

Review Article

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Fake News in Educational Communication: A Systematic Review

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Abstract

Background/purpose. The authors of this research present a study on Fake News and the communication processes that are generated in different educational and professional contexts through a systematic review.

Materials/methods. This is descriptive research that analyses 139 results present in Web of Science and SCOPUS, using the criteria established by the PRISMA protocol. It gives special relevance to the following categories: country of origin, date of publication, main objectives, methodological design, variables analyzed and considered, size and details of the samples, and their respective scientific contributions in relation to their area of research.

Results. The results show that this is a new field of study due to the lack of in-depth studies on the subject. Despite this, this analysis provides three major areas of action regarding fake news: its definition, diagnostic tools, and students' perspectives. These phases can be considered and included in current educational policies to curb misinformation and promote adequate media literacy.

Conclusion. The value of this research lies on offering a critical view based on an in-depth analysis of the existing scientific production between Fake News and communication in education.

1. Introduction

Last two decades has seen a remarkable transformation in human beings. Although this statement may seem overstated, new technological advancements have impacted the lives of millions of people (Vaterlaus et al., 2011). The communicative process evolves differently from previous times, as does the way of relating interpersonally (Torres et al., 2011). Smartphones must be identified as the axis of new routines, habits, and customs in relation to digital media (Mauri et al., 2023). Tablets, smartwatches (Siepmann & Kowalczyk, 2020), and smart speakers are examples of devices that promote environments in which people will develop new ways to do shopping, get information, entertain themselves, or interact and communicate with each other. Because smartphones have become a vehicle for many digital practices other than phoning, such as participating in social networks (Romero et al., 2020) and communicating through instant messaging, practices that expose new digital consumption routines (Hu, Mao & Zhang, 2025).

2. Literature Review

ICTs have established themselves as a means for creating and disseminating information, increasing the speed with which messages are sent and received. Since technological decentralization entails the creation of numerous discourses around any fact or event, this context necesses rapid screening in terms of sources and content (Auberry, 2021; Lee, 2018; Nygren et al., 2021; Dias & Walmsley, 2019; Loos et al., 2018; Ricoy et al., 2019; Rogers 2019). One of the issues that have risen in the age of digital democracy is Fake News (Ushkin, 2024), an exponential increase (Gordon, 2018; Haynes et al., 2022; van Helvoort & Hermans, 2020), whose definition is still unclear (Tibbs, 2024). Actually is used to refer to news that has been altered or is not supported by true data (Bhaskaran et al., 2019). Beyond altering the truth, this type of action is expected to cause serious digital difficulties for citizens (Stoddard et al., 2021).

The rise of information issuers in digital formats represents a before and after in history. Smartphones make it possible to create, adapt, and transmit any type of data (Buckingham, 2019). This device assumes that human interaction can be translated to non-physical settings, including communication. A global, direct, and instant alternative that has not gone unnoticed by those who wish to spread Fake News. On a large scale, prominent examples reveal the deliberate and harmful nature of Fake News (Thakar & Bhatt, 2024).

Fake News is intended to deceive the people who receive it. The technological boom has practically made it possible to have information available 24 hours a day. Nomophobia is becoming a more prevalent topic of study, particularly because smartphones already generate dependence (Rodríguez et al., 2020). All of this necessitates an almost unlimited offer, no longer conditioned by the big media, which responds to new profound and constant consumption habits. Because the use of mobile devices is rooted in increasingly younger and older ages, an intergenerational issue is also critical (Bringula et al., 2021). This disparity can increase Fake News consumption, exacerbated by the youth's lack of experience in dealing with information (Syam & Nurrahmi, 2020) and the absence of digital screening skills as people get older.

Questions about how to behave in the digital environment must be added to this situation of information creation and consumption (Mostafa et al., 2025). If there are certain guidelines and models of proceeding in the physical world, the current trend toward the digital incorporates new suitable patterns of participation in society. Netiquette was coined at the end of the 20th century as a combination of "netiquette" and "Internet." A method of approaching citizenship that is channeled through fingerprinting and which, in the face of technological advancement, necessitates constant research (Soler et al., 2021). However, the rise of cyber-bullying (Goncalves & Vaz, 2021) and fraud (Anafo & Ngula, 2020), as well as fake news, show that there is a clear lack of preparation in this field.

The point is that, in addition to occurring with young people, these types of crimes and problems are spreading to situations involving older individuals.

Because its own goal promotes fully developing human beings and allowing them to be active members of society, a whole new paradigm cannot be foreign to the educational system (Kaufman, 2020; McDougall, 2019). The reality for students is that they have direct contact with information from compulsory educational stages (De Carvalho & De Sousa, 2020; Lopez & Planillo, 2021) to higher levels (Mendiguren et al., 2020; Onursoy et al., 2020). This creates a clear risk of political speech, misinformation, populism, polarization, bots, and hate speech (Johnston, 2020). It is critical to educate current and future generations about Fake News: how they are created and spread (Eger et al., 2020), raise awareness about their effects (Fontanin, 2018), and demonstrate how disinformation can be tackled (Shapalova, 2020).

Digital Competence (DC), a personal development format that was introduced into the Spanish educational system in 2006, is now clearly established as the key to the present and future of the 21st century (Mesquia et al., 2021). Although there are specific issues, such as Fake News (Antunes & Nina, 2020), information and media literacy (Antunes, 2021; Horn & Veermans, 2019) is becoming more in-depth. Digital scams, cyber-bullying (Medina et al., 2020), and haters on social networks are all increasing, indicating an increase in digital risks. ICTs have more possibilities but also new needs that are not limited to a specific age group but are also intergenerational (El Rayess et al., 2017; Weiss et al., 2020). Continuous adaptation of frameworks like the Digital Teaching Competence (DTC) reveals flaws and improvements, increasing their confusion when discussing future teacher training, which is a crucial fact to consider if one wants to envision a better future.

The current study is proposed based on this new paradigm. Fake News, as a biased alteration of the communication process, is becoming more common. Understanding how disinformation is created, adapted, and spread in digital environments is critical. The training industry is moving toward the integration of ICTs, as evidenced by the evolution of communication processes among educational actors. The school cannot be ignorant to new habits and risks that can affect human development, which is why this project focuses on exposing the scientific reality between Fake News and the educational context. This is determined by a review of the existing literature in the main databases used for the study. It is a method of knowing and understanding, which includes the consideration of deception in highly informative and formative fields like education.

3. Methodology

This systematic review is based on an examination of existing literature on the term "Fake News" in the Scopus and Web of Science (WoS) databases across educational contexts. Its realization has been developed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009) in order to answer the research questions and to verify the hypotheses listed below. Other publications in impact journals have also been considered (Jurado et al., 2020; López et al., 2019; Rodriguez et al., 2019) with the goal of following analysis models validated by experts. The country of origin, date of publication and main objectives, methodological design, variables considered, sample details as well as their respective scientific contributions to the subject are all included in the analysis.

3.1. Research questions and hypotheses

Before addressing the search strategy, the starting point for this research must be provided through the search questions and hypotheses. As indicated in the theoretical framework, the rise of fake news is a direct consequence of new media supported by ICTs. Its impact has been real in processes as relevant as the United States of America elections. Therefore, this research delves into

fake news in the field of education. Is there scientific work that unites fake news and education at its different levels? This question led to understanding how, if so, it was being addressed.

RQ1 In what state is the scientific production related to Fake News in educational field?

RQ2 What type of research is being developed around Fake News in educational field?

Two research hypotheses were developed. The first was closely related to the current state of the art, asking whether the fake news phenomenon had been addressed from a scientific perspective in recent years rather than as a social phenomenon. The second hypothesis focused on the processes of detecting and controlling fake news over the last five years. Both questions were intended to be clear indicators from which the integration of fake news into society could be inferred through its main driver, formal education.

H1 Fake News has been increased significantly over the last five years?

H2 Are new strategies to combat Fake News been detected over the last five years?

3. 2. Search strategy

During the months of September, October, and November 2021, a search was carried out on the presence of Fake News in the educational field. Given the nature of this research, an extended search by terms were established in two relevant scientific databases (Aksnes et al., 2019), Web of Science and SCOPUS. The investigation on these bases was developed through the combination of terms in the title together with the AND logical operator. These selected keywords were "early-years", "pre-school", "primary education", "secondary education", "further education", "higher education", "school", "university", and "education" since they represented the diversity of approaches and educational stages that are most significant today. The general search strings, only in English, were in Web of Science the following: TITLE: ("Fake New*") AND TITLE: ("early years"); TITLE: ("Fake New*") AND TITLE: ("pre-school"); TITLE: ("Fake New*") AND TITLE: ("primary education"); TITLE: ("fake new*") AND TITLE: ("secondary education"); TITLE: ("Fake New*") AND TITLE: ("further education"); TITLE: ("Fake New*") AND TITLE: ("higher education"); TITLE: ("Fake New*") AND TITLE: ("school"); TITLE: ("Fake New*") AND TITLE: ("university"); TITLE: ("Fake New*") AND TITLE: ("education"). Regarding SCOPUS, they were: (TITLE ("Fake New*") and title ("early years"); (TITLE ("Fake New*") and title ("pre school"); (TITLE ("Fake New*")) and title ("primary education"); (TITLE ("Fake New*") and title ("secondary education"); (TITLE ("Fake New*") and title ("further education"); (TITLE ("Fake New*") and title ("higher education"); (TITLE ("Fake New*") and title ("school"); (TITLE ("Fake New*") and title ("university"); (TITLE ("Fake New*") and title ("education") This initial search returned 139 files, although the final sample consisted of 34 references.

3. 3. Inclusion criteria

The results were channeled to the final sample through the PRISMA protocol (Moher et al., 2009), designed for conducting systematic reviews. The main objective was to analyze those articles focused on Fake News and its presence in educational contexts, which is why such restrictive search criteria were established. Afterward, those results articles that were not in educational contexts were eliminated, both in WoS (n=56) and in the SCOPUS database (n=83). Of the 79 articles that remained, those duplicates were eliminated since they were part of both databases (n=40). Once suppressed, the availability and information contained in the remaining 39 articles were analyzed in order to verify their eligibility. Finally, those whose texts were not accessible on the Internet (n=5) were eliminated, leaving 34 as the final reduced sample (Figure 1). All of them are articles incorporating the term Fake News in their title and one of the previously mentioned educational stages. They are not repeated in both databases, and the full text has been accessed.

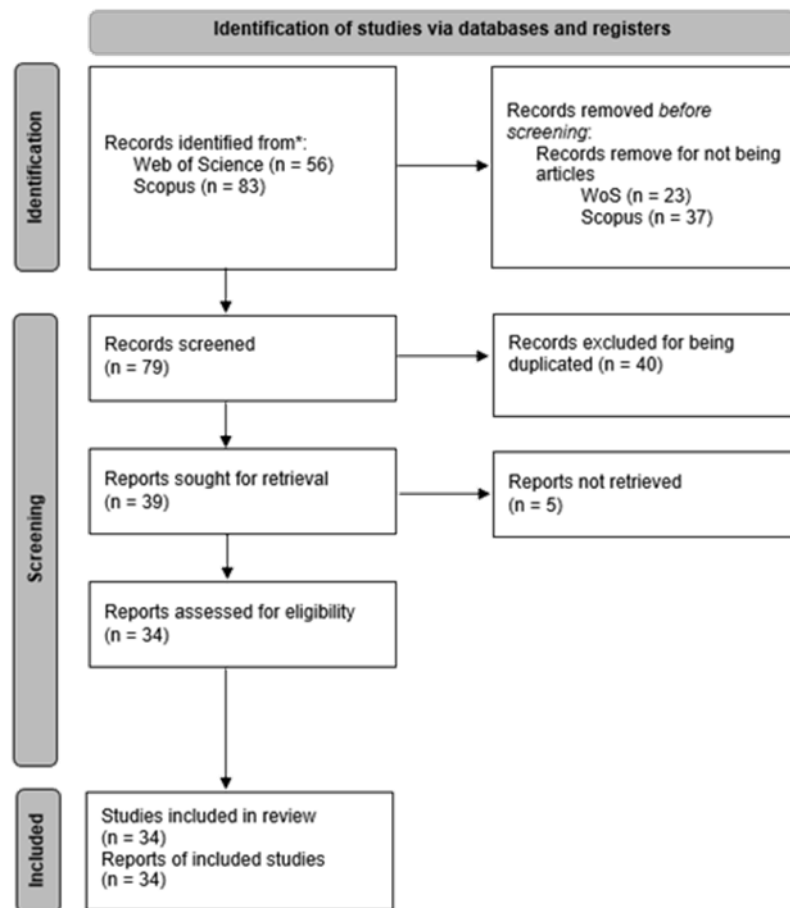


Figure 1. Flowchart of the PRISMA Systematic Review on communication and ML

3. 4. Content analysis

As indicated, the selection and screening of the articles analyzed was based on the PRISMA methodology. No criteria were developed related to the content of these articles since, in order to answer the research questions and initial hypotheses, it was important to understand the scientific output on this subject of study, applying the least possible bias. The 34 articles displayed diverse approaches, methodologies, and content, an aspect that adds value to the research in this case, as it reflects the real state of fake news in the educational field.

The 34 articles were read and analyzed, classifying their data according to the criteria shown in the previous section: country of origin, date of publication, main objectives, methodological design, variables analyzed and considered, size and details of the samples; and their respective scientific contributions in relation to their area of research. For more information, the tables developed for the analysis of each article are included in the Appendix: Table A1 and Table A2.

4. Results

For the development of this section, it has been decided to elaborate a codification of the analyzed articles. This approach has been elaborated to favor the exposition of the results concisely, facilitating the understanding and direct relationship with the studies examined. The coding of the works is specified in Table A1 and Table A2. These tables include the main variables analyzed of the investigations, whose results are described in the following subsections. The organization, through two tables, Tables A1 and A2, is based on the possible grouping by a scientific approach, which is empirical in the first case and purely theoretical in the second. In turn, Table A1 highlights the

methodological disparity: quantitative approaches (n= 12), qualitative approaches (n= 5) and mixed approaches (n= 3).

4.1. Country

The nationalities of the authors of the analyzed works amount to 22 countries. In the case of single authors, the greatest presence falls on the United States (Kaufman, 2020; Rogers, 2019; Auberry, 2018; Gordon, 2018; Lee, 2018; Stoddard, 2021; Haynes, LaWanda & Patton, 2021; Loos, Ivan & Leu, 2018; and Weiss et al., 2020), Spain (Ricoy, Sanchez & Feliz, 2019; Lopez & Planillo, 2021; & Mendiguren, Pérez & Meso, 2020), Portugal (Antunes, Lopes and Sanches, 2021; Figueira & Santos, 2019; and Antunes & Salome, 2020) and the Philippines (Paglinawan, 2020; and Rex et al., 2021). There are combinations with European (McDougall et al., 2019; and Eger et al., 2020) and intercontinental (Dias & Damien, 2018) approaches, although the independence of the origin of the articles stands out. The cataloging by approach also exhibits variety, with 17 different nationalities in the case of empirical works and nine in the theoretical ones. Only the United States, Spain, Portugal and Brazil four contribute papers in both cases, with the United States (Kaufman, 2020; Rogers, 2019; Gordon, 2018; Lee, 2018, and Haynes, LaWanda & Patton, 2021) and the United Kingdom (Dias & Damien, 2018; McDougall et al., 2019; and Buckingham, 2019) contributing the most in the theoretical block.

The researchers' variety of nationalities highlights this research topic's international relevance. It is striking that different approaches are being made from 22 different countries, which exposes how the Fake News phenomenon is not a local problem. Another outstanding point is the number of papers made up of members of different nationalities, data that reinforces the interconnection of this situation and promotes the creation of more extrapolated scientific content. In particular, the particular cases of the theoretical production of the United States and the United Kingdom must be mentioned, since they group a significant percentage of works in this area. This can be extrapolated to the specific impact of Fake News in both countries, highlighting the United States due to the political period led by Donald Trump).

4.2. Language

Most of the articles considered were written in English (Kaufman, 2020; Rogers, 2019; Shapalova, 2020; Nygren et al., 2021; Dias & Damien, 2018; Abram, 2019; Auberry, 2018; Bhaskaran, Mishra & Nair, 2019; Gordon, 2018; Lee, 2021; Antunes, Lopes & Sanchez, 2021; Haynes, LaWanda & Patton, 2021; Fontanin, 2018; Horn & Veermans, 2019; Johnston, 2020; Loos, Ivan & Leu, 2018; El Rayess et al., 2017; Syam & Nurrahmi, 2020; Weiss et al., 2020; Eger et al., 2020; Paglinawan, 2020; and Rex et al., 2021), the rest being written in Spanish (Lagomarsino et al., 2019; Figueira & Santos, 2019; Lopez & Planillo, 2021; Mendiguren, Perez & Meso, 2020; and Antunes & Salome, 2020), Italian (Fontanin, 2018), Portuguese (De Carvalho & de Sousa, 2020), Turkish (Onursoy et al., 2020) and Catalan (Antunes, Lopes and Sanches, 2021). Several cases presented in two languages, English and Spanish (McDougall et al., 2019; Buckingham, 2019; and Ricoy, Sanchez & Feliz, 2019) stand out.

The analysis that can be carried out of this data, the language of the works that make up this work, is subject to two factors. The first is the origin and nationality of the authors, with publications from English-speaking countries such as the United States and the United Kingdom being significant. On the other hand, it is difficult to isolate the research work and scientific dissemination of media that bet on English as the main language. In this sense, it is coherent that most papers are presented in this language, both due to publication constraints and the worldwide implementation of this as a global scientific language. Despite this, the Spanish, Italian or Portuguese cases stand out; even more striking is a publication in a minority language such as Catalan.

4.3. Dates

All the articles analyzed are included in the last six years (Figure 2), the first being dated in 2017 (El Rayess et al., 2017) and the most recent in 2021 (Nygren et al., 2021; Stoddard, 2021; Antunes, Lopes & Sanches, 2021; Haynes, LaWanda & Patton, 2021; Lopez & Planillo, 2021; and Rex et al., 2021). A clear growth trend can be seen from 2017 to 2020, rising significantly in 2018 (Dias & Damien, 2018; Auberry, 2018; Gordon, 2018; Lee, 2018; Fontanin, 2018; and Loos, Ivan & Leu, 2018) and 2019 (Rogers, 2019; McDougall et al., 2019; Lagomarsino et al., 2019; Abram, 2019; Bhaskaran, Mishra & Nair, 2019; Buckingham, 2019; Figueira & Santos, 2019; Ricoy, Sanchez & Feliz, 2019; Horn & Veermans, 2019). It also highlights an evident decrease in 2021 (Nygren et al., 2021; Stoddard, 2021; Antunes, Lopes & Sanches, 2021; Haynes, LaWanda & Patton, 2021; Lopez & Planillo, 2021; and Rex et al., 2021), returning to 2018 figures. There is a similarity in the number of publications per approach, being almost identical in 2018, 2019, and 2021. However, it is in the year 2020 when the empirical works (Johnston, 2020; De Carvalho & de Sousa, 2020; Onursoy et al., 2020; Mendiguren, Perez & Meso, 2020; Syam & Nurrahmi, 2020; Antunes & Salome, 2020; Weiss et al., 2020; Eger et al., 2020; and Paglinawan, 2020) gain prominence against more theoretical approaches (Kaufman, 2020; Shapalova, 2020; and Hermans, 2020).

Despite the existence of news on the Internet since the beginning of this 21st century, it is striking that it was not until 2017 that the investigation into the so-called Fake News began. This starting year corresponds to the rise of a new trend that, as the data shows, is increasing significantly until the year 2021. This may correspond to an information boom through old and new digital media, which added to the appearance of social networks during the last decade. The year 2020 stands out for its pandemic context and the confinement measures taken by the countries, a practice that corresponds to an increase in work around Fake News. This can be understood given the relevance of the Internet in access to information and how disinformation strategies were developed about medical and social issues. In turn, it is also necessary to cite the figure of Donald Trump since his mandate coincided with the establishment of the Fake New terminology.

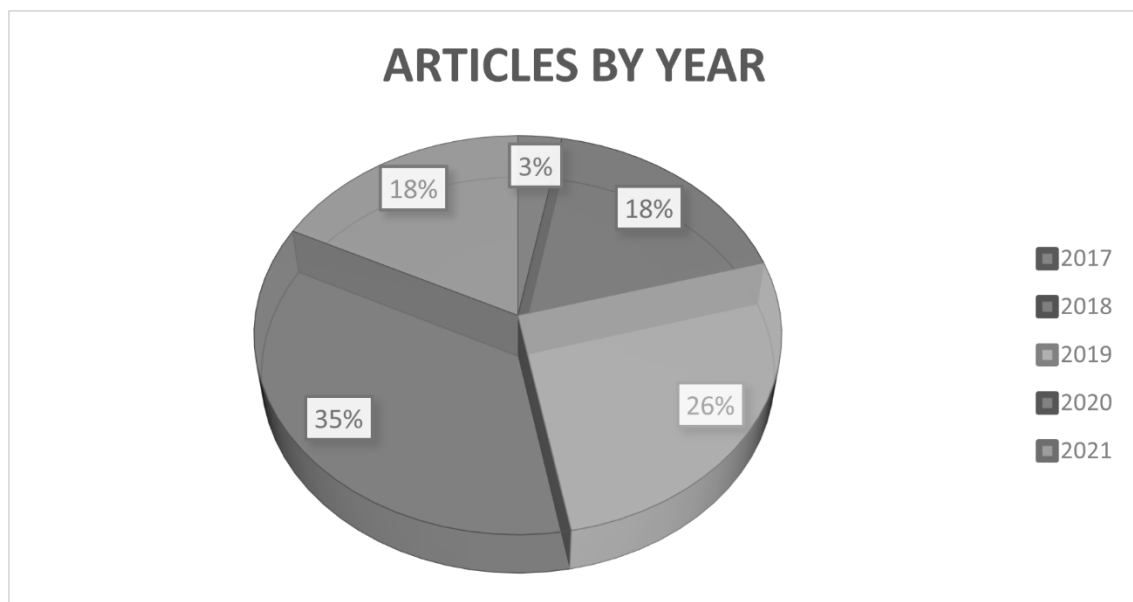


Figure 2. Articles published each year

4.4. Objectives

Despite the difference in approaches, there are four progressive and interlocking objectives (Figure 3). The approaches related to digital literacy and media education related to the importance of critical thinking stand out (Kaufman, 2020; Shapalova, 2020; Lagomarsino et al., 2019; Auberry,

2018; Lee, 2018; Stoddard, 2021; Fontanin, 2018; and Horn & Veermans, 2019), all oriented toward Fake News. Another line is the analysis of Fake News itself, from its theoretical conception (Rogers, 2019; Dias & Damien, 2018; McDougall et al., 2019; Abram, 2019; Gordon, 2018; Buckingham, 2019; Antunes, Lopes & Sanches, 2021; Haynes, LaWanda & Patton, 2021; Onursoy et al., 2020; El Rayess et al., 2017; and Weiss et al., 2020) to the study of the perception that students have of them (Bhaskaran, Mishra & Nair, 2019; Figueira & Santos, 2019; Johnston, 2020; Loos, Ivan & Leu, 2018; Lopez & Planillo, 2021; Mendiguren, Perez & Meso, 2020; Syam & Nurrahmi, 2020; Antunes & Salome, 2020; Paglinawan, 2020; and Rex et al., 2021). Finally, the translation of the above is channeled into different proposals aimed at improving the skills of students to identify, not build, and not share new Fake News (Nygren et al., 2021; Auberry, 2018; Ricoy, Sanchez & Feliz, 2019; Hermans, 2020; and De Carvalho & de Sousa, 2020).

The first category is related to critical thinking. It is a capacity that, in recent years, has acquired greater relevance in society, especially focused on the educational stages and how training in this area is essential for personal development. Another category is the theoretical conception of Fake News. It is a subject that, despite being a common term, continues to require extensive analysis to facilitate its understanding and delimitation to develop strategies to combat them. The perception that students have of Fake News, understood as the ability to detect them and how they internalize them, is another category represented. Given the digital boom, it is essential to know the impact that Fake News has on the new generations in order to prepare them for a foreseeable scenario commanded by digital information. Lastly, there is the category associated with the specific development of techniques to detect Fake News, referring to those cases in which corrective measures are being implemented.

4.5. Methodological design

Two clear methodological designs can be differentiated: empirical articles and theoretical articles. In the first case, there is a differentiation between quantitative works (Nygren et al., 2021; Auberry, 2018; Figueira & Santos, 2019; Fontanin, 2018; Horn & Veermans, 2019; Johnston, 2020; Lopez & Planillo, 2021; Onursoy et al., 2020; Mendiguren, Perez & Meso, 2020; El Rayess et al., 2017; Weiss et al., 2020; and Rex et al., 2021), mixed approaches (Syam & Nurrahmi, 2020; Antunes & Salome, 2020; and Paglinawan, 2020), and only qualitative (Bhaskaran, Mishra & Nair, 2019; Ricoy, Sanchez & Feliz, 2019; Loos, Ivan & Leu, 2018; De Carvalho & de Sousa, 2020; and Eger et al., 2020). Regarding the more theoretical works, there is a division between those based on the construction of knowledge (Kaufman, 2020; Rogers, 2019; McDougall et al., 2019; Lagomarsino et al., 2019; Abram, 2019; Gordon, 2018; Lee, 2018; Stoddard, 2021; and Haynes, LaWanda & Patton, 2021), reviews of the literature (Shapalova, 2020; Antunes, Lopes & Sanches, 2021; and Hermans, 2020) and opinion articles (Dias & Damien, 2018; and Buckingham, 2019).

The construction of knowledge around a theme is always associated with two models: theory and practice. In this case, the analysis of fake news follows this bipartition, with the number of empirical articles (20) in relation to the theoretical ones (14) being especially striking. That is, almost 6 out of 10 articles developed around Fake News have an empirical focus. It stands out since the analysis of the term Fake News is not yet something clearly delimited theoretically, so the number of more practical works evokes knowledge more of consequences than delimitation and prevention. Quantitative and qualitative studies with disparate and non-standardized data collection instruments support this. There is also little precision in the theoretical approaches, and there are several topics for reflection: knowledge construction, literature reviews, and opinion articles.

4.6. Sample

The sample that makes up the articles analyzed is found in those that develop a quantitative model, among those that have an empirical approach. There is almost unanimity regarding the object

of study since in all the articles except one, the sample consists of students of different ages and educational stages. There is a subdivision around the student body, grouping into formative stages prior to higher education (Loos, Ivan & Leu, 2018; Figueira & Santos, 2019; Horn & Veermans, 2019; Johnston, 2020; De Carvalho & de Sousa, 2020; López & Planillo, 2021; Nygren et al., 2021) or university students (El Rayess et al., 2017; Auberry, 2018; Fontanin, 2018; Bhaskaran, Mishra & Nair, 2019; Figueroa & Santos, 2019; Onursoy et al., 2020; Mendiguren, Perez & Meso, 2020; Syam & Nurrahmi, 2020; Antunes & Salomé, 2020; Weiss et al., 2020; Eger et al., 2020; Paglinawan, 2020; Rex et al., 2021). The sample size is also variable, ranging from 20 people (Eger et al., 2020) to 500 university students (Syam & Nurrahmi, 2020). On the other hand, the work of Ricoy, Sánchez, and Feliz (2019) focuses on the study of 120 news items.

4.7. Variables

The variables found in the analyzed articles are very diverse. In the case of quantitative variables, they focus on accessing information related to habits that range from the use of digital tools to the media and search engines or social networks (Nygren et al., 2021; Figueira & Santos, 2019; Fontanin, 2018; Johnston, 2020; Lopez & Planillo, 2021; De Carvalho & de Sousa, 2020; and Onursoy et al., 2020). The articles supported by mixed methodologies show combinations of variables related to narrative or language issues of the students and their attitudes or perceptions towards Fake News (Bhaskaran, Mishra & Nair, 2019; Horn & Veermans, 2019; and Mendiguren, Perez & Meso, 2020). The works with qualitative approaches are the most focused on the definition of Fake News through the opinions of the students after their experience with news of this type (Ricoy, Sanchez & Feliz, 2019; Loos, Ivan & Leu, 2018; El Rayess et al., 2017; Syam & Nurrahmi, 2020; and Antunes & Salome, 2020).

Following the patterns of other variables analyzed, there is a disparity regarding the research variables addressed in the articles analyzed. This is appreciated in the few similarities shared between articles with similar research methodologies. Quantitative variables address everything from techniques to capabilities without focusing on specific issues. The mixed variables approach Fake News in a similar way, although they focus on the students' visions and realities. Finally, the qualitative variables cover a spectrum that is not very specific, an evaluation that is more posterior than preventive.

4.8. Instruments

The instruments used in the analyzed articles cover quantitative, mixed, and qualitative perspectives. The quantitative instruments have been based mainly on the development of ad-hoc questionnaires (Figueira & Santos, 2019; Onursoy et al., 2020; Syam & Nurrahmi, 2020; Antunes & Salome, 2020; Weiss et al., 2020; and Rex et al., 2021) and digital information tools (Nygren et al., 2021; Auberry, 2018; and Horn & Veermans, 2019), the qualitative ones have been subject to discussion groups and categorizations (Ricoy, Sanchez & Feliz, 2019) and the mixed ones have combined questionnaires with discussion groups (Syam & Nurrahmi, 2020; Antunes & Salome, 2020; Paglinawan, 2020). The theoretical articles have not used instruments in their development.

This variable reflects the discrepancies and initial difficulties of the research on this topic. The disparity of instruments used, especially in quantitative research, reflects a marked lack of standardization and representativeness. This implies that it is difficult to extrapolate and even replicate these works in order to delve into the matter.

4.9. Main findings

The main synthesized results of the articles worked on can be categorized into three blocks: the context of Fake News and the press (Rogers, 2019; Dias & Damien, 2018; McDougall et al., 2019; Abram, 2019; Bhaskaran, Mishra & Nair, 2019; Gordon, 2018; Figueira & Santos, 2019; and Ricoy,

Sanchez & Feliz, 2019), student access to Fake News (Onursoy et al., 2020; Mendiguren, Perez & Meso, 2020; Syam & Nurrahmi, 2020; Antunes & Salome, 2020; Eger et al., 2020; and Paglinawan, 2020) and specific work against Fake News (Nygren et al., 2021; and Auberry, 2018). Regarding the conceptualization of Fake News, difficulties are noted in establishing a clear definition of what it is and what this type of news entails (Figueira & Santos, 2019; Weiss et al., 2020). Although the role of future journalists in this process of creation and dissemination is extrapolated (Bhaskaran, Mishra & Nair, 2019), just as it reflects on the enhancement of libraries as a source of information (Antunes, Lopes & Sanchez, 2021 and Rex et al., 2021). There is complementarity between empirical and theoretical articles in aspects such as the need to work on critical thinking (Lagomarsino et al., 2019; and Stoddard, 2021). On the other hand, the urgency of improving media literacy (Shapalova, 2020; Buckingham, 2019; Johnston, 2020; Lopez & Planillo, 2021; and El Rayess et al., 2017) and information literacy (Fontanin, 2018) in educational contexts, both for students and adults (Lee, 2018; Haynes, LaWanda & Patton, 2021; and Loos, Ivan and Leu, 2018), is deduced. The provision and development of tools (Auberry, 2018; Kaufman, 2020; and Hermans, 2020) also emerge as a way to combat disinformation, obtaining significant improvements in disparate cases (Nygren et al., 2021; Horn & Veermans, 2019; and De Carvalho & de Sousa, 2020). All needs can be grouped into four approaches: development of critical thinking in civic contexts, the need to define and identify what Fake News is, develop informational and media literacies of students or other people (generic approaches), and their work through specific tools to combat Fake News.

The development of critical thinking is a theme that has been increasingly studied in recent years and that is essential in the formative stages, both for students and future teachers. Critical thinking is understood as those skills developed that allow the subject to be aware of their context and possess the ability to define issues such as the information they consume. Fake News is closely linked to access to information since its definition and conceptualization are understandable to a large part of the population. However, there are still major problems to identify them. For this reason, training deficiencies are also reflected regarding the media, how students approach them, and what capacities they have to act against false or distorted information. In summary, it is urgent to develop strategies applicable to the formative stages and teaching staff, which will allow the creation of new tools that can be used to combat fake news.

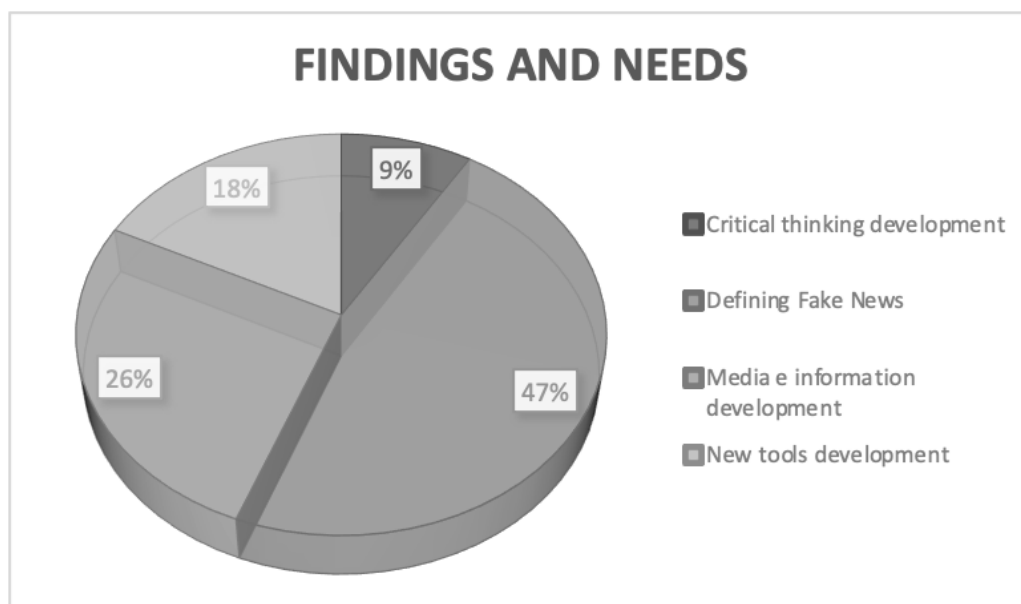


Figure 3. The main results of the articles analyzed.

5. Limitations

Regarding the limitations of this study, the first to be highlighted is its systematic review methodology. Although the inclusion criteria were clear and broad, there is a risk of missing information due to the selection strategy based on article titles. Similarly, this article could be updated or supplemented by new research addressing the state of fake news from 2023 to 2025, a scientific period not included in this work. In turn, other databases could have been incorporated, which would enrich the perspective on the state of fake news. However, for this study, we chose to work with the most relevant ones, such as Scopus and WoS.

Regarding the object of study, despite the passage of time, the term "fake news" has become embedded in society, but its conceptualization remains complex. The education sector is no stranger to this reality, although teaching processes seem to focus more on practice than theory, leading to significant difficulties in addressing this problem from its source.

6. Discussion

As a result of a new evolutionary stage, the rate at which new mobile devices like smartphones are incorporated approaches addiction risks (Rodríguez et al., 2020). In recent years, the relationship between humans and technology has become increasingly interconnected, influencing how we relate to others (Ye et al., 2021). This new paradigm rethinks fundamental processes like communication. The democratization of the message necessitates reassessing the needs of the sender and receiver (Soler et al., 2021) not only to comprehend the message but also to be able to sort it (Auberry, 2021; Lee, 2018; Nygren et al., 2021). In the face of biased news, it is critical to promote strategies and critical thoughts.

The following inferences are drawn from the analysis of the articles collected through Web of Science and Scopus, which landed at 34 and met or exceeded the inclusion criteria established during the PRISMA analysis process. The analysis shows and demonstrates a lack of definition of the subject of study, which is supported by lax and separated objectives between the Fake News definition and the students' actual needs. There is also a clear disparity in the methodologies and tools employed in relation to the instruments mentioned in the reviewed literature. The majority of quantitative investigations rely on ad-hoc questionnaires (Antunes & Nina, 2020; Figueira & Santos, 2019; Onursoy et al., 2020; Syam & Nurrahmi, 2020; Weiss et al., 2020) whose scientific criteria are unclear, making it difficult to verify its validity, or use diagnostic tools (Auberry, 2018; Horn & Veermanns, 2019; Nygren et al., 2021). In turn, the sample sizes are varied, with figures that are either small (De Carvalho & de Sousa, 2020) or more representative. A complementarity between qualitative approaches and theoretical frameworks is appreciated, and in both cases, it is more openly stated that the purpose of these works is the search and conceptualization of Fake News in generic (Dias & Walmsley, 2019; Rogers, 2019) or educational contexts (Kaufman, 2020).

The findings of the articles investigated can be divided into three groups: search for a definition of Fake News, analysis of students' perception of Fake News, and achievements achieved after the specific development of Fake News with students. The products that result from the respective scientific proposals reveal four major requirements for combating Fake News. Critical thinking (Stoddard et al., 2021) emerges as an essential skill for personal or social development. The concept of Fake News is evidently difficult to conceptualize (Ricoy et al., 2019; Rogers, 2019), and this aspect must be worked on in order to propose measures to combat them. The educational system is critical in the training processes related to information and media literacy (López & Planilla, 2021), as it is a clear deficit in the student population. To combat Fake News, the development of specific tools like fact-checking taps into a need for strategies that can be applied in didactic settings (van Helvoort & Hermans, 2020).

7. Conclusion

Considering the findings of this study, it can be concluded that Fake News research in the educational field is still in its infancy. The publication time limit, with the first published in 2017, and the limited production in this field of study are both significant, particularly in contexts of constant access to digital information. The scientific production of 2021, which replicates figures from 2019, demonstrates a continuing interest in the subject but without exponential growth. The difficulty of conceptualizing terms like Fake News, cyber-bullying (Goncalves & Vaz, 2022), or netiquette (Soler et al., 2021) cannot justify a lack of investigation of problems that can seriously harm society. Fake News appears to be one of the dangers posed by teachers who do not have an appropriate DC and Teacher Digital Competence (TDC).

Several points can be made in relation to the initial hypotheses. In the last five years, more than 30 papers have been published on these interrelated topics. However, there are no direct links between the two. Due to the limitations of the current study, as well as those found in the systematic review, the descriptor's selection strategy may result in information being lost, especially given its semantic breadth. The term Fake New and its association with educational degrees were created because of its direct presence in educational and legislative frameworks. Some of the proposed research directions in this area include the development of new methods that take teachers' visions and assessments into account, which have not been appreciated to date.

Declarations

Author Contributions. R.SC.: Literature review, conceptualization. P.LO.: methodology, data analysis, original manuscript preparation. C.B.R.: review-editing and writing, P.M.M.: review-editing and writing. All authors have read and approved the publication of the final version of the article.

Data Availability Statement. Web of Science and SCOPUS scientific databases.

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Appendix I.

Table A1. Empirical design

Country	Language	Date	Aim	Methodology	Sample	Variables	Measurement
Ethiopia	English	2021	To increase the secrecy capacity of the wireless networks when there are moving cooperative communication devices.	Quantitative research	---	The transmit parameters, the interaction of the transmitter, receiver, relay-node, and the eavesdropper devices	Reinforcement learning. Q-learning
China	English	2021	To study the addition of intelligent algorithms to wireless network communications to optimize and build autonomous mobile learning for cloud education.	Quantitative research	550 students	Transmission delay of wireless network communication system, the energy consumption	Questionnaire survey
China	English	2021	To design an English mobile learning platform based on the GSM-R wireless network communication system	Experimental research	---	The platform encryption technology, and learning recommendation algorithm to create the English mobile learning platform.	Deep learning and method based in similarity measure
Costa Rica	Spanish	2020	To know students' opinion on the educational use of mobile devices, and the implementation of mobile learning in university classroom using Whatsapp	Qualitative research	67 students	Usefulness of the application as a communication tool	Questionnaire
Australia United States	English	2020	To explore the use of mobile technologies to connect hospitalized adolescents students to their schools, classmates, and families to reduce their isolation and disrupted	Qualitative research	18 hospitalized adolescents, 29 teachers, and 4 parents	Technology related to learning, communication with school, and wellbeing	In-depth interviews QSR Nvivo

Country	Language	Date	Aim	Methodology	Sample	Variables	Measurement
United Arab Emirates	English	2020	schooling experiences. To analyze how do students use technology in their educational processes, and why do they use some technologie	Qualitative research	100 students, 2 specialists of the university and 10 instructors from college	Funcionalidad, intuitiveness, progress tracking, relation with studies, user-friendly interface	semi-structured interviews, focus group
China United States	English	2018	To analyze the efficiency of collaborative learning comparing learning-related uses of an online discussion forum against such use of a mobile instant-messaging app	Qualitative research	78 upper-division undergraduate pre-service teachers	Learning interaction, network density, cliques, usefulness, ease of use	Ad-hoc Questionnaire
Colombia	Spanish	2018	To develop a communicative mediation tool that allows deaf people and listeners to communicate.	Experimental research	---	Sign generation speed, translation validity and system performance	System development through mathematical processing
India	English	2018	To propose a mobile application which can be used to access the University Learning Management System with the mobile and the mobile digital book with augmentation system	Qualitative and experimental research	200 teachers and 500 students 280 students	the effectiveness of existing technologies in teaching and learning process. Effectiveness analysis of the application	Questionnaires
Taiwan	English	2017	To propose a context-aware mobile Japanese conversation learning system (CAMJAL) for Taiwanese students.	Quantitative research	86 university students	Perceived convenience, ease of use, and usefulness	Ad-hoc questionnaire
Taiwan	English	2017	To analyze how the mobile Computer-Supported	Quasi-experimental approach	199 students (three groups)	Communication and coepetition, Examination scores,	Questionnaires & Artefact analysis

Country	Language	Date	Aim	Methodology	Sample	Variables	Measurement
Malasya	English	2016	Collaborative Learning (mCSCL) contexts help learners improve their learning To develop and design an android application, namely MobileLearning Communication Aid (MOLECOMAID), based on the social constructivism theory	Experimental research	---	learning satisfaction level,	Application use
Taiwan	English	2014	To investigate the effects of mobile learning participation time on students' conception of collaboration, communication, complex problem-solving, meta-cognitive awareness and creativity	Quantitative research	606 students	Namely collaboration, communication, complex problem-solving, meta-cognitive awareness, and creativity	Ad-hoc Questionnaire
South Africa	English	2013	To establish how the use of mobile technology could enhance accessibility and communication in a b-learning course.	Mixed research	30 students	Need for use of ICT, Access to ICT, Frequency of use and Use of ICT for communication and collaboration	Questionnaire likert scale and open ended questions
Chine	English	2010	To evaluate the use of mobile information and communication technology in a large- sized undergraduate class, where the effectiveness of multilearner participation and prompt learner-instructor interaction is often challenged.	Mixed research	232 students	Age, Gender, Prior usage of PDA, Prior learning and experience, Course information	Ad-hoc Questionnaire and focus group
Spain	English	2015	To present a project-based	Qualitative and	50 students	The work in groups under a	Opinion Questionnaire

Country	Language	Date	Aim	Methodology	Sample	Variables	Measurement
Spain	Spanish	2009	learning experience to teach mobile communications courses, carried out at Alcalá University, Madrid, Spain To evaluate the use of mobile learning (m-learning) as a tool for the development of discussion skills in asynchronous communication forums is proposed.	experimental research Qualitative and experimental research	80 students	group's leader, the competition process and rules established and motivation in the course Student evidence left in the forums	Focus group and rubric
Chine Taiwan	English	2008	Analyze the effectiveness of mobile communication to stimulate teacher-student communication and improve learning efficiency.	Quantitative research	176 senior high school students	The independent variable: use of individual media in instruction process. The dependent variables were student pressure, motivation and performance of learning.	Ad-hoc questionnaire and coding with ANOVA
Australia	English	2006	To analyze the influence that Tablet PCs have had on the way multimedia students learn concepts and approach their design development work through their communicative ecology	Qualitative research	17 students	Tablet PCs in Everyday Work Practices, Drawing With the Tablet PC, Communication and Tablet PCs.	Survey, structured interviews and focus groups.
Greece	English	2006	The proposed environment attempts to enhance the information flow among the members of a department and, furthermore, to provide a test-bed mobile Web application for students	Mixed research	43 students	Student-Specific Functionality, Academics Using the Mobile Web Services and Management of the Mobile Web Services	Ad-hoc Questionnaire and foc group

Country	Language	Date	Aim	Methodology	Sample	Variables	Measurement
			undertaking Internet technologies courses.				

Table A2. Theoretical design

Country	Language	Date	Aim	Methodology	Main Findings
United States	English	2020	To support mobile applications (apps) use for classroom management, communication with parents, and student learning.	Descriptive analytics based on documentary review and empirical inquiry	Although teachers have acknowledged an unfamiliarity with tools to support their selection of apps for effective use with students, they have welcomed guidance for such evaluations. Mobile technology (apps) has been reviewed from a sociocultural perspective, evidence-based research has been synthesized, and directions for future research have been offered.
Turkey	English	2017	To provide a theoretical framework for connectivist learning focused on how to evaluate our perception of mobile communication technology	Descriptive documentary methodology based on a systematic review	A combination of two-pronged approach of Technology Acceptance Model and Media Naturalness Theory proposed in this study introduces a method for evaluating technology in a way that will help us understand the opportunities, benefits, and shortcomings of the technology we seek to grasp and utilize in learning.
Malasya	English	2015	To present a mobile learning framework to develop a Malay language learning application using near field communication (NFC) technology.	methodology based on a systematic review	The system allows Malay language learning using mobile devices and NFC technology to achieve several learning theories such as Ubiquitous, immerse learning, context and tangible interface. Users learn the language using their mobile devices to enrich their learning process. NFC helps the learning process as it requires touch on tag or other NFC devices to work; therefore students interact with object directly.
USA, Taiwan	English	2007	To discuss a general framework to	Descriptive documentary	A cross-discipline approach may help us to reach the goal of better

Country	Language	Date	Aim	Methodology	Main Findings
			depict the interaction of the knowledge contents and the components of communication tools that are involved in their delivery.		learning/teaching, and an incremental, modular approach may allow this collaboration to take place. We can be certain that because of the diverse economic and social structures, the dimension and magnitude of 3G impact will be different among different countries and geographic areas.
			Text		

Figure 1 shows the cover of the Journal.