021. On 23 May, the tweets focused mainly on the announcement of the so-called "Evening of the year", among others. This event was a boxing match organised on 26 May on the *Twitch* platform by @IbaiLlanos, in which six influencers (Future and Torete; Viruzz and Jagger; and Reven and ElMillor) entered the ring while @IbaiLlanos broadcast the match live. The event reached more than 1.5 million people, who were connected simultaneously, and it became the most widely viewed sporting event in *Twitch* history (**Ariza-Martín**, 2021; *Interactivadigital.com*, 2021). On 6 June, the posts were about the results their followers would receive from their university admissions tests, the *NBA* basketball game between the *Los Angeles Clippers* and *Dallas Mavericks*, and to a lesser extent, the boxing match between Floyd Mayweather and Logan Paul. On 16 June 2021, @IbaiLlanos' streaming presentation of the new song "Turreo" by Argentinian *cumbia* singer Elian Ángel Valenzuela (artistically known as L-Gante), was predominant, among other topics.

It is noteworthy that in the ranking related to number of Likes, @bysTaXx is the one who has the most with 569, of which 210 Likes are from 24-06-2021, and 199 are from the day after (25-06-2021), which coincides with the resumption of his streams with a game of *Counter-Strike: Global Offensive* on *Twitch*, after he returned from holiday. He is followed by @Rubius5 with 103 Likes, @IbaiLlanos with 87, @mangelrogel with 44, and @vegetta777 with 21. This coding indicates that although @IbaiLlanos has the most tweets and retweets with the largest audience, his followers are more likely to participate actively rather than exhibit passive behaviour limited only to viewing and clicking on Like.

5.2. Content analysis of the *Twitter* publications

5.2.1. Most frequently-used hashtags

The most frequent-used hashtags show that the content published is mainly focused on sporting events. Among the top twenty are included #laveladelaño, #laveladadeibiai, and #laveladadeiano with a total of 584 mentions. These tweets correspond to the publications resulting from the "Evening of the year" broadcast by @IbaiLlanos on his *Twitch* channel. In second place, #portaventura received 410 mentions in relation to the broadcast of *America's Cup* (#copaamerica; #copaamerica2021, which gained 137 mentions), carried out by @IbaiLlanos on his *Twitch* channel from *PortAventura World*, with the collaboration of footballers and sports commentators. Moreover, he has organised other previous events for *America's Cup* at the same amusement park. The next most common topics are focused on sports as well (#euro2020, #elcorazóndelaliga, #thehearttoflaliga, and #tokyo2020) with 126 hashtags in total.

Other issues are also addressed, such as #evau2021 and #gustazoconcedido, the latter of which is oriented toward an advertisement by the company *Grefusa* (@grefusa) within the framework of the #gustoConcedido campaign in which the company asks its followers to answer the following question through *Twitter*: "What is your greatest pleasure?" Within this marketing strategy, one highlight that stands out is the interview of @IbaiLlanos with the impersonator @raulperez_76, who clones the streamer by holding a conversation between the two of them on the *Twitch* platform, which had more than 110,000 views on *Twitter* on12-11-2021.

5.3. Polarity and emotion

Polarity analysis allows us to study whether tweets and retweets are positive, negative, or neutral. Of the 48,878 posts analysed, nearly half are positive (44.6%), while a smaller proportion are negative (31.5%), and neutral (23.9%).

According to each influencer, 57.1% of the posts by @vegetta777 were positive, 34.1% of those published by @bysTaXx were negative, and 34% of the posts by @mangelrogel were neutral. @IbaiLlanos and @Rubius5 received mostly positive messages, with 44.3% and 48.5%, respectively (Table 3).

Table 3. Polarity in the messages analysed

Twitter	Positive	Total %	Negative	Total %	Neutral	Total %	Total
@Rubius5	815	48.5	420	25.0	447	26.6	1,682
@vegetta777	214	57.1	59	15.7	102	27.2	375
@mangelrogel	178	50.0	57	16.0	121	34.0	356
@bysTaXx	138	40.2	117	34.1	88	25.7	343
@IbaiLlanos	20,452	44.3	14,763	32.0	10,907	23.6	46,122
Total	21,797	44.6	15,416	31.5	11,665	23.9	48,878

With regard to emotion, of the total number of 48,878 publications analysed, 4,088 posts showed the expression of some type of emotion (8.4% of the total). Surprise was the most predominant emotion, which appeared in 34.2% of all messages in which emotions were shown, followed by fear at 28.4%, and anger at 13.7%. The analysis reveals that surprise is the predominant emotion in posts referring to @IbaiLlanos, @bysTaXx, @mangelrogel, and @Rubius5. In the case of @vegetta777, happiness and fear are the most common emotions.

This study indicates a relationship of dependency between polarity and emotion. According to the values of η^2, the size of the effect between the variables is moderate in the case of polarity. However, in the case of sentiment, this effect ranges from moderate (the highest value for sadness stood at 0.535) to mild (the lowest value for dislike was 0.034) (Table 4).

Table 4. Means of polarity and sentiment identified, and the Anova test

	@Rubius5	@vegetta777	@mangelrogel	@bysTaXx	@IbaiLlanos	Anova 1 factor
Positive	48.45%	57.07%	50.00%	40.23%	44.34%	F = 41.0 p = .000 η^2 = .457
Negative	24.97%	15.73%	16.01%	34.11%	32.01%	F = 43.3 p = .000 η^2 = .470
Neutral	26.58%	27.20%	33.99%	25.66%	23.65%	F = 45.7 p = .000 η^2 = .484
Anger	0.95%	0.27%	0.56%	1.46%	1.16%	F = 29.9 p = .000 η^2 = .380
Surprise	2.32%	0.80%	4.49%	2.62%	2.89%	F = 12.1 p = .000 η^2 = .199
Happiness	1.07%	1.07%	2.53%	0.29%	0.36%	F = 22.4 p = .000 η^2 = .315
Sadness	1.66%	0.80%	0.84%	2.04%	1.12%	F = 53.1 p = .000 η^2 = .535
Fear	0.83%	1.07%	0.56%	0.00%	2.47%	F = 3.2 p = .024 η^2 = .061
Dislike	0.06%	0.53%	0.00%	0.29%	0.45%	F = 2.7 p = .046 η^2 = .034
Neutral	93.10%	95.47%	91.01%	93.29%	91.54%	F = 43.3 p = .000 η^2 = .471

A multiple comparison analysis (post-hoc test) was performed using Tukey's HSD test to establish comparisons and delve into existing differences between the variables. Once the existence of differences between the means is determined, the post-hoc rank test makes it possible to determine which means differ, and to identify the homogeneous subsets of the means. With regard to polarity, it has been observed that there are significant differences (p = 0%) between @IbaiLlanos and the rest of the influencers, which is not the case for the others (Table 5).

Table 5. Tukey's HSD post-hoc test. Polarity

Account 1	Account 2	Positive			Negative			Neutral		
		Lower	Upper	Sig.	Lower	Upper	Sig.	Lower	Upper	Sig.
@Rubius5	@vegetta777	-121,7	151,8	1,0	-87,6	105,7	1,0	-60,4	77,7	1,0
	@mangelrogel	-120,8	152,7	1,0	-87,6	105,7	1,0	-60,9	77,2	1,0
	@bysTaXx	-119,8	153,7	1,0	-89,1	104,2	1,0	-60,1	78,0	1,0
	@IbaiLlanos	354,2	627,7	0,0	261,9	455,2	0,0	192,5	330,5	0,0
@vegetta777	@mangelrogel	-135,9	137,7	1,0	-96,6	96,7	1,0	-68,6	69,5	1,0
	@bysTaXx	-134,9	138,7	1,0	-95,2	98,1	1,0	-68,7	69,4	1,0
	@IbaiLlanos	369,2	642,7	0,0	271,0	464,2	0,0	201,1	339,2	0,0
@mangelrogel	@bysTaXx	-135,8	137,8	1,0	-95,1	98,1	1,0	-68,2	69,9	1,0
	@IbaiLlanos	370,1	643,6	0,0	271,0	464,3	0,0	200,6	338,7	0,0
@bysTaXx	@IbaiLlanos	371,1	644,6	0,0	269,5	462,8	0,0	201,4	339,5	0,0

Significance level: 0.05

By applying the same test to the emotion encountered on *Twitter*, statistically significant differences (p = 0%) were found between @IbaiLlanos and the rest of the profiles, a finding that demonstrates that the publications that mention @ IbaiLlanos show divergent behaviour in polarity and emotion with regard to the rest of the profiles analysed. The only exception observed is in the case of dislike, where no discrepancies were found. This result is consistent with the Anova analysis which, in relation to this sentiment, yields a value that is very close to the 0.05 significance level (p = 0.046).

5.3.1. Pattern of communicative behaviour according to polarity

In order to study the behavioural trend of *Twitter* posts that cite influencers, polarity (positive, negative, and neutral sub-variables) is related to the total number of posts by applying a simple linear regression model ($Y= \beta 0 + \beta 1X + \varepsilon$), which allows us to calculate the expected value of a variable. Polarity is used as the dependent response variable (Y), and the total number of publications is a function of the independent predictor variables (X), in order to test whether the volume of publications is linked to the polarity sub-variables (positive, negative, and neutral). $\beta 0$ and $\beta 1$ are the parameters of the regression coefficient model, and ε corresponds to the random error variable that explains the variability (Table 6).

Table 6. Regression model on the polarity sub-variables

	Negative	Neutral	Positive
Multiple correlation coefficient	0.97123258	0.89625709	0.96829123
Coefficient of determination R^2	0.94329272	0.80327677	0.93758791
Adjusted R^2	0.94180043	0.79809984	0.93594549
Standard error	85.6312442	114.293977	128.076516
Observations	40	40	40

All the sub-variables show regression coefficients (adjusted R^2) that are greater than 0, which indicates that with an increase in the number of publications, the number of tweets and retweets increases in all the polarity sub-variables, with the largest augmentation found in negative publications (adjusted R^2 = 0.94180043), and the smallest rise seen in neutral publications (adjusted R^2 = 0.80327677). Similarly, the multiple correlation coefficients in all three cases are greater than 0, which infers a direct relationship between the polarity sub-variables (positive, negative, and neutral) and the total number of publications. Therefore, it is the negative variable that shows the strongest correlation (correlation coefficient 0.97123258), which is evidence of the tendency to create and disseminate negative or disapproving content.

Along the same lines, the neutral sub-variable (correlation coefficient 0.89625709) shows the lowest correlation, which confirms the tendency among the authors toward more emotional behaviour based on the publication of comments that are more positive or negative rather than neutral.

6. Conclusions and discussion

This paper has analysed communicative relationships in the context of the parasocial interaction generated on the *Twitter* profiles of the Spanish influencers with the most followers. The study is based on the amount of content published and the number of responses received from users. Furthermore, the polarity and sentiment conveyed by this communication has been examined as well.

This research contributes to the theoretical advancement of social discourse and sentiment analysis on social networks in the field of social science. It reinforces the understanding of human behaviour, as well as the identification of behavioural patterns. As demonstrated in this study, such patterns tend to become emotional behaviour based on negativity, which can lead to similar conduct on other social networks, or even in the physical world. Moreover, the practical implications of our findings could be of use to the scientific community as well as to the professionals who work in influencer marketing.

The results will enable the understanding of attitudes and digital participation, as well as an increase in knowledge regarding the issues that matter most to internet users, which can be implemented in the corporate strategies of marketers. In addition, these findings will help marketing professionals to select influencers based not only on the number of followers they have, but also on the interactivity, emotionality, and polarisation they generate, bearing in mind the possible negative trends that may be arise in relation to the brands.

Contrary to the study by **Mueller** and **Stumme** (2017), the results of our research show that the account with the highest number of followers is not the one with the highest number of tweets and retweets, partly coinciding with the findings of **Fernández-Muñoz** and **García-Guardia** (2016) on the dissassociation between interactivity and number of followers. Nevertheless, the tendency of teenagers and young adults to click on Like instead of posting comments (**Edelmann**, 2017; **Bossen**; **Kottasz**, 2020) might explain our findings that retweets are not associated with more popularity, as suggested by **Wallner**, **Kirigslein** and **Drachen** (2019), and **Jain** and **Sinha** (2020)

It can also be observed that teenagers and young people (the main targets of the accounts studied) set clearly defined trends, as the activity generated by one of the influencers studied (@IbaiLlanos) is exponentially greater than the rest. In fact, he accounts for more than 87% of the audience registered in the five profiles. The number of retweets generated by Ibai Llanos also shows quick reaction time, a characteristic highlighted by **Alp** and **Öğüdücü** (2018) for increasing popularity on *Twitter*. It is also likely that this feature encourages a greater sense of belonging to the community, as described by **Gräve** (2017).

> Parasocial interaction gives rise to the heightened perception of users that they identify influencers as their friends in real life

In this regard, another significant aspect found in this study is that the influencer with the largest amount of content, @IbaiLlanos, receives a higher number of tweets and retweets, which indicates much more active participation by his followers than the engagement registered in other profiles, such as that of @bysTaXs. The followers of the latter account display more passive behaviour that is reflected in a high number of likes, but with far fewer text responses.

Content's polarity explains the popularity of the most followed influencers, who use it to attract a large number of followers by expressing their opinions

Sports, along with associated events, is the most recurring theme in the hashtags posted. Once again, the contributions of Ibai Llanos stand out from the rest. The most relevant event was a boxing match that Ibai Llanos broadcast himself. Moreover, the rest of the hashtags in this realm are mostly found on his account, as his online reputation is best known as a streamer. The professionalism that his content seems to symbolise can be associated with the credibility mentioned by **Berne-Manero** and **Marzo-Navarro** (2020), along with his gradual consolidation and strategic positioning on social networks (**Loria** *et al*., 2020).

The findings of this study have added a new strategy for achieving popularity. The appropriate selection of a topic is positively associated with greater recognition by social network users. In our research, it has been observed that content related to broadcasts and events involving sports arouses great interest among users, regardless of the author who publishes it.

It is also worth noting the brand-related hashtag, which was widely reproduced and backed by nearly 1.5 million likes. The advertising strategy that relies on these Internet influencers is relatively new, yet is being increasingly adopted. In this context, the code developed by *Autocontrol* (2020) states that the way in which the influencer uses language and communication allows them to increase their number of followers and, consequently, increase the audience's empathy with the brand that sponsors them (**Jiménez-Castillo**; **Sánchez-Fernández**, 2019). However, attention should be paid to this type of sponsorship because the interest shown by adolescents or young people toward this type of recommendation may be triggered by their attempt to seek an interconnection that compensates for their lack of self-esteem (**Krause**; **North**; **Heritage**, 2018; **Hwang**; **Zhang**, 2018).

In the analysis of reported sentiment, we found a high level of polarity, with a predominance of positive content (44.6%), followed by negative (31.5%), and lastly, by neutral content. However, the regression analysis has allowed us to observe a tendency toward negative messages, followed by those that are positive. In other words, the expected values show that the sign of the polarity will change, yet the polarity remains, with a tendency toward reducing neutral content. This result reinforces the findings of **Kim**, **Kim** and **Collins** (2021) who have observed that emotional content generates greater interest and attraction among followers.

In fact, the polarity of the content analysed in this study partly explains the popularity of the most widely followed influencers in Spain. Neutral comments, which are more descriptive than emotional, are the least used. The percentage of publications with some sign of polarity exceeds 88% in almost all the cases studied, with the exception of one influencer, @mangelroel, whose neutral content reaches more than one third (34%). We believe that these low registers are not a mere coincidence. Instead, we consider this to be a strategy of the figures under study, the purpose of which is to engage a larger number of followers by expressing their opinions (**Mueller**; **Stumme**, 2017). Similarly, the connection or relation between the user and the content, described in the concept of parasocial interaction (**Stever**; **Lawson**, 2013; **Dibble**; **Hartmann**; **Rosaen**, 2015; **Kim**; **Song**, 2016, among others), can lead to responses that mimic the influencer's comments (**Sailunaz**; **Alhajj**, 2019).

Finally, in the contents examined, it is worth highlighting the references made to other platforms, as well as to channels such as *Twitch*, which could be related to hypermediation, a concept developed mainly by **Scolari** (2008), among others, which is seen as a limitation of this study. Therefore, the authors suggest that this issue should be explored further in subsequent studies based on this theoretical approach, while taking into account the natural use of new technologies that currently characterises young people, adolescents, and children (**Yuste**, 2015). Another limitation of this study is the focus on Spanish influencers, who are mostly followed by users from Spain.

In this regard, it has been observed that recently emerging phenomena, an example of which is e-sports, attract young people to a large extent. The amount of interactivity generated by this type of competition, which has been detected in our analysis, provides evidence of this relationship. Moreover, these kinds of events are becoming increasingly international in scope. This should lead to an increase in the monitoring of other profiles that not only stand out for their textual comments, but also for their actions carried out at such events. These new practices of young people and minors give a broader, more diverse perspective to the already well-known globalisation of new technologies.

As such, other lines of research are recommended in which the globalisation mentioned is reflected in studies related to the activity of following influencers carried out by millennials and later generations. This, together with other issues, will pave the way for communication without language or linguistic limitations, which will at-

It has been observed that content related to broadcasts and events involving sports arouses great interest among users, regardless of the author who publishes it

tract the interest of these age groups toward international profiles. For future research, a comparison among countries is also proposed, since one of the limitations of this study is the fact that it is limited to Spanish influencers.

> Emotional content has a greater interest and attraction among followers

With regard to the limitations in the methodology applied, one aspect that stands out is the difficulty of the tool used in describing ambiguous words, which can be interpreted in different contexts (**Tauhid**; **Ruldeviyani**, 2020), or in providing a description of sarcastic expressions (**Bharti**; **Naidu**; **Babu**, 2017). This study has not been limited to keywords alone in the retrieval of content related to conversations generated in relation to influencers, yet the tweets were limited to those from Spain. Future research might evaluate the use of *Twitter* by the followers of the main influencers in other countries in order to understand their behaviour, feelings, and emotions. Furthermore, in line with **Garcia** and **Berton** (2021), the findings in this type of research are limited to *Twitter* users who are interested in influencers and interact with them as well.

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Influencers with physical disabilities on *Instagram*: Features, visibility and business collaboration

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Abstract

In the digital world, social media have become important for people with disabilities in terms of communication and visibility. They have also become the ideal place for activism, as they allow the self-representation of disability by the content creators themselves. This social group, traditionally segregated and discriminated against, has seen in these platforms a tool to promote social inclusion and confront the dominant discourse. This paper explores the social media *Instagram* as a space for communication and visibility of instagrammers with disabilities from Europe and Latin America. The main objective of the research is to analyse the publications of Spanish-speaking influencers with physical disabilities to establish if there are similar characteristics or if there are significant differences in the uses they make of *Instagram*'s functions and how disability is represented in their profiles. Through quantitative, descriptive, and statistical research, a content analysis was carried out of 400 publications corresponding to 10 *Instagram* profiles, all of them of microinfluencers and macroinfluencers with physical disabilities who had different types of business collaborations. The results show that disability is visible in 85% of the publications, whether in the photos or videos shared, in the text of the post, hashtags or emoticons, although it predominates to a greater extent in audiovisual content. In advertising, mentions or tags of brands stand out, much more than paid collaboration, which appears as a minority compared to other forms of promotion. The degree of influence is decisive for interactions in the form of likes and views per video or reels. Finally, the use of hashtags on inclusion and social awareness reinforces the importance of these platforms for the social integration of people with disabilities.

Keywords

Social media; Social networks; *Instagram*; instagrammers; Influencers; Physical Disability; People with disabilities; Accessibility; Inclusion; Content analysis; Brands; Influencer marketing.

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1. Introduction

Online social platforms are an ideal space for virtual contact between people and groups with similar habits and interests. **Ibáñez-Cubillas**, **Díaz-Martín**, and **Pérez-Torregrosa** (2017) state that social networks provide the public with a sense of closeness that breaks down barriers of idiosyncrasy, culture, or language, enhancing inherent human socialization. **Ladogina** *et al*. (2020) recognize that social networks such as *Facebook*, *Instagram*, *YouTube*, *Twitter*, or *TikTok* incorporate a dynamism in communication processes that immerse the user in new realities. With the advent of these virtualities, forms of consumption have changed from an analog to a digital model of practice and behavior, transforming user attitudes (**González-Carrión**; **Aguaded**, 2020). In this regard, **Hung** *et al*. (2019) speak of a world 2.0 with increasingly heterogeneous demands, and to which individual and industrial content creators must respond with acumen.

This study focuses specifically on the social network *Instagram*, which is noteworthy for its ability to establish interactions and communities compared with other platforms (**Arora** *et al*., 2019; **Casaló**; **Flavián**; **Ibáñez-Sánchez**, 2020). This has encouraged its use by influencers and companies that collaborate to carry out advertising and marketing campaigns through social networks.

The main objective of this research is to analyze the posts of Spanish-speaking influencers with physical disabilities to establish whether they exhibit similar characteristics or significant differences in how they use the features of *Instagram* and how disability is represented on their profiles.

This study is important because research on disability and media literacy is scarce and does not analyze the accessibility and use of ICTs by the collective, which implies a lack of visibility and representation of people with disabilities (**Bonilla-Del-Río**; **Valor-Rodríguez**; **García-Ruiz**, 2018; **Prefasi** *et al*., 2010). Therefore, there is a need for more studies that focus on a group that is usually ignored in the research carried out in this area (**Gutiérrez-Recacha**; **Martorell-Cafranga**, 2011; **Samaniego** *et al*., 2012).

Social networks such as *Instagram* allow content creators with disabilities to show their interests, participate in the digital environment, and interact with their audience, which facilitates a decrease in barriers and stereotypes and favors their collective empowerment.

Likewise, a key feature that differentiates influencers is the monetization of their social media profiles through marketing collaborations with companies (**Kay**; **Mulcahy**; **Parkinson**, 2020). These collaborations can occur directly with monetary compensation as well as indirectly through free products, which they must promote or give away (**Hwang**; **Jeong**, 2016). This study has focused on the analysis of *Instagram* profiles that, in addition to being placed on the scale of micro- or macro-influencers, have had direct or indirect collaborations and that therefore monetize their profile.

This issue is considered an essential condition for the study because, as previous works have shown (**Foster**; **Pettinicchio**, 2021), social networks allow for an approach and visibility of disability that promote the value of diversity and foster social inclusion. On the basis of this premise, this study focuses on profiles that have not only achieved this visibility on *Instagram*, but also captured the attention of brands and even established collaborations with them. At the same time, this reinforces the consideration that the demand for diversity in social networks is not just an altruistic manifestation of profiles of influencers with disabilities, but that it is taken into account by the business sphere and publicly manifested on the social network in the form of collaboration.

2. Theoretical framework

2.1. Social networks and visibility of disability

The recognition of diversity and social inclusion are fundamental issues on which today’s democracies are based. In the case of people with disabilities who are traditionally and historically discriminated against, the objectives of full participation and social inclusion include representation in and accessibility to communicative environments of all kinds as a necessary condition for people with disabilities to fully enjoy all human rights and fundamental freedoms (*UN*, 2006).

> The recognition of diversity and social inclusion are fundamental issues on which today's democracies are based

Nowadays, social networks have become part of the communicative environment and have become a space that favors virtual contact between people and groups with similar habits and interests. Social relations with the peer group and the search for autonomy and freedom are established as priorities in which leisure acquires a fundamental role (**Codina**; **Pestana**; **Stebbins**, 2017). Along these lines, among the most prominent reasons for the use of social networks by people with disabilities are communication with friends and entertainment (**Bonilla-del-Río**; **Sánchez-Calero**, 2022).

These platforms encourage users to produce and share their own content, as well as to interact with and disseminate the content of others (**Aguaded**; **Jaramillo-Dent**; **Delgado-Ponce**, 2021), which represents a real transformation of the communicative processes. In this way, users become prosumers, constructing their identities in the network and sharing interests that highlight their presence and protagonism through self-representation and self-exhibition (**Pérez-Daza**, 2021).

Social networks, as highlighted by **Durante** (2011), allow users the possibility of constructing, at least in part, their personal identity in a way that is different from what happens in physical reality. Therefore, the information that is transmitted and shared may be influenced, among other factors, by the user's self-confidence and self-concept, by the decision they make concerning the spheres of their life they wish to share, by the importance they give to privacy, or by the search for popularity (**Durante**, 2011). In this sense, social networks offer the opportunity for people with disabilities to control how and when they disclose information about their disability on these digital platforms, since sometimes the stigma associated with physical disability generates barriers for this group in the consolidation of meaningful friendships (**Furr**; **Carreiro**; **McArthur**, 2017).

According to **Bassey** *et al*. (2021), social networks foster social contact of the collective and promote visibility and social awareness of disability, as well as communication, exchange, and activism (**Ellis**; **Kent**, 2016). These platforms enable people with disabilities to gain positive experiences in terms of social identity and self-esteem development, entertainment, friendship, and enjoyment (**Caton**; **Chapman**, 2016).

In fact, digital inclusion can become the engine that leads to the social inclusion of people with disabilities, and the digital economy and entrepreneurship, through content creation, present opportunities for empowerment (**Johnson**, 2019).

Social networks give activists belonging to groups at risk of social exclusion multiple opportunities for the construction of alternative narratives that challenge the dominant discourse and generate new representations (**Moors**, 2019; **Bitman**, 2021). These resources therefore enable people with disabilities to foster their digital participation, social inclusion (**Bayor** *et al*., 2018), and community integration (**Snethen**; **Zook**, 2016). One of the goals of content creators with disabilities is thus to influence legislators and journalists (**Trevisan**, 2017).

However, there are studies that talk about how, despite their potential, social networks have proven to be inaccessible and have discriminatory attitudes toward people with disabilities (**Ellis**; **Kent**, 2016). These platforms make it so that disability activists must work harder to achieve their goals (**Bitman**, 2021). This is because they have to become a profitable niche market in the economic dynamics of the social networks themselves to promote their accessibility, visibility, and impact, which other groups achieve more easily.

2.2. Physical disability

Currently, approximately 15% of the population worldwide has some type of disability (*World Health Organization*, 2021), a figure that is increasing mainly owing to aging populations and the prevalence of chronic ailments.

According to the *World Health Organization* (2001), the term disability "encompasses impairments, activity limitations, or participation restrictions", and is a "complex phenomenon that reflects an interaction between the characteristics of the human organism and the characteristics of the society in which it lives" ["*fenómeno complejo que refleja una interacción entre las características del organismo humano y las características de la sociedad en la que vive*"] (**Hermida-Ayala**; **Mateos-Borregón**; **Olalla-Vizcaino**, 2010).

On the basis of *Royal Decree 1971/1999* of December 23, 1999, regarding the procedure for the recognition, declaration, and qualification of the degree of disability, the Spanish *State Representative Platform of Persons with Physical Disabilities* (*Predif*, n/d) proposes a classification of disabilities into three large groups: (1) Physical disabilities (related to the body, limbs, and organs in general), (2) sensory disabilities (originating in the visual or auditory system and possibly affecting the throat and language-related structures), and (3) psychic disabilities (related to intellectual and mental health disabilities).

Physical disability is that which affects the locomotor system, especially the limbs, resulting in an impairment caused by the physical condition of the person that prevents them from moving with full functionality of their motor system in a permanent and irreversible manner (*Observatori de la Discapacitat Física*, n.d.). The majority of people with physical disabilities (around 80%) acquire the disability after birth, either due to common conditions or an accident, while a smaller percentage of them become disabled during pregnancy. This disability can be reflected by the decrease or lack of coordination of movement from disorders in muscle tone or balance (*Predif*, n/d).

In their relationship with social networks, several studies show the motivation of people with physical or motor disabilities, especially young people, to expand their personal relationships and improve their social skills, which is also connected to the social inclusion potential of these platforms (**Suriá-Martínez**, 2015). In fact, among the various types of disability, it is people with motor disabilities who show the highest perception of support in social networks (**Suriá-Martínez**, 2017) and their presence and representation compared with other types of disability is emphasized (**Shpigelman**; **Gill**, 2014). Finally, studies such as those by **Magee** (2012) highlight how people with severe physical or motor disabilities who need personal assistance to use social networks find the privacy of their communications limited, hence the importance of the accessibility of these platforms and the implementation of a design for all people.

2.3. *Instagram*, types of influencers, and monetization

This study focuses on the social network *Instagram*, which stands out for building leadership profiles, for its inherently visual nature, and for its ability to convey trends (**Casaló**; **Flavián**; **Ibáñez-Sánchez**, 2020). Visual impression and content expansion, the primordial basis of *Instagram*, reveal the population's remarkable interest at a global level in storytelling through imagery (**Hernández**; **Hernández**, 2018).

According to **Rojas-Torrijos** and **Panal-Prior** (2017), *Instagram* has features shared with other platforms such as *Facebook*, as well as some of its own. These include the hashtag, which groups content by tags and themes and facilitates the search for topics, users, and interactions such as likes or comments, which allow for feedback and opinions from followers to be counted on the basis of the interest aroused by the content shared. Another feature is the text that accompanies the audiovisual content, which allows users to describe their post or provide the information they consider appropriate. Since its creation, the features of *Instagram*'s have been evolving, including filters, emojis, mentions, and new formats such as stories, videos, or reels, and even the "paid collaboration" features, which promotes collaboration between brands and content creators, among others.

Similarly, their ability to establish interactions and communities (**Casaló**; **Flavián**; **Ibáñez-Sánchez**, 2020) has encouraged their use in influencer marketing.

Craig (2019) believes that content creators are motivated by an entrepreneurial spirit and a desire to generate a brand of their own. These are ordinary users who accumulate a "relatively large" number of followers with whom they share personal stories, and they end up monetizing their content by integrating advertising and opinions (**Abidin**, 2016). For **Ki** and **Kim** (2019), influencers aim to strengthen relationships between the captive communities that follow them and the companies or brands that hire them. However, this reality does not always translate into contracts that seek to close sales, but also to the improvement or modification of the image of a brand, organization, product, or service (**Mateus**; **León**; **Núñez-Alberca**, 2022).

Influencers are figures with great fame and power (**Falla-Rubio**, 2019) who gain followers and reputation on the basis of their personality, which characterizes them in their social networks. The power of recommendation and influence on social networks is very effective, and this fact has not gone unnoticed by brands and companies (**Scolari**, 2007).

In a globalized world, being able to hide ulterior motives without being discovered is highly unlikely. Therefore, companies must exercise extreme caution when combining their advertising and marketing interests with users' own interests, especially if social networks come into play, always taking care not to cross the limits set by legality and ethics (**Castelló-Martínez**; **Del-Pino**, 2015). However, the design of influencer marketing actions must be understood as part of the brand's integral communication strategy in an era in which advertising has to be transmedia and multidisciplinary (**Jenkins**; **Ford**; **Green**, 2015).

Undoubtedly, influencers are characterized by accumulating a large, albeit variable, number of followers (**Casaló**; **Flavián**; **Ibáñez-Sánchez**, 2020; **Gottbrecht**, 2016). However, studies such as those by **Djafarova** and **Rushworth** (2017) have shown how *Instagram* users tend to trust influencers with a modest number of followers more than those with a larger number. In fact, recent work proposes that the number of followers can even reduce follower engagement (**Tafesse**; **Wood**, 2021). According to **Alassani** and **Göretz** (2019), the categories of influencers can be classified as follows:

1. *Mega-influencer:* Those considered to be celebrities; that is, people recognized for their talent such as artists and actors, among others, and who also appear in different media. These influencers have 1,000,000 or more followers.

2. *Macro-influencer*: These are experts, such as journalists, bloggers, and professionals. Their community ranges from 100,000 to 999,999 followers.

3. *Micro-influencer*: They are ordinary consumers whose influence is based on experience with brands and audiences and who have, on average, between 1,000 and 99,999 followers. The influencers in this group are also referred to as micro-celebrities (**Marwick**, 2015).

4. *Nano-influencer*: This group has a maximum number of 1,000 followers, so their reach is limited, although the level of engagement with their audience is high.

This hierarchy is taken into account when monetizing the profiles and content shared by influencers, who have become the opinion leaders of the twenty-first century, with commercial brands relying on them to launch their messages (**Rodrigo-Martín**; **Rodrigo-Martín**; **Muñoz-Sastre**, 2021).

The monetization of a profile is understood as the capacity to generate income by posting audiovisual content. For **Castelló** and **Pino** (2015), collaboration must be on a win–win basis so that both parties obtain some benefit, which is not always economic. While the brand is imbued with the credibility and trust that the influencer radiates, the influencer sees their work rewarded by strengthening their professional position and relevance (**Martínez-Sanz**; **González-Fernández**, 2018).

Influencer marketing is based on the contact and connection that a company establishes with previously identified influencers to multiply the reach of their brand communication. This discipline merges corporate communication with advertising, bringing out the best of each to ultimately generate a bond with the user that ends up building loyalty (**Castelló**; **Pino**, 2015).

3. Objectives

The main objective of this research is to analyze the posts of Spanish-speaking influencers with physical disabilities to establish whether they exhibit similar characteristics or significant differences in how they use the features of *Instagram* and how disability is represented on their profiles. Specifically, this main goal is broken down into the following distinct objectives:

O1: To examine how influencers with disabilities who create content on *Instagram* use *Instagram* on the basis of their degree of influence.

O2: To test whether there are differences in terms of gender in regard to the use of *Instagram* by influencers with disabilities.

O3: To analyze the collaborations that influencers with disabilities make with brands on *Instagram*.

O4: To study the self-representation of disability and the accessibility of content created by influencers.

4. Methodology

4.1. Sample

For this research, a content analysis of 10 *Instagram* profiles was carried out, all of them of Spanish-speaking influencers with physical disabilities who had business collaborations.

For the design of the research, the selection of the sample, and the analysis tool, the previous literature, together with the application of the walkthrough method, were taken as a reference, which made it possible to adapt the method to the specific study. This walkthrough technique allows for the selection of a corpus of data on which to build a detailed analysis and serves as a basis for user-centered research (**Light**; **Burgess**; **Duguay**, 2018). The walkthrough method was performed prior to the analysis and in two phases: (1) a search for profiles in line with the objectives to define the object of study, and (2) a preliminary analysis of the 10 profiles analyzed to adapt the analysis tool to the characteristics of the selected influencers and the objectives of the study.

In the first phase, we began the search for profiles managed by people with disabilities who met the requirements to be influencers and had some kind of commercial relationship with a brand, i.e., not only had followers, but also had some form of profitable position as influencers. This generic search was refined owing to the fact that the results obtained were dominated by profiles of influencers with physical disabilities who had monetized their status as influencers or, at the very least, had business support in other forms of collaboration, compared with other types of disabilities. Therefore, it was decided to limit the search to this type of profile. To cover a larger sample and taking into consideration the Spanish-speaking accounts found, international profiles with this characteristic were selected in an attempt to utilize a diverse sample in terms of the influencers' geographic origin. Information was recorded for all the profiles found, as well as their characteristics (user name, gender, number of followers, nationality, collaboration with brands, and type of disability). A number of micro- and macro-influencers were established, and it was decided to balance the sample in terms of the influencers' gender. The profiles that made up the final sample were selected on the basis of these criteria.

Throughout this process, the objectives of the study were defined while also taking into account previous research. Likewise, the different profiles of the selected influencers were chosen by looking at their biographies, stories, highlights, and posts to decide which content was to be analyzed. Finally, the authors decided to focus the study exclusively on posts.

During the second phase, once the 10 profiles had been selected and the tool had been designed, a preliminary analysis was carried out to assess its reliability. These processes are detailed in the following sections.

The study focused on this type of disability. Ten Spanish-speaking profiles from European and Latin American countries –Chile, Colombia, Ecuador, Italy, Mexico, Spain, and Venezuela– were selected. The profiles were balanced by gender: five men and five women. Similarly, considering the diversity of profiles according to the number of followers and interactions, five profiles of micro-influencers (1,001-99,999 followers) and five of macro-influencers (100,000-999,999 followers) were selected (**Alassani**; **Göretz**, 2019). Establishing profiles proportionally in terms of sex and degree of influence facilitates the comparison considering that the sample was also balanced in terms of the number of units of analysis per profile.

> It is significant that macro-influencers tend not to answer, while with micro-influencers the trend is reversed

Table 1. Data on the profiles included in the study as of February 28, 2022

Name	User name	Country	Degree of influence	Followers
Cisco García	@ciscogarve	Spain	Macro-influencer	301,308
Edna Serrano	@ednaserranooficial	Mexico	Macro-influencer	297,917
Mauricio Riffo	@tenientedan	Chile	Macro-influencer	209,169
Davide Morana	@davidebartolomorana	Italy	Macro-influencer	101,846
Victoria Salcedo	@vicco_salcedo	Ecuador	Macro-influencer	165,664
Dany	@v_a_l_i_e_n_t_e	Colombia	Micro-influencer	53,527
Franwil Basulto	@franwil_basulto	Venezuela	Micro-influencer	37,147
Alan	@alanelruedas	Spain	Micro-influencer	26,833
Anabel Domínguez	@nosoyloquevesoficial	Spain	Micro-influencer	16,224
Cami Herrera	@cami.herrerar	Chile	Micro-influencer	14,543

For the selection of the sample, from all the content available on *Instagram*, we focused on the influencers' posts, because of their ongoing presence on their profiles. We thus selected 40 posts from each profile. In total, the sample size was 400 units of analysis corresponding to posts published up to February 28, 2022. The posts from this date backwards were analyzed until the required number from each profile was reached.

4.2. Variables

For the selection of the variables and categories to be analyzed, we began with tools used in previous literature (**González-Romo**; **Iriarte-Aguirre**, 2020; **Romero-Coves**; **Carratalá-Martínez**; **Segarra-Saavedra**, 2020; **Villena-Alarcón**; **Fernández-Torres**, 2020), including adaptations to this study through digital ethnography. The combination of these criteria makes it possible to create a tool that is both solidly based and tailored to the specific study. The specific variables analyzed were:

1) post subject matter;
2) advertising;
3) audiovisual format;
4) interactions, e.g., likes, comments, and responses;
5) presence and company of the influencer;
6) accessibility; and
7) self-representation/visibility of the disability.

In the variable "post subject matter," the following categories were distinguished on the basis of previous literature (**González-Romo**; **Iriarte-Aguirre**, 2020) and the walkthrough method applied herein:

1) recommendation and promotion (includes those posts that recommend products and promote events, workshops, campaigns, or books);

2) disability (posts in which the main content is disability, the rights of the collective, barriers and adaptations, and claims, among others);

3) sports (covers all sports disciplines, training, guidelines, recommendations, etc.);

4) fashion and beauty (posts on outfits, clothing, footwear, skin care, makeup, beauty treatments, cleaning and exfoliation routines, or haircare, among others);

5) Covid-19 (posts dealing with the pandemic, infographics, prevention measures, treatments, symptoms, and general information);

6) humor (any post that has comic or humorous content);

7) personal (posts of a personal nature such as selfies, personal images, and/or moments from the influencer's personal life); and

8) other (posts that cannot be categorized in the previous sections).

In addition, "advertising" was measured as a separate variable, following the previous literature (**González-Romo**; **Iriarte-Aguirre**, 2020). This is owing to the importance of this issue for the study, as one of the requirements for the selection of the profiles was business collaboration of some kind on *Instagram*. Thus, we distinguish between:

1) explicit mention of "paid collaboration";
2) the appearance of hashtags such as #ad, #publi, and #gift; and
3) mentions or tags of brands.

In view of all the options offered by *Instagram*, the following categories were established in terms of "audiovisual format":

1) photography;
2) video;
3) reel;

4) photo carousel;
5) video carousel; and
6) mixed carousel

Regarding "interactions" or engagement, the numbers of views, likes, and comments were analyzed. Compared with other research (**Romero-Coves**; **Carratalá-Martínez**; **Segarra-Saavedra**, 2020), we also studied whether influencers respond to at least some of the comments on their posts.

We included the variable "content accessibility" in consideration of the fact that this is a study on profiles with disabilities and that, in the ethnographic analysis of *Instagram* in general and of the studied profiles in particular, some accounts that included captioning in their videos were found. Other audiovisual accessibility services were also added. In that case, we distinguish whether it is captioning, sign language, or alternative text (#alt).

To analyze "self-representation/visibility of disability," we observed whether it is present and, if so, whether it appears in: (1) audiovisual content, (2) text, (3) hashtags, and (4) emojis. We also collected data on the use of hashtags or emojis concerning disability to establish which are the most widespread and used.

We also included the variable "Presence and company of the influencer in the post" (**Romero-Coves**; **Carratalá-Martínez**; **Segarra-Saavedra**, 2020), which consisted of the following categories: (1) individual, (2) with a partner, (3) with family, (4) with friends, and (5) other.

Finally, the variable "mentions or tags" measures whether the post mentions other accounts.

In addition to all these quantitative variables that measure the frequency of occurrence of the items noted, the tool allowed the coder's qualitative impressions to be collected. This addition of qualitative elements to content analysis has been supported for decades by **Bardin** (1986) and **Krippendorff** (1990).

4.3. Tool

The tool was designed in *Google Forms*, and to measure the accuracy of the analysis sheet a test was performed including 10% of the total sample distributed among all the profiles analyzed. The test served to correct and increase the accuracy of the tool and, therefore, of the analysis itself. Finally, the Krippendorff alpha coefficient was calculated for reliability, suitable for studies involving more than two coders, on 10% of the total analyzed. Overall, the reliability was satisfactory, reaching 0.824 (**Krippendorff**, 2004).

Once the content analysis and coding had been carried out, the information from the form was extracted in Excel format, transferring the data for each variable to the *SPSS v.28.0* software. For data processing, we first performed the chi-squared and Cramer's *V* correlation tests followed by Spearman's correlation. The former was used to assess the probability of discrepancies on the basis of the null hypothesis, which states that there is no relationship and that the variables have complete independence (**Flores-Peña**, 2016), to test for the existence of significant differences between the observed and expected frequencies, calculating Cramer's *V* correction to determine the intensity of relationship of nominal type variables (**Vizcaíno-Verdú**; **Tirocchi**, 2021). Spearman's correlation made it possible to measure the association between two ordinal variables, or between one ordinal and another scale variable (**Reguant-Álvarez**; **Vilà-Baños**; **Torrado-Fonseca**, 2018).

5. Results

It is first essential to provide a brief description of the biographies of the profiles analyzed in order to then focus on the posts analyzed. Selecting only profiles of influencers with physical disabilities has allowed us to find parallels between them, such as the fact that half of them use the blue wheelchair emoji in their biography. The use of this specific emoji corresponds with the accounts of all the influencers who move in wheelchairs, with the exception of Cami Herrera. The rest of the profiles also show disability in their biography in various ways. A total of 50% of them tell their personal story about their disability in the featured stories. Davide Morana uses the text "amputee x4" and "adapted athletics." Some profiles use motivational phrases such as "LimitsAreOnlyInOurMinds" ["*LosLímitesSoloEstánEnEnNuestraMentes*"] (Franwil Basulto), "If it doesn't challenge you it doesn't change you" (Victoria Salcedo), or "Even when life doesn't end up being the party that you hoped for.... Never stop dancing!" ["*Aunque la vida no resulte ser la fiesta que esperabas...¡Nunca dejes de bailar*!"] (Dany). Although this information is sometimes ambiguous on its own, it is complemented by audiovisual content, such as their profile picture or featured stories, thus clarifying that it refers to the issue of disability. Like other influencers –with or without disabilities– they include other social networks in their biographical text, such as *YouTube* channels or *link.tree* links to all their sites (90%), information about their profession or area (50%), contact email for collaborations (40%), or links to their own products, such as books (20%).

5.1. Uses of *Instagram* based on the degree of influence of content creators

The content analysis encompassing the 400 posts first analyzed the uses that influencers with disabilities make of the various features, then related these results to their degree of influence.

Regarding the format types most used by the influencers (Figure 1), micro-influencers prefer to use the photo carousel (24.8%), followed by the mixed carousel (13.3%) and reels (10.5%), while macro-influencers share their content more frequently through mixed carousels (those that combine photos and videos) (22.8%) and reels (14.5%). In both cases, there is a low preference by the influencers to share their posts in video format (5%) or video carousels (1.3%).

We also analyzed the interactions generated by the influencers, taking into account whether they are micro- or macro-influencers (Table 2).

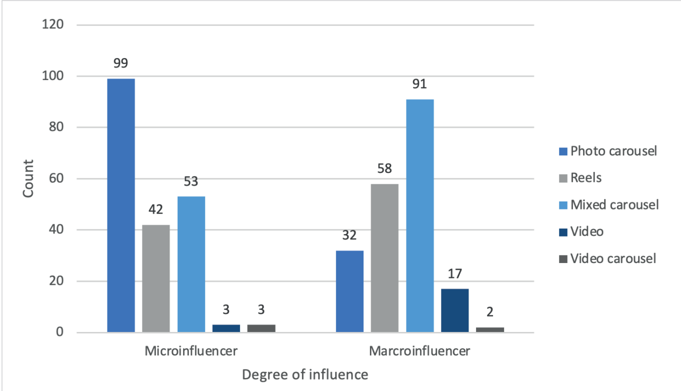

Figure 1. Formats most commonly used according to the degree of influence

Table 2. Summary of case processing by degree of influence and interactions

	Cases					
	Valid		Lost		Total	
	N	Percentaje	N	Percentaje	N	Percentaje
Degree of influence – followers	400	100	0	0.0	400	100
Degree of influence – likes	380	95.0	20	5.0	400	100
Degree of influence – comments	400	100	0	0.0	400	100
Degree of influence – views	119	29.8	281	70.3	400	100

These results were calculated on the basis of the number of valid posts. In the case of "likes," there are 20 missing data items owing to the fact that influencers activated the *Instagram* feature that allows hiding the number of "likes" so that the information is not visible. Likewise, in the case of the number of "views," there are 281 posts in which this criterion did not apply, either because they are photographic posts or because the data were not available, as in the case of the videos that form part of the video carousels. However, as mentioned above, this type of post is very scarce (1.3%).

Table 3. Spearman's correlation between degree of influence and interactions

Spearman's correlation		
	Value	Sig. (bilateral)
Followers	0.870	< 0.001
Likes	0.613	< 0.001
Comments	0.237	< 0.001
Views	0.705	< 0.001

The data show the existence of a positive and significant correlation in the number of followers, likes, and views (Table 3). In the first case, there is a highly significant correlation, which is explained by the fact that the number of followers determines the degree of influence, i.e., these data determine whether influencers are considered micro- or macro-influencers. There is also a moderate to strong association regarding the number of "likes" and views, as well as a weak correlation regarding the number of comments. Therefore, we can conclude the significance of the degree of influence of the influencers with respect to the interactions they generate from their followers.

Table 4. Influencer interaction through comments according to their degree of influence

			Interaction in the comments		
			Yes	No	Total
Degree of influence	Micro-influencer	Count	153	47	200
		% within degree of influence	76.5	23.5	100
		% within interaction in the comments	74.6	24.4	100
		% of total	38.3	11.7	50.0
	Macro-influencer	Count	52	148	200
		% within degree of influence	26.0	74.0	100
		% within interaction in the comments	25	75	100
		% of total	13.0	37.0	50.0
Total		Count	205	195	400
		% of total	51.2	48.8	100

It is also relevant to highlight that both micro- and macro-influencers interact through comments, responding to their followers and taking advantage of this *Instagram* feature (Table 3). According to Figure 2, there is a balance between posts in which this interaction occurs (51.2%) and those in which it does not (48.8%). However, it is significant that macro-influencers tend not to answer (37% of the occasions compared with 13% in which they do respond with at least some comment), while with micro-influencers the trend is reversed (in 38.3% of the cases they answer whereas in 11.7% they do not).

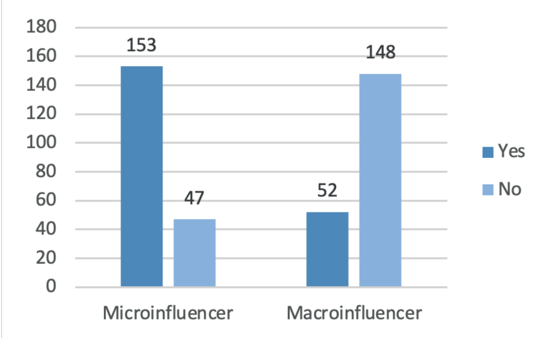

Figure 2. Interaction of influencers with followers based on their degree of influence

5.2. Uses of *Instagram* according to influencers' gender

The results were then analyzed according to the variables and gender (Table 5). Moderate significant associations were found in the following variables according to Cramer's *V* and in ascending order: "accessible content," "post format," "disability visibility," and "type of presence." Regarding the latter two, it is worth noting the tendency of influencers of both genders to appear alone in their posts (n = 293; 73.25%), although, when accompanied, it is more common for men to appear with a member of their family (n = 21; 5.25%), with their partner (n = 11; 2.75%), with other people such as, for example, health specialists or work colleagues (n = 36; 9%), or with friends (n = 1; 0.25%), when compared with the data for women, which show that when they appear accompanied, the percentages are reduced, appearing to a greater extent with friends (n = 11; 2.75%), with family (n = 8; 2%), with their partner (n = 4; 1%), or with other people (n = 7%; 1.75%). Regarding the visibility of disability, for both genders there is a greater representation through the posts' audiovisual content (men: n = 91; women: n = 87), as well as through the combination of several categories: audiovisual content, text of the post, hashtags, and/or emojis (men: n = 55; women: n = 89). Text is where the least representation of disability in isolation exists (men: n = 5; women: n = 0), along with hashtags (men: n = 0; women: n = 5), and followed by emoji (men: n = 8; women: n = 0). It is also significant that only 4.5% of the posts by women (n = 18) and 10.5% of the posts by men (n = 42) do not show their disability, meaning that their visibility is significant.

Table 5. Variables in chi-squared test and Cramer's *V* function in the *Instagram* posts in terms of gender

Pearson's chi-squared test				
	Value	**df**	**Asymptotic significance (bilateral)**	**Cramer's *V***
Post format	20.093	4	<0.001	0.224
Influencer presence in the post	0.490	1	0.484	0.035
Type of presence	42.668	4	<0.001	0.327
Visibility of disability	35.709	5	<0.001	0.299
Accessible content	18.399	2	<0.001	0.214
Advertising	4.783	3	0.188	0.109
Interaction in the comments	12.986	1	<0.001	0.180
Mentions or tags	0.224	1	0.636	0.024

Note: df = degree of freedom

On the other hand, it is essential in a study on influencers to highlight the number of views their content has (Table 6). There is a relationship between the number of followers and the average number of plays per video or reel, in which macro-influencers are in the lead. With respect to the gender variable, the cases of Victoria Salcedo and Dany should be emphasized, because they have an average number of views per video or reel higher than that of other male influencers with a larger number of followers, such as Mauricio Riffo.

Table 6. Average views based on influencer and followers

	No. of views	**No. of videos/reels**	**Average number of views**	**Number of followers**
Cisco García	4,324,089	18	240,227	301,304
Davide Morana	3,457,435	15	230,495	192,992
Edna Serrano	3,211,526	19	169,028	296,385
Victoria Salcedo	560,105	6	93,351	163,065
Dany	412,009	6	68,668	53,600
Mauricio Riffo	1,090,358	17	64,139	212,333
Franwil Basulto	354,874	26	13,649	37,147
Cami Herrera	79,021	13	6,079	14,400
Alan	0	0	0	25,900
Anabel	0	0	0	16,000
Total (*N*)	13,489,417	120	885,636	1,313,126

5.3. Collaborations between brands and influencers with disabilities

Another of the most interesting variables is "advertising," which analyzes the collaborations that influencers make with brands and how they indicate the recommendation and promotion of products. In 28.25% of the posts analyzed, direct advertising of some kind was found (*n* = 113), either by labeling the post as "paid collaboration," adding hashtags that identify the content as advertising (#ad, #publi, #collaboration, etc.), mentioning the brand, or through a combination of several of these options.

Having established the number of posts that include product recommendations, we first calculated the possible correlations between this variable and the others (Table 7).

Table 7. Variables in chi-squared test and Cramer's *V* function in *Instagram* posts in terms of advertising

Pearson's chi-squared test				
	Value	**df**	**Asymptotic significance (bilateral)**	**Cramer's *V***
Nationality	56.811	18	<0.001	0.377
Profile theme	23.038	12	0.027	0.139
Post theme	246.909	24	<0.001	0.454
Post format	43.067	12	<0.001	0.189
Influencer presence in the post	6.572	3	0.87	0.128
Type of presence	13.079	12	0.363	0.104
Visibility of disability	12.388	15	0.496	0.109
Accessible content	12.037	6	0.061	0.123
Interaction in the comments	3.453	3	0.327	0.093
Mentions or tags	91.267	3	< 0.001	0.478

Note: df = degree of freedom

The data show a moderate positive correlation, in ascending order, in relation to the variables "nationality," "subject of the post," and "mentions or tags."

The representation of posts in the 40 per profile that were analyzed in which advertising is present according to nationality is 47.5% for the Ecuadorian influencer (*n* = 19), 42.5% for the two Chilean influencers (*n* = 34), 37.5% for the Venezuelan influencer (*n* = 15), 26.6% for the three Spanish influencers (*n* = 32), 15% for the Italian influencer (*n* = 6), 10% for the Mexican influencer, and 7.5% for the Colombian influencer.

In terms of post subject matter, there is a greater presence of advertising in the content included in the "beauty" (*n* = 44; 38.94%) and "fashion" (*n* = 23; 20.35%) categories, followed by "personal" (*n* = 18; 15.93%), "sports" (*n* = 15%; 13.27%), and "humor" (*n* = 13; 11.51%).

The preferred feature for sharing advertising content is through "mentions or tags," either by tagging the post as a recommendation and promotion (*n* = 89; 78.76%) or by combining this with other ways, e.g., with the use of specific hashtags or "paid collaboration" (*n* = 24; 21.24%).

5.4. Self-representation of disability and accessible content

Another relevant aspect for the study is the visibility of disability by the influencers themselves in their posts. This variable took into account all the elements that make up *Instagram* posts: audiovisual content, text, hashtags, and emojis. In 85% of the posts analyzed (*n* = 339), there is representation of disability, which is a significant percentage.

Only one profile was found, that of Alan, in which the posts where disability is not seen or not alluded to are more numerous (*n* = 22; 55%) than those in which it is shown (*n* = 18; 45%). In all other cases, there is a greater representation of disability versus its absence. This is especially seen in the profiles of Dany and Mauricio Riffo that make disability more visible (100% in both cases), followed by Cami Herrera and Edna Serrano (95% in both), and Davide Morana and Victoria Salcedo (92.5%, respectively).

> It is worth noting the tendency of influencers of both genders to appear alone in their posts

In all cases, the element in which disability is most visible is audiovisual content, whether it be photographs, reels, or videos, seen in 79% of the units analyzed (*n* = 314). The results allow us to establish some patterns in the treatment of disability by some of the influencers studied. This is the case of Mauricio Riffo, who uses the wheelchair emoji (♿) in all his posts, or those of Dany, Cami Herrera, and Victoria Salcedo, who use hashtags related to disability on a regular basis. However, these are characteristics of specific profiles and not features common to all the influencers studied. Another emoji used repeatedly is the "mechanical arm" (🦾), particularly in Davide Morana's profile.

The following classification has been made regarding the use of hashtags (Table 8).

Table 8. Use of hashtags related to disability

Hashtags related to disability or physical disability	#amputee #amputees [#*amputados*] #amputeelife #disability [#*discapacidad*] #amputation #amputeestrong #peoplewithdisability [#*personascondiscapacidad*] #osteogenesisimperfecta #oi #disabilitycolombia [#*discapacidadcolpmbia*] #oiwoman #oigirl #disabled #amputeegirl #womenamputees [#*mujeresamputadas*]
Hashtags related to inclusion and social awareness	#diversityandinclusion #inclusion #inclusivity #integratedchile [#*integradochile*] #togetherforinclusion [#*juntosporlainclusion*] #AssistedVote [#VotoAsistido] #Summerinclusive #disabilityawareness #bravewomen [#mujeresvalientes] #therearenobarriers [#*nohaybarreras*] #togetherforinclusion [#*juntosporlainclusion*] #imperfect #accessibletourism [#*turismoaccesible*] #accessibility [#*accesibilidad*] #universalaccessibility [#*accesibilidaduniversal*] #healthwithouthoaxes [#*saludsinbulos*] #internationaldisabilityday [#*diainternacionaldeladiscapacidad*] #internationalpeoplewithdisabilityday [#*diainternacionaldelaspersonascondiscapacidad*] #marchfordisability [#*marchaporladiscapacidad*] #inclusivebar [#*barinclusivo*] #WorldMentalHealthDay [#*DiaMundialDeLaSaludMental*]
Hashtags related to disability and fashion	#disabledandcute #disabledmodel #disabledmodel #disabledfashion #wheelchairoutfit #inclusivefashion [#*modainclusiva*]
Hashtags related to disability and sport	#adaptedathletics #parathletics
Motivational hashtags	#Nolimits [#*Sinlimites*] #UpWithLife [#*ArribaLaVida*] #UpWithLife💪 [#*ArribaLaVida*💪] #bosslady #selflove [#*amorpropio*] #willpower [#*fuerzadevoluntad*] #confidence [#*confianza*] #resilience [#*resiliencia*] #hope [#*esperanza*] #inspiration [#*inspiracion*] #disabledandproud #inspirationalquotes #yesyoucan [#*sipuedes*] #iloveyou [#*teamo*]
Hashtags specifically related to reduced mobility	#ottobock #prothesis [#*protesis*] #wheelchairgirl #prostheticleg #wheelchairboss #wheelchairlifestyle #wheelchairstyle #wheelchairlife♿ #wheelchair #wheelchairwoman #wheelchaircostume #wheelchairlifestyle♿ #3R80 #wheelchairtravel #cleg

The category with the most hashtags is the one we have named "inclusion and social awareness." Through these labels, the influencers make reference to diversity and to recognized days such as International Disability Day or World Mental Health Day. They also demand universal accessibility, the need for assisted voting, and that there be no barriers; thus, through these hashtags, they make disability visible and demand their rights. The categories "disability or physical disability" and "reduced mobility," the next most commonly used, include hashtags related to limb amputation and osteogenesis imperfecta (#osteogenesisimperfecta #oi #oiwoman #oigirl), as well as hashtags related to the products they use, such as wheelchairs or prostheses. Some of these tags include the name of specialized product suppliers for users with reduced mobility (#ottobock) and the name of some of their prostheses, such as #cleg (C-Leg is a prosthetic knee) or #3R80 (a knee joint).

Also present in the posts are the hashtags that we have included in the "motivational" category, referring to inspirational messages (#inspirationalquotes, [#*Sinlimites*] #UpWithLife [#*ArribaLaVida*]), self-affirmation and self-care (#disabledandproud, #selflove [#*amorpropio*], #willpower [#*fuerzadevoluntad*], #confidence [#*confianza*], #resilience [#*resiliencia*], and #hope [#*esperanza*]), and support for other people with disabilities (#yesyoucan [#*sipuedes*] and #iloveyou [#*teamo*]).

It is also interesting to analyze the subject matter of the posts that include self-representation. It is noteworthy that almost half of the posts (n = 183; 46%) are of a personal nature. This is followed by 21% of recommendation and promotion posts (n = 84) and 14% of posts on disability issues (n = 57). Also noteworthy is the fact that topics related to the specialization or interest of the profiles analyzed were clearly underrepresented: fashion and beauty (7%), sports (6%), and humor (3%).

We also analyzed whether the content published by the influencers with disabilities was accessible and through which resource this accessibility was achieved, namely alternative text, subtitles, or sign language. The data show that, in 93% of the posts analyzed (n = 372), the content did not incorporate any of these three elements to improve accessibility. It should also be noted that none of the posts analyzed included alternative text.

To measure the use of subtitles and sign language by influencers accurately, only those formats in which these elements could be included were taken into account (n = 156). Therefore, photo posts or photo carousels were not counted. In this regard, only 16.62% of the posts that make up the sample and that could be accessible include subtitles (n = 26), with Mauricio Riffo's profile having the most subtitled content shared (9.58%), followed by Franwil Basulto (4.48%), Cami Herrera (1.92%), and Alan (0.64%). In the case of Franwil Basulto, it is worth mentioning that, although subtitles are sometimes included, they generally appear partially, only subtitling what the influencer himself says; that is, in videos in which he appears with other people, their speech is not subtitled, so the content is not 100% accessible. Furthermore, only one of the posts analyzed contained content in sign language (0.64%), although it was not the influencer who signed.

> The preferred feature for sharing advertising content is through "mentions or tags," either by tagging the post as a recommendation and promotion or by combining this with other ways, e.g., with the use of specific hashtags or "paid collaboration"

6. Discussion and conclusions

Social networks have joined the communicative framework as platforms that favor socialization processes and active participation in society (**Ibáñez-Cubillas**; **Díaz-Martín**; **Pérez-Torregrosa**, 2017). For people with disabilities, social networks encourage social contact and promote visibility and awareness (**Bassey** *et al*., 2021), while fostering the development of social identity, self-esteem, entertainment, friendship, and enjoyment (**Caton**; **Chapman**, 2016). The findings of this research make it possible to conclude that these platforms are relevant for people with disabilities in terms of communication, exchange, and activism, just as **Ellis** and **Kent** (2016) demonstrated in their study. They also present interesting opportunities for empowerment (**Johnson**, 2019).

The main objective of this research is to analyze the posts of Spanish-speaking influencers with physical disabilities to establish whether they exhibit similar characteristics or significant differences in how they use *Instagram*'s features and how disability is represented on their profiles.

This last issue of self-representation or visibility of disability is linked to one of the main values of social networks for vulnerable groups or those at risk of exclusion, namely the possibility of telling their own story. These platforms overcome the limitations of physical reality (**Durante**, 2011) and make the construction of alternative narratives that challenge the dominant discourse and generate new representations possible (**Bitman**, 2021). Regarding narrative or identity construction, the findings highlight that the profiles contain the personal story of the influencers, in which they tell their followers about their experience with disability, as well as that almost half of the posts analyzed (46%) were about personal topics. In conclusion, the use of these platforms to make disability visible and "normalize" it is emphasized. This implies an evolution in the representation of disability and the models used to understand it, owing to the fact that, in previous decades under the rehabilitative or medical models, it was considered that people with disabilities had to undergo a rehabilitation process or hide their disability to be socially accepted, which prevented them from participating actively in society (**Franco-Zapata**, 2019; **Pérez-Dalmeda**; **Chhabra**, 2019). Social networks, as shown by the results obtained herein, also allow people with disabilities to show their interests, collaborate with brands, and interact with a large audience, valuing and making diversity visible and sharing messages that allow for social awareness and the elimination of stereotypes about the group, which is in line with previous studies (**Bonilla-de-Río** *et al.*, 2022).

In relation to the specific objective of studying the self-representation of disability, the high percentage of posts (85%) in which disability is visible, and also the fact that audiovisual content, whether photographs, reels, or videos, is the element in which it is most visible (79%), is emphasized. This shows that, in general, there is no make-up or concealment of disability in the analysis carried out, but that it is shown in a natural way in posts that not only deal with disability but can also be of a personal nature, promotion, etc.

The results allow us to establish patterns in the treatment of disability by some of the influencers studied. This is the case of Mauricio Riffo, who uses the wheelchair emoji (♿) in all his posts, or those of Dany, Cami Herrera, and Victoria Salcedo, who use hashtags related to disability on a regular basis. However, these are characteristics of specific profiles and not features common to all the influencers studied.

The use of hashtags is striking mainly because the results allow us to establish categories that are also related to self-perception and the narration of disability. In conclusion, among these categories, "social inclusion and awareness" stands out, which in turn is connected to the potential of social networks to promote awareness and social integration of vulnerable groups shown in previous studies (**Bassey** *et al*., 2021; **Foster**; **Pettinicchio**, 2021).

This specific objective also included measuring the accessibility of content published by influencers with physical disabilities. Specifically, the results indicate that alternative text was not used in the sample analyzed and only one post had sign language, although it was not the influencer who signed. Subtitled content was found, which makes sense since this is the most implemented and widespread accessibility service (**García-Prieto**; **Aguaded**, 2021). The results showed that 16.62% of the posts in the sample that could be accessible –excluding photographs and photo carousels– were captioned.

In addition, the study focused on influencers with physical disabilities who had collaborations with companies of some kind. The objective of analyzing the collaborations of influencers with disabilities and brands was addressed in the "advertising" variable. The data show that, in 28.25% of the posts analyzed, direct advertising of some kind was found, predominantly with the "mentions or tags" feature, mainly as a unique way of tagging the post as a recommendation and promotion (78.76%), and in a smaller proportion combining this option with others, either with the use of specific hashtags or "paid collaboration." Thus, among the multiple options for monetization or earning for influencers, paid collaboration remains a minority compared with other forms of promotion among the micro- and macro-influencers with physical disabilities analyzed, which coincides with what was proposed by **Hwang** and **Jeong** (2016).

Regarding the analysis of *Instagram* uses and the degree of influence of content creators, despite previous studies showing how *Instagram* users tend to trust influencers with a modest number of followers more (**Djafarova**; **Rushworth**, 2017) or even that a higher number

> There is a greater presence of advertising in the content included in the "beauty" and "fashion" categories

of followers can reduce follower engagement (**Tafesse**; **Wood**, 2021), this research found a significant correlation between the degree of influence of influencers and the interactions generated by their followers with regard to likes and views, although not the number of comments. On the other hand, in the case of the influencer's own response to followers' comments, an inverse relationship was found, which coincides with the studies that show that influencers with fewer followers have higher engagement.

> Content creators make visible their disability in the audiovisual content using emojis or hashtags specific to this type of disability

However, it is significant that macro-influencers tend not to answer (37% of occasions compared with 13% in which they do respond with at least some comment), while micro-influencers do tend to respond (in 38.3% of the cases they answer while in 11.7% they do not). Nevertheless, in this case, the interaction comes from the content creator themselves and not from their followers. According to **Sarmiento-Guede** and **Rodríguez-Terceño** (2020), micro-influencers generate greater interaction owing to the fact that as their community is smaller, the level of engagement increases, which implies greater two-way communication with their followers.

Meanwhile, moderate correlations were found between the variables "accessible content," "post format," "visibility of disability," and "type of presence" and the gender of the influencers. However, for both genders, posts in which the influencer appeared alone predominated, as well as those in which the visibility of the disability was given in an audiovisual content or through the combination of several categories: audiovisual content, text of the post, hashtags, and/or emojis. The fact that influencers' content is dominated by posts in which they appear alone could be interpreted as a way of professionalizing their account, avoiding putting the focus on their personal contacts. However, in some of the content, they are accompanied by people from their closest circles, such as family or friends.

Finally, the analysis of the profiles of influencers with physical disabilities has allowed a comparison to establish the existence of some common characteristics, such as the visibility of the disability in the audiovisual content and the use of emojis or hashtags specific to this type of disability. Nevertheless, for future research, it would also be interesting to compare these profile data with other types of disability to see if these or different patterns are found. A limitation of this study that is worth mentioning is its quantitative approach and the number of accounts analyzed, which does not allow the results to be generalized. In this way, the possibility of expanding the number of accounts analyzed and deepening qualitative aspects through interviews or focus groups with influencers and collaborating companies that have chosen to work with influencers with disabilities as marketing influencers is being considered. However, the study highlights the need to analyze the use and visibility of social networks of people with physical disabilities, providing an inclusive perspective that continues to be necessary to eliminate barriers, stereotypes, and situations of digital or social exclusion.

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Elections and fact-checking in Portugal: the case of the 2019 and 2022 legislative elections

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Abstract

Fact-checking is a relatively recent journalistic genre in Portugal that has been growing in recent years, alternately viewed as a journalism reform movement or criticized as inefficient and idealistic. Our study is a comparative analysis of the output of the Portuguese fact-checkers *Observador* and *Polígrafo* in the 2019–2022 elections to determine whether their coverage is politically biased. Performing a quantitative content analysis of all fact-checking articles on national politics (n = 265) published during the campaign for the parliamentary elections, our results show that fact-checking activity has increased in the last elections. These data may indicate that fact-checking agencies have increased their capacity and resources, but may also suggest a greater presence of subjectivity and deception in Portuguese political discourse. The focus of Portuguese fact-checkers is statements produced during political debates (70%), while social media verification is disregarded. Our most significant finding is the lack of evidence of partisan or political bias in the selection of the assessed statements. Both fact-checkers do not show a tendency to check statements that are more or less anti- or pro-government and/or statements that are ideologically favorable to the left wing or the right wing. Therefore, our findings confirm the high level of professionalism and impartiality of Portuguese fact-checkers evidenced in other studies, and demonstrate that the Portuguese citizen's skepticism toward the practice has no foundation.

Keywords

Fact-checking; Disinformation; Political bias; Partisanship; Left-wing; Right-wing; Digital media; *Observador*; *Polígrafo*; Elections; Portugal.

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1. Introduction

The spread of disinformation continues to be a problem with serious consequences for societies. Journalists and academics have expressed their concerns about the threat that disinformation poses to democracy (**McKay**; **Tenove**, 2020; **Tenove**, 2020), contributing to distrust in the media and public institutions (**Bennett**; **Livingston**, 2018) and increased political polarization (**Spohr**, 2017).

The scale of the problem has led several governments to take action. In 2018, the *European Commission* created a group of experts on fake news and disinformation and, in 2020, the *European Digital Media Observatory* (*EDMO*) was created, bringing together academics and media professionals to understand and analyze disinformation. In Portugal, the *Government* also announced a *National Plan* to combat fake news and cyberattacks (*DN/Lusa*, 2019) and the adoption of measures of the *European Action Plan* against disinformation was approved by the *Portuguese Parliament*. In fact, political disinformation is a reality in Portugal, with a special focus on *Facebook* (**Baptista**; **Gradim**, 2022; **Cardoso** *et al.*, 2019a; 2019b; **Pena**, 2019; *ERC*, 2019). **Cardoso** *et al.*, (2019b) monitored, during the 2019 legislative elections, the activity of 47 political disinformation pages on *Facebook*, which use around 39 political groups or closed communities to share false and manipulative messages. These disinformation pages are followed by thousands of users. **Baptista** and **Gradim** (2020) compared the activity of some of these pages with the pages of national newspapers on *Facebook* during the electoral campaign and found that fake news tends to be shared more than real news. However, fake news, from these disinformation pages, did not obtain greater engagement than real news. Unlike other countries (see **Humprecht**, 2020), such as Germany or the United Kingdom, the disinformation narrative in Portugal does not seek to reduce Islamic culture to stereotyped fundamentalisms. On the other hand, in Portugal, the discourse of political disinformation is essentially against the political class and corruption, assuming a populist and anti-system rhetoric (**Cardoso** *et al.*, 2019b; **Baptista**; **Gradim**, 2022). Fake news also assumes an informal and offensive language (**Pena**, 2019). With the COVID-19 pandemic, several groups dedicated to covering the topic appeared on *Facebook*, which ended up promoting the dissemination of false and misleading content about the disease (**Cardoso** *et al*., 2020). In addition to *Facebook*, the same Obercom report notes that Whatsapp has become a social network used to disseminate false content about the disease, especially in audio format (**Cardoso** *et al*., 2020).

Despite everything, journalists – "the guardians of the truth for the last 50 years" (**Ladd**, 2012) – have been heavily affected by disinformation, not only because of the way it threatens their digital business model (**Baptista**; **Gradim**, 2021), but also how it denigrates the reputation of their profession. This has led to low trust in the media in most Western countries (**Newman** *et al*., 2021) and to great skepticism regarding the rigor of journalism, namely in relation to fact-checking (**Baptista** *et al*., 2022, in press). Therefore, it is not surprising that, in recent years, the number of fact-checking organizations has increased exponentially, especially in Europe (**Brandtzaeg**; Følstad, 2017; **Graves**; **Cherubini**, 2016; **Stencel**, 2019).

With the emergence of fact-checking agencies around the world – due to the need to restore confidence in the truth, correct misperceptions and promote a healthy democracy – the fact-checking of statements made by political candidates during elections has also increased. **Wintersieck** and **Fridkin** (2016) surveyed all fact-checking between 2003 and 2012, during elections (USA), and found that about 20% of the total focused on statements that politicians had made in electoral debates. Fact-checking has played an increasingly important role during elections, as it can contribute to voters' greater knowledge and perception of political affairs (**Gottfried** *et al*., 2013; **Nyhan**; **Reifler**, 2015a). Several studies have also shown that fact-checking can influence voters' trust in political candidates, which can affect their electoral decisions (**Barker**; **Joesten-Martin**; **Nalder**, 2022; **Cobb**; **Nyhan**; **Reifler**, 2013; **Nyhan**; **Reifler**, 2015b; **Wintersieck**, 2017). Therefore, if fact-checkers are politically biased in their checks, they may not be fulfilling one of their core missions, since impartial coverage of election campaigns is fundamental to democracy.

Until now, few studies have focused on analyzing the political bias in the coverage of fact-checking agencies, although it is a topic explored in relation to traditional media (**Hassell**; **Holbein**; **Miles**, 2020; **Jost**; **Koehler**, 2021). However, researchers are increasingly interested in checking their own fact-checkers (**Amazeen**, 2016; **Lim**, 2018; **Louis-Sidois**, 2022).

The main objective of this study is to understand if Portuguese fact-checking agencies reveal is any kind of political bias during the coverage of national elections. In view of the increase in skepticism and distrust of the media in recent years, particularly in the face of fact-checkers' practices, it is vital to analyze the possible existence of political and ideological biases in fact-checking agencies. A recent study by **Baptista** *et al.* (2022) warned that 50% of the Portuguese citizens surveyed were skeptical about the impartiality and political rigor of fact-checkers.

In short, our study analyzes the coverage of the two Portuguese fact-checking agencies, *Polígrafo* and *Observador*, in two government elections: Legislative in 2019 and 2022. We focus the analysis on articles published during this period, realizing how fact-checkers vary in relation to the selection and evaluation of verified political contents. More specifically, we consider the political-party and ideological orientation of each publication and intend to identify the most verified topics, parties, and political candidates and possible correlations between the two fact-checkers.

Fact-checking has played an increasingly important role during elections, as it can contribute to voters' greater knowledge and perception of political affairs

2. Fact-checking: a recent practice in Portugal

Fact-checking, as a journalistic practice, has always existed, although it was a purely internal process and prior to publication. Indeed, seeking the truth through rigor and impartiality are practices inherent in journalism (**Schudson**, 2001; **Tuchman**, 1972). **Canavilhas** and **Ferrari** (2018) label the success of fact-checking as the "return of journalism to its origins". However, we can consider the precursors of fact-checking to be the surveillance of political advertisements (ad watch) that were in vogue during the 1990s in the United States (**Frantzich**, 2002; **Glowaki**; **Jonhson**; **Kranenburg**, 2004). In the same country, fact-checking has become a recurrent practice since the 2000s, with the emergence of the first organizations (**Graves**; **Nyhan**; **Reifler**, 2016). Thus, the journalistic movement that was assumed to be crucial for the reform of journalism and being itself a "democratic institution" (**Graves**; **Cherubini**, 2016) has grown, in the last two decades, to an unprecedented level. With the growing threat of disinformation, this journalistic movement acquired more relevance and began to integrate the practices of established news organizations and to operate, in other cases, independently and exclusively (**Humprecht**, 2020). In 2021, Duke Reporter's Lab identified 341 active fact-checking projects, which represent 51 more than the previous year and is an activity that has spread to 102 countries worldwide.

This new style of reporting uses basic professional principles of journalism, namely the impartial and non-partisan treatment of information (**Graves**, 2013). For these reasons, **Singer** (2018) considers fact-checking simply as "good journalism". However, fact-checking is more associated with the scientific method, seeking to expose the truth based on factual evidence and not through seeking consensus or exposing different points of view (**Coddington**; **Molyneux**; **Lawrence**, 2014). In fact, the scientific treatment of the content of fact-checkers, through the analysis of evidence, the use of methods and the selection of various sources, is what makes this journalistic genre viable and reliable (**Amazeen**, 2015; 2016). Alongside conventional journalism, fact-checking appears to reinforce the watchdog role of matters of public and political interest. In 2015, the *American Press Association* considered that

> "fact checkers and fact-checking organizations aim to increase knowledge by re-reporting and researching the purported facts in published/recorded statements made by politicians and anyone whose words impact others' lives and livelihoods" (**Elizabeth**, 2014).

The same report points out that

> "fact checkers investigate verifiable facts, and their work is free of partisanship, advocacy and rhetoric" (**Elizabeth**, 2014).

Like a scientific protocol, fact-checking agencies have formalized and institutionalized their methods through a code of principles proposed by the International Fact-Checking Network. By following the code, fact-checkers undertake to assess the veracity of declarations of public and political interest in a non-partisan, fair, transparent manner, with open and honest corrections.

In Portugal, the practice of fact-checking is relatively recent. The first Portuguese fact-checker appeared only in 2015 at the initiative of the digital newspaper *Observador*, which dedicated an exclusive section to fact-checking. The newspaper was created in 2014, has a transversal and impartial editorial line. In a text published in 2017, the executive director, Mário Pinheiro, said that the objective of the "fact-check" section is to "increase scrutiny of the various powers" (**Pinheiro**, 2017). In the same article, it can be read that the

> "*Observador* decides to do a fact-check whenever someone makes a statement that raises doubts in the public space",

stressing that the fact-checker

> "does not go into journalistic investigation with any closed idea about what the conclusions will be" (**Pinheiro**, 2017).

In 2018, the first fact-checker operating independently with exclusive dedication appears. *Polígrafo* reinforces the new journalistic movement on the rise in Portugal. Presented during the *Web Submit*, *Polígrafo* assumes itself as "an online journalistic project whose main objective is to find out the truth –and not the lie– in the public space"[1]. The *Poynter Institute* considers *Polígrafo* a success case for the way it became popular in Portuguese society and also for the influence it managed to achieve with Portuguese politicians, who even contact the newsroom to acknowledge their mistakes (**Tardáguila**, 2019). In addition, this fact-checker was distinguished with 11 awards in two years[2].

The activity of *Polígrafo* and *Observador* became more familiar due to the partnerships that both created with the main Portuguese television channels. In partnership with the *SIC* channel, *Polígrafo* created *Polígrafo SIC*, a TV show that increases the number of broadcasts during election periods. *Observador*, together with the *TVI* channel, created the TV show (which has already ended) "A hora da verdade" (The hour of truth).

In addition to these two fact-checkers, *Público* daily newspaper also dedicates a section to fact-checking entitled "Prova dos factos" (Evidence of facts).
https://www.publico.pt/prova-dos-factos

Other Portuguese media have joined forces to fight disinformation. The *Lusa* news agency recently created a platform (*Fighting fake news. A democratic issue*) that aims to group information and develop computing resources and technological tools to support professionals and citizens in combating disinformation. Finally, also in 2019, *Diário de Notícias* joined forces with the *MediaLab* of the *Instituto Universitário de Lisboa* to "monitor propaganda and disinformation on social media".

3. Perceived political media bias

Like the conventional media, fact-checking has been the target of various criticisms and accusations. This emerging genre has been accused of being partisan in the selection process and during the verification of politicians' statements (**Krugman**, 2011; **Stencel**, 2015). Other criticisms are related to the mission –for some "Utopian"– of fact-checkers in verifying the "political facts". **Uscinski** and **Butler** (2013) criticized the practice of fact-checking in relation to political discourse, due to its controversy, subjectivity and complexity. For these authors, facts in politics can always be contested and subject to different interpretations.

The doubts generated by political facts are legitimate. For these reasons, several authors recognize that verifying debates or political statements is a very difficult task. Opinion, motivated reasoning, and partisanship influence the interpretation of information. In fact, these have been the main problems associated with belief and the spread of disinformation (**Baptista** *et al*., 2021a; 2021b). Although the audience accepts and recognizes fact-checking as a positive and important practice (**Nyhan**; **Reifler**, 2015a), part of the audience continues to select and share fact-checking articles that benefit their candidate or political party (**Shin**; **Thorson**, 2017). It has long been known that journalists can be affected by political bias during their professional routines and in their interpretation strategies (**Tuchman**, 1978). **Uscinski** and **Butler** (2013) criticize the method of selecting fact-checkers for these reasons, even considering that political bias may be unconscious, bias can cause sampling problems. However, **Amazeen** (2015) does not agree with the position of **Uscinski** and **Butler** (2013) and states that

> "it is precisely because facts are complex and often not self-evident that more fact-checking, rather than less, is necessary" (**Amazeen**, 2015, p. 3).

The author reinforces the crucial role that fact-checkers have in correcting mistakes, stressing that it is important to distinguish between facts and opinions. Fact-checkers should focus on verifiable facts.

In another study, **Amazeen** (2016) showed that there is a high level of agreement in the assessments of policy statements made by fact-checkers. However, it is the more aggressive political ads that attract the most attention from fact-checking agencies (**Amazeen**, 2016). This problem is not unique to fact-checking, but to all media because it pays too much attention to negativity.

Focusing on Portugal, the Portuguese media system has evolved a lot in recent years, which motivated **Hallin** and **Mancini** (2017) to rectify, after a decade, their position in relation to the Portuguese case. In 2004, the authors integrated the Portuguese media system into the Polarized Pluralist model, which corresponds to a weak journalistic culture, with high political parallelism and a great dependence on the State (**Hallin**; **Mancini**, 2004). This label has been contested over the years by several academics who believed that these characteristics did not define the Portuguese system (**Álvares**; **Damásio**, 2013; **Brüggemann** *et al*., 2014; **Fishman**, 2011; **Santana-Pereira**, 2016).

The Portuguese media stands out for its ideological, partisan, and professional impartiality (**Álvares**; **Damásio**, 2013; **Fishman**, 2011; **Santana-Pereira**, 2016). Furthermore, the party identities of Portuguese journalists are among the least perceived by the audience (**Popescu** *et al.*, 2011). Recently, **Hallin** and **Mancini** (2017) reviewed their position and considered the Portuguese media system to be more liberal, confirming that the level of political parallelism had significantly decreased. The level of professionalism of journalists and reduced political dependence is what distinguishes the Portuguese media from other countries in southern Europe (**Santana-Pereira**, 2016).

Over the years, the Portuguese media has also been an exception due to the little attention it has devoted to political populism (**Caeiro**, 2019; **Salgado**, 2019; **Salgado**; **Zúquete**, 2016). The populist discourse and attitudes appeared in the media in a derogatory and pejorative way (**Salgado**; **Zúquete**, 2016).

> The main objective of this study is to understand if Portuguese fact-checking agencies reveal any kind of political bias during the coverage of national elections

In the 2019 national elections, a deputy from the populist radical right was elected to *Parliament* for the first time and the media began to devote ample attention to a single deputy (**Caeiro**, 2020; **Palma** *et al*., 2021). The leader of *Chega!*, a party of the populist radical right (**Marchi**, 2019; 2020; **Mendes**; **Dennison**, 2020), André Ventura managed to gain strong media attention and became a regular presence in the columns and covers of newspapers (**Palma** *et al*., 2021). On the other hand, **Graça** (2017) found that it is the mainstream parties that deserve more media attention, even if the news tone does not favor them. The author also observed an increase in the politicization of the media in general. **Popescu** *et al.* (2011) had noticed that partisan bias seems more noticeable on television than in the press. In fact, in terms of television, over the years, there has been a strong influence of parliamentary representation in the distribution of political commentators on Portuguese television, with a majority of members of the *Social Democratic Party* (*PSD*) and *Socialist Party* (*PS*) being present (**Figueiras**, 2018).

Finally, the Portuguese political system is multi-party, in which voters have political representation from various ideological families: left-wing with the *Socialist Party* (*PS*), the *Portuguese Communist Party* (*PCP*), *Bloco de Esquerda* (*BE*), *People- Animals-Nature* (*PAN*), *Free* (*L*) and right-wing with *Social Democratic Party* (*PSD*), *Liberal Initiative* (*IL*), *Social Democratic Center* (*CDS*) and *Chega!* (*CH*).

4. Methods

Our study aimed to carry out a comparative analysis of the coverage, of two Portuguese fact-checkers, of the national election campaigns of 2019 and 2022. Our analysis focused on the articles published by *Observador* and *Polígrafo*. Both are part of the list of 101 fact-checkers of the *International Fact-Checking Network* (*IFCN*).
https://en.unesco.org/node/296054
https://ifcncodeofprinciples.poynter.org/signatories

In addition, *Observador* and *Polígrafo* undertake to evaluate the statements of public and political figures in general, which justifies our choice. On the *Polígrafo* website, it is read that the fact-checker coverage falls on "a wide range of personalities whose interventions have public relevance", namely politicians, commentators and influencers.
https://poligrafo.sapo.pt/institucional/artigos/o-nosso-metodo

Observador published an article, in 2015, on the eve of the national elections, stating that the fact-check section "will serve to analyze the controversies of the electoral campaign", stressing that "whenever parties conflict on an important issue, we will look to the topic and tell who is more right" (*Observador*, 2015).

A content analysis, systematic, objective and quantitative was performed (**Igartua**, 2006; **Neuendorf**, 2017; **Piñeiro-Naval**, 2020; **Piñeiro-Naval**; **Morais**; **Baptista**, 2021), and was also applied to analyze the media coverage of fact-checkers (**Dimitrova**; **Nelson**, 2018; **Farnsworth**; **Lichter**, 2019; **Kim** *et al*., 2022; **Marietta**; **Barker**; **Bowser**, 2016). Our analysis focuses on the publications of *Polígrafo* and *Observador* articles during two national election campaign periods. The sample selection comprises all fact-checking articles on national politics (n = 265) published in 2019 (between September 1 and October 4) and in 2022 (between January 1 and January 28). During the two collection periods, we selected a total of 182 articles from the *Polígrafo* and 83 from the *Observador*.

4.1. Coding

To answer the research questions, a code book was created to be applied to each unit of analysis. The coders analyzed each fact-checking article, taking into account the statement being verified through

1) the figure who made or shared the statement (α_k = .75);
2) party affiliation (α_k = .79);
3) topic or issue under discussion (α_k = .66);
4) context/format in which the statement was made (α_k = .75);
5) political orientation of the statement (pro-*vs.* anti-government) (α_k = .76);
6) the ideological position (left *vs.* right) that favors (α_k = .58); and
7) the classification attributed by fact-checkers (α_k = .99).

As fact-checkers use different veracity scales in their ratings, the scales were standardized from 1 to 6[3].

The coding of the sample was carried out between February 10 and March 10, 2022 by two coders who coded the same 265 fact-checking articles. In order to calculate the reliability of the coding process, a sub-sample of n = 50 cases (~19% of the total) analyzed by the two study coders simultaneously was randomly selected. From there, it was possible to calculate the alpha of Krippendorff parameter (**Hayes**; **Krippendorff**, 2007; **Krippendorff**, 2011) for each of the 7 variables, reaching a satisfactory average: α_k = .75.

5. Results

In descriptive terms, it was found that more fact-checking articles were published during the 2022 elections (n = 179) than in 2019 (n = 86). Both fact-checkers increased the number of publications in 2022. In both years, the *Polígrafo* published more articles than the *Observador* (Table 1).

Table 1. Frequency and percentage of publications by each fact-checker in each election year

	Polígrafo		*Observador*		Total	
	n	%	*n*	%	*n*	%
2019	50	58.1	36	41.9	86	100
2022	132	73.8	47	26.2	179	100
Total	182	68.7	83	32.5	265	100

Analyzing Table 2, we observe that both fact-checkers devote practically the same attention to statements made by the same politicians and users of different social networks. Overall, there is no significant trend [χ^2 (11, n = 214) = 12.799, p = 0.30; v = 0.245].

We found that António Costa, the current prime minister, was the personality most scrutinized by fact-checkers in both electoral campaigns. Rui Rio, leader of the opposition, was the second most verified (19.2%). It is important to highlight that António Costa's statements deserved, significantly, more attention from the *Observador* (36%) than the *Polígrafo* (23%). Also noteworthy is the percentage of verifications of André Ventura's statements by the *Polígrafo* (14.4%), which is significantly higher than the amount of verifications made by the *Observador* (5.3%).

Regarding the elections (see Table 2), the differences are clearly evident [χ^2 (11, n = 214) = 46.195, p < 0.001; v = 0.465]. It is notorious that statements/posts or publications from *Facebook* users during the 2019 elections (21.5%) were more verified by fact-checkers than during the 2022 elections (2%). The leaders of the new parties with parliamentary seats since 2019, were most checked in the 2022 elections, such as André Ventura (14.8%), Cotrim Figueiredo (7.4%) or Rui Tavares (6.0%).

In a later analysis, we only considered the verifications of political figures, which we grouped into "left-wing leaders" and "right-wing leaders". We analyzed the percentage of checks considering the election year and each fact-checker. However, our results did not show significant differences between groups or in relation to election years [χ^2 (1, n = 188) = 3.360, p = 0.67; v = 0.134], nor in relation to fact-checkers [χ^2 (1, n = 188) = 2.780, p = 0.95; v = 0.122].

Table 2. Statements and/or publications by politicians and social media users (% per column)

Author	Total %	Fact-checkers		Elections	
		Polígrafo %	*Observador* %	2019 %	2022 %
Facebook user	7.9	7.2	9.3	21.5 +	2.0 –
Twitter user	3.7	3.6	4.0	4.6	3.4
Twitter/Facebook page	0.5	0.7	0	0	0.7
António Costa (*PS*)	27.6	23.0 –	36.0 +	33.8	24.8
Rui Rio (*PSD*)	19.2	18.0	21.3	23.1	17.4
André Ventura (*CH*)	11.2	14.4 +	5.3 –	3.1 –	14.8 +
Jerónimo Sousa (*PCP*)	1.4	1.4	1.3	1.5	1.3
Inês Real (*PAN*)	2.3	2.9	1.3	0	3.4
Cotrim Figueiredo (*IL*)	5.1	6.5	2.7	0 –	7.4 +
Catarina Martins (*BE*)	11.2	10.1	13.3	12.3	10.7
Rui Tavares (*L*)	4.2	5.8	1.3	0 –	6.0 +
Francisco Santos (*CDS*)	5.6	6.5	4.0	0 –	8.1 +
n	214	139	75	65	149

Note: + statistically higher value (analysis of corrected typified residuals); - statistically lower value (analysis of corrected typified residuals).

Regarding the main political topics addressed by *Polígrafo* and *Observador*, in 2019 and 2022 (Table 3), we found that some topics resulted in more verifications than others, showing significant differences between electoral acts [χ^2 (15, n = 265) = 31.857, p = 0.007; v = 0.347] and between the two fact-checkers [χ^2 (15, n = 265) = 25.060, p = 0.002; v = 0.364].

Table 3. Topics covered by fact-checkers in the 2019 and 2022 national elections (% per column)

Topics	Fact-checker			Elections		
	Total %	*Observador* %	*Polígrafo* %	Total %	2019 %	2022 %
Income	12.5	8.4	14.3	12.5	9.3	14.0
Health	10.9	15.7	8.8	10.9	2.3 –	15.1 +
Energy	1.1	3.6 +	0 –	1.1	1.2	1.1
Nationalizations	4.5	8.4 +	2.7 –	4.5	4.7	4.5
Economy	18.5	22.9	16.5	18.5	22.1	16.8
Employment	2.6	2.4	2.7	2.6	2.3	2.8
Labor conditions	0	0	0	0	0	0
Immigration	2.3	2.4	2.2	2.3	3.5	1.7
Education	3.4	3.6	3.3	3.4	4.7	2.8
Racism	2.3	2.4	2.2	2.3	3.5	1.7
Administration	2.6	4.8	1.6	2.6	4.7	1.7
Environment	1.1	0	1.6	1.1	3.5 +	0 –
Social security	2.6	3.6	2.2	2.6	3.5	2.2
Internal security	1.5	2.4	1.1	1.5	4.7 +	0 –
Elections	26.4	10.8 –	33.5 +	26.4	20.9	29.1
Justice	3.4	6.0	2.2	3.4	4.7	2.8
Other	4.2	2.4	4.9	4.2	4.7	3.9
n	265	83	182	265	86	179

Note: + statistically higher value (analysis of corrected typified residuals); - statistically lower value (analysis of corrected typified residuals).

Considering Table 3, we notice that it was the theme "Elections" that resulted in more checks in the analysis set (26.4%). In other words, matters related to accusations, false polls or electoral controversies were the most verified, especially in a clearly more evident way by the *Polígrafo*. Comparing the verifications carried out by both fact-checkers, the *Observador* significantly focused more attention on subjects such as "Energy" and "Nationalizations". For most topics, we did not find a clear trend.

If we analyze the coverage of topics by election year, we observe a noticeably higher percentage of checks on "Health" during the 2022 elections. It is important to note that, unlike 2019, in 2022 the world was in a COVID-19 pandemic period. It is also noted that, during the 2022 election campaign, the "Environment" and "Internal Security" were not subject to any checks, contrary to what happened in 2019.

In Table 4, we analyze the context/format in which the statement verified by the fact-checkers was made. Most of the checks carried out (69.8%) resulted in the analysis of statements made by politicians in televised political debates. There is a significant increase in political debate checks, from 59.3% (in 2019) to 74.9% (in 2022).

> In 2021, *Duke Reporter's Lab* identified 341 active fact-checking projects, which represent 51 more than the previous year and is an activity that has spread to 102 countries

Table 4. Formats and contexts of the checked declaration (% per column)

Format	Fact-checker			Elections		
	Total %	***Observador* %**	***Polígrafo* %**	**Total %**	**2019 %**	**2022 %**
Under debate	69.8	86.7 +	62.1 –	69.8	59.3 –	74.9 +
In interview	1.9	0	2.7	1.9	2.3	1.7
Statement	6.0	1.2 –	8.2 +	6.0	12.8 +	2.8 –
Facebook post	2.3	2.4	2.2	2.3	3.5	1.7
Tweet	3.0	1.2	3.8	3.0	2.3	3.4
Post with photo	5.7	2.4	7.1	5.7	4.7	6.1
Tweet with photo	2.3	1.2	2.7	2.3	2.3	2.2
Meme post	2.6	0	3.8	2.6	4.7	1.7
Meme tweet	0	0	0	0	0	0
Post with graphic	1.5	1.2	1.6	1.5	1.2	1.7
Tweet with graphic	0.8	0	1.1	0.8	0	1.1
Video post	0.8	1.2	0.5	0.8	0	1.1
Video tweet	0.4	1.2	0	0.4	0	0.6
Meme with video	0	0	0	0	0	0
Fake news	1.5	1.2	1.6	1.5	3.5	0.6
Other	1.5	0	2.2	1.5	3.5	0.6
n	265	83	182	265	83	182
Context	**Total %**	***Observador* %**	***Polígrafo* %**	**Total %**	**2019 %**	**2022 %**
Social media content	21.1	12.0 –	25.3 +	21.1	22.9	20.2
Media context	78.9	88.0 +	74.7 –	78.9	77.1	79.8
n	261	83	178	261	83	178

Note: + statistically higher value (analysis of corrected typified residuals); - statistically lower value (analysis of corrected typified residuals).

On the other hand, it is noted that fact-checkers, during the two elections, paid little attention to publications from social media. If we group the different formats into two sets "Social media content" and "Traditional media context", we observe that checks from social media only correspond to 21% of the analysis corpus. Even so, considering these two categories, we found significant evidence between *Polígrafo* and *Observador* [χ^2 (1, n = 261) = 5.965, p = 0.015; v = 0.151], with *Polígrafo* devoting more attention to social media content than *Observador*.

Table 5. Classifications attributed by the fact-checkers (frequencies and percentages of each point of the range)

	Polígrafo		***Observador***	
	n	**%**	***n***	**%**
True / Right	82	45.1	20	24.1
True but.../ Mostly true	19	10.4	6	7.2
Imprecise	12	6.6	9	10.8
Decontextualized/Inconclusive	3	1.6	5	6.1
Manipulated / Deceived	0	0	16	19.3
Pepper on tongue / False	66	36.3	27	32.5
Total	182	100	83	100

Considering the positioning of the political content of the checked statement (1 = Pro-government, 2 = Neutral, 3 = Anti-government), we did not find any significant trend between *Polígrafo* and *Observador* [χ^2 (2, n = 265) = 3.719, p = 0.15; v = 0.118] and between the two legislative elections [χ^2 (2, n = 265) = 0.292, p = 0.86; v = 0.33]. Our results also reject the idea of political bias in relation to the political dimension of content (1 – Pro-left, 2 – Neutral, 3 – Pro-right), either between the two fact-checkers [χ^2 (2, n = 265) = 4.278, p = 0.118; v = 0.127], or between 2019 and 2022 [χ^2 (2, n = 265) = 0.292, p = 0.86; v = 0.033]. In other words, there is no significant evidence that any of the fact-checkers have carried out biased checks that favor a particular political field. In this way, the evident impartiality on both sides stands out.

Regarding the classifications attributed by the fact-checkers (Table 5), through Student's t test analysis we noticed that the *Observador* significantly classified the checks, on average, as being more false (M_{checks} = 3.87, SD = 2.02) compared to *Polígrafo* (M_{checks} = 3.10, SD = 2.28) [t (263) = 2.63, p = 0.009, d = 0.357].

Table 6. Relationship between the classification of fact-checkers and the political orientation of the statements

		Fact-checker classification		*F*	*p*
		M	*SD*		
Political orientation	Pro-government	3.61	2.23	0.635	0.53
	Neutral	3.23	2.21		
	Anti-government	3.27	2.23		
Ideological orientation	Pro-left	3.09	2.16	0.910	0.40
	Neutral	3.39	2.23		
	Pro-right	3.53	2.28		

Our results also show that the political orientation of statements does not influence the ratings given by fact-checkers, either in relation to the pro-government and anti-government dichotomy [$F_{(2, 262)}$ = 0.635, p = 0.53], or with regard to the pro-left and pro-right dyad [$F_{(2, 262)}$ = 0.91, p = 0.40] (Table 6).

6. Discussion and conclusions

Our results confirmed that Portuguese fact-checkers performed more checks of political statements during the 2022 elections compared to the 2019 elections. These data may indicate that fact-checking has become a more common journalistic activity in Portugal, but may also suggest that fact-checking agencies have increased their capacity and resources. Furthermore, its role as a political affairs whatchdog was reinforced in 2022. On the other hand, these findings may also indicate a greater presence of subjectivity and deception in Portuguese political discourse, which agrees with several studies that highlighted an increase in the political instrumentalization of disinformation, especially through *Facebook*, during the 2019 elections (**Baptista**; **Gradim**, 2022; **Cardoso** *et al.*, 2019b).

On the other hand, the increase in the number of fact-checking articles, from 2019 to 2022, may be directly related to the transmission of televised debates. While 13 televised debates were held in 2019 (**Borges**, 2019), during the 2022 electoral campaign, 30 face-to-face electoral debates were broadcast on television (**Monteiro**, 2022). Our study showed that about 70% of the total of fact-checking articles are verifications of statements made by politicians in electoral debates. Our results reinforce the idea that fact-checkers focus their attention essentially on political debates (**Amazeen**, 2016; **Wintersieck**; **Fridkin**, 2016).

Similar to what **Amazeen** (2016) found analyzing the US presidential race in 2008, our study also seems to support the idea that fact-checkers pay more attention to the negativity in political advertising. This finding is evident when we observe that the topic "elections" (which highlights controversial statements and accusations between candidates) was the most prominent topic in general. Other studies have also found this trend (**Lim**, 2018). However, it was found that *Polígrafo* devoted significantly more attention to this type of subject. In the case of *Observador*, topics such as "Health" and "Economy" were the subject of greater scrutiny. Therefore, our findings raise some important questions to add to the contemporary debate about the business model and the practice of fact-checking. Are independent fact-checkers (like *Polígrafo*) more dependent on controversial statements and accusations among politicians than fact-checkers that are integrated into a news organization? We believe that our investigation can be a starting point for this discussion.

Our findings also confirmed that both fact-checkers paid very little attention to social media in both election periods. Portuguese fact-checkers seem to be almost exclusively focused on political discourse and debate, although some studies in Portugal have warned of the increased dissemination of disinformation in social media (**Baptista**; **Gradim**, 2022; **Cardoso** *et al*., 2020; 2019b), including that disinformation in Portugal

> "is large enough to bias public opinion's perception of the veracity of the information and thus diminish the quality of our democracy" (**Cardoso** *et al*., 2019a, p. 4).

As in our study, **Ribeiro** *et al.* (2021) found that fact-checkers have difficulties in keeping up with the digital universe, highlighting that many fake publications that went viral were not verified in several countries.

More importantly, our findings did not identify evidence of partisan and political bias in the selection of statements for assessment by fact-checkers. We did not find, on the part of *Observador* and *Polígrafo*, any tendency to verify more or less anti- or pro-government statements and/or ideologically favorable statements on the left or the right. In addition, we also found that the political orientation of the statements had no influence on the ratings given by fact-checkers. Our findings are not in agreement with some literature that has identified political bias in checking fact-checkers. For example, **Louis-Sidois** (2022) analyzed the partisan bias of French and American fact-checkers and found that fact-checkers tend to check ideologically close politicians less often and agree with them. In addition, polarization increases during electoral periods. In the Portuguese case, on the other hand, our results confirm the high

> In Portugal, the practice of fact-checking is relatively recent. The first Portuguese fact-checker appeared only in 2015 at the initiative of the digital newspaper *Observador*, which dedicated an exclusive section to fact-checking

level of professionalism and impartiality of Portuguese fact-checkers (**Álvares**; **Damásio**, 2013; **Da-Silva** *et al*., 2017; **Fishman**, 2011). Furthermore, our study also demonstrates that the skepticism with which the Portuguese view the practice of fact-checking is exaggerated (**Baptista** *et al*. 2022, in press).

In the 2019 national elections, a deputy from the populist radical right *Chega* was elected to *Parliament* for the first time and the media began to devote ample attention to a single deputy

In short, our study allowed us to perceive that fact-checkers' attention fell mainly on the statements of political candidates during electoral debates. We believe fact-checkers should focus more attention on the digital universe, tracking viral posts and politically segregated groups. In future work, it is important to try to evaluate the efforts of fact-checkers to follow up on disinformation online. On the other hand, our work highlights the professionalism of journalists dedicated to fact-checking in Portugal and can serve as a vote of confidence in the practice of fact-checking, which has proven to be non-partisan and impartial.

7. Notes

1. The *Polígrafo*'s editorial statute is available at:
https://poligrafo.sapo.pt/institucional/artigos/estatuto-editorial

2. More information at:
https://poligrafo.sapo.pt/institucional/artigos/poligrafo-vence-mais-dois-premios-e-ja-sao-onze-em-dois-anos

3. The veracity scale of *Polígrafo* has 7 points, while the *Observador* has only 6. Therefore, as for *Polígrafo*, two values of the initial scale were combined in the "6" category: 6 = False and 7 = Pepper in tongue (the value "7 = pepper in tongue" only initially appeared in 5 cases in 2022). This decision was taken to standardize the scales of the two fact-checkers: from 1 to 6 values.

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Integrated research model for web interfaces: toward a taxonomy of quantitative and qualitative analysis for digital native media

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Abstract

In a context marked by the emergence of new platforms and interfaces, digital native media face the challenge of organizing and presenting their content in an effective and eloquent way. This milestone requires ongoing work toward the identification and conceptualization of the dimensions that map the structural and formal requirements necessary for fluid communication with audiences and adequate visibility in the digital ecosystem. This study, which adopts a quantitative–qualitative methodological design, proposes, describes, and applies a taxonomy for the analysis of digital media web interfaces. Based on a review of the literature, two rounds of expert judgment, and a pilot test, the research identifies 14 thematic dimensions, 36 indicators, and 69 variables. The study focuses on the importance of renewing research about taxonomy related to structural dimensions that address narrative, quality, usability, information search, and content redissemination and socialization, among other aspects. The study of web interfaces applied to journalism demands long-term research work with a holistic approach that, at a conceptual and practical level, can offer proposals for analysis and diagnosis on the basis of an integrated method.

Keywords

Internet; Web; Journalism; Digital journalism; Content; Communication; Interfaces; Digital; Slow journalism; Benchmarking; Indicators; Models; Taxonomies; Quantitative analysis; Qualitative analysis; Digital native media; Cybermedia; Narrative; Quality; Usability; Search.

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1. Introduction

The global communication ecosystem is giving increasing importance to digital native media. The migration of legacy media to the digital scene has given way to an explosion of new journalistic projects and developments conceived "from" and "for" cyberspace (**Salaverría**, 2020a). In this scenario, the study of the properties of their websites, conceived as the nerve centers of their communication strategy, constitutes an important area of study and research.

Although it has not been part of the mainstream of studies in digital journalism, understanding journalism from each era requires knowledge of its foundation, that is, the scenario in which it occurs. Thus, at various points, understanding journalism implied understanding the properties of printed publications (the written press), the spoken word (radio), or the moving image (television). Currently, the study of the digital platform (the media's website) thus becomes essential to understand the media, especially digital native media, and their dynamics (**Salaverría**, 2020b). Although it lacks a dominant role at the research level, previous work in the academic literature has dealt with this subject.

The study of "what are" ["*qué son*"] and "what are not" ["*qué no son*"] new media (**Cabrera-Méndez**; **Codina**; **Salaverría**, 2019) has become a recurrent line of research during the last decade (**López-García** *et al.*, 2022; **Salaverría**; **Martínez-Costa**, 2021; **García-Orosa**; **López-García**; **Vázquez-Herrero**, 2020). The classic studies of the particularities of multimedia, hypermedia with a special emphasis on links (**Landow**, 1995; 1997), or information architectures (**Wurman**, 1997) have given way in recent years to various studies about organic positioning in search engines, innovation in formats and narratives, business models, Big Data, or trends such as slow journalism (**Romero-Rodríguez**, **Tejedor**; **Castillo-Abdul**, 2021; **Le-Masurier**, 2015; 2016; **Zelizer**, 2009).

The study of links and thereby hypertextuality forms part of the class of works that have the digital as a focus of study and, therefore, as one of the genuine characteristics of online journalism (**Stroobant**, 2019). In that paper, Stroobant looks at hyperlinks as navigational cues that can guide users through the information available in the digital ecosystem. Specifically, Stroobant's study focuses on health journalism. This aspect is important because online media are frequently used and represent convenient sources of information on aspects that *Google* (2022, p. 11) calls "your money or your life." This study conducts an environmental analysis of search engine results pages for the term "health news." One of the findings highlights that native news websites have a tendency to provide more hyperlinks than legacy news websites do. A second result refers to the use of corporate hyperlinks, that is, links to sites or pages of the company or business group themselves, a trend that is more pronounced in legacy media. Although the study focuses on health news, the results about hyperlinking strategy remain significant in general.

The functional use of hyperlinks to external sources was also studied by **Humprecht** and **Esser** (2018). In this case, the authors categorize hyperlinks around three main functions they identify: increasing transparency, increasing understanding, and increasing the capacity for deliberation. This typology of links and functions allows for the design of digital media analysis based on the important functions in each case. The study of the hypermedia component, which connects with the media ownership, has required studies on new phenomena such as the use of clickbait, among other subjects (**Bravo-Araujo**; **Serrano-Puche**; **Novoa-Jaso**, 2021; **García-Serrano**; **Romero-Rodríguez**; **Hernando-Gómez**, 2019).

The relationship between website design elements and related usability elements has also been studied (**Kim**; **Jeon**; **Choi**, 2020). In this research, they analyze seven design elements that impact the usability of news media websites: advertisements, font, layout, volume of information, use of categories, use of color, and the way in which titles are presented, combining text and images. Although the study focuses on Korean media, the conclusions can probably be extrapolated, as their research concludes, among other things, that users prefer consistent layout designs throughout the site and at different levels, that titles are displayed next to a photo, that the depth of the category menu structure has a maximum of two levels, and that the links follow the usual blue color convention.

In a similar vein, **Al-Said** and **Al-Said** (2022) study the influence of news site design on information perception and recall. They conclude that interactive sites that combine different resources –images, video, and typography– to present news improve both the reception and recall of information.

A study by **García-Perdomo** and **Magaña** (2020) in which they interview managers of digital native media is focused on their perception of the drivers of their activity. The results rate the quality of the content and journalistic standards highest, higher than the technology and the digital platforms themselves, which shows that, for some of these companies, innovation is not limited to technological aspects but rather to the ability to offer journalistic products and integrate users, although this last point is still considered very limited.

> Our study proposes a quantitative-qualitative design of descriptive scope with the aim of building, validating and testing a taxonomy for the analysis of digital media web interfaces

The role of SEO in newsrooms is also being progressively studied, as in the work of **Prawira** and **Rizkiansyah** (2018), who applied ethnographic methods and observed the role of organic SEO in the newsrooms of three Indonesian media outlets, which allowed them to see how the respective business cultures influence the adoption of SEO as part of journalistic routines.

In a similar vein, **Lopezosa** *et al*. (2020a; 2021) carried out research on newsrooms and concluded that, regarding the adoption of SEO as part of the strategies of the media, direct support from management is essential, as is the establishment of two tiers corresponding to the actions of the editors and those of the person in charge of the global SEO strategy. Likewise, **Lopezosa** *et al*. (2020b) propose an integrated system of indicators to analyze and measure the SEO of media that for use by scholars or practitioners.

In turn, **Seyser** and **Zeiller** (2018) propose the portmanteau "scrollytelling" to designate certain longform articles in journalism. Specifically, scrollytelling, as these authors define it, is a format that uses extensive narrative texts and multimedia content, and they draw a conclusion about the essential role of infographics in these kinds of what they call complex stories.

In addition, data journalism is often considered one of the best resources in digital journalism because of its well-known ability to help readers understand complex phenomena. **Plazas** (2019), after analyzing a sample of the best cases of data journalism from the *Malofiej Awards*, categorizes up to six modalities of vision, which he calls the visualization of events, of hidden problematics, of places, of narratives, of subjectivities, and of convergences.

In the search for innovation, newspaper companies have opted to merge newsrooms and have set up labs for new formats, such as virtual reality. **Vázquez-Herrero**, **Negreira-Rey**, and **López-García** (2019) propose that innovation in digital media can be studied through four dimensions: the use of multimedia narratives, data journalism, virtual reality or 360° video, and fact-checking. They add a fifth dimension that involves identifying the media that have been equipped with a lab. They conclude that the models are unstable and that the search for a model that is sustainable, through a combination of technological and human resources, can provide everything necessary to ensure their consolidation in the digital environment. In addition, several authors, such as **Pérez-Seijo** (2021), have studied the use of immersive video in digital native media.

The so-called i-docs, web docs, or interactive documentaries are undoubtedly a genuinely digital form of innovation in journalism. Although i-docs combine contributions from film documentaries and video games, they are an area in which the journalistic approach of taking a critical look at current affairs is fundamental. In this sense, the work of **Dowling** (2022) consists of the analysis of how the i-doc in US productions has evolved since 2015 to focus, above all, on the principles of transparency, social responsibility, and commitment to truthfulness, thus configuring i-docs as an empathetic alternative to traditional news coverage work.

In a similar vein but focusing in this case on interactive multimedia productions, **Van-der-Nat**, **Müller**, and **Bakker** (2021) examine what they call the "architecture of interactivity", focusing specifically on the analysis of the navigation systems of some specific cases of such productions. In their study, they identify structures with varying degrees of sequential and open trajectories, with the latter providing the most agency to users.

An original approach to the treatment of digital news comes from the study by **Kulkarni** *et al.* (2022). In their work, these authors explore structures other than the inverted pyramid to analyze users' reception of these structures. They conclude that audiences consider structures that are more linear and narrative, rather than the inverted pyramid, to be more attractive, as they can better convey content.

The case study is applied again in the work of **Peña-Ascacíbar** and **Álvarez-Peralta** (2021). Specifically, they analyze common characteristics (such as societal structure) and differential characteristics (paywalls and ethical codes), as well as the trajectory of the Spanish digital native media outlets *El confidencial*, *ElDiario.es*, and *infoLibre*. In their study, the authors also evaluate the main digital network metrics, although they conclude that the latter data are not a good predictor of membership as identified by the number of followers.

Regarding recent protocols applied to the analysis of specific aspects of digital journalism, **Santos-Hermosa**, **Lopezosa**, and **Codina** (2022) analyze interactivity in the digital press, focusing their study specifically on parameters and indicators related to user experience and user interaction options related to the characteristic dimensions of digital media such as the media-user relationship, user-generated content, the user-user relationship, and content personalization options.

In the work of **Tejedor** *et al*. (2020b), the business models of various Ibero-American digital native media are analyzed. The findings include a trend toward business models based on diverse and "hyper-specialized" content as well as those targeting "micro-audiences." In addition, the research identifies a clear interest in what the authors call horizontality, participation, and user engagement. The study emphasizes the need for native media to diversify their sources of income.

Romero-Rodríguez, **De-Casas-Moreno**, and **Torres-Toukoumidis** (2016), in turn, ask how to evaluate and assess the informative quality of digital media. Specifically, they look for convergences between academics and practitioners, with the aim of identifying "areas and dimensions of digital media news quality in terms of objective or quantifiable values" ["*áreas y dimensiones de la calidad informativa de los medios digitales en función de valores objetivos o cuantificables*"] (pp. 1-2). Among other results, they present a "taxonomy of dimensions of information quality" ["*taxonomía de dimensiones de la calidad informativa*"] (pp. 3-4), obtained both from a review of the scientific literature and from a three-way Delphi analysis. The research ends by proposing a structured model to analyze the information quality of digital media.

Meanwhile, **Romero-Rodríguez** and **Aguaded** (2017) propose a model for analyzing the quality of media information by using structured categories and dimensions to evaluate the quality of information, also taking into account aspects of the "macro-environment of the journalistic environment" ["*macroentorno del entorno periodístico*"] (p. 12). The research concludes that political polarization and the discourse of social confrontation have a direct impact on the quality of news products. It should be noted that this research focuses on print media, but the scope of its proposals can be applied to journalism in general with few changes, which is why it is included in this literature review.

The digital context should not lead us to forget that the essence of journalism, in any format, is investigative journalism, which can be approached through various formats, with the case of slow journalism being very significant. Against this background, **Romero-Rodríguez**, **Tejedor** and **Castillo-Abdul** (2021) conducted a case study in which 12 examples of slow journalism media in Ibero-America were reviewed. The research focuses on the thematic axes, content, esthetic elements, and funding sources, concluding that their content can be considered "elitist," at least in comparison with conventional digital media, which reduces their ability to attract both subscriptions and advertising and increases their dependence on international cooperation.

Another way of analyzing the quality of digital native media is proposed by **Rodríguez-Hidalgo**, **Rivera-Rogel** and **Romero-Rodríguez** (2020). In their work, they use a taxonomy of evaluation dimensions of news quality that include news sources, uses of international agencies, and content review. In addition, they consider ideological plurality in their opinion and other pieces.

The aspect of media visibility, although it tends to attract less academic interest than professional interest, also has notable research. In the case of **Lopezosa** *et al*. (2021), the authors present a system of analysis for media visibility through the use of search engine positioning tools from a set of research studies. The authors propose a system called *AVCIS* (*Análisis de visibilidad de cibermedios con indicadores SEO*), which integrates a set of metrics for analyzing the visibility of digital media into a single protocol.

On a more abstract level, researchers in the field of the study of digital resources proposed a system of analysis (**Codina**; **Pedraza-Jiménez**; **Guallar**, 2016) centered on a group of operational concepts presented through terminological units and integrated through a group of articulated elements that determine "the what" (parameters) and "the how" (indicators). This proposal, although based on developing analysis protocols for digital media that do not necessarily have to be media outlets, is a meta-protocol since its objective is to help develop particular systems of analysis for each case. Previously, part of the same group (**Codina** *et al.*, 2014) proposed the *SAAC* (*Sistema articulado de análisis de cibermedios*) protocol that was more focused on digital media analysis, of which the *SAAMD* (*Sistema articulado de análisis de medios digitales*) was an extension. These proposals have been applied in subsequent studies focused on a wide range of topics, such as the work of **Tejedor** *et al.* (2020a) on the websites of the most important hospitals in Latin America.

Although not forming a dominant research line, a wealth of studies have adopted mainly theoretical and operational approaches in the form of different sets of metrics or indicators to analyze various dimensions of digital media, in some cases, only digital natives, and in others, without making this distinction.

This panorama indicates the need to address a comprehensive treatment of how the quality of digital media can be measured or evaluated, particularly in relation to the platform. In the past, both the professional and academic sectors had shared constructs and evaluation criteria for assessing the quality of print media. On the basis of these examples, a systematic study of the literature, and consultation with experts, we propose herein a model for the integrated study of web interfaces using a mixed methodology to enable a diagnostic, analytical, and descriptive evaluation of digital media content and platforms.

2. Materials and methods

The study proposes a quantitative–qualitative design of descriptive scope with the objective of constructing, validating, and testing a taxonomy of analysis of digital media web interfaces. To this end, first, an exploration of the literature on methods and models for the evaluation of media and channel was carried out, providing raw material for an initial theoretical matrix of fields, dimensions, and integrated indicators. This first stage made it possible to draw up an initial matrix of elements related to quality, usability, and the search for information, combining a total of 14 thematic dimensions, 36 indicators, and 69 variables for consideration in the construction of the proposal (Table 1).

Table 1. Matrix of fields, dimensions, indicators, and variables derived from the literature review

Field	Dimension	Indicator	Variable
Quality	Form of content and narrative	Narrative model	Immersive/transmedia Conventional/pyramidal Mixed Other
		Multimedia and hypermedia	Conventional videos and photographs Augmented videos and images, 360°, virtual reality Hyperlinks and interactive architecture (i-docs, animations, gamification, newsgames) Other
	Journalistic genres and styles	Conventional genres	News item, interview, report, chronicle, review
		Specialized genres	Literary, cultural, travel, technology
		Investigative genres and slow journalism	Major stories, documentary, exposé
		Data journalism	Infographics, illustrations, and data visualization (DatViz) Open statistical data (dataset and interoperability) Complete statistical information (sample, dates, error)
		Opinion genres	Articles, columns, editorials, mastheads, political cartoons, blogs, and vlogs.
	Headlines	News headlines Clickbait Top title and summary	
	Metadata of the news stories	Metadata	Date and time of publication Name and surname(s) of author(s) Authors' bio and email or link to their social network Identification of institutional or corporate authorship Name and surname in credits of photo, illustration, or infographics Name and surname in credits of photo, illustration, or infographics Statistics (metrics) of the news story (unique accesses, readings, average reading time)
	Transparency, truthfulness, and validity of content	Fact-checking systems and procedures	
		Transparency and readers' ombudsman	Clear societal structure Ethical codes Information and legal form Sources of financing and transparency portal (subsidies, advertising, subscriptions, crowdfunding, cooperation agencies, sale of copies, etc.). Ombudsman, letters to the editor
	Related content	Link to content related to the information inside or outside the media	
	Content curation	Search engines and collection, filtering, and selection systems	
Usability	Noninvasive reading	Ads/advertising (layout)	Layout of advertising spaces that do not disrupt the reading or comprehension of the news stories or the home page
		Cookie information, subscriptions, and terms and conditions	Layout of legal notices that do not disrupt the reading or comprehension of the units Information or home page
	Interface layout	Content layout	Blog layout Layout of printed newspaper Transmedia integrations and interactive blocks
	Legibility of content	Font (stylography)	
		Volume of information	
		Use of subheadings and dividers	
	Readers–media–authors interaction	Readers' comments section in the feedback for each news story	
		Readers' votes (like/dislike) section for each news story	
		Content sharing buttons	*Twitter*, *Facebook*, *Instagram*, *LinkedIn*, *WhatsApp*, *Telegram*, email, copy link
		Possibility of communication between readers and authors	Authors' email and/or *Twitter* accounts
	Content customization	Ability to request a newsletter	
		Content syndication via mobile, app, or web	
		Content recommendations based on users' browsing cookies	

Field	Dimension	Indicator	Variable
Search for information	Web browser	Search engine	Simple search, using *Google* or *Bing* Simple search, using the media outlet's website Advanced search (filters, categories, tags)
	SEO and visibility	SEO metrics (domain authority [DA] and page authority [PA] in *Moz*), metadata, taxonomies, visibility index (*Sistrix*)	

Subsequently, two rounds of expert judgment were conducted, the first for construction and content validity and the second for the assessment of the weights of each dimension in an effort to fix the taxonomy.

To validate the applicability of the model, a pilot test was applied to 10 Ibero-American digital media outlets, selected for their geographic diversity as well as position in international rankings and directories. The sample, designed to be a geographically representative portion of the Ibero-American digital media community, was selected to test the analysis approach presented in Table 2.

The corpus for analysis was selected by intentional or nonprobabilistic convenience sampling since a heterogeneous sample or a sample with maximum variation is required to test the usefulness of the model (applicability test) and determine its usefulness in different environments. In this regard, several inclusion criteria, such as geographic diversity, year of creation, and interface characteristics, were chosen.

The unit of analysis has been Ibero-American digital media focused on the production of various types of journalistic content that have appeared in the last 15 years, during which many new journalistic developments have occurred (**Zuluaga-Trujillo**; **Gómez-Montero**, 2019). This study thus applied the constructed analysis matrix to 10 digital media outlets that appeared between 2009 and 2020. This deliberate or judgmental sampling enabled the test or pre-test to incorporate media from different countries, years of creation, and characteristics. For this purpose, we used the media directory made by the platform *SembraMedia*, which includes 1,104 Spanish-language digital media outlets in 24 countries.
https://directorio.sembramedia.org

This directory, created by a nonprofit organization, maps the digital media ecosystem in Ibero-America and has been cited in more than 150 articles and research papers. The test was carried out between June and August 2022.

Table 2. Digital media analyzed in the pilot test

Number	Medio	Country	Creation	URL
1	*GK*	Ecuador	2011	*http://gk.city*
2	*Eldiario.es*	Spain	2012	*http://eldiario.es*
3	*El surtidor*	Paraguay	2016	*https://elsurti.com*
4	*Efecto Cocuyo*	Venezuela	2015	*http://efectococuyo.com*
5	*Acento*	Dominican Republic	2011	*http://acento.com.do*
6	*Periodismo de barrio*	Cuba	2015	*http://www.periodismodebarrio.org*
7	*Conexión migrante*	Mexico	2016	*https://conexionmigrante.com*
8	*La silla vacía*	Colombia	2009	*http://lasillavacia.com*
9	*La brava*	Bolivia	2020	*http://revistalabrava.com*
10	*LadoB*	Mexico	2011	*http://ladobe.com.mx*

The first tool was developed using theoretical constructs. That is, based on an exploratory review of the scientific literature, we extracted those dimensions, indicators, and variables that were included in previously validated tools related to information quality, media transparency, and the analysis of web platforms and interfaces (Table 1).

This tool went through a first round of expert judgment, understood as an intersubjective knowledge-building technique of people who, by their knowledge and expertise in a field, contribute by separately assessing and evaluating a proposal (**O'Haggan**, 2018). In this sense, expert judgment consists of "asking a number of people who judge an object, tool, or material, or give their opinion on a specific aspect" ["*solicitar a una serie de personas que juzguen un objeto, instrumento o material, o que den su opinión sobre un aspecto concreto*"] (**Cabero-Almenara**; **Llorente-Cejudo**, 2013, p. 14), being closely associated with the Delphi technique (**López-Gómez**, 2018; **Mengual-Andrés**; **Roig-Vila**; **Blasco-Mira**, 2016).

The experts were selected on the basis of competence and expertise, as well as their self-assessment with respect to the selected objectives, a method proposed by **Cabero-Almenara** and **Barroso-Osuna** (2013) and **López-Gómez** (2018). The determining aspects for the selection included:

- Experience as a teacher and researcher for more than 10 years in digital media, platforms, and interfaces
- Recent publications (less than 3 years) on digital media, platforms, and interfaces
- Members of research groups with recognized prestige and track record in the field of digital media for more than 10 years.

A total of 15 experts participated in the first round, of whom only 12 were considered suitable (self-assessment) to make an objective judgment. They were sent a PDF document with the theoretical constructs tool (first version[1]) and also a survey consisting of Likert scales from 1 to 5 (1, strongly disagree; 5, strongly agree) for each dimension and its indicators within the primary model. Also, the experts had a space for each dimension in which they could make observations about that dimension or its indicators. The results of this first round are presented in Table 3.

Table 3. Results of the first round of expert judgment: theoretical constructs

Indicator	Median (M_E)	Fleiss' kappa (*k*)	Asymptotic standard error	*p*-Value
Dimensions presented (general–articulated)	5	0.725	0.33	1.24
Form of content and narrative	5	0.628	0.35	1.22
Journalistic genres and styles	5	0.621	0.28	1.28
Headlines	5	0.700	0.36	1.26
Metadata of the news stories	4	0.538	0.39	1.22
Transparency, truthfulness, and validity of content	5	0.616	0.29	1.28
Related content	5	0.658	0.33	1.24
Content curation	5	0.525	0.29	1.28
Uninterrupted reading	5	0.608	0.28	1.21
Interface layout	5	0.856	0.19	1.03
Legibility of content	5	0.902	0.11	1.01
Reader–media–author interaction	5	0.616	0.29	1.28
Content customization	5	0.658	0.33	1.24
Web browser	5	0.608	0.28	1.21
SEO and visibility	5	0.525	0.29	1.28

The study uses Fleiss' kappa (*k*) as an indicator of interobserver agreement when there are more than two evaluators. According to **Landis** and **Koch** (1977), Cohen's kappa can be interpreted as follows: < 0.20 indicates poor agreement, 0.21-0.40 indicates fair agreement, 0.41-0.60 indicates moderate agreement, 0.61-0.80 indicates strong agreement, and 0.81-1.00 indicates very strong agreement. In this regard, as seen in Table 1, all the concordances (*k*) of the theoretical indicators showed moderate (0.515) or very strong (0.902) agreement, whereas the median –as a measure of the central position– of the Likert responses was between 4 (agree) and 5 (strongly agree).

Table 4. Results of the second round of expert judgment: weighting by dimension and indicators

Field	Dimension	Median (M_E)	Relative weight	Weighted average*
Narrative	**Value for the field**	9.5	21.43%	10
	Form of content and narrative	9.0	36.99%	4
	Journalistic genres and styles	7.3	30.12%	3
	Headlines	8.0	32.88%	3
Quality	**Value for the field**	8.2	18.41%	8
	Metadata of the news stories	7.5	18.22%	1
	Transparency	8.2	19.82%	2
	Truthfulness and validity of content	9.5	23.08%	2
	Related content	7.8	19.02%	1
	Content curation	8.2	19.82%	2
Usability	**Value for the field**	9.5	21.43%	10
	Uninterrupted heading	8.2	23.54%	3
	Interface layout	8.5	24.53%	2
	Legibility of content	9.7	27.87%	3
	Content customization	8.3	24.04%	2
Search for information	**Value for the field**	8.8	19.92%	9
	Web browser	7.3	46.30%	5
	SEO and visibility	8.5	53.69%	4
Redissemination of content and socialization	**Value for the field**	8.3	18.79%	8
	Interaction with new stories	8.3	49.40%	4
	Redissemination	8.5	50.60%	4

*A correction factor is applied to the weighted average to standardize the rubric and avoid decimals

> We propose a matrix to analyze narrative, quality, usability, search for information, and redistribution of content and socialization

Overall, the dimensions presented a median (M_E) of 5, a *k* equal to 0.725 (good), an asymptotic standard error of 0.33, and a *p*-value of 1.24. Although this confirms the construct and content validity of the initial model, the experts made various qualitative observations on the questionnaire that were considered appropriate to incorporate into a second version, while others were discarded. Among these observations, two unrelated experts observed that accessibility should be included in this analysis model. However, accessibility, being such a complex subject, is already part of numerous academic approaches and also has specific protocols and means of analysis, validated by the international community and international organizations. Thus, a second version of the tool[2] was developed, including two new dimensions (narrative and content redissemination).

In the second round of expert analysis, in which the questionnaire was sent only to the 12 experts who answered the first round, 10 experts participated. This time, the survey did not ask for the validation of dimensions and indicators –already previously validated– but rather a weighting (value) of each dimension and indicator with a score from 1 (lowest) to 10 (highest). This would provide a rating of the variables of the tools, as a rubric, which would allow a posteriori quantitative and qualitative evaluation of the digital media outlets. The results of this round are presented in Table 4.

3. Results

The study has yielded results at different stages or phases of the research. In this sense, Table 1, derived from the literature review on taxonomies or analysis models designed for the analysis of news websites or digital media platforms, has allowed us to identify three thematic areas of interest: quality, usability, and the search for information. Each of these is broken down into a total of 14 thematic dimensions, 36 indicators, and 69 variables, which are detailed in the aforementioned analysis sheet (Table 1). Based on this, the incorporation of two rounds of evaluation and review by experts enabled the creation of a matrix that expanded the main thematic areas to five: narrative, quality, usability, the search for information, and content redissemination and socialization. These, in turn, include a proposal that encompasses 16 dimensions (Table 5).

Table 5. Proposed taxonomy for the analysis of digital media web interfaces

Field	Dimension	Range
Narrative	Form of content and narrative	Diversity of formats and proposals Application of innovation in the creation of content
	Journalistic genres and styles	Type and variety of journalistic genres and styles included in the medium
	Headlines	Type and features of headlines (approach, wording, and use of teasers)
Quality	Metadata of the news stories	Use of keywords in the labeling of the content presented
	Transparency	Identification of sources, resources, and other aspects Presentation of the organizational chart
	Truthfulness and validity of content	Support in sources: diversity of references used
	Related content	Access to related thematic content that enable a deep dive into the subject
	Content curation	Verification, editing, and quality control work
Usability	Uninterrupted reading	Presentation of content and communication with users without the inclusion of advertising or invasive content
	Interface layout	Physical design of informative messages
	Legibility of content	Adaptation of messages for screen-based enquiry
	Content customization	Option of customizing the digital media content
Search for information	Web search engine	Actions and tools designed for the (internal/external) search for content
	SEO and visibility	Organic positioning in search engines and content visibility strategies
Redissemination of content and socialization	Interaction with new stories	User–content–media communication options through different actions (liking, forwarding, commenting, commenting, rating, etc.)
	Redissemination	Dynamics of content dissemination on other platforms for dialog, especially social networks

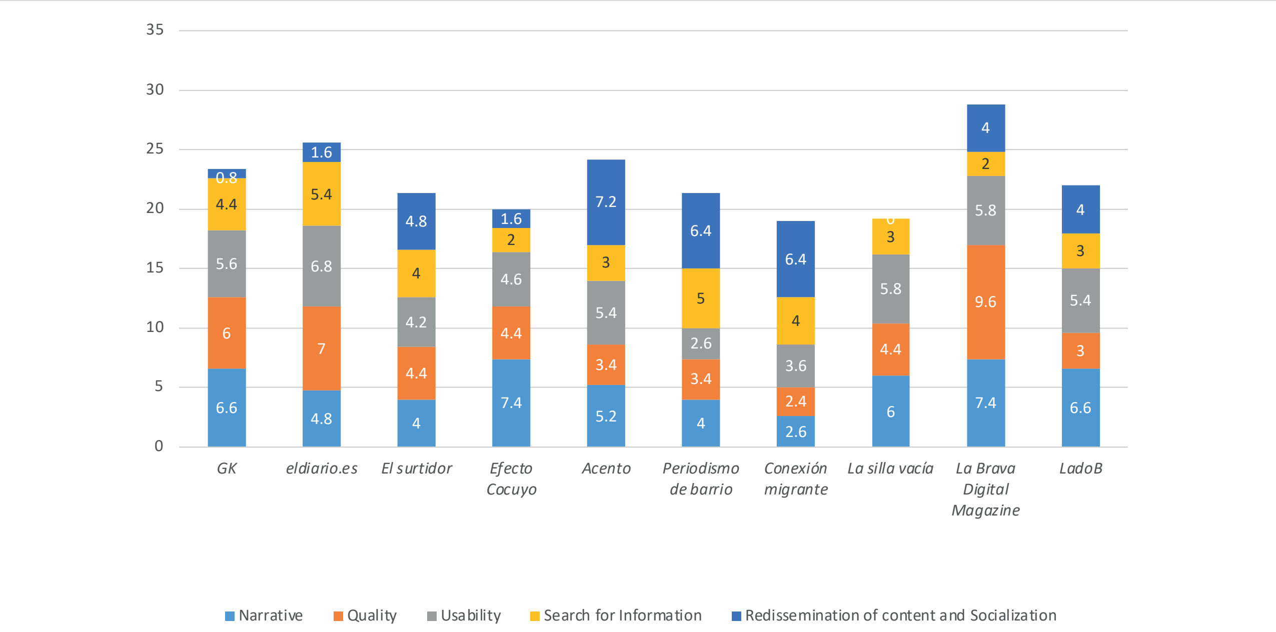
The applicability of the model was tested through a pilot test with 10 Ibero-American digital media outlets. The following are the results derived from this application, organized according to the five main thematic areas of this model (narrative, quality, usability, the search for information, and content redissemination and socialization). This testing was carried out with a descriptive quantitative-qualitative design. Table 6 quantifies the presence of the different elements in the set of digital media tested using a Likert scale ranging from 0 (absent) to 5 (very present) and its reconversion to the value for each dimension.

Table 6. Results of the quantitative application of the model in the pilot test

Field	Dimension	*GK* (Ecuador)	*Eldiario.es* (Spain)	*El surtidor* (Paraguay)	*Efecto Cocuyo* (Venezuela)	*Acento* (Dominican Republic)	*Periodismo de barrio* (Cuba)	*Conexión migrante* (United States)	*La silla vacía* (Colombia)	*La brava digital* magazine (Bolivia)	*LadoB* (Mexico)
Narrative	Form of content and narrative	2.4	2.4	1.6	3.2	1.6	1.6	0.8	2.4	3.2	2.4
	Journalistic genres and styles	1.8	1.2	1.2	2.4	1.8	1.2	0.6	1.8	2.4	2.4
	Headlines	2.4	1.2	1.2	1.8	1.8	1.2	1.2	1.8	1.8	1.8
Quality	Metadata of the news stories	0.6	0.8	0.6	0	1.0	0	0	0	5.0	0
	Transparency	1.6	2.0	0.8	1.2	0.4	2.0	1.0	1.6	1.6	0.8
	Truthfulness and validity of content	1.6	2.0	1.2	1.6	1.2	1.2	0.8	1.6	1.6	1.2
	Related content	0.6	0.6	0.6	0.4	0	0.2	0.2	0	0.2	0.2
	Content curation	1.6	1.6	1.2	1.2	0.8	0.8	0.4	1.2	1.2	0.8
Usability	Uninterrupted reading	1.8	2.4	1.2	1.2	1.8	1.2	1.2	2.4	1.8	2.4
	Interface layout	1.2	1.2	0.8	1.2	0.8	0.8	0.8	1.2	1.2	1.2
	Legibility of content	1.8	2.4	1.8	1.8	2.4	0.6	1.2	1.8	2.4	1.8
	Content customization	0.8	0.8	0.4	0.4	0.4	0	0.4	0.4	0.4	0
Search for information	Web browser	2.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0	1.0	1.0
	SEO and visibility	2.4	2.4	2.0	1.0	2.0	2.0	2.0	1.0	1.0	2.0
Redissemi-nation of content and socialization	Interaction with new stories	0.8	0.8	2.4	0.8	3.2	3.2	3.2	0	0.8	0.8
	Redissemination	0	0.8	2.4	0.8	4.0	3.2	3.2	0	3.2	3.2
TOTAL		**23.4**	**25.6**	**21.4**	**20.0**	**24.2**	**21.4**	**19.0**	**19.2**	**28.8**	**22.0**

The reading and interpretation of the results derived from the pilot test applied to the 10 selected digital media outlets was organized around the five thematic areas that structure the defined model: narrative, quality, usability, the search for information, and content redissemination and socialization (Graph 1).

As can be seen in Graph 1, there is a great deal of correlational variability among the results of each media outlet for each dimension. *Efecto Cocuyo* (Venezuela) obtained the best rating for the narrative dimension, whereas *La brava* digital magazine (Bolivia) obtained the best rating for the quality dimension. In terms of usability, as well as the search for information, the Spanish *Eldiario.es* scored better. In the case of content redissemination, *Acento* (the Dominican Republic) stood out above its Ibero-American peers.



Graph 1. Quantified results derived from the pilot test

3.1. Narrative

The analysis of the results derived from the dimensions related to the narrative shows a similar commitment to the media as a whole, especially in reference to the form of content, journalistic genres, and styles. The headlines, on the other hand, take a strictly informative approach in all cases, avoiding headlines that are flashy or that could be designed as clickbait.

The presence of graphic elements in the news pieces is very limited, as they are relegated to individual sections in most of the analyzed media, despite the fact that this is high-value content for accompanying, complementing, expanding, and enriching news pieces predominated by textual information. This aspect, framed in the narrative section of the proposed analysis table, opens an important reflection on the incorporation, from a protagonistic approach, of this type of content and resources.

There are, however, exceptions such as *El surtidor* from Paraguay, which designs graphics, tables, timelines, and other visual resources as "paragraphs" of the developed content and not just as complementary elements or additions that do not connect with the thread of the story presented by the content of the piece in which they have been inserted.

Regarding journalistic genres and styles, this pilot test identified that there is no clear indication of the type of pieces presented in the digital media as a whole. In some cases, however, such as the Ecuadorian media outlet *GK*, founded in 2011 and focused on in-depth journalism and social impact, it was observed that the content is organized from its home site or home page by means of bylines that allow the reader to anticipate what type of content they will find. This is a headline element that groups several pieces of information based on the type of journalistic genre. They are short or one-word expressions: "News" ["*Noticias*"], "Reports" ["*Reportajes*"], "Opinion" ["*Opinión*"], or "Trending" ["*En tendencia*"]. In addition, there are sections such as "More news, explained" ["*Más noticias, explicadas*"]. This distribution (Figure 1) makes it easier for the reader to identify and locate the different types of messages digital media display.

Figure 1. *GK. http://gk.city*

Figure 1. For its part, Cuba's *Periodismo de barrio* organizes its content on the basis of categories that blend genre type with the particularities of the platform. Thus, at the same hierarchical level and using the same graphic elements (typeface, color, and font size), "Latest articles" ["*Últimos artículos*"], "Topics ["*Temas*"]," "Podcast," "Illustrations" ["*ilustra-*

Figure 2. *La silla vacía. http://lasillavacia.com*

Figure 3. *La brava. http://revistalabrava.com*

ciones”], “Images” [“*Imágenes*”], or “Gender manual” [“*Manual de género*”] are mentioned. In addition to the above, one can find products such as that of *La silla vacía* from Colombia, which opts for very creative section names (“The empty chair” [“*La silla vacía*”], “The full chair” [“*La silla llena*”], “The academic chair” [“*La silla académica*”], “The chair –courses” [“*La silla cursos*”], “Super friends” [“*Super amigos*”], or “Sunday edition” [“*La dominguera*”]) that, therefore, may make it difficult for the user to anticipate the type of journalistic genres they contain (Figure 2), whereas other media outlets such as *La brava* from Bolivia opt for a more conventional structure (Figure 3).

Social networks are a resource used by various media outlets to report on different topics. The inclusion of pieces derived from other platforms, especially *Twitter*, *YouTube*, or *Instagram*, is a recurring element in all the media studied. The application of the model of analysis, therefore, enables a dual diagnostic and descriptive work that, thanks to link journalism, makes it possible to identify the platform ecosystems and synergies of digital media on their own and other platforms. The case of the Venezuelan media outlet *Efecto Cocuyo* is a good example of this type of material coming from both primary sources and other journalistic pursuits (Figure 4).

Figure 4. *Efecto Cocuyo. http://efectococuyo.com*

Fig*El surtidor*, a Paraguayan digital media outlet, stands out for its graphic design focused on the use of caricatures, mastheads, and illustrations with a clear commitment to innovation in formats and content. This media outlet, winner of the *Gabriel García Márquez Journalism Award* in 2018 in the Innovation category, opts to breathe new life into stories with both their approach and their presentation, that is, the “what” and the “how” (Figure 5).

3.2. Quality

The proposed taxonomy has made it possible to analyze the quality on the basis of the presence of metadata in the news stories, the support for (varied and numerous) news sources, and the content curation process at a formal and stylistic level.

It is worth noting that the pilot test found that very few digital media outlets recommend or link other content, whether their own or others’, in their news pieces. This aspect is limited, in most cases, to the use of keywords or tags, not taking advantage of the navigational capabilities of hyperlinks and the possibilities they offer when it comes to delving deeper into a topic.

Figure 5. *El surtidor.https://elsurti.com*

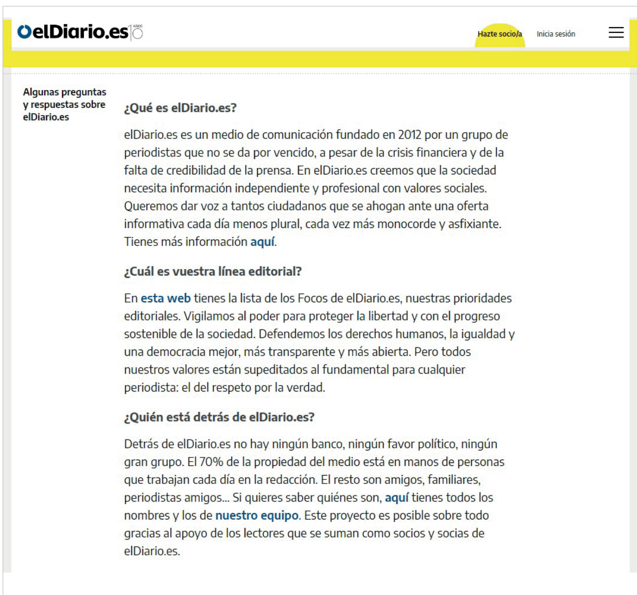


Figure 6. *Eldiario.es. http://eldiario.es*

> The study of the digital platform (the website of the media) is essential to understand the media and its dynamics, especially native digital media

In terms of transparency, in general, all the media outlets analyzed had sections dedicated to introducing the members of their respective teams, their profiles, and the means of contacting them. This information was also enriched using data related to economic balance, income, or potential sources of financing. The case of *Eldiario.es* from Spain is undoubtedly a paradigmatic element owing to the effort it makes (Figure 6) to offer detailed information about the media outlet, its editorial line, the entities that support it, its economic situation, and other information aimed at promoting transparency between the digital media outlet and society as a whole. In September 2018, on its sixth anniversary, this newspaper company published its official accounts with a detailed report of its revenues, expenses, and profits.

Colombia's *La silla vacía* is also an example of transparency owing to its disclosure of its structure, operation, organizational chart, and economic aspects. It showed the rates for each advertising package in detail, while precisely stating its sources of income and its partners, as well as how they invest their resources.

Incidentally, the Cuban media outlet *Periodismo de barrio* also stood out for its commitment to transparency. On its platform, together with a section entitled "Financial transparency" ["*Transparencia financiera*"], it includes a section called "Code of ethics" ["*Código de ética*"], which presents information about the principles that define the media outlet; aspects related to the "integrity, independence, responsibility, commitment and confidentiality" ["*integridad, independencia, responsabilidad, compromiso y confidencialidad*"] of the project; financing; coverage, research, and relationships with said sources; the writing, editing, and publication of content; photography and audiovisual components; the dissemination of publications and interaction with users, their use of *Creative Commons* licenses; and the digital media outlet's code of ethics, among other things.

3.3. Usability

Regarding the usability component, the application of the model of analysis identified that the selected media outlets are at the same level, with the exception of some that present a content layout that is somewhat invasive, as the layout makes it difficult to read some pieces on screen. Readability is, however, an element that was achieved in all cases, with nuances that differentiate them. Content personalization is one of the general weaknesses shown by the 10 digital media outlets studied.

In this dimension encompassed by the usability of the platforms, the Dominican media outlet *Acento*, winner of the *National Digital Journalism Award* in the category of Best Digital Native Newspaper, stood out for tagging their content very extensively, especially in association with their pieces. In this way, the reader can access other related content. However, this proposal for a hypermedia roadmap is not very sophisticated, since it uses keywords to generalize themes and topics that sometimes correspond to very specific thematic areas.

The Ecuadorian media outlet *GK* stood out for its short-form content accompanied by images whose sizes end up impacting on usability and the interaction between users and content (Figure 7). This news project, which focuses on three thematic areas (gender, environment, and transparency), stood out for its use of bold type and links (especially external ones) –aspects that contribute to optimizing the adaptation of content to on-screen reading– in all its content. Other media outlets, such as *Eldiario.es* in Spain, *Periodismo de barrio* in Cuba, *La silla vacía* in Colombia, and *El surtidor* in Paraguay, hardly took advantage of hyperlinks in their news stories; at the same time, they avoid using bold type, both for the organic positioning strategy of the content and for usability and readability aspects on screen.

Figure 7. *GK. http://gk.city*

3.4. Search for information

The search for information was centered in practically all cases on a generic search tool, located in the upper frame, generally in the right-hand portion of the information hub. In this sense, particular importance was not given to the implementation of filters or advanced searches, which are crucial aspects of journalistic documentation to receive results that are more selective and specific to the information requirements of the users.

With regard to organic positioning in search engines, simple actions, such as the use of bold font, links (internal or external), and an advanced process regarding the wording of the title elements, which would be of great value to enhance performance in terms of SEO positioning, were neglected.

The Cuban media outlet *Periodismo de barrio* is focused on the development of research about communities affected by natural disasters or found themselves in situations of great social and economic vulnerability. Together with the usual search engine, it offers a list of thematic categories that, in addition to being used for content tagging, plays an important role in the identification and retrieval of content when using the general website tool to search (Figure 8).

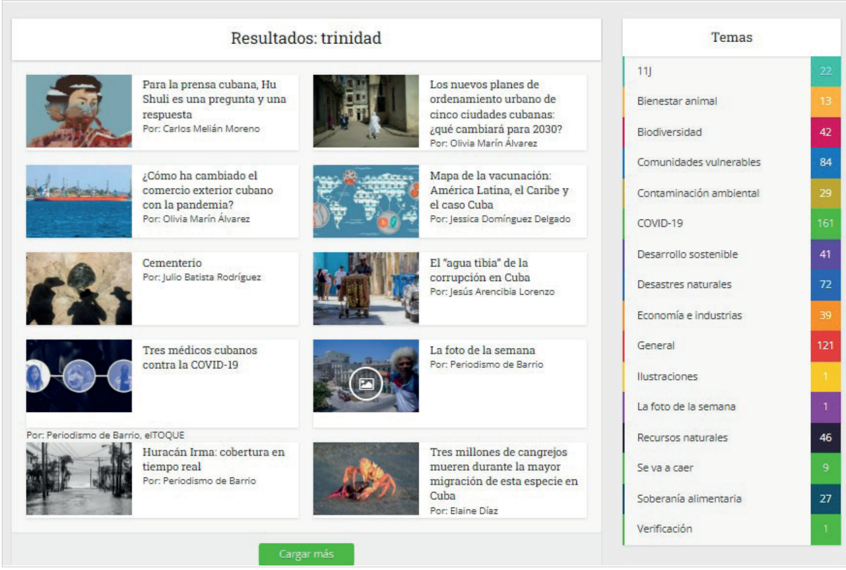


Figura 8. *Periodismo de barrio. http://www.periodismodebarrio.org*

3.5. Redissemination of content and socialization

The redissemination of content and the promotion of socialization is one of the dimensions that showed the greatest difference among the media outlets analyzed. Thus, the pilot test identified media outlets that did not provide any services in this regard, whereas others offered users the possibility of sharing content on social networks, reporting errors, and contributing content. In the case of the Ecuadorian media outlet *GK*, for example, there were no options for users to interact with the content for redissemination or socialization. The comment option is offered only after registration and is subject to a series of restrictive requirements.

4. Discussion and conclusions

Research on the characteristics of digital platforms used by digital native media is an area of growing importance, as highlighted by the various approaches and perspectives adopted by **Cabrera-Méndez**, **Codina**, and **Salaverría** (2019), **Salaverría** and **Martínez-Costa** (2021), **García-Orosa**, **López-García** and **Vázquez-Herrero** (2020), and **López-García** *et al*. (2022), among others. Just as it would have been impossible to study radio journalism without considering the properties of the audio medium, the study and understanding of journalism today requires ongoing and up-to-date studies on the digital media ecosystem. In this context, digital native media emerge as an object of study of great interest.

Accordingly, this research shows that studies centered around the particularities of digital media have focused on specific characteristics of the digital medium. Visibility or aspects linked to new formats have become increasingly important. This body of research provides valuable contributions to the necessary understanding of the digital medium, which, as this study indicates, is key. On this basis, the current research adopts a holistic method in an attempt to include all dimensions, without neglecting any significant ones. Therefore, the work presented herein offers researchers and professionals, especially digital native media entrepreneurs, a tool that, both conceptually and practically, provides a 360° view for the analysis and auditing of the quality of digital media, including aspects of visibility.

The designed methodology combines learning from previous work with expert judgment, by means of a two-round system and the application of stringent measures of levels of agreement, before finally testing the taxonomy with a pilot test (application test). This study thus presented a taxonomy of elements of analysis of the quality of digital native media websites that can be applied by digital media entrepreneurs and managers to improve their chances of sustainability insofar as they depend on the quality of their website to act as a media–user interface.

Moreover, the study is useful for digital journalism researchers who need to understand the digital native media of a country or a cultural area or a type of journalism, such as investigative or cultural journalism, among others, in terms of their adaptation to the digital context. This proposed taxonomy for the analysis of the elements of digital media aims to provide an element, from academia, to support the sustainability of journalism thanks to the possibility of better understanding the medium on which it is based.

> To understand the journalism of each era is necessary to know its substrate, that is, the scenario where it develops

5. Notes

1. Available at:
https://doi.org/10.5281/zenodo.6811157

2. Available at:
https://doi.org/10.5281/zenodo.6811176

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Effects of advertising on problem gambling: Neural-cue reactivity as a possible underlying mechanism

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Abstract

Problem gambling has recently been reclassified as a non-substance-associated behavioral addiction. To the associated vital impact (family, social, labor, and economic), we must add its increasing incidence in recent years, which has led to prioritizing the problem from the point of view of public health. Although the effects of advertising on gambling behavior have been explored since the second half of the twentieth century, there is a lack of research regarding its underlying mechanisms. Thus, the objective of this review is to present an update on the effects of advertisements on gambling attitudes and behavioral intentions, as well as to present the neurobiological correlates of gambling-related cues as a possible hypothesis for this effect. Advertisements in various formats may act both as a precipitating factor and as a maintenance factor for the gambling disorder, changing both attitudes and beliefs about gambling. Activation of brain areas related to reward, such as accumbens nucleus, to memory, such as hippocampus or amygdala, and to executive functions could be the underlying mechanism of this effect. Also, ads promoting responsible gambling do not appear to be effective in reducing behavior or encouraging self-control, but the available evidence is scarce. Therefore, the number of studies on this topic needs to increase. In addition, the available evidence questions the effectiveness of responsible gambling policies to promote self-control in this population, as well as to reduce the negative impact of this disorder, so future research on neural-cue reactivity to gambling-related stimuli may serve to improve the design of advertising strategies that increase the impact of these messages.

Keywords

Addictive behavior; Addiction; Advertising; Bets; Executive functions; Gambling; Learning; Neural reactivity; Prevention; Responsible advertising; Responsible gambling; Reward system; Risk factors; Review.

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1. Introduction

Both problem and pathological gambling (PG) are part of a mental disorder (**Nowak**, 2018) classified within the "substance-related and addictive disorders" in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (*APA*, 2013). PG is characterized by an urgent need to bet increasing amounts of money (tolerance), an appearance of nervousness or irritation when one cannot gamble (abstinence), betting activity occupying much of the gambler's time and thoughts (dependency), a continuous desire to gamble when it is not possible (craving), as well as attempts to recover from losses and repeated failures to give up the habit (**Petry** *et al.*, 2014). To avoid stigmatization, PG has been known as Gambling Disorder (GD) since the DSM-5. GD is related to severe disturbances of personal, familiar, social, occupational, and economic issues. For instance, among the primary burden of harm associated with gambling is generally damage to one's health and relationships as well as psychological suffering (**Abbott**, 2020). Additionally, the financial repercussions of GD might range from poor credit to legal issues and even complete bankruptcy (**Williams**; **Rhem**; **Stevens**, 2011). Furthermore, an observational study revealed that children of compulsive gamblers had higher rates of smoking, drinking, and drug abuse (**Jacobs** *et al.*, 1989). In essence, the disorder causes a serious impact on different aspects of the person's life, such as the family, social life, work, and the economic sphere (*DGOJ*, 2019).

In addition, the incidence of this disorder has increased notably in recent years in several countries such as China (**Long** *et al.*, 2018), the United Kingdom (UK), Australia, or the United States of America (USA) (**Abbott**, 2020; **Calado**; **Griffiths**, 2016; **Erbas**; **Buchner**, 2012; *World Health Organization* [*WHO*], 2017). According to the *WHO* (2017), the growth in commercial gambling has been associated with a considerable increase in PG. The problem is especially worrisome in young people, since the period of greatest vulnerability to the disorder is between 18 and 24 years of age (**Hing** *et al.*, 2016). In fact, it has been observed that minors may be exposed to this content due to its extraordinary ubiquity, both in television advertising during sporting events, and through its growing presence on social media and web portals (**Monaghan**; **Derevensky**; **Sklar**, 2008; **Rossi** *et al.*, 2021). Thus, **Chóliz** (2016) observed a considerable increase in online gambling since the legalization of this type of gambling in Spain (*Law 13/2011*), particularly in young people, going from 0% to 44.46% in a period of four years in under 26-year-olds. Other countries such as the UK, Australia, and the USA have reported similar increases in gambling consumption, something that has been noticeably accentuated as a result of the Covid-19 pandemic (**Håkansson**, 2020), especially in its online modality (**Hubert**; **Griffiths**, 2018).

At the same time, spending on advertising for gambling has also increased. For example, in Spain alone, gambling companies spent 48% more on advertising in 2018 than in the previous year, which is equivalent to about 328 million euros (*DGOJ*, 2019). Advertising spending also increased in other countries such as the UK and Australia in the same period (*GambleAware*, 2018; *Victorian Responsible Gambling Foundation*, 2019).

The increased incidence of problem gambling in recent years, especially in the online mode (**Lindner** *et al.*, 2020), has led to prioritizing the problem from the point of view of public health (*Responsible Gambling Strategy Board*, 2019). One of the most relevant questions to determine therapeutic targets and design effective programs to reduce the incidence of problem gambling consists of the identification of factors leading to greater risk and maintenance of the problem. Risk factors for problem gambling are usually divided into three groups: personal, family, and socio-environmental (**Garrido**; **Jaén**; **Domínguez**, 2004). Since the early work of **Hess** and **Diller** (1969), several studies in the 90's have attempted to clarify the role of advertising over gambling consumption habits (**Heiens**, 1993; 1999). Furthermore, **Griffiths** (2005) observed that the possible effect of gambling advertising over gambling behavior should be placed in the same category as alcohol and tobacco public health policies. Subsequently, over the past decades, this interest has increased (**Floyd**; **Whelan**; **Meyers**, 2006; **Hing** *et al.*, 2014; **Planzer**; **Wardle**, 2012; **Syvertsen** *et al.*, 2022). Despite this growing attention to this topic, it is not yet clear what its role in this disorder is, through what mechanisms it acts, or how it affects each individual based on different gambler profiles (**Binde**, 2013). Furthermore, very few evidence-based recommendations are readily available for policymakers (**López-González**; **Griffiths**, 2021).

Therefore, the main objective of this review is to present the state of the art in relation to the possible impact of advertising on gambling in the initiation and maintenance of problem gambling behavior. Afterwards, a hypothesis concerning the neural reactivity to gambling-related stimuli as a possible underlying mechanism of this effect is proposed based on the evidence available until the present. This approach could serve to boost new insights for developing more effective messages and prevention campaigns in the field of marketing, public health policies and communication.

> Increasing incidence of problem gambling in recent years has led to prioritizing the problem from the point of view of public health

2. Effects of advertising over gambling behavior and attitudes

To our knowledge, the first work studying the effects of advertising on gambling behavior was published in 1969 (**Hess**; **Diller**, 1969). In this research, the motives to gamble are analyzed (explored) through a qualitative content analysis methodology in relation to marketing appeals. Since then, many works have tried to examine the effects of advertising on gambling behavior and attitudes. Although the subject has been receiving increasing attention in the past decades, to date no firm conclusions can be offered (**Hanss** *et al.*, 2015). Thus, the question is very simple: does gambling advertising cause an increase in problem gambling? And, furthermore, what is the possible underlying mechanism of this effect?

It has been proven that more exposure to advertisements is associated with more positive attitudes, usage initiation and problematic use of addictive products such as alcohol or tobacco (**Anderson** *et al.*, 2009; **Lovato**; **Watts**; **Stead**, 2011). But before answering these questions applied to gambling consumption, we must bear in mind the conceptualization of the mass media effect. According to **Potter** (2011), a mass media effect is a

> "change in an outcome within a person or social entity that is due to mass media influence following exposure to a mass media message or series of messages" (p. 903).

Following this definition, we must consider several factors when studying the influence of mass media. For example, the *outcome*, which includes cognitions, attitudes, beliefs, affects, physiology and behaviors. Also, the *mass media* must be precisely defined, especially regarding new technologies like social media. The *change*, which is measured as a shift in a magnitude. And finally, the *influence*, which can be direct or indirect, in the long or short term and conscious or unconscious. Then, two classification rules are proposed to organize the conceptualization of mass media effect: there must be a clear outcome that shows change, and the media must be shown to have had an impact (**Potter**, 2011, p. 911). Finally, due to the cyclical nature of mass media exposure, it is of special importance to rule out the influence of "third variables" which could be acting on the effect considered.

In relation to the influence of mass media on gambling, the principal outcomes considered by the research so far have been cognitive functions, attitudes, physiological response and behaviors, besides content analysis or subjective reports. Recent research on this question (*GambleAware*, 2020; **Syvertsen** *et al.*, 2022) seems to indicate that there is a relationship between gambling advertising exposure and gambling behavior. Indeed, two recent systematic reviews conclude that advertising about gambling may act as a facilitating agent of gambling behavior, greater desire or craving, greater participation, and more impulsive and risky behaviors when gambling (**Bouguettaya** *et al.*, 2020; **Newall** *et al.*, 2019). These studies and others carried out in the past decade reveal that exposure to gambling advertisements is related to a higher probability of gambling (**Abdi**; **Ruiter**; **Adal**, 2015; **Clemens**; **Hanwinkel**; **Morgenstern**, 2017; **Fried**; **Teichman**; **Rahav**, 2010; **Pitt** *et al.*, 2017a), even becoming the main predictor of gambling behavior , making it three times more probable to gamble measured through an odds ratio (OR = 3.53) (**Hayer** *et al.*, 2018).

In relation to attitudes, **Derevensky** *et al*. (2010), found in a qualitative study through a questionnaire applied to 1,147 young participants (12-19 years old) that gambling advertising exposure by several means (internet pop-up ads, TV advertisements) influenced attitudes towards gambling, especially in those with established gambling habits. Moreover, **Thomas** *et al*.'s. participants (2012) felt 'bombarded' and 'targeted' by sports bet marketing, highlighting the effectiveness of betting promotions in influencing gambling-related attitudes. In addition, a cross-sectional study in the USA found that more self-reported exposure to adverts for gambling was associated with improved gambling attitudes (**Lee**; **Lemanski**; **Jun**, 2008). More recently, **Deans** *et al*. (2017) explored the influence of marketing on sports betting, finding that sports betting marketing saturation promotes normalization of gambling in sports. In fact, in a qualitative focus groups study, **López-González** *et al*. (2020) found that several forms of gambling advertising such as bonuses and free money gambling promotions along with stimuli designed on the basis of cognitive heuristics (i.e., availability, confirmatory, representative and hindsight biases), were particularly harmful and persuasive in triggering gambling intentions and behavior. Also, it is interesting to note that gambling advertising may also act as a risk factor for the initiation of gambling behavior, especially through a system of incentives or welcome bonuses (**Hidalgo-Cerezo**, 2018; **Hing** *et al.*, 2017). **Grant** and **Won-Kim** (2001) studied the factors that produced craving in a sample of 131 American adults with PG. Despite the fact that previous studies confer a marginal weight to craving, social pressure, and advertising (12%) as precipitating factors of relapses in problem gambling (**Binde**, 2007; **Fernández-Montalvo**; **Echeburúa**; **Báez-Gallo**, 1999), these authors found that almost half of the sample of their study (n = 60) affirmed that the gambling advertisements on TV, radio, and billboards acted as a precipitating motivation to gamble.

Regarding cognitive effects, it has been consistently demonstrated that exposure to gambling advertising notably increases knowledge about it and recall of advertisements and brands and their notoriety. Indeed, the recall of the content of the advertisements is better in gamblers than in control subjects (**Amey**, 2001; **López-González**; **Griffiths**, 2021; **Pitt** *et al.*, 2017b). Also, several recent investigations using biometric techniques such as eye-tracking or facial recognition of emotional expressions conclude that specific gambling-related stimuli draw attention more easily than responsible gambling messages while viewing commercial advertisements about gambling (**Cuesta-Cambra** *et al.*, 2019; **Lole** *et al.*, 2019).

> The effect of advertising is rarely cited in the scientific literature as a modulating factor

> Several studies have outlined the possible harmful effect of gambling advertising over gambling behavior

Finally, several studies have pointed out the link between gambling adverts exposure and intentions and behavior. For example, **Hing**, **Vitartas** and **Lamont** (2013), using an online survey with 212 participants, reported an increase in both gambling intentions and behavior in relation to exposure to gambling sponsorship of sport. Also, gambling behavior was influenced by a significant increase in gambling advertising due to the removal of gambling marketing restrictions in Macau in a survey with 4208 participants (**Ho**; **Sau-kuen**; **Man-Chu**, 2012). In another study conducted in Norway, half of the sample (n = 25) reported an expected increase in their gambling behavior as a consequence of gambling advertising exposure (**Binde**, 2009). Several quantitative cross-sectional studies conducted in different countries such us Norway, Australia and the USA demonstrate the relationship between increased gambling advertisement exposure and gambling or problem gambling behavior (**Hanss** *et al.*, 2015). Remarkably, a study developed in three US states revealed that for every 1% increase in lotteries advertising expenditure, there was a .1%-.24% increase in revenue because of a rise in gambling consumption. Furthermore, in a self-reported survey performed with a Swedish population, perceived negative influence from gambling advertising was positively associated with problem gambling severity, frequency and online participation through a multivariate regression analysis (**Binde**; **Romild**, 2019).

In general, the available evidence exposed here seems to support an important role of gambling advertising in influencing gambling attitudes, beliefs and behavioral intentions. However, we must consider that almost half of the scientific literature published in this field employed qualitative methodologies, thus more objective, empirical evidence is needed in order to achieve stronger conclusions (**Bouguettaya** *et al.*, 2020). More recently, nevertheless, neural response to gambling-related stimuli paradigms is being considered as a promising approach which can lead us measure the influence of mass media over persons or social entities.

3. Neural reactivity to gambling-related stimuli (GRS) as a possible underlying mechanism for the effects of gambling advertising

The study of neural reactivity to stimuli related to addiction has shown its usefulness as a biomarker of the severity of the disorder, efficacy of the treatment, and risk of relapse (**Brevers** *et al.*, 2019). Although there is currently no agreement on the brain areas involved and the sense of activation (increased or decreased) in the case of problem gambling, these investigations have served to raise interesting questions. Some of these are whether these stimuli are capable of inducing craving in PG, if there are some regions of the brain that are especially sensitive to them, and possible differences depending on various factors, such as the patient's clinical status, the duration of abstinence, or if there is a specific reactivity depending on the type of game practiced (i.e. lottery, betting or machines).

In general, the available evidence seems to support greater activation of the brain areas involved in PG when exposed to gambling-related stimuli (GRS) (**Brevers** *et al.*, 2019). For example, **Goudriaan** *et al*. (2010) found greater activation in parahippocampal regions, right amygdala, and prefrontal cortex (DLPFC) in PG. In addition, they reported a positive relationship between the intensity of the BOLD (*Blood Oxygen Level-Dependent*) signal in ventrolateral prefrontal regions, left insula and left caudate nucleus, and the subjective craving of the subjects when they watched scenes related to gambling compared to other, neutral scenes. In fact, another series of studies has shown greater activation in the prefrontal cortex, parahippocampal regions, and occipital cortex when PGs are exposed to GRS, something that is consistent with research conducted with other behavioral addictions (**Crockford** *et al.*, 2005; **Holst** *et al.*, 2010; **Miedl** *et al.*, 2010). The activation of the ventral and dorsal striatum, as well as the accumbens nucleus, has been associated with the anticipation of economic rewards in PG, in addition to a reduced sensitivity of the same regions for erotic stimuli (**Sescousse** *et al.*, 2013). Other regions involved in the emotional assessment of stimuli and the anticipation of consequences, such as the orbitofrontal cortex (OFC), have also shown greater activation in PG when they obtained a monetary gain in a "delayed incentive task" (**Sescousse** *et al.*, 2013). These results are consistent with the main theories on addictive behavior, which point to the convergent involvement of three brain systems: reward and motivation system, learning system, and executive functioning (**Cummings**; **Blum**, 2000; **Robinson**; **Berridge**, 2001; **Volkow**; **Fowler**; **Wang**, 2003). In fact, it has been found that both types of addictions could share the same neurobiological circuits (**Crockford** *et al.*, 2005; **Holst** *et al.*, 2010; **Kober** *et al.*, 2016).

However, data have also been found showing the opposite pattern. For example, **Potenza** *et al*. (2003) found that PGs showed less activation in the anterior cingulate cortex (ACC), OFC, caudate nucleus, basal ganglia (BG) and thalamus when exposed to a video about gambling intended to produce desire to play compared to control subjects. Likewise, **Balodis** *et al*. (2012) found less activation in the medial and ventral prefrontal regions, left inferior frontal gyrus, insula, ACC and left ventral striatum in PG when they performed a delayed economic incentive task. These discrepancies could be reflecting methodological differences such as the type of stimuli used, screening instruments to select the participants or the specificity of the type of game (lottery, slots, online betting, horseracing, etc.). Other research has found similar results using visual and auditory GRS interchangeably (**Sodano**; **Wulfert**, 2010; **Wegmann**; **Stodt**; **Brand**, 2018).

In line with these results, the recent meta-analysis by **Starcke** *et al*. (2018) about reactivity to stimuli in behavioral addictions, concludes that PG showed greater reactivity to GRS than did controls. This activation was correlated with a greater subjective desire to play (*craving*) and with psychophysiological measures such as heart rate, sweat gland activity or skin temperature. The brain areas that showed greater activation in response to these stimuli were caudate nucleus, medial cingulate, subgenual cingulate, inferior frontal gyrus, and precentral gyrus, areas associated with anticipation, processing and decision-making related to rewards.

> Prevention campaigns, as well as responsible gambling advertising, should be empirical-based in order to effectively prevent problem gambling behavior

Furthermore, studies carried out to date have consistently found that GRS visualization is capable of inducing craving in people with PG, showing a direct relationship with the severity of the disorder (**Balodis** *et al.*, 2012; **Crockford** *et al.*, 2005; **Goudriaan** *et al.*, 2010). Not only that, but **Limbrick-Oldfield** *et al.* (2017) found that the greater the abstinence, the lower the craving caused by the GRS (video), also reducing neural reactivity. This finding is relevant to be able to design cessation programs, by being able to estimate how long PGs need to avoid gambling, so that their reactivity to contextual signals related to gambling is neurologically minimal and they feel less craving. This would significantly reduce the chances of a relapse. Considering that two thirds of all relapses, approximately, occur in the first three months after the end of treatment (**Brown**, 1987; **Marlatt**; **Gordon**, 1985), it would be interesting to complement these results with the study of their correlates in terms of neural reactivity. In fact, in brain connectivity studies, higher craving scores after exposure to GRS were associated with lower connectivity between regions of the accumbens nucleus and frontomedial prefrontal cortex (**Quester**; **Romanczuk-Seiferth**, 2015). This reinforces the hypothesis that a disconnection between prefrontal cognitive control centers and areas of the reward and pleasure circuit such as the *nucleus accumbens* and adjacent regions could explain the problems of inhibition and control over immediate reinforcement in people with gambling problems (**Volkow**; **Fowler**; **Wang**, 2003).

4. Conclusions and recommendations for the future

Pathological gambling is a disorder with high personal, social, and economic costs. Its incidence has increased in recent years at the same rate as the proliferation of online gambling operators and the advertising spending of gambling companies, worryingly and more pronounced in young people. Therefore, it is a public health problem that deserves reflection.

Although there is evidence that seems to point to a possible causal role of advertising in the initiation and maintenance of gambling behavior, especially in the online mode (**Hing** *et al*., 2014), the results of the scientific literature available on this topic are not conclusive at present. Most of the studies use qualitative methodologies such as interviews or self-reports (**Binde**, 2009; **Bouguettaya** *et al*., 2020), making it necessary to increase the number of studies that use a quantitative methodology, in addition to suffering from a lack of homogeneous criteria regarding the methodological approach to study this problem (**Torrance** *et al*., 2021). Thus, although the topic has been studied since at least the second half of the 20th century, more quantitative studies are needed to allow us to develop more evidence-based knowledge in this field (**Labrador** *et al*., 2021). Therefore, most studies conclude that it is necessary to improve the methodological rigor of the research and increase the number of investigations in the near future.

A possible mechanism through which advertising could modulate the onset and course of problem gambling disorder would be through a combination of processes such as motivation and drive, association and learning, attentional processes, and cognitive control. Neuroimaging studies have revealed that the associated brain areas in PG exposed to GRS (visual and auditory) involve the activation of specific areas such as the striatum, nucleus accumbens, OFC, amygdala, hippocampus and prefrontal regions. Advertising, by using game-related stimuli in its messages, would alter these systems, awakening curiosity, favoring their accessibility to memory and attentional processing, influencing attitudes and producing craving, eventually facilitating relapses. However, the results of research on this topic have some limitations that need to be discussed. First, the clinical status of the patients (active, in remission or abstinent), as well as the intensity and duration of the disorder, must be considered. Secondly, the study factors such as the type of reinforcement, the way to induce craving and the type of stimuli used, controlling that the GRS are specific to the type of game played by the person with the disorder (**Kober** *et al*., 2016). In fact, most of the studies use only one type of stimuli (visual) and the typical cognitive paradigms include tasks of reaction time or estimation of gain/loss, each of these experimental situations involving different cognitive processes that could explain some inconsistencies; therefore, these methodological discrepancies must be considered. Finally, some authors have observed that the failure to correct the significance thresholds for analyzing neuroimaging data in some previous studies could increase the amount of *type I errors* (that is, finding statistical differences in brain regions activation when there is not) and, therefore, make the statistical validity of their results questionable (**Brevers** *et al*., 2019; **Potenza**, 2008).

On the other hand, "responsible gambling" messages and guidelines have not proven their effectiveness in preventing problem gambling (**Labrador** *et al*., 2021; **Williams**; **West**; **Simpson**, 2007). On the contrary, various investigations have documented that their application could be counterproductive (**Cárdaba** *et al*., 2016; **Syvertsen** *et al*., 2022). In fact, in a review carried out

> Activation of brain areas related to reward, learning and memory, as well as executive prefrontal functions could act as a key risk factor for gambling when subjects are exposed to gambling-related stimuli

on the effect of RG campaigns, it was concluded that they would be ineffective as the main strategy to reduce problem gambling, since their impact on non-gamblers, or at-risk gamblers, is minimal (**Williams**; **West**; **Simpson**, 2007). Therefore, it appears that RG messages are perceived as ineffective, unattractive and not very credible (**Labrador** *et al*., 2021). Not only that, but also, in PG, these ads would not have the desired effect either, but could even produce the opposite effect to that expected; that is, they would increase craving in people with the disorder, in addition to not producing any preventive effect in people without previous gambling problems. For example, **Newall** *et al*. (2022) observed in a study of 3000 players with PG that messages aimed at preventing gambling, such as the slogan *'When fun stops, stop!*' used in advertising campaigns in the UK, not only did not reduce the frequency of gambling, but had a counterproductive effect by increasing the number of bets. Because of that, advertising regulations should be based on empirical evidence to accomplish their public health goals in preventing problem gambling behavior.

Responsible gambling advertisements do not appear to be effective in reducing behavior or encouraging self-control; on the contrary, a boomerang effect has been observed

These contributions, and other future ones, should be useful to guide and offer evidence-based information to political and legislative agents with the aim of developing effective strategies that regulate the content of advertising and reduce the damages of problem gambling, especially focused on prevention programs in early ages. Likewise, it is expected that they will serve to adequately regulate advertising about gambling and promote marketing that is more respectful of ethical principles and the code of ethics for advertising, which guarantees the protection of the most vulnerable people and minors, such as was established by the *EU Audio-visual media services directive 2018/1808* (*Directive (EU) 2018/1808*, 2018). "Responsible advertising", rather than placing the responsibility of self-control on gamblers, seems a more promising and necessary goal in the short and medium term.

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Digital footprints of Kashmiri Pandit migration on *Twitter*

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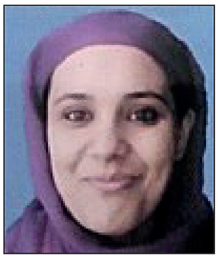

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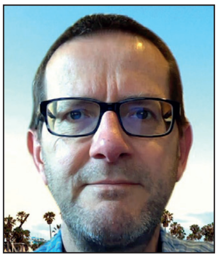

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Abstract

The paper investigates changing levels of online concern about the Kashmiri Pandit migration of the 1990s on *Twitter*. Although decades old, this movement of people is an ongoing issue in India, with no current resolution. Analysing changing reactions to it on social media may shed light on trends in public attitudes to the event. Tweets were downloaded from *Twitter* using the academic version of its application programming interface (API) with the aid of the free social media analytics software *Mozdeh*. A set of 1000 tweets was selected for content analysis with a random number generator in *Mozdeh*. The results show that the number of tweets about the issue has increased over time, mainly from India, and predominantly driven by the release of films like *Shikara* and *The Kashmir Files*. The tweets show apparent universal support for the Pandits but often express strong emotions or criticize the actions of politicians, showing that the migration is an ongoing source of anguish and frustration that needs resolution. The results also show that social media analysis can give insights even into primarily offline political issues that predate the popularity of the web, and can easily incorporate international perspectives necessary to understand complex migration issues.

Keywords

Kashmiri Pandit migration; Content analysis; *Twitter*; *Mozdeh*; Cohen's kappa; *Twitter* data analytics; Social media analytics; Kashmir; Social media; Public attitudes; India.

1. Introduction

It is often believed that Kashmir has derived the title "*paradise on earth*" exclusively due to its unmatched natural beauty. In reality, however, there is much more unfolded to it. Out of the many other determinants contributing towards such adulation, *Kashmiriyat*, an indigenous tradition of communal harmony and religious syncretism, stands out and has definitely been the most indispensable factor to sustain such pursuit. Unfortunately, though, it is this fabric of *Kashmiriyat* that has been the primary casualty due to the protracted political conflict in the valley of Kashmir. The mass exodus of the Kashmiri Pandit community (followers of Hindu religion) that took place at the very beginning of the armed insurgency built many walls and razed the centuries-old bridges between the majority Muslim population and the minority Pandit population. Such unwanted migration not only dented the secular orientation associated with *Kashmiriyat* but also led to an unprecedented loss to humanity in general. In the modern history of South Asia, after the post-partition migration of common people between India and Pakistan, the Pandit migration surely has to be the second largest displacement of common people, ironically an exit that nobody would want because it would mean an exit from Paradise.

The Kashmir Valley has been in crisis since the British-administered partition of India in 1947 led to this Muslim-majority area joining India within the Jammu and Kashmir region. A part of the region has been administered by Pakistan (Azad Kashmir, Gilgit-Baltistan) ever since, and China also administers a small part of it, known as Aksai Chin. Such divided regional control amongst three nuclear powers, primarily from a political perspective, has pushed the region into a protracted conflict that, till date, remains unresolved partially, if not completely. Kashmir conflict has many dimensions; however, of the many ongoing controversial issues in the area, this paper focuses on the Kashmiri Pandit migration of the 1990s, when a large Hindu group migrated from the Kashmir Valley due to the onset of political instability and fear for their safety. Whilst this issue is three decades old, forced migration causes a lifelong crisis for the victims and sympathy continues to be expressed, for example through the 2020 and 2022 *Bollywood* films *Shikara* and *The Kashmir Files*. In particular, the focus is on how this issue is discussed on *Twitter* in the hope of gaining insights into ongoing public opinions about the subject. Social media is suitable for studying political opinions because, unlike traditional media, users play an active part in reporting and sharing online content globally and locally (**Odlum**; **Yoon**, 2015). Social media platforms can therefore transform public discourse and assist by adding grassroots contributions to those of established media agencies, governments, and political organizations (**Karatzogianni**; **Nguyen**; **Serafinelli**, 2016). In addition, social media platforms help generate virtual bonds between users who express their opinions and develop relationships through posts, comments, messages, and likes (**Öztürk**; **Ayvaz**, 2018). According to **Chew** and **Eysenbach** (2010), social media users can share at least 14 different types of information about an issue: news and updated information about an event; individual experiences; personal thoughts and interests; jokes; marketing and products; advertising; irrelevant information; humor and sarcasm; joy; risk reduction; concern, fear, anxiety or sadness; despair and anger; misinformation; and questions related to an event or subject.

Twitter is a popular microblogging platform that is often used in some countries to share news, current status, opinions, and activities during global and local events, making it an attractive source to mine for public opinions about news-related issues (**Pak**; **Paroubek**, 2010). For example, sentiment analyses of tweets are sometimes used to study public perspectives about issues on a large scale (**Li**; **Liu**; **Li**, 2020). *Twitter* has been widely used internationally to discuss refugees and migrants when they are in the news. The different perspectives that it shares (**Nerghes**; **Lee**, 2018) may help users to empathize with displaced people. This makes it a suitable platform to analyse recent reactions to the Kashmiri Pandit Migration of the 1990s.

2. Background of Kashmiri Pandit migration

Kashmiri Pandit migration fits within the history of Kashmir as part of a period of unrest starting in 1988 or 1989 (**Bose**, 1997; 2009; 2021; **Burki**; *United States Institute of Peace*, 2007; **Hanif**; **Ullah**, 2018; **Hussain**, 2021; **Rajput**, 2019). Elements of the unrest were also hostile to the Kashmiri Pandits (**Bose**, 2021; **Evans**, 2002) with fears or misunderstandings that the killings were or would target Hindus indiscriminately (**Evans**, 2002). This then led to a wave of migration of 90,000-100,000 out of 120,000-140,000 Pandits from the Kashmir Valley to escape the threats and violence (**Bose**, 2021; **Sarkaria**, 2009, p. 197; **Sawhney**, 2019; **Singh**, 2015), despite some Kashmiri Muslim delegations and neighbors asking them to stay (**Evans**, 2002). The Kashmiri Pandits are officially termed 'migrants,' by the Government of India and that of Jammu and Kashmir (**Datta**, 2016, p. 53; 2017, p. 1099).

The migrants initially went to refugee camps in Jammu but most subsequently moved elsewhere in India (**Evans**, 2002). Thus, it seems clear that the primary reason for the migration was a genuine fear for safety due to the targeted killings, and widespread unrest.

The mass exodus of Kashmiri Pandits was a humanitarian crisis that brought disrepute to the centuries-old socio-cultural tradition of *Kashmiriyat*, with its communal harmony and religious syncretism (**Zutshi**, 2019). Since 1990, both Kashmir and *Kashmiriyat* remain broken and incomplete until the Kashmiri Pandits have a safe return to the Valley.

Few of the Pandits have returned, despite almost all the major parties in Kashmir calling for this, a small government financial incentive to return in 2008, and an apparent attempt to make Kashmir favorable for migration from India (**Rai**, 2020) and elsewhere. For example, one of the Muslim leaders insinuated,

> "We want our Kashmiri Pandit mothers, sisters, and brothers to come back. It is their land. They have every right to live in it as we do" (**Sharma**, 2004).

In this context, on *Twitter*, it could be expected that Kashmiri Pandits would get widespread support within Kashmir and India.

3. *Twitter* as a source of information on crisis and political opinions

Twitter has been widely used for investigating public reactions and information dissemination during natural crises. For instance, *Twitter* has been used to help trace the spread of discussions about infectious diseases like Zika, Ebola, H1N1, and COVID-19 (**Bhat** *et al.*, 2020; **Guidry** *et al.*, 2017; **Jain**; **Kumar**, 2015; **Medford** *et al.*, 2020; **Thelwall**; **Thelwall**, 2020; **Thelwall**, 2021; **Vijaykumar** *et al.*, 2018), to hold opinions about gender bias (**Thelwall**, 2018 a, b) and also during natural disasters like floods (**Gul** *et al.*, 2018; **Middleton**; **Middleton**; **Modafferi**, 2013). In addition, *Twitter* has also been used to investigate social movement communication during the 2011 UK riots (**Gascó** *et al.*, 2017) and Wisconsin Labor Protests (**Veenstra** *et al.*, 2014), for stock market prediction (**Mittal**; **Goel**, 2012), to study consumer perceptions (**Schivinski**; **Dabrowsk**, 2016), and for election predictions (**Ansari** *et al.*, 2020; **Gul** *et al.*, 2016; **Wang** *et al.*, 2012). All these studies have shown that *Twitter* can be a useful source of information about public opinion related to political issues, although they do not prove that it is always useful, and all prior research has had substantial limitations. In particular, all have had to ignore the opinions of those that do not tweet. This is a substantial limitation given that tweeters tend to be atypical within a country.

3.1. *Twitter* analyses of migrations to Europe

Twitter data has been used to investigate reactions to migration episodes across the globe, including to contrast the "deserving refugees" and "undeserving migrants" frames of reference. Most of the analyses seem to have focused on Europe. **Urchs** *et al.* (2019) analysed 2015 tweets about migrants and refugees to Hungary, Germany, and Austria. The study found that most tweets were sent in the initial stages and were predominantly in English, followed by German. A high proportion were retweets or contained links to information elsewhere.

Similarly, **Coletto** *et al*. (2016) examined EU citizens' tweets related to the *Mediterranean Refugee Crisis.* The analysis showed that the term "refugees" was associated with a positive attitude, but "migrants" was associated with negativity. Most tweets came from the United Kingdom, followed by France and Germany. There was a significant peak in tweets on three news-related days, showing that European users were sensitive to news events.

Several studies have found positivity towards migrants or refugees on *Twitter* in Europe.

Vázquez and **Pérez** (2019) analysed refugee-related tweets referring to the ship *Aquarius*, which carried refugees to the Spanish port of Valencia after being rejected by Italy. They analysed tweets in Spanish, finding that most of the messages were positive towards the refugees. However, the share of negative messages, including hate speech against the refugees and politicians, grew after the Spanish government welcomed the refugees. This illustrates that *Twitter* can be used to voice discontent against government policies and is perhaps a more natural medium for protest rather than agreement. **Arcila-Calderón** *et al.* (2021) also analysed refugee-related Spanish tweets around high-profile events, finding an overall positive attitude towards the refugees. In this case, the most negative words were mainly reserved for the politicians.

Aydemir and **Akyol** (2020) explored the negotiation of pro-migrant online activism campaigns and evaluated the response of individuals in France and India during the COVID-19 pandemic. The tweets tended to express support, solidarity, and help for migrants.

In contrast, other studies have found negativity towards migrants or refugees. **Backfried** and **Shalunts** (2016) analysed the refugee crisis in German, finding that the temporal sentiment in traditional media was neutral, whereas social media was dominated by negative sentiment.

Yantseva (2020) analysed migration attitudes in Sweden with newspapers, an online forum, and *Twitter*. The study concluded that messages shared on social media sound negative, and some media frames contributed to a migration-hostile discourse. **Ozduzen**, **Korkut** and **Ozduzen** (2020) studied the evolutionary modes of online anti-immigrant and racist discourse related to Syrian Refugees in Turkey. The qualitative content analysis and sentiment analysis of tweets revealed that most of the tweets express a clear racist attitude towards Syrians. The negativity in Turkey, Germany, and Sweden may reflect negative media frames or more popular or better-organized anti-immigrant right-wing groups.

The mainstream news media, politicians, and influential tweeters can all impact the way in which migrants are discussed.

Ferra and **Nguyen** (2017) analysed the public discourse and online platforms related to the migrant crisis in 2016. They deduced that many international media outlets, media-related individuals, and NGOs play an active role in transmitting information and shaping public discourse. Also, the wide geographical distribution of users reflected by their *Twitter* accounts shows that the discourse on the topic has a transnational-global reach.

Vilella *et al.* (2020) found a strongly separated network of tweets about migration in Italy that showed clear interaction with the Italian political and social landscape that seemed to be disconnected from the actual geographical distribution and relocation of migrants.

Gökçe and **Hatipoglu** (2021) analysed four months of tweets about the Syrian refugee crisis, finding that half of the tweets were associated with at least one political party in Turkey.

Nerghes and **Lee** (2018) analysed tweets posted two days after the death of the three-year Syrian refugee toddler Alan Kurdi, who drowned in the Mediterranean Sea. They found that more influential users made less dramatic statements.

3.2. Analysis of migrations in other countries through *Twitter*

Twitter has also been used to study migrations in other parts of the world.

In relatively mono-ethnic South Korea, 500 Yemeni refugees isolated offshore caused substantial debates about gender, nationalism, and identity (**Kim** *et al*., 2020).

In Cameroon, tweets discuss diaspora communities, with social media giving activists a platform to engage with government narratives (**Nganji**; **Cockburn**, 2020).

In the USA, **Walker** and **Boamah** (2020) analysed the tweets related to the *"Central American Migrant Caravan"* travelling from the Guatemala–Mexico border to the Mexico–United States border in 2018. Whilst tweets that were positive about the migrants expressed emotions like trust, joy, and anticipation, negative tweets mostly expressed fear and anger.

In India, internal migration issues have been mainly tweeted in relation to Covid-19. Analyses of tweets about the internal migrations of workers returning from cities to their home villages due to Covid-19 economic closures have shown widespread trust in, and reliance upon, government intervention to support those affected by the disruption (**Misra**; **Gupta**, 2021). In partial contrast, a smaller-scale analysis focusing on the deaths of migrant families in a train accident led to *Twitter* pressure on the government for greater support to poor workers with Covid-19 unemployment (**Sharma**, 2022). This issue faded from *Twitter* relatively quickly. This is unsurprising since *Twitter* is news driven to some extent.

4. Methods

The research design was to gather a large sample of tweets mentioning Kashmiri Pandits and then conduct an exploratory content analysis of them and report quantitative information about the tweets. This is a common approach in *Twitter* research (e.g., **Chew**; **Eysenbach**, 2010), although data mining (**Misra**; **Gupta**, 2021), network analysis (**Nerghes**; **Lee**, 2018), and sentiment analysis (**Bhat** *et al.*, 2020) are also used. We did not use data mining or sentiment analysis because the issue is fundamentally multilingual so these would not be very effective. We did not use network analysis because interactions between tweeters seemed too rare for this topic to give relevant results. As described below, the content analysis was inductive, with the coders designing relevant categories after reading samples of tweets. The inductive approach is appropriate because this is the first analysis of *Twitter* for the topic and there are no guides about the issues that are likely to be discussed.

A keyword search method was developed to identify many tweets that were clearly relevant to Kashmiri Pandit migration.

It is impossible to retrieve *Twitter* for all tweets relating to Kashmiri Pandit migration because some relevant tweets contain only images and others may allude to the issue without mentioning it directly (e.g., "I agree!", "19 Jan is a day of sad memories for me.", "I do not feel safe here anymore"). The stages of the methods, including the content analysis part, were as follows.

1. Eight relevant hashtags were found by exploring *Twitter*: #KashmiriPanditMigration, #KPExodusDay, #HumWapasAayenge, #kashmirexodus1990, #iheartkashmir, #KashmiriHindus, #Kashmiri_Pandit_targetted, #kashmiri_pandit. These were selected from a much larger initial set of potentially relevant tags after rejecting those matching a substantial proportion of irrelevant tweets.

2. All tweets matching these eight hashtags from the start of *Twitter* (2006) to August 2021 were downloaded from *Twitter* using the academic version of its application programming interface (API) with the aid of the free social media analytics software *Mozdeh* (*mozdeh.wlv.ac.uk*).

3. The top 1000 hashtags were extracted from the matching tweets.

4. The 1000 hashtags were manually checked to identify those that were directly about Kashmiri Pandits, finding 85.

5. All tweets matching these 85 hashtags from the start of *Twitter* (2006) to August 2021 were downloaded from *Twitter* using the academic version of its API. Accordingly, a total of 2,768,695 tweets were downloaded.

6. The tweets were filtered to remove duplicates (e.g., multiple copies of the same retweet, otherwise identical tweets). Before the duplicate check, all hashtags and @usernames were removed from the tweets to eliminate spam tweets that add random hashtags or usernames to marketing information.

7. To avoid domination by individual tweeters, a maximum of one tweet per tweeter per month was allowed, chosen at random by *Mozdeh* with a random number generator. This is a compromise rule that allows multiple tweets from prolific tweeters but restricts them to one per month so that they do not overwhelm the data. This gave 111,788 tweets.

8. The countries of the tweeters were identified by checking their *Twitter* biographies for country names (e.g., India, Pakistan) or major cities (e.g., Islamabad, Delhi). The countries of users with biographies not containing these indicators were left undefined.

9. A set of 1000 tweets was selected for the content analysis with a random number generator in *Mozdeh*. Two coders (Library and Information Science researchers) based in Kashmir identified a relevant set of categories for these tweets, coded all the tweets, and designed descriptions for the categories (i.e., a content analysis codebook). Categories were chosen based on the main points of the tweets when several tweets made similar points. Tweets not in a language that the coders could read were translated using *Google Translate*.

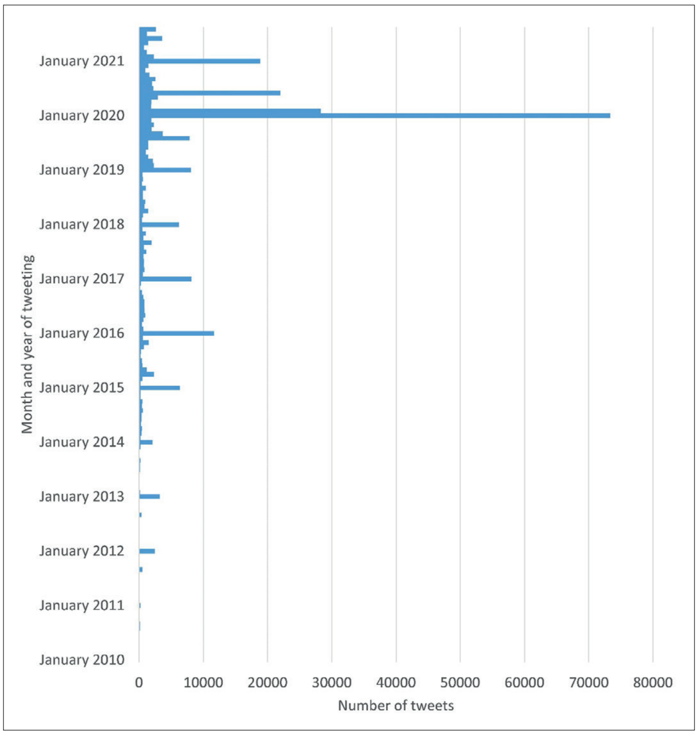
10. A further 100 tweets were randomly selected and coded by the two coders for a consistency check with Cohen's kappa (**Cohen**, 1960). The inter-coder consistency check had a Cohen's kappa score of 0.84 on the 99 non-missing tweets, which is high enough to validate the categories and coders.

5. Results

The first tweet collected by the hashtag queries was from 2019 and there was at least one tweet every month from January 2020. The number of tweets tended to increase each year, led by increases in January on the anniversary day (Graph 1). This suggests that the issue is growing in online attention, but the results may be distorted by increases in the proportion of the Indian population using *Twitter*, by old tweets being deleted by users when they leave the platform or clean their timeline, or by *Twitter* banning of controversial tweets. Perhaps more importantly, major news events like related film releases may have increased the volume of tweets for recent years.

5.1. Geographical distribution of tweets

The 111,788 tweets (one per user per month) matching the 85 Kashmiri Pandit migration hashtag queries were mainly from India (89%), with low representation from other countries (Table 1). The dominance by India is expected because the area of concern is within India. Tweets from other countries, such as the USA, might also be partly from Indians that have moved abroad, whether temporarily or permanently.



Graph 1. Number of tweets per month from January 2010, after filtering out duplicate tweets

Table 1. National origin of tweets matching 85 Kashmiri Pandits hashtags (one per user per month), excluding the 52.3% with an unknown origin (top 10 countries)

Country	All tweets	Tweets from an identified country	Tweets
Unknown	52.3%		58,515
India	42.4%	89.0%	47,425
USA	1.9%	4.0%	2,131
UK	0.9%	2.0%	1,059
Pakistan	0.4%	0.9%	469
Canada	0.3%	0.7%	383
Australia	0.3%	0.6%	314
United Arab Emirates	0.2%	0.4%	197
Germany	0.1%	0.3%	153
Singapore	0.1%	0.2%	100
Nigeria	0.1%	0.1%	64

5.2. Content analysis of tweets

A content analysis of a random sample of 1000 tweets matching the 85 Kashmiri Pandit migration hashtags produced ten categories of tweets (Table 2), nine of which reflect different ways of tweeting about the topic. The inter-coder consistency check had a Cohen's kappa score of 0.84 on the 99 non-missing tweets, which is high enough to validate the categories and coders.

Almost a third of the tweets were from three ostensibly neutral topics but often expressed implicit emotions or criticism (Graph 2). These three topics were: Sharing news and information (16.2%), Providing suggestions (10.7%), and Asking questions (6.4%). Thus, given that the remaining categories were explicitly emotional or critical, this shows that the issue of Kashmiri Pandit migration is emotionally charged on *Twitter*.

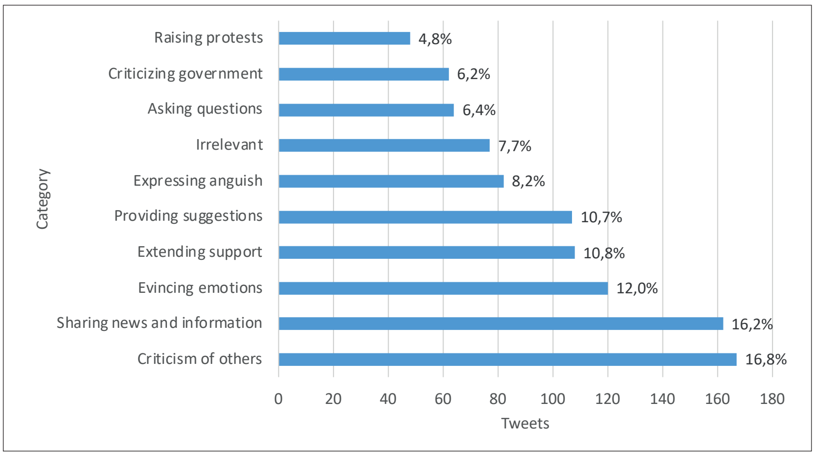
Over a fifth of the tweets about Kashmiri Pandit migration criticized others (16.8%) or the government of Jammu and Kashmir (6.2%), representing widespread dissatisfaction with the situation. A fifth of the tweets primarily expressed emotions: Anguish (8.2%) or others (12.0%). The remaining 16% of tweets were implicitly critical of the current situation by Extending support (to Kashmiri Pandits) (10.8%) or Raising protests (4.8%).

It is perhaps unsurprising that the tweets were overall very critical of the current situation of the Kashmiri Pandit migration because those who are not critical of the situation would not need to tweet about it. Therefore, it is unclear whether the

Table 2. Categories identified for a random sample of 997 tweets matching 85 Kashmiri Pandits hashtags

Category	Description	Example tweet (anonymised)
Evincing emotions	Reflects pain or sorrow about the situation of Kashmiri Pandits	Today is #KashmiriPanditExodus when #KashmiriPandits were forced from their homes by Islamists with murder, torture and threats. Their departure is ignored
Expressing anguish	Expresses anger, annoyance, and frustration about the situation of Kashmiri Pandits	The media calls the murderers militants but they are TERRORISTS! #kashmiriPanditGenocide [URL]
Sharing news and information	Communicates information or news related to Kashmiri Pandits	I welcome this RT @ANI_news: Delhi: Narendra #Modi meets Kashmiri delegation [URL} #KashmiriPandits
Criticizing government	Condemnation of central and state government policies and activities	Kashmir Valley politicians tell lies [URL] this is painful for #KashmiriPandits
Criticism of others	Opposition, disagreement with a person, group, community, or organization	RT @[username]: When #PanunKashmir said #Pakistan was a terrorist country you laughed at us. Now you agree…
Raising protests	Highlights the voices of people against the exodus of Kashmiri Pandits	It is time to get Kashmiri Hindus back in Kashmir. Never forget or forgive #KashmiriHindus [URL]
Extending support	Reflects solidarity and support with Kashmiri Pandits	RT @[username]: #KashmiriPandits I live far away but support the call for kashmiri pandits to be represented in the JK assembly
Asking questions	Asking any questions about the Kashmiri Pandits situation	Why is the killing of hindus irrelevant? How many lives were lost? #kashmiripandits @[username]
Providing suggestions	Depicts an idea, opinion, plan or reason related to Kashmiri Pandits	@[username] No! Returning all #KashmiriPandits home safely should be the top priority. Then the bad laws can be removed
Irrelevant	Unrelated to Kashmiri Pandits	This boat on Lake Dal is beautiful #colours #boat #Srinagar #Kashmir [URL]

situation on *Twitter* reflects the general opinion of people who know about the issue. However, some of the tweets were not explicitly critical of the situation but emphasized other aspects. For example, many tweets included links to news stories about an old Kashmiri Pandit who had remained in his ancestral village in Kashmir and had no co-religionists to cremate him when he passed away. The news stories celebrated that his Muslim neighbors had carefully performed his last rites according to Hindu traditions, emphasizing this small act of kindness.



Graph 2. The frequency of ten categories identified for a random sample of 997 tweets matching 85 Kashmiri Pandits hashtags

Some news stories announced the release of movies relating to Kashmiri Pandits. These films raised the profile of the issue, and therefore tweets about them would do the same. For example, the most retweeted tweet (20,178 retweets) was from filmmaker Vivek Ranjan Agnihotri announcing that he was making a film, *The Kashmir Files*, about the genocide. Nevertheless, some people may have tweeted about the movies for their own sakes. Another highly retweeted movie was Vidhu Vinod Chopra's romance/drama *Shikara* (6,164 retweets for the top tweet), although this also attracted criticism from some Kashmiri Pandits for its marketing strategy.

6. Discussion

A limitation of the results is that they only reflect the opinions of social media users. Since the *Twitter* users in the dataset seem to be primarily from India and Kashmir is part of India, it is not clear whether they present a non-Kashmiri perspective or a Kashmiri perspective. Another limitation is that the short length of tweets means that they may be misinterpreted in the content analysis. Moreover, the random sample used for the content analysis gives an overall picture of how the issue is discussed but will be dominated by popular time periods and does not help to distinguish between the comments made at different points in time. The sample size (1000) gives only rough estimates of the proportions of tweets matching each category (**Kim** *et al*., 2018).

Kashmiri Pandit migration led to the settlement of Kashmiri Pandits mainly in Jammu and other parts of India, which may be the reason why most of the tweets related to the migration are from India. However, some families may have settled abroad, expressing their sentiments related to the event. The results also confirm that even 30 years after the migration, sentiments are still alive, and *Twitter* has helped channel the feelings from India and other global regions.

Whilst, as reviewed, many investigations of tweeting about migrants found prevalent negative attitudes towards migrants (**Backfried**; **Shalunts**, 2016; **Ozduzen**; **Korkut**; **Ozduzen**, 2020; **Yantseva**, 2020), the current study did not find negativity towards the Kashmiri Pandits. Instead, many tweets were strongly supportive of them, echoing the view of almost all political parties in Kashmir and India that they should be welcomed home. The strong negative emotions in the tweets tended to be directed instead against those that were perceived to be blocking this return, and not doing enough to facilitate the homecoming. The latter echoes some previous analyses of tweets about migrants, in the sense of *Twitter* being used to express frustration against, or disagreement with, politicians (**Arcila-Calderón** *et al*., 2021; **Nganji**; **Cockburn**, 2020). In addition, there were many news-sharing and question-asking tweets. The time series graph (Graph 1), confirms that the situation is still considered current and evolving, despite the migration occurring well before the debut of *Twitter*.

One of the critical concerns is the return and rehabilitation of the Kashmiri Pandits. As evident from the tweets, many are dissatisfied with the overall government actions. Some of the tweets also express love and warmth from Kashmiri Pandits to their former Muslim neighbors in the Valley, suggesting that the *Kashmiriyat* bond has not been completely broken by the migration.

7. Conclusion

This *Twitter* analysis has shown that the Kashmiri Pandit migration of the 1990s that ruptured the social, cultural, religious, political, and ethnic heterogeneity of the Valley is still an emotionally charged issue that is commemorated in January each year. In this context, there is still pressure on governments to resolve the issue of their return peacefully, supporting the aspirations of both Muslim and Pandit communities. The local support to welcome back the Kashmiri Pandit community may also restore the reputation of the centuries-old socio-cultural tradition of *Kashmiriyat*. The syncretistic social fabric of Kashmir for which it was and is known will become more strengthened if the Kashmiri migrant Pandits will find a return to the Valley. An open-door policy from all societal sectors will help the community to find their lost homes and identities.

Recall that the Kashmiri Pandit migration predated *Twitter* for decades and occurred before the web became popular, unlike the topics of most political *Twitter* analyses. This study was still possible because *Twitter* is popular in India (*Statista*, 2022). Because of this, there were enough tweets to analyse even though the Kashmiri Pandits are not a “social media issue”, in the sense of the Arab Spring, #MeToo, or #BlackLivesMatter, even though there are important geographic dimensions. Thus, this study has shown that *Twitter* can be used to investigate important political issues that are not natural case studies for social media, as long as social media are widely enough used for substantial data gathering. Finally, for those studying issues around migrant communities, the results confirm one key advantage of social media analysis: the ability to easily incorporate global perspectives for an issue that is intrinsically international.

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