



## TECHNOLOGICAL AND VERIFICATION TRAINING IN THE SPANISH MEDIA The Case of Directors and Department Heads

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### KEYWORDS

*Data verification*  
*Training*  
*Misinformation*  
*Social media*  
*Media*  
*Spain*  
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### ABSTRACT

*This paper examines, through a survey, the level of education and training in data verification among directors and department heads in the Spanish media (n=190). Findings reveal a limited level of training in this area, mainly acquired through in-house courses or self-directed learning, resulting in a limited knowledge and use of specific digital tools for information verification. Despite this, respondents generally hold a positive self-assessment of their verification skills, with (almost) all expressing a willingness to participate in training initiatives.*

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## 1. Introduction

**M**isinformation has become a pervasive phenomenon in the digital age, posing significant challenges for journalism professionals. The impact of misinformation has been felt in areas as diverse as politics, health, education and communication, making it not only a media issue but also a social and democratic one (Pal and Banerjee, 2019; Ho et al., 2022; Domínguez-García et al., 2024). The rise of this issue has been mainly driven by the consolidation of social networks and, to a lesser extent, websites (Kapantai et al., 2021; Batailler et al., 2022). As Román-San-Miguel et al. (2022) point out, the "democratisation" of information is a reality. Anyone can share and create their own content on social networks without any kind of control or professional filter (Amorós, 2018; Muswede, 2022; Román-San-Miguel et al., 2022), making these channels a fertile field for misinformation (Vizoso and Vázquez-Herrero, 2019; Montemayor-Rodríguez and García-Jiménez, 2021).

In this context, the media environment has undergone a profound transformation, in which speed of dissemination and virality are key elements, while the task of journalists to identify the veracity of information has become increasingly complex and crucial (Nielsen and Ganter, 2017; Lecheler et al., 2019; Rúas-Araújo et al., 2020; Thomson et al., 2022). In this sense, exploring the professional routines adopted by journalists in the context of misinformation becomes an essential field of study to understand how they face this challenge in their daily practice.

This has not only affected the professional routines of journalists, but also a progressive erosion of trust and credibility of the media. According to the *I Study on Disinformation in Spain* (Uteca and University of Navarra, 2022), 95.8% of the population identifies this phenomenon as a social problem, while in relation to the media, Del Hoyo-Hurtado et al. (2020) state that the lack of identification of sources and inaccurate attributions are some of the main causes of the erosion of journalistic credibility. Other data supporting this assertion correspond to Digital News Reports (Vara, 2023): 40% of Spaniards do not often trust the news they receive, with only 33% showing some confidence in the information they receive.

Research focusing on the professional routines and training associated with verification has received limited attention, as Herrero and Herrera-Damas (2021a) point out. However, there is a growing body of work both internationally (Graves and Cherubini, 2016; Zhang and Li, 2020; Ginsberg and Gori, 2021; Xu and Gutsche, 2021; Schapals and Harb, 2022; Thomson et al., 2022; Brookes and Waller, 2023; Soo et al., 2023) and in the Spanish-speaking world (Montemayor-Rodríguez and García-Jiménez, 2021; Moreno-Gi et al., 2021; Herrero and Herrera-Damas, 2021a, 2021b; Rodríguez-Hidalgo et al., 2021; Martín-Neira et al., 2023; Rodríguez-Pérez et al., 2023). Moreover, these works focus on the work of editors, but neglect the position and work of other professionals, such as directors and department heads, who are also responsible - ultimately - for the content published by their media.

This research deals with the routines and training in data verification of Spanish media managers. The aim is, on the one hand, to fill, at least partially, the gap in the scientific literature on the training of these professionals and, on the other hand, to approach the vision that directors and department heads have of the verification process, a task that is usually carried out by the editors of the media.

## 2. State of play

### 2.1. *The New Profile of the Journalist in the Age of Misinformation*

The journalism industry is undergoing a significant transformation, impacting production processes, business models, and, most importantly, the profile of professionals sought by the media (Herrero-de-la-Fuente et al., 2022; Román-San-Miguel et al., 2022). The latter must now adopt a set of routines, skills and dynamics that were unimaginable until recently (Herrero-Diz et al., 2022). Their daily work is now characterised by speed and immediacy, values that are paramount in the context of contemporary journalism (Rosemberg and Feldman, 2008; León-Valle and Vélez-Bermello, 2021). This sometimes has a negative impact on the rigour of the data verification process (López-García et al., 2016), with consequent implications of a deontological nature (Blanco-Herrero and Arcila-Calderón, 2019). This has also led to the incorporation of innovations in news production (Sánchez-Gonzales and Sánchez-González, 2017) and in media business strategies (Sánchez-González et al., 2022) with regard to professional routines.

Journalists currently play a crucial role in the fight against misinformation (Sánchez-Gey et al., 2021), although, as Herrero-Diz et al. (2022) point out, they are often overwhelmed by the inherent complexity of verification tasks. It is noteworthy that in this field, technology presents itself as both adversary and ally (Herrero; Herrera-Damas, 2021a): while the proliferation of digital media contributes significantly to the rise of fake news (Ardèvol-Abreu and Gil-de-Zúñiga, 2016; Shu et al., 2020; Sádaba et al., 2023), numerous authors highlight the undeniable usefulness of websites and social applications in the fight against misinformation (cf. Hassan et al., 2017; Magallón-Rosa, 2018; Weikmann and Lecheler, 2023).

Several papers (Ufarte-Ruiz et al., 2018; Montemayor-Rodríguez and García-Jiménez, 2021; Himma-Kadakas and Ojamets, 2022; Moreno-Gil et al., 2022) argue that current verification requires constant training and retraining on the latest technologies and digital resources, information search tools and social networks, and even the use of robots, to which Vizoso and Vázquez-Herrero (2019) add the suitability of training in programming, handling specialised tools for verifying information and data journalism. It is also worth highlighting the growing role of artificial intelligence in numerous journalistic tasks, including the verification of information, which it significantly speeds up (Graves, 2018; Sánchez-Gonzales, 2022; Sánchez-González et al., 2022). This not only enables the categorization of messages based on their veracity but also, as noted by Graves (2018) and Parikh and Atrey (2018), facilitates a detailed examination using algorithms, considering the linguistic features of the information and its interactions on social networks.

However, the scientific literature warns that these skills - the so-called "digital forensic tools" of Himma-Kadakas and Ojamets (2022, p. 883) - must be combined with professional routines and classical journalistic skills: such as transversal knowledge of current affairs, development of critical thinking or contrasting sources (Örnebring and Mellado, 2016; Marta-Lazo et al., 2020; García-Marín, 2021; Himma-Kadakas and Ojamets, 2022; Sánchez-Gonzales, 2022).

## ***2.2. Verification Training, a Pending Issue in Spanish Journalism***

To optimise the tools offered by the web, Ufarte-Ruiz et al. (2018) warn of the need for a "solid training of journalists that integrates new profiles" (p. 1). In this sense, the findings of Herrero-de-la-Fuente et al. (2022), who highlight the growing importance of fact-checking and verification in the curricula of bachelor's degrees in journalism in Spain, are encouraging, although they are still insufficient for the adequate training of future journalists, and this training is often left to specific master's degrees or specific degrees (Moreno-Gil et al., 2023). Some proposals have been made by experts in the field to remedy this situation (Pérez-Curiel, 2024). This need for change becomes even more important in the light of Herrero and Herrera-Damas (2021a), who, after interviewing journalists and academics, point out that digital competences will become more relevant in the near future. Flores-Vivar and López-López (2020) point out that the curriculum in communication sciences has always evolved to provide students with the best possible preparation, although these changes have not always occurred with the necessary speed (Acosta et al., 2016; Sánchez-García and Tejedor, 2022).

The other important vector in the training of journalists is media companies. Himma-Kadakas and Ojamets (2022) point out that although the media sometimes provide courses or training for their journalists, this often takes place during working hours, which makes it difficult to monitor, especially in news organisations with small staffs.

As a result, the training of Spanish journalists is generally "self-taught" and "anarchic" (Herrero-Diz et al., 2022), which contributes to a low level of knowledge (Himma-Kadakas and Ojamets, 2022). Similarly, Montemayor-Rodríguez and García-Jiménez (2021) and Fernández-Barrero et al. (2024) have observed that in the Spanish context, the data verification process is still predominantly rudimentary, demonstrating a limited use of digital tools. The tools mainly used by editors are mostly generalised tools such as Google, Google Maps and Google Images, characterised by a lack of specialisation in the field of information verification.

## **3. Objectives**

This study was undertaken with the purpose of exploring the level of education and training that managers in Spanish media have in data verification. The aim was to provide accurate knowledge about

the training and potential educational deficiencies related to information fact-checking among directors and department heads of Spanish media.

In order to achieve this, four secondary objectives were set. The first was to examine the level of fact-checking training of the journalists interviewed, as well as the ways in which this learning had taken place (O1). The second objective (O2) was to quantify media managers' self-perception of their capacity and ability to carry out the fact-checking process. Linked to the technological section, the third objective (O3) focused on respondents' knowledge of the existence of specific digital applications or tools for fact-checking, as well as their purpose in relation to possible future training. Finally, the fourth objective (O4) sought to explore media managers' perceptions of the journalistic task of verifying information, addressing issues such as the credibility of sources or the main difficulties involved in this process.

## 4. Methodology

### 4.1. Method and Sample

In this exploratory research, the survey technique was used as a heuristic tool due to its suitability for studying groups formed by numerous individuals in a short period of time (Blanco, 2011), as well as its virtues for addressing a wide "spectrum of topics" and for studying the characteristics associated with the study groups (Hernández-Sampieri et al., 2003; Sautu et al., 2005).

The survey was distributed online in two successive waves between May and June 2023. It was sent by e-mail to the directors and department heads of the media controlled by the Office for the Justification of Diffusion (OJD) and the General Media Study (EGM), as well as to the Spanish verification platforms registered in the Duke Reporters' LAB and the media identified from the press directories of the autonomous communities. A total of 190 responses were received, of which 69.5% were male. The majority were between 35 and 54 years old (65.3%) and had more than 20 years' experience in journalism (67.9%). In terms of professional status, 47.9% of respondents were department heads, while 52.1% were directors of their media. Most respondents worked in the print or digital press (Table 1):

**Table 1.** Type of business according to respondents

Type of company	Respondents	Percentage
Paper/digital press	104	54,7%
Paper/digital magazine	18	9,5%
Radio	31	16,3%
Television	22	11,6%
News Agency	12	6,3%
Verification platforms	3	1,6%
Total	190	100%

Source: Own elaboration, 2024.

### 4.2. Survey Design

The survey consisted of 29 closed-ended questions, with a combination of single and multiple answers and a Likert scale. For its design, an extensive consultation of the scientific literature was carried out, taking as reference previous studies on the subject (Blanco-Herrero and Arcila-Calderón, 2019; Martínez-García and Navarro, 2019; López-Martín et al., 2021; Román-San-Miguel et al., 2022) and adding ad hoc variables related to the purpose of the research. A pre-test was carried out with 20 journalists as a step prior to distribution and to refine the wording and categories considered. The survey was divided into three blocks:

- a) Registration information. This includes identification and socio-professional variables of the respondents, such as gender, age, level of education, professional category or work experience.

- b) Verification and professional routines. This section focuses on the views of directors and department heads on the process of verifying information: differences between news sectors, difficulties in contrasting content, the credibility given to news sources, the impact of social networks on the spread of fake news or possible action against disinformation promoted by their companies.
- c) Training. This third section looks at variables related to the training of respondents in the field of verification, the training - regulated or not - received and required in this respect, and their knowledge of digital and technological tools used to verify information.

### 4.3. Data Analysis

Once the responses were received, a data matrix was generated in the SPSS statistical programme, from which statistical analysis and exploitation were carried out, using descriptive and inferential statistical treatment to identify possible relationships between variables.

## 5. Results

### 5.1. Initial Formation and Training

The results show that the majority (71.1%) of Spanish media managers have not received specific training in fact-checking. In detail, this rate increases slightly in the case of directors (72.7%), while 30.8% of department heads have received training in fact-checking.

Of those who have received specific training, Table 2 shows that the most common route is on-the-job training (50.9%). This option is much more common than the other learning modalities or methods, among which self-learning also plays an important role. A distinction can be made between those who opt for self-learning using online resources (30.9%), by watching videos or consulting blogs or forums, and those who opt for learning using offline resources (16.4%), i.e. reading books or using physical media, or a combination of the two. To a lesser extent, attending and following courses - both face-to-face and online - are common ways of training in verification.

On the other hand, it is worth noting the low rate of mention of academic alternatives, such as the presence of subjects related to the subject in the undergraduate (14.5%) or postgraduate (3.6%) courses attended by the respondents, which may reveal certain shortcomings in the planning or design of university studies in terms of the optimal and complete training of future journalists. Similarly, only 5.5% of respondents had taken specific university master's courses. The chi-square statistical test with Yates correction shows a relationship between gender and learning through offline resources [ $\chi^2$  (1, N=55)=4.814,  $p<0.05$ ]; it is mainly men who opt for traditional resources such as reading or consulting physical media.

**Table 2.** Main channels of training received in verification.

Training pathway	Mentions
Higher education - undergraduate course	14,5%
Higher education - subject in university master's degree	3,6%
Specific university master's degree on Verification	5,5%
Other university degrees (expert courses, certifications)	5,5%
Self-taught via online resources (videos, blogs, forums)	30,9%
Self-taught through offline resources (books, physical media)	16,4%
On-the-job training (advanced training sessions, bootcamps)	50,9%
Formal online education (online courses, certifications)	27,3%
Formal offline education (such as bootcamps and professional courses)	20%

Source: Own elaboration, 2024.

However, the lack of formal training in fact-checking is not a barrier to a favourable view, to say the least. Most media professionals consider themselves sufficiently or fairly well trained in their ability to check information (Table 3). On a scale of 1 to 5, the majority (42.6%) choose option 3 - medium level - while a similar proportion (41.1%) consider themselves to be skilled - option 4; these two categories account for almost the entire sample (83.7%). In general, there are no significant differences in people's perceptions of their skills according to their occupational category. The chi-square test also shows no relationship between the variables.

**Table 3.** Verification training by professional category

Category	1	2	3	4	5
Director	2%	9,1%	41,4%	41,4%	6,1%
Head of Department	-	11%	44%	40,7%	4,4%
Total	1,1%	10%	42,6%	41,1%	5,3%

Source: Own elaboration, 2024.

## 5.2. Recycling and Training in Verification

Despite the respondents' positive assessment of their skills in verification, 85.8% expressed the need for recycling and/or training in this area. It is noteworthy that the lower the professional rank, in this case department heads, the more training they request, and there is a statistical correlation between the professional category and the desire for training in the contrast data [ $\chi^2$  (1, N=190)=4.207,  $p<0.05$ ]. 91.2% of department heads would like to receive training in verification, while this figure drops to 80.8% for managers. The size of the company is also a conditioning factor [ $\chi^2$  (3, N=190)=9.148,  $p<0.05$ ]. The chi-square test with continuity correction applied shows that managers of the largest companies (>26 employees) are the most proactive in recycling in fact checking and verification. More than 92% of managers and executives in companies with more than 26 employees - between 26 and 50 employees, 95.8%; more than 50 employees, 92.8% - want to receive training, a slightly higher incidence than that of employees in companies with smaller workforces - between 11 and 25 employees, 81.3%; less than 10 employees, 76.9%.

It is worth noting that although the respondents hold decision-making positions in their respective media and recognise the need for more training, it is noteworthy that 80% of them consider their companies to be by far the most responsible for properly training journalists in verification. Other options do not reach 45% of the respondents. There is some disagreement on this point, with journalists themselves (self-taught) (44.2%), press associations (43.7%) and universities (42.1%) all being considered equally important. On the other hand, public journalism training institutes seem to be outweighed by public institutions (16.3%). Again, several variables seem to condition respondents' views. Giving responsibility for training to the media is the category most influenced by variables such as company size [ $\chi^2$  (3, N=190)=25.689,  $p<0.05$ ] and professional category [ $\chi^2$  (1, N=190)=8.863,  $p<0.05$ ]. Journalists from larger companies are the ones who give a higher rate of responsibility to their media, with notable differences in this aspect. Specifically, the response rate differs by around 30 percentage points between those responsible for companies with more than 50 employees (92.8%) and those responsible for media with less than 10 employees (60%). Similarly, it can be concluded that heads of departments are more aware of the media's responsibility to train their journalists (89%), while directors are less aware (71.7%). The statistical test also shows a relationship between the type of company and self-directed learning - journalists' responsibility [ $\chi^2$  (5, N=190)=13.350,  $p<0.05$ ]. Respondents working in television companies are the ones who are more in favour of this learning path, which contrasts with the opposite view of those responsible for radio stations.

## 5.3. Technology at the Service of Fact-Checking

For their part, media professionals' knowledge of digital tools and applications related to fact-checking is scarce and limited. When asked about their understanding of a battery of 20 digital resources, with the exception of Google Maps (66.3%) and newspaper libraries (65.8%), the remaining categories were mentioned by around 25% or even less. The information search tool TweetDeck (26.3%) and the

website repository Archive.org (23.2%) are close to this threshold. To a lesser extent, they are familiar with other resources such as reverse image search (16.3%), Google's Fact Check Explorer verification tool (16.3%) or analysing and finding information on networks such as CrowdTangle - Facebook and Instagram - (12.1%). On the other hand, 16.3% of the sample said they were not familiar with any of the tools they were asked about.

In this context, they also expressed a desire for training on tools related to the analysis and repositories of content hosted on websites and social networks, such as the aforementioned Archive.org (25.3%), Fact Check Explorer (21.6%), CrowdTangle (14.2%), as well as useful resources for checking audiovisual content, such as Fotoforensics (16.3%) (Table 4).

**Table 4.** Main verification tools that journalists demand training on

Tool	Mentions
Archive.org	25,3%
Bellingcat	11,6%
Botometer	11,6%
CrowdTangle	14,2%
Fact Check Explorer	21,6%
Fotoforensics	16,3%
Google Maps / Google Earth Pro	9,5%
Newspaper libraries	12,6%
InVID	9,5%

Source: Own elaboration, 2024.

The chi-square statistic shows the relationship between the type of media they work in and the desire or need for training in specific verification tools. As expected, those responsible for verification or fact-checking platforms are the ones who demand more training in almost all the tools or applications they were asked about, such as Botometer, InVID, SaveEcoBot or Telegago. In all of these cases, they have much higher scores than the rest of the respondents assigned to other types of media - radio, press, news agencies and television. There is only a slight increase among television managers in the use of tools for comparing and validating audiovisual resources (Table 5).

**Table 5.** Demand for training according to type of media.

	Press	Magazine	Radio	TV	Agencies	Platforms	
Botometer	8,7%	11,1%	3,2%	27,3%	16,7%	66,7%	$\chi^2 (5, N=190)=13.978, p<0.05$
Fotoforensics	15,4%	16,7%	3,2%	31,8%	16,7%	66,7%	$\chi^2 (5, N=190)=12.529, p<0.05$
InVID	4,8%	11,1%	6,5%	27,3%	16,7%	33,3%	$\chi^2 (5, N=190)=13.099, p<0.05$
Namech_K	3,8%	5,6%	-	27,3%	8,3%	66,7%	$\chi^2 (5, N=190)=21.319, p<0.05$
SaveEcoBot	3,8%	5,6%	-	22,7%	8,3%	66,7%	$\chi^2 (5, N=190)=18.670, p<0.05$
Reverse Search	6,7%	16,7%	-	18,2%	16,7%	33,3%	$\chi^2 (5, N=190)=11.526, p<0.05$
SunCalc	1%	11,1%	3,2%	22,7%	8,3%	66,7%	$\chi^2 (5, N=190)=24.054, p<0.05$
Telegago	4,8%	11,1%	6,5%	22,7%	16,7%	33,3%	$\chi^2 (5, N=190)=10.913, p<0.05$
Telemetr.io	3,8%	5,6%	-	27,3%	16,7%	33,3%	$\chi^2 (5, N=190)=17.910, p<0.05$
TinEye	5,8%	5,6%	-	27,3%	8,3%	66,7%	$\chi^2 (5, N=190)=18.820, p<0.05$

Note: Only those tools where a relationship between variables is identified are shown. Source: Own elaboration, 2024.

#### 5.4. Procedures and Sources of Information

Although directors and department heads are not often involved in editorial work, their perceptions of fact-checking procedures and routines were examined. In this respect, almost all (95.3%) consider that the time spent on fact-checking varies considerably depending on the subject matter of the information. Content related to politics (69.6%), the economy (39.2%) and health (33.1%) are the most difficult to verify, according to Spanish media managers. At the other end of the spectrum are culture (3.3%) and sport (8.8%).

For the verification process, the sources of information that inspire the most trust are academic or expert sources (72.6%), government sources (55.8%) and state security forces (47.6%), while other alternatives such as political (non-governmental) sources (16.3%), business sources (16.3%), digital resources (11.1%) or social networks (2.1%) have moderate or low credibility. The chi-square test shows that the more experience in journalism, the more trust they have in academic sources [ $\chi^2$  (5, N=190)=14.517,  $p<0.05$ ] and the more trust they have in section heads compared to directors [ $\chi^2$  (1, N=190)=12.618,  $p<0.05$ ].

The type of company also seems to influence the professionals' view of the security forces - heads of news agencies and verification platforms have more credibility in them - [ $\chi^2$  (5, N=190)=14.049,  $p<0.05$ ] and media sources - directors and department heads of radio stations and magazines have more confidence in what has been published by other media or colleagues - [ $\chi^2$  (5, N=190)=20.575,  $p<0.05$ ]. Similarly, working in news agencies [ $\chi^2$  (5, N=190)=13.251,  $p<0.05$ ] and in companies with larger workforces [ $\chi^2$  (3, N=190)=9.232,  $p<0.05$ ] influence a greater tendency towards corporate sources. It is worth highlighting the remarkable credibility that media directors give to political sources [ $\chi^2$  (1, N=190)=7.242,  $p<0.05$ ], with significant divergences detected with regard to the perception of department heads.

Regarding social networks and messaging applications, respondents perceive them as common channels for the dissemination of fake news, especially X (72.6%), Facebook (66.8%) and WhatsApp (62.6%), where they perceive a greater presence of fake news, while Twitch (5.8%), Reddit (3.7%), Pinterest (2.1%) and Snapchat (2.1%) are the channels with the lowest incidence of fraudulent content. Age and gender are the most influential variables. X and TikTok are the two networks where gender is predictive: men think that fake news predominates on X [ $\chi^2$  (1, N=190)=6.340,  $p<0.05$ ], while women have a similar opinion on TikTok [ $\chi^2$  (1, N=190)=3.929,  $p<0.05$ ]. With regard to age, it was found that, in general, the older the respondent, the more distrustful they are of the content circulating on social networks and messaging applications.

There is a greater consensus on the need for newspaper companies to implement measures to combat disinformation (98.4% of mentions). These mainly focus on training staff (89.3%) and establishing alliances with fact-checking platforms (44.9%). By professional category, there is little divergence in the views of managers and department heads (Table 6).

**Table 6.** Measures against misinformation according to respondents' professional category

Measures	Heads of Department	Directors
Training workers in verification	92,3%	83,8%
Partnerships with <i>fact-checking</i> platforms	45,1%	43,4%
Partnerships with other media	31,9%	33,3%
Development of own tools	28,6%	20,2%
Improving the search filters of your newspaper libraries	38,5%	33,3%
Creation of a department dedicated to verification	49,5%	26,3%

Source: Own elaboration, 2024.

Finally, they identified the availability of interested sources (73.7%) and excessive workload (73.2%) as the main difficulties journalists currently face in getting the information right. Finding and contacting sources (49.5%) and documentary research (21.6%) are other problems that hamper journalistic work



to a lesser extent. According to the chi-square test of independence, the gender of the respondents seems to influence the perception of the danger of interested sources [ $\chi^2$  (1, N=190)=4.212,  $p<0.05$ ]; men perceive this circumstance as more difficult. It could also be noted that women [ $\chi^2$  (1, N=190)=5.453,  $p<0.05$ ], respondents working in larger companies [ $\chi^2$  (3, N=190)=14.791,  $p<0.05$ ] and heads of department [ $\chi^2$  (1, N=190)=4.435,  $p<0.05$ ] are the most critical of excessive workload or lack of time.

## 6. Discussion and Conclusions

The objective of this study was to examine the educational background and training of directors and department heads in the Spanish media, who bear ultimate responsibility for the content disseminated through their respective outlets. While existing literature predominantly examines editors, there is a dearth of research on the perspectives and training of these professionals concerning the phenomenon of misinformation and the strategies for mitigating it. Consequently, this investigation adopts a highly exploratory approach.

The survey results, distributed nationwide, confirm O1's expectations that the majority of journalists in positions of responsibility within the Spanish media lack specific training in verification. This limited training primarily occurs within their own companies through on-the-job courses or is self-taught, with these two avenues representing the primary training channels for respondents. Conversely, formal academic education, including university courses or specialized master's degrees, has minimal impact on the acquisition and enhancement of skills in data verification. These findings align with observations made by Moreno-Gil et al. (2023), highlighting the inadequate incorporation of verification into journalism degree curricula. Additionally, there appears to be a correlation between gender and learning preferences, with men favouring physical or offline resources while women demonstrate a stronger inclination towards online learning.

Regarding the respondents' self-perception of their training in verification (O2), despite the general lack of formal training, their expressed confidence appears somewhat generous, with more than 80% considering themselves adequately or fairly qualified to handle fact-checking tasks. However, a slightly higher proportion acknowledge the need for refresher or additional training in this field (cf. Fernández-Barrero et al., 2024), indicating that, despite their positive self-perception, they recognize deficiencies in this area. This desire is particularly pronounced among department heads, whose scores are approximately 10 percentage points higher than those of media managers, who show greater reluctance to engage in training activities.

On the contrary, respondents' familiarity with digital tools for verifying information (O3) appears to be quite limited. Aside from widely used resources like Google Maps and newspaper archives, knowledge of specific tools for sourcing information from social networks and websites—such as Archive.org, CrowdTangle, or TweetDeck—or for analysing the authenticity of audiovisual content—such as Fotoforensics or InVID—shows only marginal incidence values. The limited utilization of digital tools seems to be a consistent trend extending to editors, consistent with the findings of Montemayor-Rodríguez and García-Jiménez (2021) and Fernández-Barrero et al. (2024). Regarding training, the resources they express the most interest in learning about are the Archive.org website repository and Google's Fact Check Explorer tool for information comparison. However, this preference or need for training varies significantly depending on the type of media they work in. As anticipated, those responsible for fact-checking platforms demonstrate the greatest enthusiasm for learning and training on various digital tools, while directors and department heads of television media express interest in participating in training activities focused on verifying and validating audiovisual resources. Almost all media managers agree that this training should be the responsibility of their respective companies, a practice that appears to be increasingly entrenched (cf. Himma-Kadakas and Ojamets, 2022).

Finally, the fourth objective (O4) aimed to explore the perspective of media managers on the task of verification, which is influenced, firstly, by the subject matter of the information: predominantly Politics, followed by Economy and Health, are the areas where journalists encounter the most challenges in fact-checking. Additionally, academic and government sources are generally deemed the most credible, contrasting with widespread distrust of social networks and messaging applications. Platforms such as X, Facebook, and WhatsApp are perceived as common channels for spreading misinformation, a view

supported by the majority of the scientific literature (Vizoso and Vázquez-Herrero, 2019; Sánchez-Duarte and Magallón, 2020; López-Martín et al., 2023).

Similarly, there is a clear recognition of the scale and threat of the misinformation phenomenon, leading to unanimous agreement that companies should implement more measures to counter the spread of fake news. It is noteworthy that media managers themselves identify excessive workload as one of the primary obstacles to effective content verification, along with the presence of biased sources. As previously identified by Herrero-Diz et al. (2022) and Fernández-Barrero et al. (2024), this lack of time, combined with high work volumes and production processes focused on immediacy, poses significant challenges to the verification task.

In conclusion, there is a clear imperative for enhanced education and training in verification among directors and department heads within the Spanish media. While these responsibilities may not typically fall to these professionals, they bear ultimate accountability for the content disseminated by their respective media outlets. Moreover, the pervasive influence of disinformation and its associated hazards necessitate tailored training that can be universally applied to all professional cohorts within media organisations, regardless of their individual roles. Even those with minimal involvement in news content production should receive such training. For future research endeavours, it would be valuable to investigate the training initiatives undertaken by journalistic enterprises and assess their effectiveness over time through a diachronic analysis. This would provide insights into the evolution of skills and training levels among media managers in Spain.

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