

Information Disorder and Journalism: Mapping Digital Skills and Training Deficits Among Journalists in Portugal

Desorden informativo y periodismo: cartografía de las competencias digitales y las carencias formativas de los periodistas en Portugal



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Abstract:

The aim of this article is to identify and determine the areas with the most significant training needs within the production routines of local, national and international journalism in Portugal. Using data from a survey (n=169), the study analysed the mean values and performed a factor analysis. The findings show distinct training demands: local journalists expressed a need to learn more about techniques to increase the visibility of their news content on the internet and social media. In contrast, national journalists sought greater knowledge in artificial intelligence, while international journalists focused on data. The factor analysis revealed three factors; the first two reflect the interests of local journalists, while the second reflects international journalists' interests. The third factor highlighted the strongest elements associated with the context of disinformation, such as fact-checking.

Keywords:

Digital skills; journalist training; information disorder; disinformation; social media.

Resumen:

El objetivo de este artículo es identificar y determinar los temas con mayores necesidades de formación para las rutinas de producción del periodismo local, nacional e internacional en Portugal. A partir de un cuestionario (n=169), el estudio analizó las medias y realizó un análisis factorial. Los resultados muestran que hay diferencias en las demandas de formación: los periodistas locales dicen que necesitan aprender más sobre técnicas para aumentar la visibilidad de las noticias que producen en internet y las redes sociales, mientras que los periodistas nacionales buscan más conocimientos sobre IA y los periodistas internacionales sobre datos. El análisis factorial determinó tres factores, de los cuales los dos primeros reflejaban los intereses de los periodistas, más concretamente de los locales, y el segundo de los internacionales. El tercer factor tuvo como elementos más fuertes temas relacionados con el contexto de la desinformación, como el fact-checking.

Palabras clave:

Competencias digitales; formación de periodistas; desorden informativo; desinformación; redes sociales.

1. Introduction

Journalists and the media industry face new challenges due to the intensified use of digital social media platforms. In an era of ongoing technological advancement and shifts in communication paradigms (Cardoso, 2007; Ireton & Posetti, 2018), journalism is encountering new difficulties in maintaining its historically granted status as a mediator of public interest issues in democracies. The rise of hyperpartisan and proselytising channels, content creators with large followings, the preference for entertainment consumption, the shift away from news and the use of AI to produce misleading reports are challenges for journalism, systematised in this article. These factors are directly and indirectly linked to the global decline in trust in journalism (Newman et al., 2024).

The exponential growth of unverified information, questionable sources, and harmful discourse has not only contaminated citizens' information diet but has also challenged perceptions of journalistic authority (Waisbord, 2018; Carlson, 2018), thereby impacting journalistic routines (Carazo-Barrantes et al., 2023). Even large media outlets face challenges maintaining visibility compared to other publications by low-credibility accounts and sources (Shao et al., 2018). This issue often affects local media, which encounter additional obstacles, such as limited financial and human resources, and often lack the expertise to navigate these systems, optimise results based on algorithmic performance, and effectively attract the public's attention. These topics will be examined in the empirical section of this article.

Assessing whether journalists possess digital skills and identifying ways to enhance their qualifications to deliver engaging, high-quality information to citizens, particularly those who are digitally literate, is a current demand, but one that faces structural

obstacles related to professional precarity, especially among local media and journalists. Salary and career progression issues in Portugal contribute to dissatisfaction among local journalists, with 60.4% reporting that they had considered leaving their profession, mainly due to low income (Morais et al., 2020).

This situation is reflected in the supply and demand of professional qualifications. A recent study revealed that 47.5% of local journalists in Portugal had not undertaken any recent additional training, while among those who had (65.4%), 41.1% pursued it on their own initiative. Within the same sample, 96% agreed that disinformation is already a significant issue in the Portuguese context (Miranda et al., 2023), underscoring the need to develop new skills such as verification techniques, establishing connections and real-time monitoring (Beers et al., 2020). Studies have shown that even professionals skilled in fact-checking are prone to errors due to the pressures inherent in their professional routines, including the urgency to publish first, over-reliance on authorities, and channels that imitate official communication (Himma-Kadakas & Ojamets, 2022; Jerónimo & Sánchez-Esparza, 2023).

1.1. Structural Challenges for Journalism Posed by Digital Platforms

The increased exposure of individuals to misinformation and disinformation on social media platforms, characterised by their intent and the scale of production and dissemination of self-serving messages (Benkler et al., 2018; Ecker et al., 2022), has broad-reaching implications for journalism. In some contexts, these platforms have become primary spaces for consuming and interacting with news and information (Rúas-Araújo et al., 2020). This study conceptually differentiates misinformation and disinformation as distinct yet complementary complex phenomena. Misinformation refers to the unintentional spread of inaccuracies rooted in widely held yet inaccurate beliefs (Kuklinski et al., 2000). Disinformation, in contrast, involves intentionally creating and disseminating diverse content aimed at deceiving audiences (Fallis, 2015), targeting both individuals and digital platforms' algorithms for political and financial gain (Allcott & Gentzkow, 2017). Thus, we believe that disinformation campaigns may reinforce and entrench societal misinformation.

Journalists recognise that online misinformation and disinformation have transformed their professional routines (Rodríguez & Jiménez, 2021) and express concern about the impact of false information on journalism, news organisations, and, most importantly, audiences (Saldaña & Vu, 2022). The rapid spread of viral political content on social media, alongside journalism's potentially weakened watchdog role, threats to journalistic objectivity, and the long-term decline in public trust in the media translates into threats to journalism itself (Schapals, 2018). The proliferation of misinformation and disinformation is widely regarded as one of the primary risks associated with social media platforms (World Economic Forum, 2024). Therefore, to build greater societal resilience to information overload, citizens must be better equipped to assess information quality, evaluate source credibility and distinguish between news and opinion.

Additional intersecting issues directly impact the sustainability of journalistic activity in digital environments. Researchers have noted that the increasing centrality of social media is reshaping the types of content prioritised for digital consumption. Entertainment content, particularly popular among younger audiences and adults, has become a primary means of incidental news exposure (Edgerly, 2017). Studies also indicate that young people do not actively seek news but consume it incidentally, intermingled with other social media content (Boczkowski et al., 2017). Research further reveals that in areas where local

newspapers have closed, residents are more likely to rely on social media for information (Barclay et al., 2022), which significantly affects community participation and knowledge acquisition (Ardia et al., 2020).

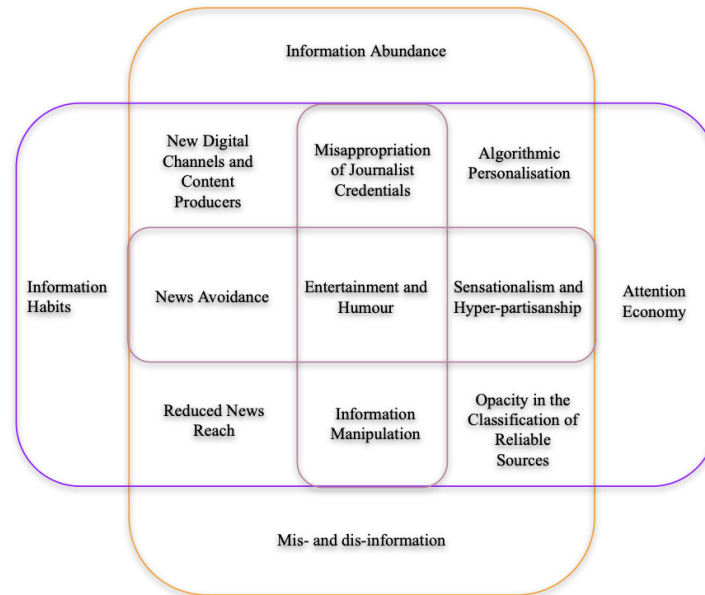
This aspect may be related to the gradual decline of interest in news, a phenomenon that leads individuals to avoid news. News avoidance tends to manifest in distinct ways, consciously or unconsciously, depending on factors related to media systems, the perceived credibility of journalism and how individuals are currently exposed to news (Skovgaard & Andersen, 2019). At the individual level, being young, a woman, ideologically aligned with the left wing, relying on (and not only using) social media as a primary source for accessing news, preference for soft as opposed to hard news are considered essential predictors of news avoidance (Toff & Kalogeropoulos, 2020).

Another phenomenon challenging journalism is the professionalisation of content creation, which has transformed platforms like YouTube and TikTok into essential sources of information. According to Huang & Yang (2024), YouTube's recommendation system contributes to partial filter bubbles by frequently suggesting videos from the same algorithmic category. Additionally, YouTube is more likely to recommend entertainment videos after a user watches a news video. "The probability of entertainment videos to be recommended is three times higher than the probability of news videos to be recommended, indicating that no matter what users start with on YouTube, they are more likely to end up watching entertainment than news videos" (Huang & Yang, 2024, p.2).

The decline in interest in news is reflected in the logic of the social media attention economy, where content is optimised for algorithmic circulation and mass consumption. This often involves using topics subject to political polarisation, eliciting affect (particularly negative affect), favouring content that is easy to like and read, and sensationalised. Bessi et al. (2014) demonstrate that those who have a strong preference for alternative sources are also more likely to interact with false information, which affects the formation of beliefs and the revision of information.

The rise in content creators has expanded the number of information channels available on the web, social media and messaging applications through which individuals access political information (Van Aelst et al., 2017). Many of these digital channels and content lack professional training, operate independently of media systems and misappropriate the status of journalists (Dourado et al., 2024). Finally, additional challenges for journalism on social media platforms include the limited reach of journalistic sources within recommender systems (Bailo et al., 2021) and the lack of transparency around how big tech companies classify and prioritise reliable sources.

Figure 1 systematises the structural challenges characterising the relationship between information disorder, digital platforms, and contemporary journalism, as outlined in the theoretical framework developed in this chapter. It argues that four main interconnected dimensions encompass secondary yet crucial aspects of message distribution and digital interactions on social media.

Figure 1. Structural Challenges for Journalistic Activity (Venn Diagram)

Source: created by the authors

Thus, strengthening journalism is seen as a way to curb the problems and effects stemming from misinformation and disinformation. This approach underscores the need to promote ongoing training processes for professionals in the field, especially those working in local contexts. Many journalists regard journalism training as the most effective way to combat misinformation and disinformation, including ongoing education and university-based professional development (Blanco-Herrero & Arcila-Calderón, 2019). Although there is a widespread perception that journalists are skilled in fact-checking, in Spain, only a minority have received specific training in this area (Gómez-Calderón & López-Martín, 2024).

2. Methodology

Through a quantitative exploratory study, this article aims to investigate the digital competencies and training needs of journalists working in Portugal, considering the geographical scope of the local, national and international media. Specifically, it identifies similarities and differences in journalists' challenges and needs and examines critical issues according to different geographical areas. To achieve this, a questionnaire was conducted between August and October 2023, distributed via email by

the *Comissão da Carteira Profissional de Jornalista*¹ (CCPJ) in Portugal, yielding 169 valid responses (n=169). As of September 2023, the CCPJ's email database included 5,394 registered professionals. The sample reliability is 80%, with a margin of error of 5%.

The questionnaire consisted of 23 questions –20 close-ended and three open-ended– divided into six sections: 1. Sociodemographic data, 2. Professional profile, 3. Education and training, 4. Digital competencies, and 5. Training needs. Most questions were multiple-choice, with four questions using Likert scales ranging from (1) not at all to (5) quite a lot, from (1) not at all to (advanced), from (1) never to (5) always, or from (1) not at all to (5) a lot. Responses were anonymised and processed using SPSS (Statistical Package for the Social Sciences) version 28. For the quantitative analysis of the other research question options, the programme Maxqda was used.

2.1. Sample characterisation

Age. The largest age group is between 41 and 50 (32.5%), followed by those aged between 51 and 40 (29.6%). The third largest group comprises respondents aged 21 to 30 (14.2%), followed by 31 to 40 (13.6%). Additionally, 7.7% of respondents are between 61 and 70 years old, and 2.4% are over 70.

Gender. The majority of respondents identify as men (60.4%), followed by women (39.1%) and others (0.6%).

Professional Qualification. Most respondents hold a bachelor's degree (53.8%), followed by those with secondary education (16.6%) and a master's degree (16%). To a lesser extent, respondents hold vocational training in journalism (3.6%) or other fields (3.6%) and PhDs (3%). Respondents with postgraduate qualifications (specialisation, MBA, etc.) represent (1.2%) (Other).

District. The majority of journalists work in Lisbon (36.1%), with much smaller proportions in other districts: Porto (12.4%), Leiria (6.5%) and Coimbra (5.9%). Following these are Faro (5.3%) and Castelo Branco (5.3%), tied ahead of Aveiro (4.1%), Azores (3.6%), Braga (3.6%) and Madeira (3%). Viana do Castelo (2.4%), Évora (1.8%), Guarda (1.8%), Setúbal (1.8%), Viseu (1.8%), Beja (1.2%), Bragança (1.2%), Santarém (1.2%). Portalegre (0.60%) and Vila Real (0.60%) appear less frequently.

Work Experience. A significant proportion of respondents have over 15 years of work experience (59.8%). Among the rest, some have up to five years of experience (16%), between 5 and 10 years of experience (13.6%) and between 10 and 15 years of experience (10.7%).

Professional Qualifications. Most respondents hold a professional journalist licence (74.6%), while others have a salaried employee licence (10.7%), equivalent journalist licence (10.1%), temporary trainee licence (3.6%) and foreign correspondent licence (1.2%).

Position. Most respondents are writers/reporters (40.2%), followed by board members (13%), permanent employees (10.7%), photojournalists/graphic reporters (9.5%), section editors/coordinators (8.9%), and editors-in-chief/heads of editorial (4.7%). Free-

1 The *Comissão da Carteira Profissional de Jornalista* (in English: Commission for the Professional Journalist Card) is an independent public law body in Portugal regulated by the *Estatuto do Jornalista* (in English: Journalist Statute) and the *Regime de Organização e Funcionamento da CCPJ* (in English: Regulation of the Organisation and Functioning of the CCPJ) and the *Acreditação Profissional do Jornalista* (in English: Professional Accreditation of Journalists). See: <https://www.ccpj.pt/>

lancers make up 3.6%. Other roles include owners, retirees, news editors, infographic journalists, deputy editors-in-chief, directors, editors, and interns, represented in smaller numbers.

Predominant Media Type. Most respondents work in print media and/or its digital formats (55.6%), followed by digital-only media (13.6%), radio and/or its digital media (13%), television and/or its digital media (8.9%) and news agencies (5.9%). Other types of media are less common or without format.

Geographical Scope: Respondents primarily work in national (45.6%) and local media (44.4%), with a smaller proportion in international media (10.1%).

2.2. Organisation of Quantitative Analyses

Means. Initially, we analysed and compared the means of the responses regarding journalists' interests, the challenges they encounter in their journalistic routines and their identified training needs based on their geographical areas. For the topics of interest (*"For which of the activities listed below would you be most interested in receiving training?"*) and regarding perceived difficulties (*"What do you perceive as the most difficult aspects of your daily routine in journalism?"*), respondents were given two options: No (1) and Yes (2). For training needs (*"Based on your work routine, how much do you feel you lack training on the topics below?"*). Respondents rated each option on a scale from not at all (1), a little (2), neutral (3), a lot (4), and quite a lot (5).

Exploratory Factor Analysis. An exploratory random factor analysis was conducted to identify the most significant variables related to the training needs of the surveyed journalists. This analysis focused on the question (*"Based on your work routine, to what extent do you feel you lack training in the topics listed below?"*), which included 18 variables aimed at understanding which topics journalists perceive as lacking and which are beneficial for their production routines. Initially, all 18 indicators were calculated. However, four variables were discarded due to their values falling below 0.50, which was deemed too low (*Artificial Intelligence Tool, Design Thinking, Audiovisual Production and Editing and Entrepreneurship*). Consequently, the factor analysis proceeded with 15 indicators, enabling the correlation of these variables and reducing them into three identified factors. A significance level of 0.05 was established for this study.

3. Results

3.1. Frequency Description

Education and Training. Over half of the respondents (57.4%) reported having participated in some form of training in recent years. Most of these training sessions were initiated by the journalists themselves (80.6%), while a smaller proportion was organised by their media employers (17.3%). When training was collaboratively undertaken by the individual and their employer or a trade union, the percentage was approximately 1%. These findings indicate that professionals in Portugal are proactively seeking opportunities to update their knowledge. However, only a small percentage of these individuals engage in training courses offered by academic institutions, trade unions, the journalistic sector, philanthropic organisations, civil society, or public authorities, which typically provide such training (Becker & Lowrey, 2000). When asked whether the training topics were related to fact-checking projects, less than half of respondents (42.4%) answered affirmatively. In comparison,

the majority (57.6%) indicated they were not, citing topics such as digital writing, artificial intelligence, and new information and communication technologies instead. UNESCO states that courses focusing on the disinformation industry are a priority (UNESCO, 2018), indicating a connection with the findings of this study.

3.1.1. Changes in Journalistic Routines

Respondents overwhelmingly indicated that the issue of disinformation has greatly (36.1%) and significantly (32%) affected their journalistic routines. A smaller percentage of professionals reported that disinformation had moderately affected their journalistic routines (18.9%), while even fewer noted that it had little (8.9%) or no impact (4.1%). Nevertheless, nearly all (97.6%) agreed that journalists need to update their skills in response to the challenges of misinformation and disinformation. These findings corroborate a previous survey indicating that misinformation and disinformation are perceived as the primary challenges facing journalists in Portugal (Miranda et al., 2023). Furthermore, another study highlights how the “hyperconnected, multiplatform, algorithms and AI-driven realities” present significant challenges for journalism professionals and the industry (Foà et al., 2023, p. 6).

3.1.2. Digital skills

Most respondents reported having a high level of knowledge of social media (55 %). The second-highest percentage claimed to possess reasonable knowledge (26.6%), while the third (15.4%) stated that they had little knowledge, and the fourth (3%) indicated having no knowledge. None of the respondents reported a complete lack of familiarity with social media. The vast majority regularly utilise digital tools and social media in their journalistic routines, with the most common responses being “quite a lot” (49,1%) and “a lot” (32%).

Others adopt social media at a “reasonable” level (14.2%) or “minimally” (4.7%). Previous studies indicate that nearly all journalists in Portugal use social media for professional and personal purposes, with a predominant use of Facebook and infrequent use of Twitter (renamed X in 2023). They often use these platforms to follow conversations involving business leaders, government representatives, and other sources (Mateus, 2015). Local journalists, particularly in central Portugal, report using social media multiple times daily, primarily for information gathering, accessing email and managing their social media accounts (Morais et al., 2020).

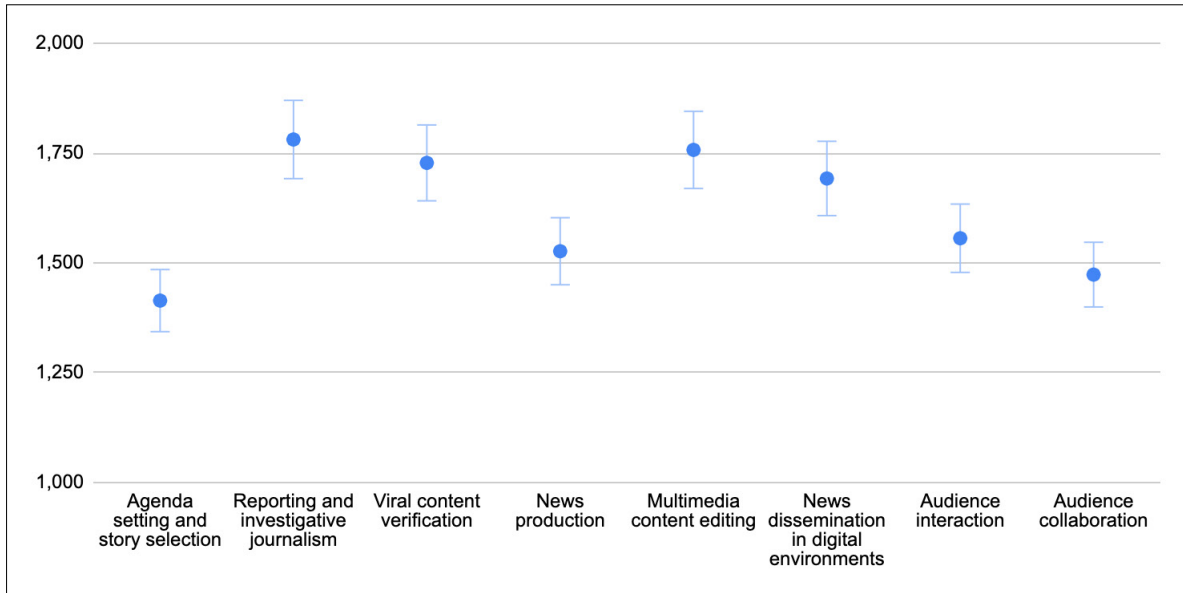
3.2. Statistical Analysis of Means

3.2.1. Topics of interest versus geographical scope

The topics “reporting and investigative journalism” (M=1.781; SD=0.415), “multimedia content editing” (M=1.757; SD=0.430), “viral content verification” (M=1.728; SD=0.446), and “news dissemination in digital environments” (M=1.692; SD=0.463) are generally identified as those of most significant interest to the respondents. Among the topics of least interest are “agenda setting and story selection” (M=1.414; SD=0.494), “audience collaboration” (M=1.473; SD=0.501), “audience interaction” (M=1.556; 0.498) and “news production” (M=1.527; SD=0.501). Apart from investigative journalism, journalists surveyed

express a greater need for training in skills associated with digital transformation and fact-checking. These skills are perceived as critical for journalists who have to effectively navigate the complexities of information disorder (García-Marín, 2021).

Figure 2. Respondents' Topics of Interest



Source: created by the authors

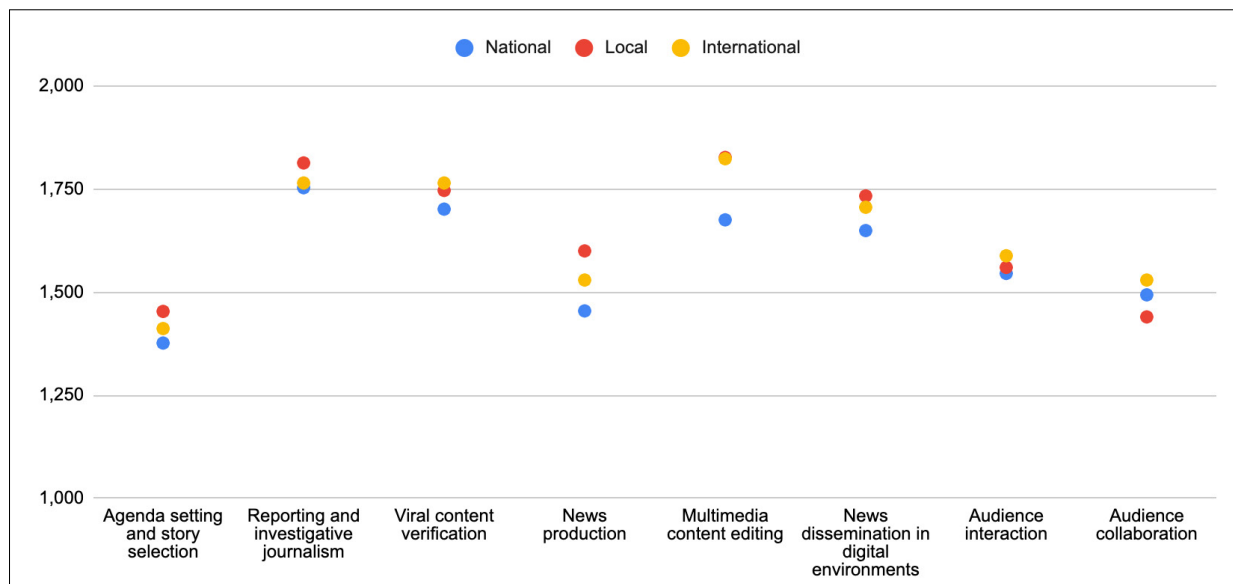
A geographic analysis of the four most pertinent topics indicates that local journalists prioritise learning about “reporting and investigative journalism” ($M=1.813$; $SD=0.392$), followed by “multimedia content editing” ($M=1.827$; $SD=0.381$), and closely after, “collaboration with the audience” ($M=1.440$; $SD=0.500$). However, they show less interest in “audience collaboration”. For journalists covering national news, the emphasis remains on expanding their knowledge of “reporting and investigative journalism” ($M=1.753$; $SD=0.434$) and “viral content verification” ($M=1.701$; $SD=0.461$), while interest is comparatively lower in “agenda identification and story selection” ($M=1.377$; $SD=0.488$).

Among those working internationally, “multimedia content editing” ($M=1.824$; $SD=0.393$) emerges as the primary area of interest, followed by “viral content verification” and “reporting and investigative journalism”, both of which share the same mean and standard deviation ($M=1.765$; $SD=0.437$). Conversely, most respondents regard access to training courses in “agenda identification and story selection” ($M=1.412$; $SD=0.507$) as a lower priority (see Figure 2).

These findings indicate that while reporting and investigative journalism skills are the most relevant across all geographic domains, identifying and elucidating viral content appears especially crucial for journalists covering national and international news. It is worth noting that local media and international media journalists show a strong interest in training in multimedia

content editing. However, it is striking that local journalists express less interest in training on audience collaboration, this may suggest that they perceive their existing skills in this area as adequately developed.

Figure 3. Topics of Interest vs. Geographical Scope of the Media Where They Work



Source: created by the authors

A one-way analysis of variance (ANOVA) was conducted to evaluate whether training needs differed among journalists from different geographic areas. The Shapiro-Wilk test was performed, rejecting the null hypothesis of normal distribution for all groups, with $p < 0.001$. Furthermore, Levene's test further indicated that variances across these groups are not homogenous ($p > 0.05$ for all groups, based on the median). As a result, findings from Welch's ANOVA test were examined, as the assumption of equal variances was also violated in this sample. However, using Welch's test incurs minimal power loss while enhancing Type I error control (Delacre et al., 2019). This time results yielded $p > 0.05$ across all groups, leading to a failure to reject the null hypothesis and conclude that there are no significant differences between groups. Thus, it can be confirmed that although journalists' interest in training topics varies slightly, they remain broadly consistent across geographic regions.

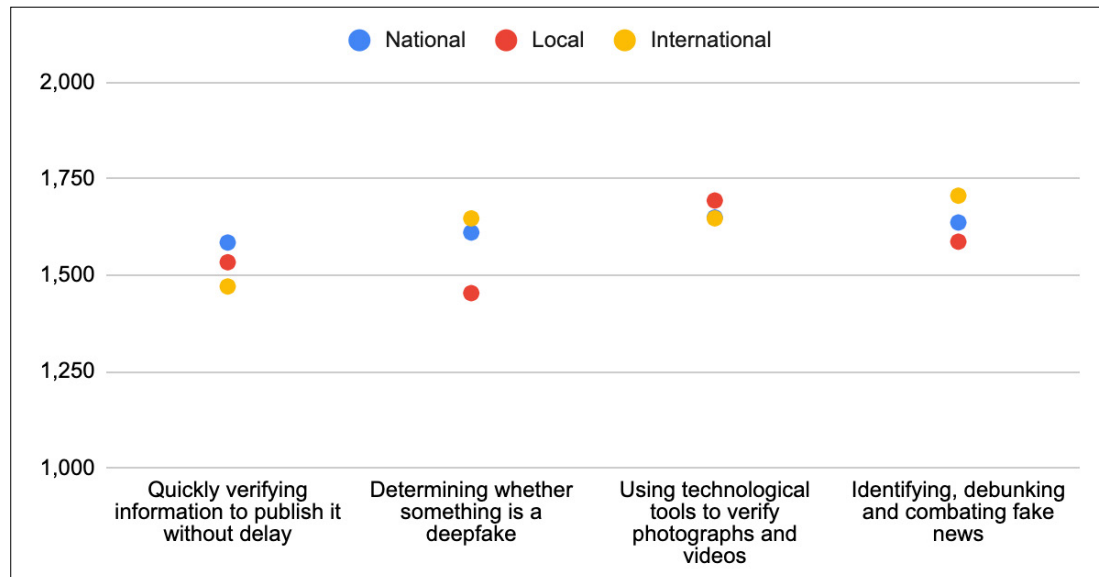
3.2.2. Main Challenges vs. Geographical Scope

The survey also examined the primary challenges journalists encounter in their professional routines. The findings are categorised into four thematic groups: verification, audiences, social media and the internet, aggression, hate speech and minorities.

Verification. Local and national journalists identify “using technological tools to verify photographs and videos” as one of their most significant challenges in the verification process ($M=1.693$; $SD=0.464$). Many journalists find it somewhat easier to verify texts than videos or photographs and admit to resorting to image experts (Rodríguez & Jiménez, 2021). This issue could potentially be remedied through targeted training, as the use of various digital tools for data verification is not yet widespread among journalists (Gómez-Calderón & López-Martín, 2024). In contrast, international journalists view “identifying, debunking, and combating fake news” as their biggest challenge ($M=1.706$; $SD=0.470$), the second most pressing issue for national and local journalists. Local journalists perceive “determining whether something is a deepfake” as their least significant challenge ($M=1.453$; $SD=0.501$), while it poses a challenge for international journalists that is comparable to “using technological tools to verify photographs and videos” ($M=1.647$; $SD=0.493$).

This observation suggests that local journalists may not encounter instances of deception in their daily work, while such challenges are more prevalent for journalists in other geographical areas. Once again, a one-way analysis of variance (ANOVA) was conducted to evaluate whether there were differences among journalists from various geographical regions regarding the challenges they face in verifying content in their routines. The results from Welch’s ANOVA test again indicated that, for all groups, $p>0.05$. Consequently, we conclude that it is not possible to state that there is a significant difference between the groups.

Figure 4. Topics Related to Fact-Checking



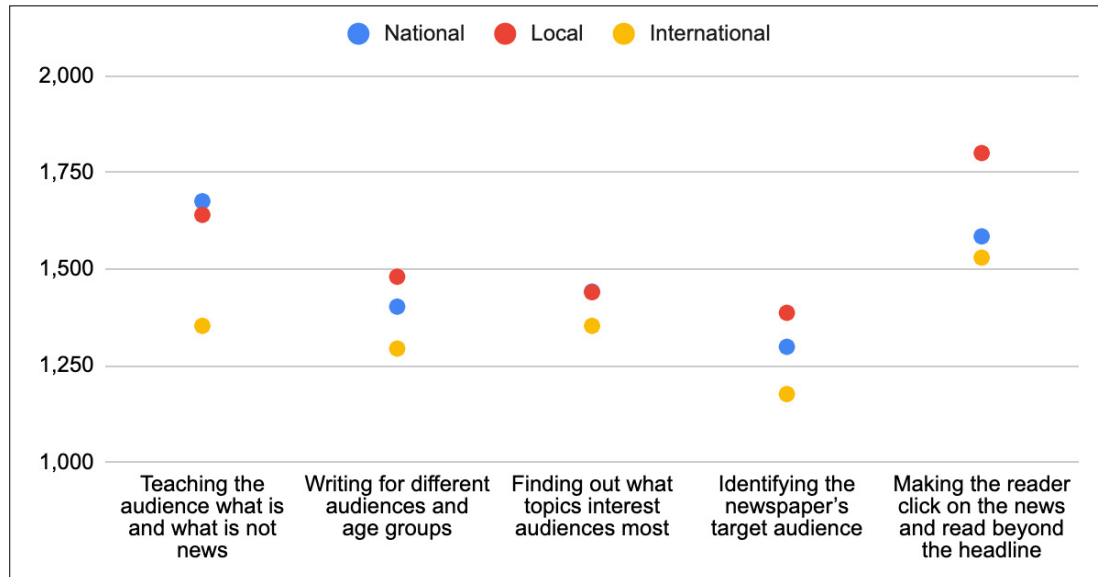
Source: created by the authors

It is noteworthy that the surveyed journalists did not regard “quickly verifying information to publish it without delay” as a significant difficulty, despite several studies indicating that time pressure is one of the main obstacles to effective fact-checking in journalistic routines (Schapals, 2018; Morais & Jerónimo, 2023; Saldaña & Vu, 2022). Notably, these represent the highest averages among all the surveyed topics, which was to be expected, as journalists, particularly younger ones, view mastering technological tools as one of the essential competencies for addressing disinformation (García-Marín, 2021).

Audiences. As previously noted, local journalists primarily identify that “making the reader click on the news and read beyond the headline” (M=1.800; SD=0.403) is, by far, their most significant challenge. This issue also emerges as a critical concern for international journalists (M=1.529; SD=0.514) and ranks as the second most pressing challenge for national journalists (M=1.584; SD=0.496). The option “teaching the audience what is and what is not news”, in turn, is perceived as the main challenge for national journalists (M=1.675; SD=0.471), while it ranks as the second most significant issue for local journalists (M=1.640; SD=0.483) and international journalists (M=1.353; SD=0.493). This concern is closely associated with “finding out what topics interest audiences most” (M=1.353; SD=0.493). It should be noted that in all three cases, “identifying the newspaper’s target audience”, “writing for different audiences and age groups”, and “finding out what topics interest readers most” do not rank among the most frequently encountered difficulties in journalistic routines. Thus, it is observed that the journalists’ main concerns regarding their audiences are related to promoting media and information literacy. Such promotion is viewed as a response to the perceived crisis in journalism, aimed at restoring the authority and legitimacy of journalism and a way to emphasise their journalistic authority. Additionally, it reflects efforts to attract attention and new audiences while aligning with journalism’s democratic goal of fostering informed and educated citizens (Jaakkola, 2022; García-Marín, 2021).

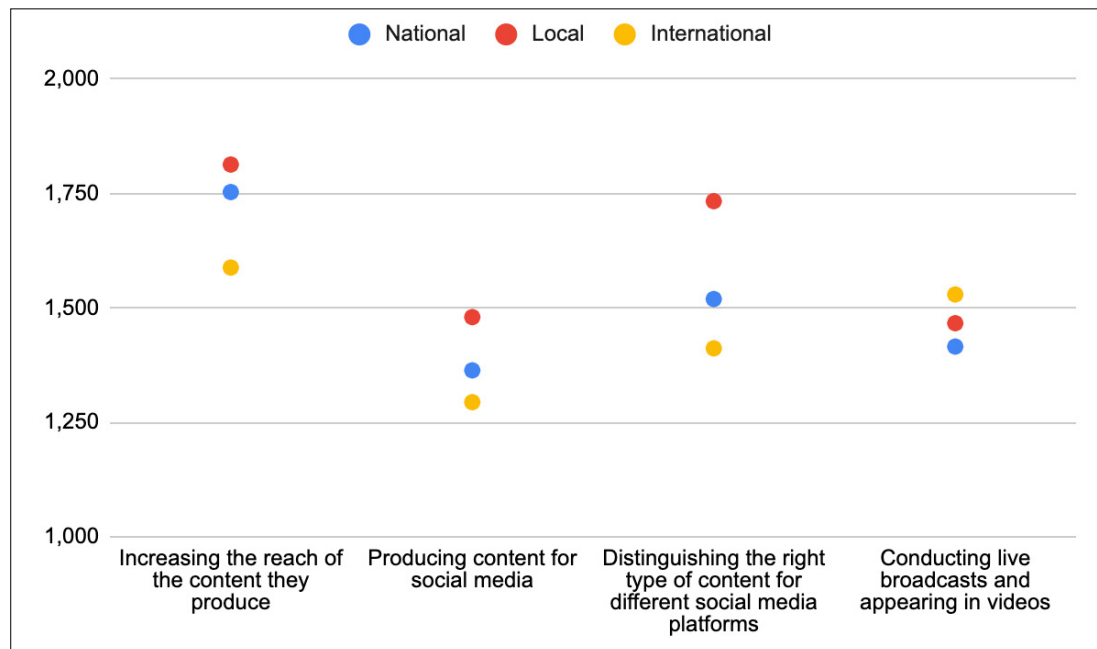
On this occasion, Welch’s ANOVA test results indicate that the difference between groups for the variable “making the reader click on the news item and read beyond the headline” is statistically significant ($t=5.466$; $DF=2$; $p=0.08$). Subsequently, a post hoc test was conducted to identify which specific groups exhibited significant differences. The Games-Howell test revealed that the primary difference lies between national and local journalists, with a mean I-J difference of 0.22114 (SD=0.735; $p=0.09$).

Figure 5. Audience-related issues



Source: created by the authors

Social Media and the Internet. Regarding this aspect, “increasing the reach of the content they produce” ($M=1.763$; $SD=0.426$) is identified as the most significant difficulty across all groups. Journalists’ concerns about the need to balance rigorous content verification with the need for engaging storytelling align with previous studies (Schapals, 2018). The second biggest challenge for local and national journalists is “distinguishing the right type of content for different social media platforms” with local journalists reporting $M=1.733$; $SD=0.445$; and national journalists, $M=1.519$; $SD=0.503$). In contrast, the second major challenge for international journalists is “conducting live broadcasts and appearing in videos” ($M=1.529$; $SD=0.514$). International journalists considered “distinguishing the right type of content for different social media” their third greatest difficulty ($M=1.412$; $SD=0.507$). Overall, “producing content for social media” ranks as the least prioritised among all three types of journalists. Once again, Welch’s ANOVA test results indicate a statistically significant difference among the groups for the variable “distinguishing the right type of content for different social media” ($t=5.352$; $DF=2$; $p=0.08$). Subsequently, the Games-Howell test revealed that the main difference exists between national and local journalists, with a mean I-J difference of 0.21663 ($SD=0.7759$; $p=0.016$).

Figure 6. Topics Related to the Internet and Social Media Audiences

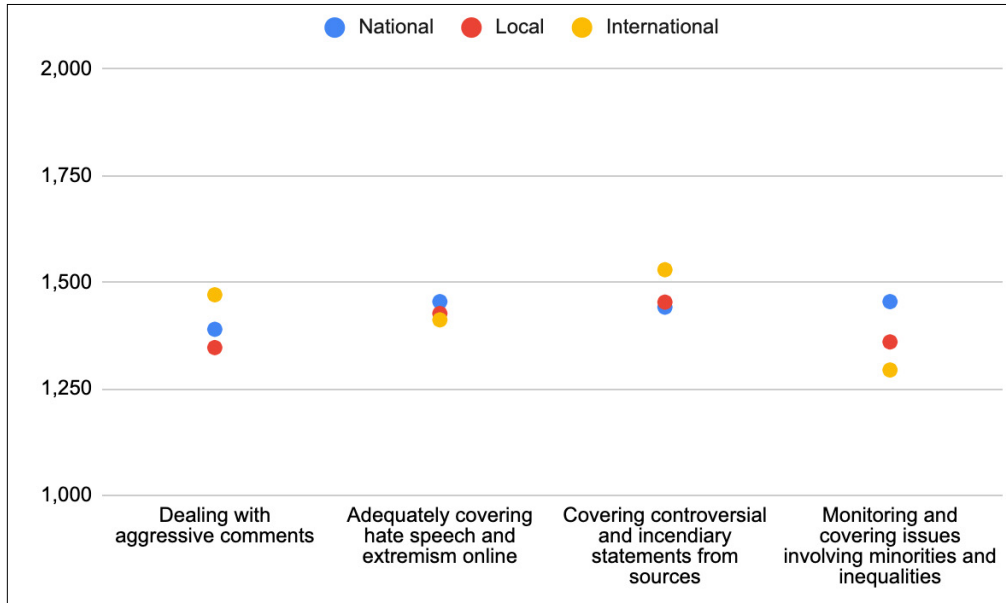
Source: created by the authors

Aggression, hate speech and minorities. In this category, there is a more balanced perception regarding the greatest difficulties journalists face. In highly polarised environments, such as social media, journalists correcting mis- and disinformation may encounter backlash and retaliation when their statements challenge the beliefs of certain groups (Saldaña & Vu, 2022). Furthermore, a significant proportion of journalists have reported experiencing some form of discursive threats in these online environments (Blanco-Herrero et al., 2023). The results for the variables “covering controversial and incendiary statements from sources” ($M=1.456$; $SD=0.500$) and “adequately covering hate speech and extremism online” ($M=1.438$; $SD=0.498$) are very close, indicating that these are considered the most challenging aspects for journalists. This concern may be related to the potential for malicious use of the information they produce, prompting journalists to ensure that their texts are very clear to prevent misinterpretation or exploitation for malicious agendas (Carazo-Barrantes et al., 2023).

For international journalists, “dealing with aggressive comments” ($M=1.471$; $SD=0.514$) is their second biggest concern, after “covering controversial and incendiary statements from sources” ($M=1.529$; $SD=0.514$). National journalists perceive “covering controversial and incendiary statements from sources” and “monitoring and covering issues involving minorities and inequalities” as equally significant challenges (both, $M=1.455$; $SD=0.501$). In contrast, local journalists do not consider “dealing with aggressive comments” and “monitoring and covering issues involving minorities and inequalities” to be challenging. This

time, as indicated by the close proximity of the results illustrated in Figure 7, Welch's ANOVA test findings reveal that $p > 0.05$ was found for all groups. Therefore, we conclude that it is not possible to assert that there are significant differences among the groups.

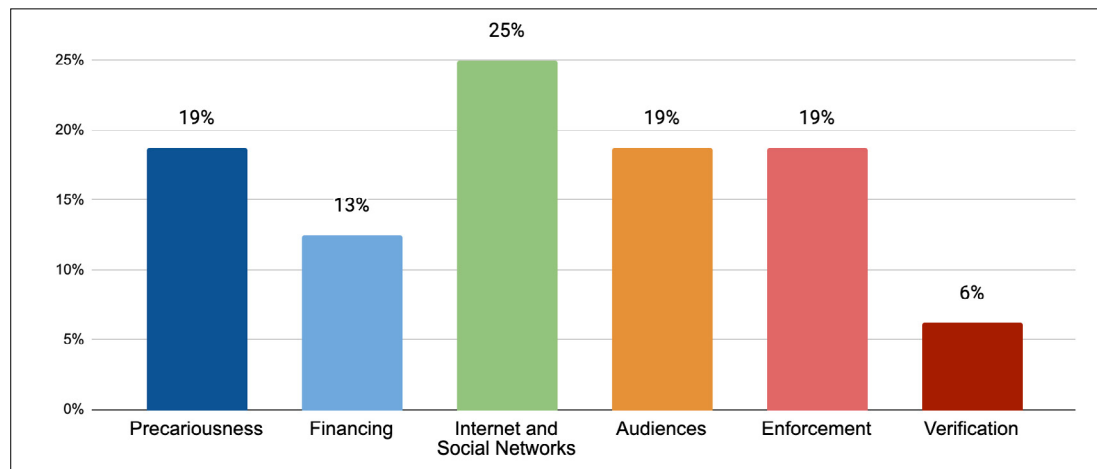
Figure 7. Audience-Related Topics: Aggression, Hate Speech, and Minorities



Source: created by the authors

Other. Respondents identified other reasons that either relate to other categories or pre-existing categories. Key concerns include the precarious nature of the profession, which is characterised by demands for immediacy, low specialisation and low investment in producing in-depth reports. Other challenges include a lack of funding, which underscores the need to explore new financing methods for journalistic activities, including securing international grants. There is also a call for improved enforcement, particularly regarding allegations of misappropriating journalist credentials and the proliferation of unchecked information on social media. These difficulties are perceived as significant challenges currently facing the sector. Previous studies indicate that journalists perceive both social media and precarious working conditions as important factors contributing to the rise of fake news (Blanco-Herrero & Arcila-Calderón, 2019).

Figure 8. Other Difficulties



Source: created by the authors

In the preexisting categories pertaining to the Internet and social media, journalists report difficulties in dealing with superiors regarding the role of social media and in recognising its significance for journalism. Concerning audiences, they identify additional challenges, such as helping to educate the public on how to consume news on social media and how to leverage technology to promote media literacy. Lastly, in the case of verification, journalists emphasised the importance of knowing how to use AI to replace mechanical tasks within their professional routines.

However, it is essential to note that among all the categories of difficulties in the survey (verification, audiences, social media and the internet, aggression and hate speech and minorities), the highest averages were observed in the first set of variables. Other studies have shown that journalists regard the acquisition of digital skills and the mastery of specific tools for fact-checking and data verification, along with an understanding of social media dynamics, as essential tools for identifying patterns in the production and dissemination of false information (García-Marín, 2021).

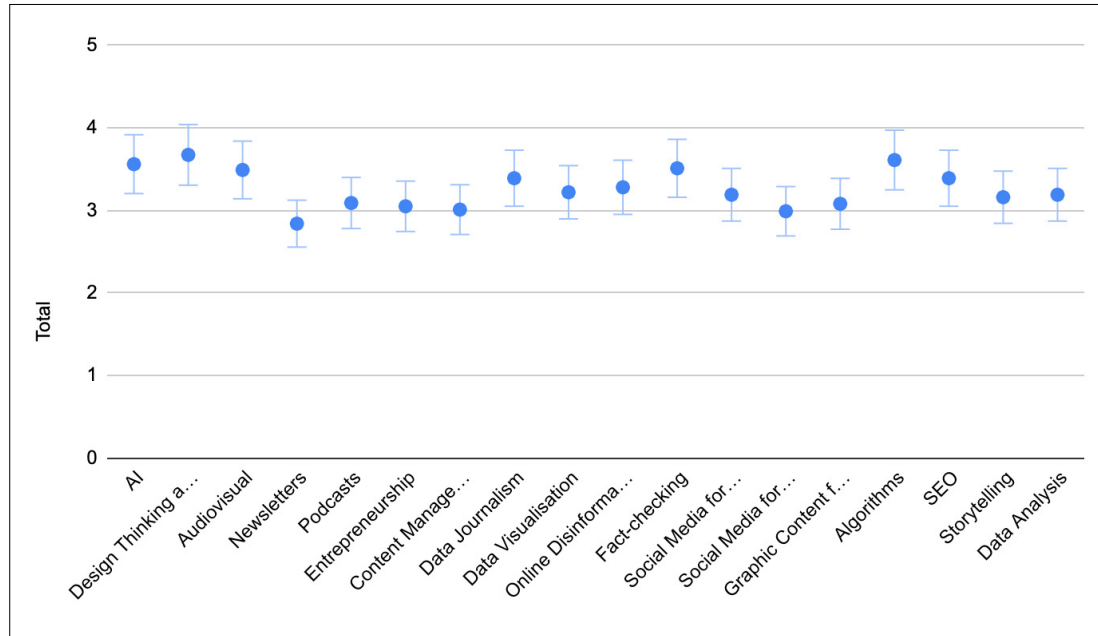
3.2.3. Training needs

Among the topics identified by the surveyed journalists as requiring further training were “Design Thinking and Innovation” ($M=3.672$; $SD=1.255$), “How algorithms work” ($M=3.61$; $SD=1.292$) and “Using AI tools” ($M=3.5602$; $SD=1.3$) (Figure 10). These findings underscore the need for more in-depth training and regarding contemporary technology and innovation topics. This need may be linked to the relative seniority of the professionals in the sample and their perception of the implications of new technologies for journalistic routines.

The topics that journalists perceived as requiring the least amount of training included “Creating newsletters” ($M=2.84$; $SD=1.241$), “Strategic Use of Social Media to Create Communities” ($M=2.99$; $SD=1.255$) and “Content Management Platforms”

($M=3.01$; $SD=1.258$). Given that the sample did not follow a normal distribution (as indicated by the Shapiro-Wilk test, which showed $p<0.001$ for all variables), a Friedman test (Liu & Xu, 2022) was conducted. The results indicate a statistically significant difference among the mean ranks of the related groups ($\chi^2=151.201$; $DF=17$; $p<0.001$).

Figure 9. Training Needs (by Average)

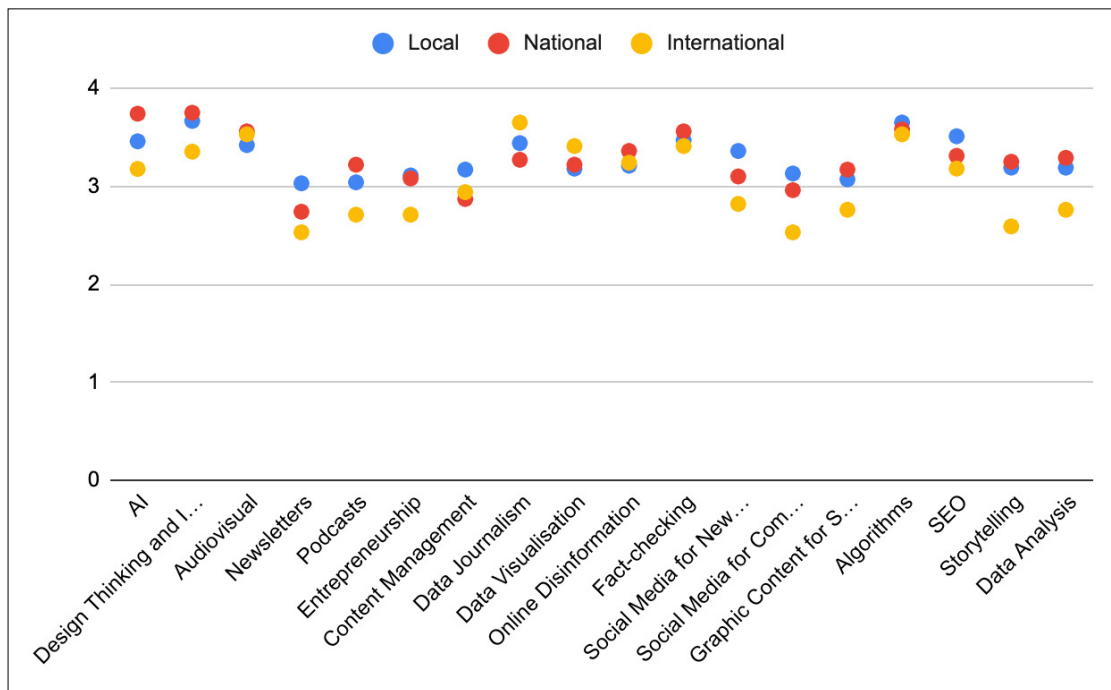


Source: created by the authors

When examining journalists' responses based on geographic scope (local, national and international) (Figure 10), local journalists identify SEO (Search Engine Optimisation)" ($M=3.51$; $SD=1.222$); "Use of social media to disseminate news" ($M=3.36$; $SD=1.166$); and "Use of social media to build communities" ($M=3.13$; $SD=1.138$) as the most relevant training needs compared to the other two groups. These findings align with previous research (Jerónimo, 2015), which indicates that local Portuguese media often respond reactively to the actions of national media. Consequently, the concerns expressed by local journalists may be perceived as somewhat outdated by their counterparts in national and international media. While local journalists seek visibility, national and international journalists are concerned with more contemporary issues such as AI.

Among national journalists, the most significant training needs, relative to the other two groups, are identified in "The use of AI tools" ($M=3.72$; $SD=1.271$) and "The Creation of Podcasts" ($M=3.25$; $SD=1.338$). Finally, for journalists working in international media, the most pronounced training needs compared to the other groups are "Data journalism" ($M=3.65$; $SD=1.222$) and "Data visualisation" ($M=3.41$; $SD=1.229$).

Figure 10. Training Needs vs. Geographical Scope (by Average)



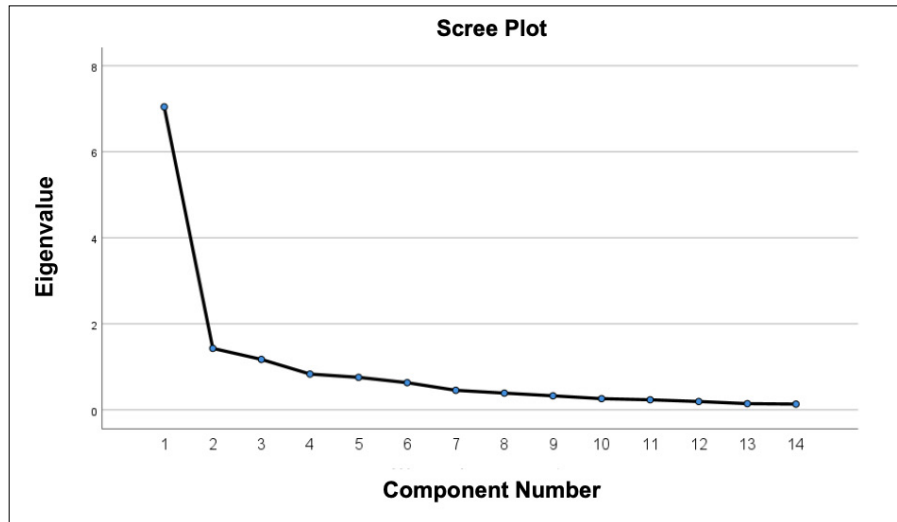
Source: created by the authors

Interestingly, all three groups of respondents indicated a comparable need for training in “Identifying and investigating disinformation”, “Digital fact-checking techniques and tools”, “Understanding how algorithms work”, and “Producing and editing audiovisual material”. A one-way analysis of variance (ANOVA) was conducted to assess whether there were differences in training needs among journalists from various geographical areas. However, the results from Welch’s ANOVA were not considered statistically significant for any group (for all hypotheses, $p > 0.05$).

3.3. Factor analysis

Finally, following an attempt with 15 items, of which three were excluded, we sought to verify the adequacy of the factor analysis. The results yielded satisfactory values for the Kaiser-Meyer-Olkin (KMO) test (0.86) and Bartlett’s sphericity test ($\chi^2 = 1576.190$; $p < 0.05$). Three items were removed from the analysed questions designed to investigate the primary training gaps in journalistic routines due to their variance for common factors being less than 50%. Ultimately, three factors were identified, each with eigenvalues greater than 1, accounting for 68.9% of the variance of the construct studied (Figure 11).

Figure 11. Sedimentation of factors



Source: created by the authors

The first factor comprises the largest variety of relevant items, with a maximum loading of 0.84 (graphic content for social media) and a minimum loading of 0.14 (database research). This factor has an eigenvalue of 7.04, which accounts for 50.3% of the variance. The most significant items within this factor pertain to journalistic production routines, encompassing aspects such as content management and production for the Internet and social media (items 10, 8, 9, 11, 14, 12) and the development of journalistic languages and formats (items 13 and 2), with particular emphasis on audio-based content such as podcasts. Consequently, this dimension is labelled “*online news production and dissemination*.” Factor 2 consists of items with a minimum loading of 0.02 (use of social media to disseminate news) and a maximum loading of 0.87 (data visualisation), resulting in an eigenvalue of 1.4, which explains 10.2% of the variance. This factor encompasses items related to data journalism (items 5 and 4) and the newsletter format (item 1), a dimension that will be designated as “*data journalism*”.

Table 1. Communalities, Factor Loadings and Rotated Matrix (VARIMAX)

Variable	Communalities	Factor Loadings		
		F1	F2	F3
1. Newsletters	0.62	0.454	0.649	0.018
2. Podcasts	0.52	0.630	0.348	0.095
3. Content Management	0.58	0.598	0.476	0.027
4. Data Journalism	0.80	0.145	0.855	0.237
5. Data Visualisation	0.85	0.167	0.875	0.252
6. Investigating disinformation	0.83	0.231	0.228	0.856
7. Fact-checking techniques	0.84	0.258	0.151	0.871
8. Using Social Media to Disseminate News	0.71	0.800	0.025	0.273
9. Using Social Media to Build Communities	0.65	0.786	0.105	0.164
10. Graphic Content for Social Media	0.75	0.841	0.204	0.058
11. Algorithm Functionality	0.57	0.668	0.249	0.255
12. SEO	0.62	0.737	0.219	0.183
13. Storytelling	0.61	0.663	0.254	0.331
14. Social Media Data Analysis	0.62	0.675	0.242	0.327
λ_j % Explained	9.647	7.044	1.430	1.173
	68.9%	50.3%	10.2%	8.3%
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation.				
a. Rotation converged in 6 iterations.				

Source: created by the authors

Factor 3, with a maximum loading of 0.87 (fact-checking techniques) and a minimum of 0.02 (content management), has an eigenvalue of 1.1 and accounts for 8.3% of the variance. The items with the highest loadings on this factor pertain to journalism's role in addressing and constructing responses to disinformation. This underscores the need for newsrooms, particularly traditional ones, to investigate disinformation and master fact-checking techniques. This includes fact-checking initiatives, which may not necessarily require specialisation. Notably, only the creation of a newsletter (item 1) shows a relatively strong loading across more than one factor, although it is more strongly associated with Factor 2 (Table 1). Thus, this dimension is labelled "*fact-checking*".

4. Conclusion

This study sought to identify the challenges Portuguese journalists face in developing digital competencies to combat misinformation and disinformation. It also sought to determine their training needs based on the geographical scope of the media outlets where they work, categorised as local, national and international. Using a questionnaire with 169 valid responses, the survey identified a latent demand across various topics. However, differences became apparent when the data were analysed broadly and in a more needs-oriented way regarding geographical coverage. Overall, no significant differences emerged among local, national, and international journalists regarding topics of interest, difficulties in their routines, and training needs. Nonetheless, the data reveal some noteworthy trends.

Design thinking and innovation, understanding how algorithms work and the use of AI received the highest average responses, indicating a strong perceived need for training in these areas. However, prioritising these topics varies depending on the journalists' scope of coverage. None of the three prioritised topics align with the specific training needs emphasised by journalists in each geographical area. For local professionals, SEO (Search Engine Optimisation) is important; for national journalists, AI tools are prioritised; and for international journalists, data-driven research is the most significant focus.

Overall, the data indicate that local journalists are primarily concerned with increasing the visibility of their stories on social media platforms and building communities. National journalists prioritise further training in podcasts and AI, both emerging industry demands that impact production routines. Meanwhile, international journalists are more interested in enhancing data literacy, specifically data-driven investigative journalism and data visualisation.

This division is evident from the factor analysis, which identified three significant factors. The first factor encompasses more robust items related to more general topics concerning social media, such as news dissemination and community building, which are preferences of local journalists ("online news production and dissemination"). The second factor comprises more robust items linked to data journalism, which is of interest to professionals working in international media outlets ("data journalism"). The third factor demonstrates a higher loading on topics related to disinformation investigation and fact-checking techniques ("fact-checking").

Local and national journalists demonstrate a greater overall interest in training, as reflected in higher averages across nearly all variables, with the exception of data journalism topics, where professionals working in international media express a greater need for training. This trend is further highlighted in the factor analysis, particularly in factor 2 ("data journalism"). Broadly speaking, local and national journalists exhibit similar training interests, demonstrated in factor 1 ("online news

production and dissemination”). Although news production and dissemination appeal to national and local journalists, certain discrepancies emerge. Specifically, local journalists appear more concerned with issues related to digital environments and their audiences, such as producing tailored content for various social media, identifying their audience on social media, expanding the reach of their content, learning SEO, learning how to use content management platforms, building online communities and encouraging readers to click beyond the headline. While national journalists share many of these interests, they are more inclined toward innovations in online journalism, such as AI, detecting deepfakes, design thinking, podcast creation and storytelling techniques. Previous studies have similarly identified this distinction between local and national journalists (Jerónimo, 2015).

Fact-checking (factor 3) emerges as the area of greatest alignment among journalists across all geographic scopes. The challenges, interests and training needs associated with fact-checking and viral disinformation identified in factor 3 (“fact-checking”) appear to be broadly shared across local, national and international journalists. Additionally, this issue undeniably sparks the interest of all journalists facing the challenges of online disinformation dissemination. The tools necessary for conducting fact-checking are still not well known or utilised by all journalists, and in line with the findings of a study conducted in Spain (Gómez-Calderón & López-Martín, 2024), most journalists believe they possess the necessary skills, but many recognise a need for retraining or more specific training on this matter.

However, this study has some limitations; it relied on a predefined list of topics encompassing areas of interest, difficulties, and training needs, which may overlook other relevant issues not examined in this research. Furthermore, the findings are confined to the experiences and working conditions of journalists in Portugal, indicating that future studies could focus on comparative analyses. Despite these limitations, this study can serve as a guide for the development of future training programmes and courses designed to equip journalists with more tools to combat disinformation.

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6. Specific contributions of each author

	Name and Surname
Conception and design of the work	Tatiana Dourado, Luísa Torre and Pedro Jerónimo
Methodology	Tatiana Dourado, Luísa Torre and Pedro Jerónimo
Data collection and analysis	Tatiana Dourado and Luísa Torre
Discussion and conclusions	Tatiana Dourado and Luísa Torre
Drafting, formatting, version review and approval	Tatiana Dourado, Luísa Torre and Pedro Jerónimo

7. Conflict of interest

The authors declare that there is no conflict of interest contained in this article.

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