

Use of generative artificial intelligence in the training of journalists: challenges, uses and training proposal

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Abstract

Artificial intelligence (AI) is already integrated into news production strategies in some media outlets. Recently, generative AIs such as ChatGPT and others have demonstrated their ability to enhance productivity in content production tasks, raising the question of how journalism faculties can address this new technology. This paper presents an academic study on the application of AI in higher communication studies. The study involved 4 in-depth interviews and 28 semi-structured interviews with university lecturers and researchers. The findings confirm varying degrees of convergence and divergence on different aspects of the technology, including the integration of AI in communication faculties, student training in AI usage, the introduction of AI and journalism as a subject area, and the potential uses of AI in news production and consumption. Additionally, this paper proposes a comprehensive training program on AI and journalism, focusing on its foundations, technical competencies and ethical considerations.

Keywords

Artificial intelligence; Journalism; Journalists; Communication; Interviews; Innovation; AI; Training; Teaching plans; Curricula; University studies; Higher education; Competencies; Skills; Ethics; *ChatGPT*.

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1. Introduction

Academic research on the application of artificial intelligence (AI) in journalism has been growing rapidly since 2008, with a notable surge in activity since 2015 (**Calvo-Rubio; Ufarte-Ruiz**, 2021). During this period, studies have explored various aspects of AI's impact on journalism, including innovation and new formats (**Meier et al.**, 2023), computational journalism and news production (**Vázquez; Codina**, 2018), data journalism and big data (**Segarra-Saavedra; Cristófol; Martínez-Sala**, 2019; **Flores-Vivar**, 2019; **Herrero-de-la-Fuente; Llamas; Castillo-Lozano**, 2022), gamification (**Tejedor**, 2022) and fact-checking (**Canavilhas**, 2022; **Sánchez-Gonzales**, 2022), among others.

Another significant area of research in recent years has focused on the integration of AI in journalism education and its implications for the job market. Studies have examined training programs related to content automation (**Túñez-López; Toural-Bran; Cacheiro-Requeijo**, 2018; **Ufarte-Ruiz; Fieiras-Ceide; Túñez-López**, 2020; **Ufarte-Ruiz; Calvo-Rubio; Murcia-Verdú**, 2020) and identified research and teaching initiatives aimed at incorporating AI into communication curricula (**Gómez-Diago**, 2022).

However, a new generation of AI models, such as *ChatGPT*, *Midjourney*, *Dall-e*, and *Stable Diffusion*, has been able to reach the general public. 2023 has been a turning point for this technology, leading to a significant impact on society and resulting in the greater adoption of AI. Additionally, it has sparked a new debate regarding its inclusion (or exclusion) in the curriculum of Spanish universities.

It therefore appears necessary to examine the new generative AI models from an educational perspective, which is the basis of this research. The main objective of this study is to analyse generative AIs in terms of their relevance to journalism and education. Specifically, the aim is to provide an assessment of their impact and potential application in communication faculties. While the development of teaching plans may require time, it is crucial for communication faculties to acknowledge and address these changes of significant societal importance as they will likely have a broad impact on employability. Furthermore, faculties have the means to incorporate these emerging trends through their offerings, such as postgraduate courses and seminars. In light of this situation, the specific objectives of this research are as follows:

- To explore the perspectives of communication educators and researchers on AI in journalism and journalism education.
- To assess whether there is a consensus among professors and researchers regarding the integration of AI into the curriculum of communication faculties.
- To identify and propose a potential training model for AI competences in communication studies based on the findings from the previous objective.

2. Theoretical framework

Artificial intelligence is advancing rapidly and has brought about significant changes in our lives, a fact acknowledged even by organizations such as the *European Commission* (2020). This impact has also extended to the field of science, presenting both opportunities and challenges (**Stokel-Walker; Van-Noorden**, 2023; **Bom**, 2023).

In the realm of social sciences, particularly in the fields of communication and journalism, there has been a notable increase in AI-related studies since at least 2015 (**Calvo-Rubio; Ufarte-Ruiz**, 2021). Numerous works have explored various aspects, including automated journalism, perceptions and implementation of AI in the journalism sector, and its role in fact-checking and other journalistic practices. The presence of artificial intelligence in newsrooms has grown steadily (**Noain-Sánchez**, 2022), heralding a transformative era for journalism and media content (**Pavlik**, 2023).

Specifically, there have been studies examining how media providers can incorporate AI and algorithms as tools for processing large volumes of data and storytelling (**Furtado**, 2020). Other studies have focused on understanding the impact of automated news on media professionals (**Danzon-Chambaud; Cornia**, 2021; **Túñez-López**, 2021), the adoption of supervised machine learning in journalism studies (**De-Grove; Boghe; De-Marez**, 2020), news trust and credibility (**Sinatra; Hofer**, 2023; **Fletcher; Schifferes; Thurman**, 2023) as well as the challenges and debates surrounding automated journalism and AI research (**De-Lima-Santos; Salaverría**, 2021). Additionally, interdisciplinary research fields like software studies have examined the social and cultural implications of software, including its role in automated news production within journalism (**Dierickx**, 2023).

These debates and challenges have prompted the exploration of opinions from both the labour and academic sectors regarding the use of artificial intelligence in education (**Lim et al.**, 2023), particularly in the field of journalism (**Calvo-Rubio; Ufarte-Ruiz**, 2020). The needs of journalists when using AI tools in their daily news creation process have also been investigated (**Diakopoulos**, 2020). Furthermore, efforts have been made to develop AI literacy in journalism, addressing the ethical and social challenges associated with this technology (**Díaz-Campo; Chaparro-Domínguez**, 2020; **Deuze; Beckett**, 2022; **Herrero-de-la-Fuente; Llamas; Castillo-Lozano**, 2022) and combining humanistic knowledge with the handling of AI.

Additionally, various research studies have focused on journalistic innovation (**Lopezosa et al.**, 2023), the integration of AI in the development of new journalistic formats to cater to emerging user profiles (**Tejedor**, 2022), and the use of AI by fact-checking agencies for information verification (**Sánchez-Gonzales**, 2022).

It is evident that research on journalistic innovation, including the application of AI, has gained increasing relevance in the field of journalism (**Salazar**, 2020; **Meier et al.**, 2022). However, the research landscape has experienced an exponen-

tial shift following the introduction of generative AIs in 2023. This impact has not only been felt in the academic realm, but it has also had a profound effect on society, with indications that this trend will continue in the short and medium term (Llaneras; Rizzi; Álvarez, 2023).

All of this has confirmed, among other things, a growing commitment within the journalism industry to produce and distribute content supported by AI (Ufarte-Ruiz; Murcia-Verdú; Túniz-López, 2023). There is also an appetite to integrate AI into production routines, particularly in the information processing phases (Sánchez-García *et al.*, 2023). However, it is important to note that the use of AI in a field as uniquely human as journalism requires a socially responsible approach. Therefore, challenges related to quality, transparency, privacy, disinformation, and overall social development must be addressed (Peña-Fernández *et al.*, 2023; Flores-Vivar, 2019).

In any case, it is evident that while AI has been previously studied in relation to journalism, the emergence of generative AIs has highlighted the need to reevaluate the training necessary for future journalists to acquire proper knowledge of AI and to use it responsibly. This research aims to address this need.

3. Material and methods

To carry out this research, a comprehensive set of interviews was conducted in March 2023, involving a total of 4 in-depth interviews and 28 semi-structured interviews. These interviews specifically targeted communication lecturers and researchers who possess extensive knowledge and experience in the fields of journalistic innovation and artificial intelligence.

Table 1. Experts from the in-depth interviews

Inter-viewees	Justification for the selection of the expert	Questions
Clara González	Lecturer and researcher, involved in the development of the first course on AI and journalism scheduled to be launched during the academic year 2023-2024 at the <i>University of Navarra</i>	<p>What inspired you to create this course on artificial intelligence and journalism?</p> <p>How do you believe artificial intelligence will impact the future of journalism and how should students prepare for these changes?</p> <p>What specific competences do you expect your students to develop through this course?</p> <p>Do you believe artificial intelligence can assist in addressing current challenges in journalism, such as misinformation or news avoidance?</p> <p>How should professionals prepare themselves for the ever-changing and evolving field of artificial intelligence?</p>
Pavel Sidorenko	Lecturer and researcher, actively involved in the <i>ChatGPT Impact Project</i> , the first quantitative research project on AI in Spain, specifically focusing on <i>ChatGPT</i>	<p>How do you believe artificial intelligence will impact the future of journalism and how will communication students be prepared to deal with these changes?</p> <p>What are the advantages of incorporating AI into the undergraduate education of communication students, and how can lecturers effectively utilize its potential to enhance the learning experience?</p> <p>What potential obstacles arise when integrating AI into university education, and how can educators mitigate these challenges to ensure effective learning outcomes?</p> <p>How can the integration of AI into the undergraduate education of communication students enhance their understanding and application of fundamental concepts in the field?</p> <p>In what ways can the utilization of <i>ChatGPT</i> enhance the ability of communication students to generate ideas, create content, and solve problems in journalism and communication?</p>
Patricia Ventura	Trainer and specialist in AI, recognized as a prominent figure in promoting ethical practices in AI within the field of journalism. She provides training to journalists, educators, and organizations on ethics, artificial intelligence, and communication through the <i>Col·legi de Periodistes de Catalunya</i> . Furthermore, she authored the pioneering report on ethics, artificial intelligence, and journalism published by the <i>Consell de la Informació de Catalunya</i>	<p>What do you perceive as the primary ethical challenges journalists encounter when utilizing artificial intelligence tools in their day-to-day work, and how should they approach these challenges?</p> <p>Do you believe that AI can assist communication students in improving their analysis and comprehension of information and media trends?</p> <p>How will communication students be equipped to navigate the transformations resulting from the integration of AI in newsrooms?</p> <p>Could you provide examples of artificial intelligence applications in news production and elucidate their impact on the quality of information conveyed to consumers?</p> <p>What technical and ethical proficiencies do you believe communication students should cultivate to effectively utilize artificial intelligence tools in the future?</p>
Santiago Tejedor	Lecturer and researcher at the <i>Department of Journalism and Communication Sciences</i> at the <i>Universitat Autònoma de Barcelona</i> , he has a background in engineering. His research work on artificial intelligence and journalism has earned her prestigious recognition and awards	<p>What practical applications of artificial intelligence do you believe are most pertinent to journalism, and how do they benefit prospective media practitioners?</p> <p>How should communication students be educated to comprehend and effectively utilize artificial intelligence tools in journalism?</p> <p>How will communication students be equipped to navigate the integration of AI into newsrooms?</p> <p>What are the major ethical challenges presented by the utilization of artificial intelligence in journalism, and how should they be tackled in educational settings?</p> <p>How can artificial intelligence aid journalists in conducting more in-depth and intricate investigations, and how can this be taught to communication students at the university level?</p>

The initial phase involved 4 in-depth interviews with 4 participants. The purpose of these interviews was twofold: to gain a comprehensive understanding of AI in communication and to validate and refine the 5 specific questions related to artificial intelligence in communication studies. These refined questions were then used in the subsequent semi-structured interviews with the 28 lecturers and researchers who participated in the study.

For the selection of the 4 interviewees, we considered their exceptional expertise in the field of AI and communication (see Table 1). We also ensured that each interviewee had knowledge and experience in one of the following areas: AI and technology, AI implementation in newsrooms, AI implementation in communication universities, and ethical aspects of AI application in journalism. Based on their remarkable backgrounds, we developed specific sets of questions for each expert while including common questions, as indicated in the table below.

After conducting the in-depth interviews and analyzing their results, a set of semi-structured interviews was designed using the same set of questions for all participants. A total of 20 teachers and researchers from Spanish universities were interviewed, as indicated in Table 2. To ensure triangulation of the results, an additional 8 experts from Latin America were interviewed, as shown in Table 3. The selection of these experts took into consideration their professional profile as university lecturers and/or researchers, as well as the criteria questions principle (Valles, 2002), which considers factors such as relevant information, availability, willingness to collaborate, and communication skills. Furthermore, the selection criteria included:

- the interviewees had to have knowledge of journalistic innovation,
- they had to have developed some activity in their social networks on AI, and/or
- they had to have published some study on AI and journalism in academic journals. These criteria resulted in a total of 28 interviews. Tables 2 and 3 provide detailed information about the interviewees.

Table 2. Subjects taught by respondents from Spanish universities

Interviewee	Subject(s) taught
1	Trends in Digital Journalism / History of Journalism
2	Cybermedia Theory and Analysis
3	Audiovisual Documentation / Audiovisual Culture / Communication Theory
4	Master's Degree in Journalism
5	Information Resources / Graphical Interfaces for Information Visualisation / Storytelling and Advanced Data Management
6	Communication Theory
7	Communication Theories / Cultural Cartographies/ Citizen Journalism
8	Fundamentals of Communication II
9	Analysis of Interactive Digital Communication
10	Journalistic Communication / Media Systems / Radio and TV Writing and Broadcasting / Theoretical and Methodological Basis of Research in Multimedia Journalism
11	Cyberjournalism / Investigative Journalism
12	Digital Journalism
13	Principles of Journalistic Design / Applications, Databases and Social Media for Research / Models and Genres of Cyberjournalism
14	Audiovisual Documentation and Online Communication / Social Media Management
15	Information Visualisation / Information Architecture / Multimedia Language and Technology
16	Computer Marketing
17	Political Communication
18	Personal Branding and Networking / Online Marketing
19	Journalistic Writing
20	International Relations / International Journalism / Broadcast Information

Table 3. Subjects taught by respondents from Latin American universities

Interviewee	Country	Subject(s) taught
1	Argentina	News Genres
2	Chile	Digital Tools / Design 1 and 2
3		Digital Journalism and New Media / Multimedia Journalistic Product / Viral Marketing and Social Networking
4	Ecuador	New Technologies in Education
5	Mexico	Journalism
6	Peru	Communication Theories
7	Portugal	New Journalism / Web Journalism / Broadcast Journalism
8	Puerto Rico	Journalism

In turn, the questions for the semi-structured interviews were designed taking into consideration the responses of the four experts (see Table 1), resulting in the identification of five questions that address five specific objectives (see Table 4). The interviews were requested and recorded via email. The results were then coded and analysed using the qualitative analysis program *Atlas.ti* (Lopezosa; Codina; Freixa, 2022).

Table 4. Coding: questions and objectives of the semi-structured interviews

Questions	Objectives/Categories
What is your opinion on the potential incorporation of AI technologies such as <i>ChatGPT</i> , <i>Midjourney</i> , <i>Stable Diffusion</i> , <i>Dall-e</i> , etc., in communication faculties?	(1) Incorporation of AI in communication faculties
Do you believe it is important to provide training for journalism students in using AI technologies?	(2) Training of students in the use of AI
Do you think there should be a dedicated course on AI and journalism in communication curricula? Why or why not?	(3) AI course in journalism: yes/no?
What specific AI-related skills and knowledge do you think journalism students should be taught?	(4) What skills should students be taught about AI and journalism?
In your opinion, how can AI potentially transform the production and consumption of journalism?	(5) Potential of AI on news production and consumption

Finally, based on the analysis of the results, a core model of AI competences in communication studies has been developed. This model incorporates the high and medium levels of perceived agreement from the responses of the 32 interviewees, which include the 4 in-depth interviews and the 28 semi-structured interviews.

4. Results

First, we provide an overview of AI in communication based on the findings from the in-depth interviews. Secondly, we present a synthesis of the semi-structured interviews, organized into 5 categories. Thirdly, we present an outline for a potential model for developing AI competences in communication studies. This model is based on the high and medium levels of agreement observed in the responses of the 32 experts (including 4 in-depth interviews and 28 semi-structured interviews).

4.1. Overview of AI in Communication

Regarding the findings from the in-depth interviews, we have not only identified the key questions that inform the development of the semi-structured interviews (refer to Table 3), but we have also gained an initial understanding, both technological and ethical, of AI in communication, particularly its applications to journalism and education.

Journalism has been significantly impacted by AI for several years now, particularly in areas such as automated text generation for weather information, sports results, and financial updates. AI is also utilized in relation to reader engagement and content recommendations, among other uses.

The challenges presented by AI and the importance of its use in a supervised and transparent manner is noted, emphasizing the idea of complementarity rather than substitution. Furthermore, it is crucial to provide AI with high-quality data, as poor design can lead to various biases. Privacy concerns related to the use of data also pose challenges, as media organizations increasingly gather more information about their readers and must ensure compliance with the *General Data Protection Regulation*. Lastly, it is noted that generative AIs can make errors, particularly when used for data gathering, highlighting the need for human involvement and robust verification processes in AI-based journalism.

In terms of the opportunities presented by AI in journalism, they rely on media organizations' ability to harness AI effectively to strengthen journalistic values. AI is already being employed for content verification and even to promote more ethical communication products, such as detecting self-reporting or gender bias. Notably, AI can be used to identify discrepancies in sentence lengths attributed to men and women or to analyse the gender representation in media by counting the use of images featuring women and men.

As for AI training, the creation of courses about artificial intelligence and journalism should consider the needs of both students and the journalism profession. It is evident that there are conflicting opinions regarding its implementation, leading to divergent perspectives. However, there is a consensus that introducing the reality of AI and its vast potential to the academic field can greatly benefit future journalists.

It is important for students to be able to utilize these resources to their advantage and approach such innovations with an open mind and a willingness to learn. The training of communication students necessitates interdisciplinary collaboration, bridging the gap between technical fields (engineering, computer science, etc.) and social disciplines (linguistics, psychology, etc.). Above all, it presents a valuable opportunity to uphold and reinforce core journalistic values and practices. Additionally, it is crucial to differentiate between the various applications of AI and understand its taxonomy. Ultimately, one of the objectives of creating a course on AI and communication is to shift the perception of AI from being seen as a threat to being utilized by students to enhance their future work, whether it be in data journalism, fact-checking, editing, and beyond.

Even so, there is a recognition of the need to approach AI responsibly and ethically, which gives rise to certain ethical challenges, particularly related to authorship, content, and its boundaries. While it is true that artificial intelligence can assist journalists in conducting more comprehensive and intricate investigations, a key aspect will be effectively managing vast amounts of data, cross-referencing variables, and identifying specific elements to humanize this data and transform it into compelling stories.

This implies that communication students will need to develop technical and ethical competencies to effectively work with artificial intelligence tools. These competencies would include understanding aspects of designing prompts, handling spreadsheets, as well as differentiating between artificial intelligence, machine learning, deep learning, and other related concepts, and utilizing them successfully. Additionally, they will need to grasp the responsibilities associated with using AI, such as critical thinking and decision-making when choosing AI applications to enhance the quality of journalistic output.

After summarizing the results of the in-depth interviews, we will now proceed with the findings from the semi-structured interviews. To present these results, we will divide them based on the categories that were established.

4.2. Incorporating AI in communication faculties

The analysis of the 28 semi-structured interviews has confirmed a high degree of consensus regarding the incorporation of artificial intelligence in communication faculties. Some participants view it as an inevitable necessity, while others believe its implementation is highly necessary, and some consider it to be a positive development. The underlying rationale for this stance primarily revolves around the importance of staying up to date with technological advancements and imparting this knowledge to students, recognizing that AI will become an essential tool in journalistic work. However, they acknowledge the challenges associated with integrating AI into curricula and anticipate that younger lecturers will likely play a significant role in incorporating these topics into their courses.

Some interviewees expressed reluctance regarding the introduction of AI technologies in the classroom. They believe that the potential and implications of incorporating these technologies into university education should be thoroughly evaluated. They suggest that before integrating AI into communication faculties, a fundamental update of the curricula will be necessary.

Likewise, there are two trends in the incorporation of AIs in communication faculties. On one hand, there is the opinion that they should be integrated in a comprehensive and interdisciplinary manner, promoting their understanding and utilization across various subjects. On the other hand, there are those who believe that AI should be specifically incorporated into dedicated courses focusing on its application in journalism.

Even so, regardless of whether AI is implemented directly or in a cross-disciplinary manner in communication faculties, it is generally acknowledged that given the communication trends and the continuous use of AI as a resource by students, it will be necessary to provide guidance and support for conscious and comprehensive utilization. This includes fostering a debate on the ethical and responsible application of AI in communication and journalism, explaining the use of AI from a critical perspective rather than solely an instrumental one, and advocating for rigour and transparency. It is important to highlight not only the benefits of AI but also the potential biases that may arise.

4.3. Training of students in the use of AI

In general, interviewees believe that journalism students should receive training in the use of AI technologies. In fact, according to the majority of respondents, students should have knowledge of how these technologies work and the impact they have on journalism. This includes understanding the changes in production routines, the business models of platforms that utilize AI, and the legal and ethical boundaries associated with its use.

The predominant reasons for training students in the use of AI are that these tools can enhance various aspects of journalistic practice and are likely to be in demand by media companies in the near future.

As interviewees acknowledge, AI technologies have already reached a level of professional and popular use, not limited to engineering experts. Therefore, students should not ignore them. In fact, it is crucial for students, in particular, to stay informed about technological advancements and incorporate them into their academic and professional growth.

Additionally, some interviewees believe that communication students should not only be familiar with the functionalities of AI and the data sources it utilizes but should also understand that, currently, it serves as a writing tool rather than a means of documenting or contextualizing facts, as AI still produces inaccuracies.

Finally, it is acknowledged that the learning of AI technologies should be integrated alongside other digital tools, including the use of machine translators, *Wikipedia*, or word processors.

4.4. IA and journalism subject

The widespread agreement regarding the potential for AI training in various areas of the curriculum does not necessarily indicate unanimous agreement on the need for specific subjects on AI applied to journalism. There are three predominant viewpoints among lecturers and researchers: those who believe that an AI and journalism course should be introduced, those who believe it should not or that it is still premature to implement it, and those who advocate for AI to be incorporated in a transversal or complementary manner within other communication subjects.

As for those who advocate for the creation of an AI and journalism course, they justify their stance by emphasizing the emerging trend that suggests the need to adapt and coexist with AI. They believe that the increasing use of AI will lead

to its rapid integration into communication departments, making knowledge of this tool a fundamental and essential requirement in various professional roles, particularly those related to communication. They argue that incorporating AI as a standalone subject is the ideal way to thoroughly investigate and explore its contributions (both advantages and disadvantages), professional standards, and ethical implications in journalism. Furthermore, proponents of this position highlight the existence of successful implementations of such subjects. Notable examples include the *University of Santiago de Compostela*, which offers a course titled “Automated Journalism: Theory, Technique, and Applications,” and the upcoming launch of an AI and journalism course at the *University of Navarra* during the 2023-2024 academic year.

On the other hand, those who believe that an AI and journalism course should not be created, or at least not now, argue for caution. They raise several points: firstly, modifying curricula is not a simple task; secondly, AI technology still has many limitations and challenges to overcome; and thirdly, the rapid and exponential evolution of this field in recent months adds uncertainty. Instead, they suggest that AI content should be integrated into relevant subjects or topics as needed. However, a potential challenge lies in ensuring that each lecturer is adequately prepared to incorporate this content into their courses.

Under this last premise, there is a third perspective held by interviewees who advocate for a cross-cutting approach to teaching AI. They suggest implementing the study of AI within broader subjects that provide context and theoretical foundations, such as information technologies or cyberjournalism. This approach would ensure that the subjects themselves stay updated. Additionally, some interviewees propose integrating AI content into curricula related to content production, such as journalism or advertising classes, considering that AI is still in its early stages. They suggest that specific subjects dedicated to AI could be developed at a later stage, once the technology stabilizes.

4.5. What should students be taught about AI and journalism?

From the results of the interviews, various areas of knowledge have emerged that can be taught in the classroom. However, there is a strong consensus regarding the importance of addressing ethical considerations arising from the use of AI in journalism. Therefore, one of the core aspects of AI education is centred around promoting responsible and critical use of AI.

Furthermore, we have identified two fundamental dimensions and three key topics that encompass the knowledge to be acquired about AI in the classroom. The fundamental dimensions pertain to AI as a resource and teaching tool, as well as AI as a journalistic source. The three topics specifically related to AI encompass understanding the technology itself, its potential and possible biases, and its application within the field of journalism.

In addition, the interviews confirm the importance of teaching students not only how these tools work at a professional level, but also how to engage with them responsibly, utilize them for practical professional activities, and foster a critical mindset towards their use.

More specifically, students should acquire a foundational understanding of various skills, such as searching for and selecting news, fact-checking, generating automated text, creating images, graphics, and videos, tailoring news content to meet audience needs, and distributing news effectively.

Finally, based on the interviews, we have confirmed the importance of explaining the fundamental principles of generative AI to enable effective collaboration in multidisciplinary teams, where the technical aspects are primarily handled by computer experts rather than journalists. It is crucial to teach students about the existence of AI and its potential applications in communication, particularly in journalism. However, it must be emphasized that AI can never replace the role of a journalist due to ethical considerations and the need for professional rigour.

4.6. Potential of AI in news production and consumption

In general, the interviewed researchers agree that AI has the potential to bring about significant changes in the production and consumption of journalism. However, there is a stronger consensus that these changes will be more pronounced in the production phase rather than in consumption.

There is a general acknowledgment that the transformation is already underway in newsrooms and will continue to increase in the medium term. Therefore, the focus now should be on analysing the disruptive effects and finding ways to guide and harness the application of AI in journalism. It is crucial to adapt the profession to ensure responsible usage, address concerns, and prevent the precariousness of the field. AI cannot replace good journalism.

Furthermore, there is a high level of agreement among the interviewees that the transformation will impact the entire journalistic process, encompassing areas such as documentation, production, and distribution of news. It is expected that AI will play a crucial role in achieving economic sustainability, building audience relationships, and improving efficiency.

Similarly, some of the interviewed experts believe that AI is likely to be utilized in various functions within newsrooms, either in auxiliary or leading roles. These functions may include data and information collection, managing large datasets, assisting in editing, and organizing information, composing certain journalistic pieces, and validating information to combat disinformation. Journalists must remain vigilant against the potential misuse of AI, which can include manipulation, misinformation, and generating noise.

To summarize its potential in newsrooms, AI is seen as a tool rather than a replacement for current journalism practices. However, if used correctly or incorrectly in the future, it could bring about significant changes in production and distribution processes, leading to a redefinition of journalistic production standards and directly impacting professional training.

“ The challenges presented by AI and the importance of its use in a supervised and transparent manner is noted, emphasizing the idea of complementarity rather than substitution ”

Furthermore, the experts interviewed believe that AI will also have an impact on news consumption. It is expected that audiences will receive more and better information, with a greater level of personalization. However, the use of this technology may also affect people’s trust in the information they consume if media outlets fail to implement transparency measures. Therefore, it will likely compel media organizations to implement strict controls and precautions against disinformation.

4.7. Training recommendations

Finally, based on the analysis of the 32 interviews (4 in-depth and 28 semi-structured), a possible training model has been compiled in Table 5 that includes the most important competences, objectives, and topics of study in AI and journalism that were identified. This is a foundational outline that can be incorporated into a more comprehensive curriculum. It should be noted that this outline will need to be tailored to specific requirements such as the expected teaching load, mode of delivery (e.g., standalone subject, postgraduate training, specialized seminars), and other relevant factors. While the outline presents the core components identified, the specific implementation details will need to be thoughtfully considered within each educational context.

Table 5. Proposed core training scheme in AI and journalism

Competences	Objectives	Topics
Substantiation	To understand the origins, development, and current state of AI applied to journalism.	Types of AI and distinctions between artificial intelligence, machine learning, and deep learning
		Origin and evolution of AI
		Basics of algorithms
		Impact of AI on the media ecology
		Different types of AI and their applications in supporting journalistic work
Technical competences	Develop skills in content production, including familiarization with common programs and tools, as well as the nature of the work involved.	Description and use of AI tools
		Prompts design and learning specific techniques for creating written, graphic, and audiovisual content using AI, followed by the “post-production” phase where subjects must review, refine, and improve the results generated by AI
		Identification of reliable information through AI: employing search tools, data cleaning, processing, verification, analysis, etc.
		Data visualisation tools in the context of AI
		Analysis of case studies of media organizations utilizing AI resources
Ethical competences	Acquire skills in understanding the ethical implications and values associated with AI in journalism.	Introduction to the ethical challenges posed by these new methods of constructing reality
		Responsible use through critical thinking and decision-making when selecting AI tools to enhance the quality of journalistic output
		Interpret and critique the potential biases of AI and its application
		Critical analysis, copyright, and legal considerations within the context of AI use

5. Discussion and conclusions

Thanks to this research, we can provide an initial comprehensive assessment of generative AI in the journalism sector, particularly its potential application in the training of future journalists. This expands on previous studies conducted in Spain, primarily by Calvo and Ufarte (Calvo-Rubio; Ufarte-Ruiz, 2020; Ufarte-Ruiz; Fieiras-Ceide; Túnñez-López, 2020; Ufarte-Ruiz; Calvo-Rubio; Murcia-Verdú, 2020; Ufarte-Ruiz; Calvo-Rubio; Murcia-Verdú, 2021).

Therefore, it is important to present an initial framework, supported by relevant theory, that can assist curriculum developers in addressing the impact of generative AI. This framework can guide them in considering its implementation in future curricula in the medium term, or exploring more immediate responses such as seminars or postgraduate courses.

Furthermore, by revisiting the objectives of this research and assessing their achievement, we can identify the following noteworthy elements:

O1. The opinions expressed by the experts interviewed, including both the 4 in-depth interviews and the 28 semi-structured interviews, have provided diverse and valuable insights into generative AI and its implications for the media, particularly its potential application in communication studies. These interviews have allowed us to gain an overview of AI in journalism, explore its integration into communication faculties, and, ultimately, comprehend its impact on news production and consumption. This objective reinforces findings already addressed in previous studies, such as the

reinforcement of journalistic values (Peña-Fernández *et al.*, 2023), the ethical use of AI by the media (Ventura, 2021), the future of journalists (Codina *et al.*, 2022), or the use of AI for automated fact-checking in news (Thorne; Vlachos, 2018).

O2. There is no consensus among the lecturers and researchers interviewed regarding the integration of AI into the curriculum of communication faculties. Three positions can be identified in this regard. The most widely accepted position is that AI should be included as a standalone subject, followed by a more conservative stance suggesting its integration across subjects that require it. Finally, there are those who believe that it is still premature to incorporate AI into journalism education. However, all of them emphasize the importance of ethical and responsible use, aligning with the prevailing trend in recent research on the topic (Sok; Heng, 2023; Kasneci *et al.*, 2023; Liebrezn *et al.*, 2023; Lopezosa; Codina, 2023; Sabzalieva; Valentini, 2023).

O3. It has been possible to present a training proposal for AI and journalism that focuses on three main pillars: foundations, technical competencies, and ethical competencies. These training recommendations align with recent studies on AI training in various fields of knowledge, thus reinforcing the findings of other researchers in this area (Halaweh, 2023; Mhlanga, 2023; Liebrezn *et al.*, 2023, among others).

In short, this work aligns with the dual approach proposed by the *European Commission* (2020), which emphasizes both excellence and trust in the field of AI. This framework promotes a thorough understanding of the potential of AI and encourages professionals, including lecturers and researchers in the field of communication, to develop the necessary skills to utilize AI to its fullest potential.

Furthermore, this research aims to serve as a foundation for the responsible development and integration of generative AI into communication curricula. It aligns with proposals put forth by other studies published in 2023, which recommend teaching AI in a manner that upholds the integrity and accountability of the education sector (Mhlanga, 2023; Kasneci *et al.*, 2023) and, of course, ensures an inclusive, equitable, transparent, and ethical use of AI (Sok; Heng, 2023; Halaweh, 2023).

In conclusion, the research presented in this study complements previous investigations on the intersection of AI, journalism, and training, while addressing a specific gap in the literature by focusing on generative AI. However, it is important to acknowledge certain limitations in our study. Firstly, we have chosen to concentrate on Ibero-American experiences and specifically on university training, which means that results may vary in studies that involve experts from other countries. Additionally, this research follows a qualitative approach, and therefore, it does not allow for the measurement or calculation of the extent to which perceptions or opinions are shared among the entire population. However, our work serves as a valuable starting point for future quantitative studies that aim to explore this dimension.

Furthermore, the findings of this study are closely tied to a rapidly evolving field, considering the continuous emergence of new generative AIs from major players like *Google* and *Facebook*, among others. Additionally, the future regulatory framework governing the use of AIs, currently being developed by governments, adds another layer of complexity. As a result, future research should aim to examine this evolving context in order to expand knowledge and gain a more comprehensive understanding of the impact of generative AIs.

As for limitations, it should be noted that our research has primarily focused on training aspects. Future studies could explore specific dimensions or emerging developments of AI in journalism, such as the application of AI in news verification.

Nevertheless, one of the most notable findings from this study is the recognition of the importance of ethical and transparent use of AI, along with the integration of critical thinking in both its application and its teaching. Furthermore, there is a strong emphasis on the need for AI utilization to align with journalistic values and contribute to the enhancement of journalism as a whole.

6. References

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The analysis of the 28 semi-structured interviews has confirmed a high degree of consensus regarding the incorporation of artificial intelligence in communication faculties

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