

Verification of Social Media Content for News Production: A Thematic Review of Journalistic Technique and Strategies

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ABSTRACT

News organisations increasingly use social media content for breaking news, eyewitness accounts and user-generated videos. However, the veracity of such content is often questioned as social media platforms are prone to false reports, rumours and manipulation. This highlights the importance of journalists using robust verification techniques and strategies to ensure the accuracy and reliability of social media content in their reporting. However, prior research revealed no review papers discussing patterns of verification techniques and strategies journalists use on social media content for news production. This thematic review aims to synthesise literature from 2019 to 2023 on the journalist's strategies and techniques in verifying social media content for news production using a thematic review (TR). A list of keywords (journalistic techniques and strategies used in verifying social media content for news production) related to the scope of this research was identified. In the second step, the keyword was searched for studies in Scopus, Dimensions and Mendeley, and 31 papers were reviewed. A thematic review was carried out, where five final themes were identified: traditional techniques, combination strategies, technology and social media tools, computational tools and training, and media literacy. This study will benefit knowledge of journalists' verification social media techniques and strategies and future study of journalists' verification practices.

Keywords: *Journalists practices, verification, techniques & strategies, social media, news production.*

INTRODUCTION

The rise of social media has radically changed the production and consumption of news. It happened because Malaysia has become one of the leading communication technology countries, with almost 89% of its population equivalent to 25.4 million Internet users (Kovalan et al., 2021). With millions of people using social media platforms such as Facebook, Instagram, and Twitter to share news and information, journalists increasingly rely on social media content for their reporting. Journalists regularly use social media to source and verify information (Zhang, 2020), and almost 80% of news organisations surveyed use social media platforms to distribute their content (Khan et al., 2023). News organisations increasingly turn to social media content to disseminate breaking news, eyewitness accounts, and user-generated videos. However, the veracity of such content is frequently questioned, as social media platforms are vulnerable to false reports, rumours, and manipulation. Study shows that social media contributed to 79 per cent of the source of fake news in Malaysia (Schuldt, 2021). This highlights the critical importance of journalists employing robust verification techniques and strategies to ensure the accuracy and reliability of social media content in their news reporting and news production. News production involves reporters who perform the tasks such as newsgathering, sourcing, verification, integrating multimedia content, and editing (Agur, 2019).

Further, according to Hernández-Fuentes and Monnier (2020), the latter corresponds to four distinct steps in the news production process: selecting relevant sources and content, collaboratively verifying facts, and article writing. Using social media in news production involves many aspects, such as sourcing and verification (Zhang, 2020). Thus, raw content in social media platforms acquires new verification practices and techniques before disseminating the news. Verification of social media has become an essential concern for journalists, as the rapid spread of misinformation and fake news can seriously affect public perception and decision-making. The use of social media for news production presents verification challenges for professional journalists (Fletcher et al., 2020). The importance of verification in news production is not new; journalists are constantly tasked with verifying data from various sources. However, the particular challenges journalists face in the verification process arise from the unique characteristics of social media, such as its real-time nature, enormous volume of content, and absence of gatekeeping. With the proliferation of images from indirect sources that systems and users can access, verification routines have become critical to the credibility of media organisations (Castellón, 2021). This requires a nuanced understanding of journalistic techniques and strategies tailored specifically for social media verification and implementing best practices to maintain journalistic integrity and accuracy.

Newsrooms' fact-checking tools have changed to keep pace with digitisation and the growth of unverified multimedia content on social media. Verification is essential in journalism and usually occurs before or during publication (Edwardsson et al., 2021). According to the survey, there is an increasing trend of journalists using computational tools to verify and fact-check UGC (ICFJ, 2019). However, contradicting study by Khan et al. (2023) has shown that only about 33% of journalists use these tools to help them during the verification process. Xu and Gutsche Jr (2021) study reveals that Western journalists rely on digital and online tools, while Chinese journalists remain offline during source verification, and others use both manual and utilising digital technology to check and verify content on social media, such as fact-checking and human verification strategies (Sushmita, 2021). Journalists also use various tools and strategies to verify the information from social media for news production. Therefore, all the research findings can serve as a reference point for policy implementations on asynchronous communication technologies and their enhancements, especially among organisations in emerging societies (Anumudu et al., 2020).

Despite the popular studies on journalist verification that describe journalists' techniques, no review paper discusses the techniques and strategies used in journalistic verification of social media content for news production. Therefore, this paper aims to conduct a systematic review of the journalistic verification techniques and strategies used in social media content for news production based on the following question:

RQ: What journalistic techniques and strategies are used to verify social media content for news production in the literature from 2019 to 2023?

METHOD

As this research method employs a thematic analysis procedure in a literature review, the phrase "thematic review" used ATLAS.ti 8 presented by Zairul (2020). Clarke and Braun (2013) defined thematic analysis as discovering patterns and developing themes through extensive reading. The following step is to identify the patterns and construct categories to understand

the techniques and strategies used by journalists in verifying social media content for news production. Literature selection is made according to several selection criterias: 1) publication from 2019 to 2023; and 2) have at least the keyword(s) verification, journalists', journalists' techniques and strategies, social media, and news production. Review papers were removed from this review because they contradicted the objective of this paper.

The literature sources were the research databases from Scopus of Elsevier, Dimensions and Mendeley. The Scopus was chosen because it has the most extensive collection of peer-reviewed publications and using the keyword TITLE-ABS-KEY ("journalist*" OR "journalism") AND ("Technique*" OR "strategy*" OR "tool*") AND ("verification*" OR "verify" OR "validation*") AND ("social media" OR "Facebook" OR "Twitter") AND PUBYEAR – 2019 to 2023. While Mendeley and Dimensions, owing to the multidisciplinary nature of research and multiple sources. Mendeley database was also used to extract Elsevier Publications using keywords "journalists" AND "verifications" AND "social media": [2019 TO 2023] and Dimensions database using keywords ("journalist*" OR "journalism") AND ("Techniques" OR "strategies" OR "tools") AND ("verifications" OR "verify" OR "validations") AND ("social media" OR "Facebook" OR "Twitter"): [2019 TO 2023] (Table 1).

Table 1: Search string from SCOPUS, Dimensions and Mendeley

SCOPUS	TITLE-ABS-KEY ("journalist*" OR "journalism") AND ("Technique*" OR "strategy*" OR "tool*") AND ("verification*" OR "verify" OR "validation*") AND ("social media" OR "Facebook" OR "Twitter") AND (LIMIT-TO (PUBYEAR, 2023) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) AND (LIMIT-TO (DOCTYPE, "ar") AND (LIMIT-TO (LANGUAGE, "English") AND (LIMIT-TO (SRCTYPE, "j") Year: 2019 – 2023	84 results
Dimensions	("journalists" OR "journalism") AND ("Techniques" OR "strategies" OR "tools") AND ("verifications" OR "verify" OR "validations") AND ("social media" OR "Facebook" OR "Twitter") Year: 2019 - 2023	64 results
Mendeley	"journalists" AND "verifications" AND "social media" Year: 2019-2023	137 results

The initial research yielded 84 articles from SCOPUS, 64 from Dimensions and 137 from Mendeley. The articles included in this paper were selected from journals, conferences and theses that were thematically reviewed. As this review is limited to peer-reviewed journals only, 254 publications were removed due to duplicate content and publications irrelevant to the research topic and not discussing the journalists' verification techniques and strategies. Only English-language articles were included in the final selection, and publications from the past five years (from 2019 to 2023 inclusive) were used for the review. After removing duplicates and scanning all abstracts to remove articles irrelevant to this research topic, 31 articles emerged as the basis for review. The articles were classified as irrelevant if they were related to citizen journalists and did not discuss journalist verification techniques in verifying information (Figure 1).

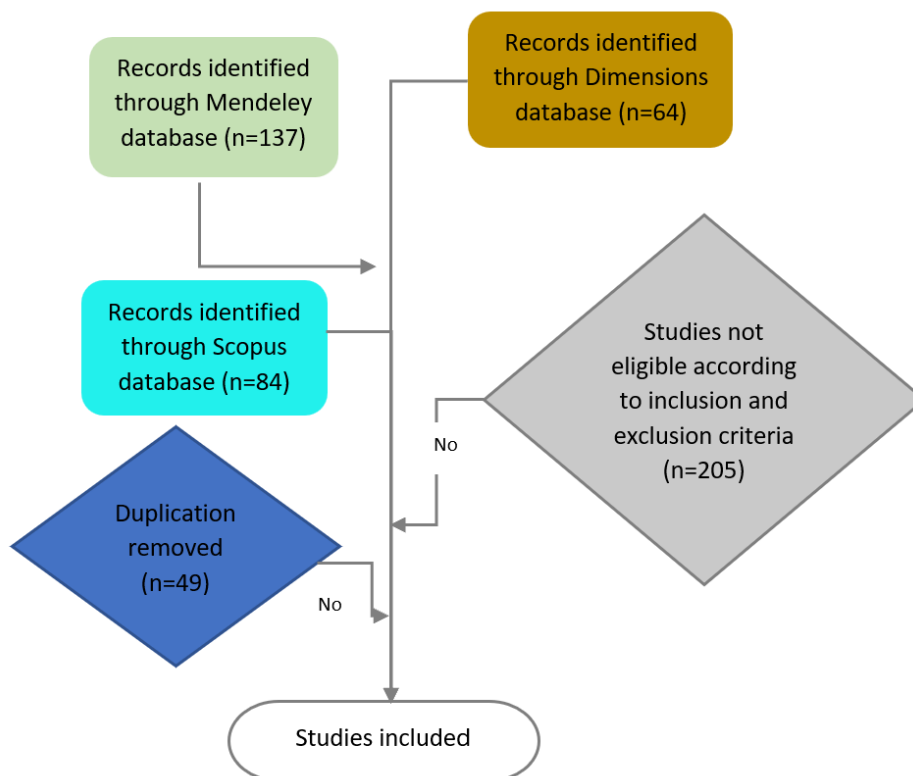


Figure 1: Inclusion and Exclusion criteria for thematic review (Zairul, 2020)

Subsequently, 31 metadata were all imported into ATLAS.ti 8 and generated as primary documents for analysis of the current pattern in literature. Several of the bibliometric data was established from the document list, including the article title, year, author, author's country, the periodical, keyword used and subject area. The new classification method in ATLAS.ti 8 makes sorting more explicit and systematic. Seven initial codes were generated in the first round of coding. Eventually, the codes were categorised into many themes and added to a final set of five main categories to answer the study objectives. The findings of this review were divided into two parts, quantitative and qualitative. The quantitative part will report on the data obtained from the numerical point of view, while the qualitative part will establish themes from the selected articles.

RESULTS AND DISCUSSIONS

Quantitative Findings

The report produced descriptive data in the quantitative section based on the geographical distribution of publications and the research trends in each country (Figure 2). The paper then determined the country vs publication based on the year (Figure 3). From 2019 to the present, we can see how the study has developed. Following that, the review provides a table including the themes developed by each paper discovered between 2019 and 2023.

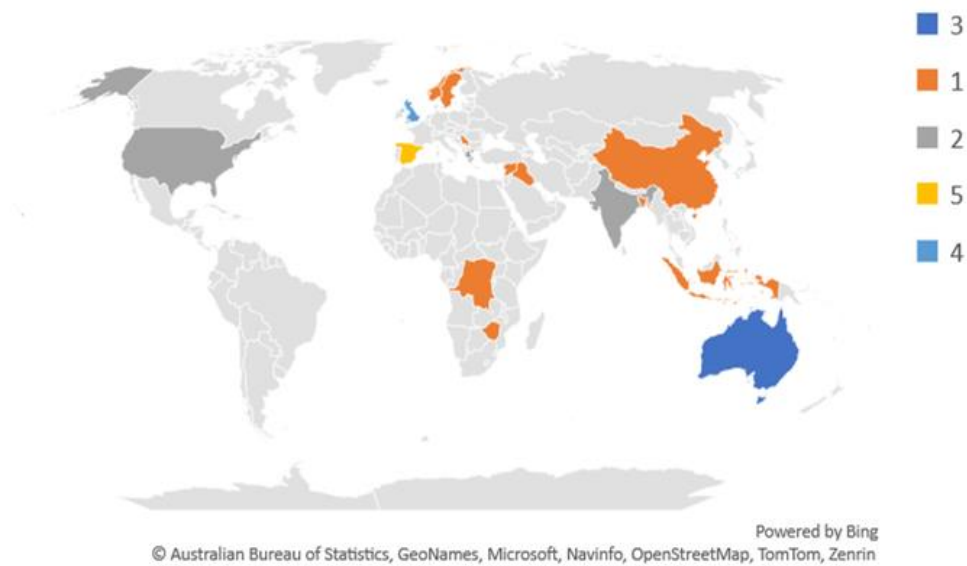


Figure 2: Geographical dispersion of studies on journalists' verification techniques & strategies

The geographical distribution of studies on journalists' verification techniques and strategies is depicted in Figure 2. According to the figure, it can be seen that Spain was the highest contributor to the studies from 2019 to 2022. Numerous Spain studies focused on the technology and social media tools in verification, such as a Twitter algorithm (Díaz-Lucena et al., 2022), and used fact-checking tools as techniques and strategies to verify social media content (López-Marcos & Vicente-Fernández, 2021). Subsequently, United Kingdom (UK) ranks second in terms of contribution to statistics. The trends from the UK can be seen mainly in computational tools and social media tools. For example, Fletcher et al. (2020) describe the Truthmeter tools used by journalists to assess the credibility of social media contributors and verify the information, as well as open-source investigations to verify information (Schapals & Harb, 2020).

Australia relies on both manual and technological tools. For example, fact-checking tools are used to identify visual misinformation (Thomson et al., 2022), and journalists perceive the risks of digital technologies and use both manual and technological tools to verify content (de Haan et al., 2022). Several studies in Greece and India focused on automated verification (Kaur et al., 2020; Papadopoulou et al., 2019). In the US, the focus is on social media verification tools and services (Walker, 2019), and in Hong Kong, offline, elite, and prefabricated sources (Zhang, 2020) are discussed for social media content verification. The statistics are continued by a study from Bangladesh, China, Congo, Germany, Indonesia, Iraq, Norway, Serbia, Sweden, Syria, and Zimbabwe, each with 1 article on the topic (Figure 3). Thus, the topic of the study is predominantly in Western countries.

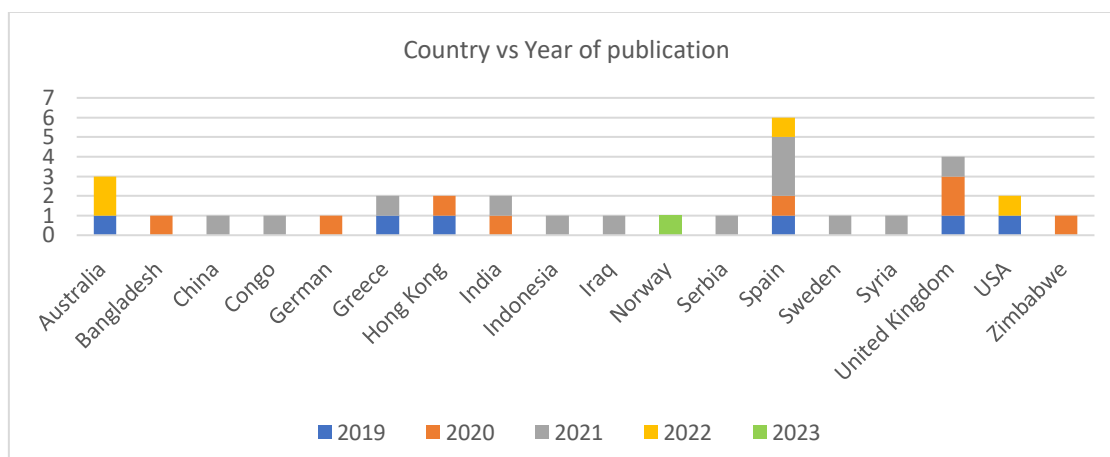


Figure 3: Country vs publication year

In Table 2, the papers were organised according to the themes determined by the ATLAS.ti 8 coding exercise. ATLAS.ti enables researchers to easily select, categorise, and thematise paper topics based on abstracts and titles. The thematic review process consists of marginal annotations expressed as codes based on social constructs and the author's interpretation of the topic discussed in the articles. Based on the sorting, five major themes were identified: combination strategies, computational tools, technology and social media tools, traditional techniques and training and media literacy.

Table 2: The theme according to year

	2019	2020	2021	2022	2023
Combination strategies		2	1	1	
Computational tools	1	1	2	1	1
Technology and social media tools	5	4	7	1	
Traditional technique	1	3	3	2	
Training and Media literacy	1	1	2	1	1

The study found that journalists still rely on traditional techniques to verify information on social media because they have more confidence in verifying in traditional ways, such as through phone calls, government sources, and cross-checking, in the face of misinformation and fake news on social media and online sources. The pattern of technology and social media tools used was discussed from 2019 to 2022 and continues to be a valuable and popular technique for journalists to verify social media content for news production. 2021 was the high point when Covid-19 hit the world, and the rise of fake news prompted journalists to use technology and social media tools to evaluate the news they receive. More computational tools or artificial intelligence (AI) are becoming popular today as social media presents challenges to the verification process for news production (Fletcher et al., 2020) and have been discussed from 2019 to 2023. The trends in combination strategies were established and discussed in 2020 (mainly using both traditional and technological methods) and are still relevant today and one of journalist's best practices. At the same time, journalism training and media literacy is a strategy trend discussed in 2019 to 2023 to improve journalists' skills in using the latest technology to assist in verifying more challenging social media information. However, when this article was written, there was only one discussion of

computer-assisted tools and training and media literacy in 2023, possibly because some articles are still in progress.

After analysing 31 publications, the results showed that the intensity of the themes developed from 2019 to 2023. Since the topics were divided into five groups, a study could be coded on more than one topic. In the first round of coding, there were seven original codes. Related ideas and solutions are compared to determine which theme best fits the facts. Data collection, coding, and analysis all take place at once. Many publications highlighted various themes in the article, which led to a unified study result. In addition, the themes can be developed as theoretical contexts, areas of study, or disciplines (Boyatzis, 1998).

Qualitative Findings

Five themes have been developed based on the directions and subject matter of the articles. The themes that emerged from the selected publication are as follows:

Table 3: Author according to themes

	Combination strategies	Computational tools	Technology & social media tools	Traditional technique	Training & Media literacy
Khan et al. (2023)		/			
Díaz-Lucena et al. (2022)			/		
Tiwari & Thorat (2021)		/			
Gearing (2019)			/		
Christensen & Khalil (2021)			/		
de Haan et al. (2022)		/		/	
Castellón (2021)			/		
Walker (2019)			/		/
Zhang (2020)			/	/	
Wintterlin (2020)			/	/	
dos Santos (2021)			/	/	
Shesterkina et al. (2021)					/
Fletcher et al. (2020)		/		/	
Bouvier (2019)			/		
Sushmita (2021)	/				
Papadopoulou et al. (2019)		/			
Giomelakis et al. (2021)			/		
Haque et al. (2020)			/		
Edwardsson et al. (2021)	/		/	/	/
Lj. Bulatović & Bulatović (2021)			/		
Thomson et al. (2022)	/		/		/
Kaur et al. (2020)			/		
López-Rabadán & Mellado (2019)			/		
Xu et al. (2021)				/	
Munoriyarwa & Chambwera (2020)	/				/
López-Marcos & Vicente-Fernández (2021)		/			
Bautista (2021)			/		
Ufarte-Ruiz et al. (2020)	/				

The main themes do not stand alone but rather overlap between the articles presented in this review. Some articles commonly adopt multiple themes and vice versa. The themes are discussed separately and in depth to answer the research question (What journalistic techniques and strategies are used to verify social media content for news production in the literature from 2019 to 2023?).



Figure 4: Overall network on how the themes answer the research question

Traditional Technique

Journalists have traditionally relied on a few elite sources, such as governments and institutions because they are considered credible. In today's digital age of social media content verification process for news production, Munoriyarwa and Chambwera (2020) propose a "triangular approach" that can reduce the influence of fake news in the long run. By combining source verification, content verification and expert consultation, journalists can enhance the accuracy and reliability of the information obtained from social media platforms. Source verification is a traditional technique journalists use to ensure the credibility and reliability of social media content when producing news. Before the content is included in the news, this technique is used to establish the authenticity and trustworthiness of the source. Zhang's (2020) study in Hong Kong found that journalists still rely on offline, elitist, ready-made and authorised government sources (dos Santos, 2021). It means seeking professional advice to verify the accuracy of social media content used in news production. For example, academics, researchers, and industry professionals bring expertise and insights to the verification process. Journalists seek the advice of these experts to verify claims, provide context and assess the reliability of social media content. Source verification is crucial to mitigate the risk of misinformation and to disseminate trustworthy news. However, it is fraught with difficulties, such as dealing with anonymous sources or accounts, identifying accounts that are likely to be fake or manipulated, and the rapid pace of information sharing on social media platforms. The amount of fake and factual information on the growing social media platforms makes journalists' work more challenging.

Further, content verification assists journalists in identifying misinformation or inaccuracies, ensuring the accuracy of news stories. However, content verification has some challenges, such as the volume and speed of information on social media, the possibility of manipulated or false information, and the need for efficient fact-checking processes to meet the demands of real-time news production. Xu and Gutsche (2021) found that information overload has led Chinese journalists to adopt a conventional verification form. However, the emerging literature on journalism and social media emphasises that the conventional

verification methods used by journalists to assess credibility may not be sufficient to deal with the amount of information available on social media (Fletcher et al., 2020) and that manual detection methods are not sufficient when verifying information on social media (Thomson et al., 2022). To support this, journalists need a new digital tool to assist them with this task (Fletcher et al., 2020; Edwardsson et al., 2021).

Nevertheless, many journalists were hesitant or afraid of the perceived risks of digital technologies (Gearing, 2019). There is still a strong sense of professional authority among journalists who believe they can work independently of any influence, including algorithms (de Haan et al., 2022). Therefore, there is a gap in establishing how traditional techniques and digital tools can be best practices for journalists in a digital age when verifying information.

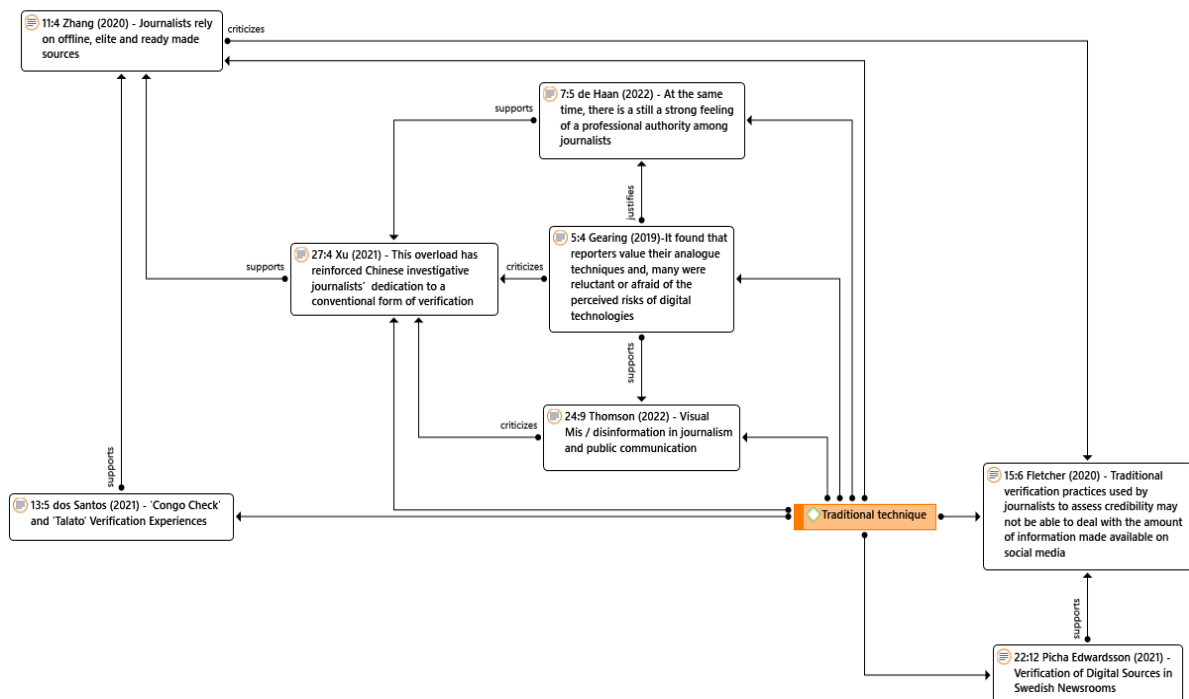


Figure 5: Network on traditional technique theme

Combination Strategies

The combination strategy involves combining manual techniques with digital technology in the verification of social media content for news production. According to Sushmita (2021) and Ufarte-Ruiz et al. (2020), journalists used both manual and digital technologies to verify content and check various facts to ensure that rumours about Covid-19 spread on social media and corporate websites were compiled into news according to journalistic principles. This approach aims to improve the accuracy, speed and reliability of verifying social media content by combining the human expertise of journalists with the efficiency and scalability of digital tools (Edwardsson et al., 2021). Supported by Thomson et al. (2022), using a combination of closely scrutinised tools provides journalists with the context and certainty needed to assess the integrity of images with unknown origins properly. The combination strategy promotes the integration and collaboration of manual and digital techniques. Journalists can use digital tools to identify potentially false or misleading information, allowing them to concentrate their manual verification efforts on more nuanced and complex

cases. Today, this norm is challenged by the dual pressures, increased speed and demands of news production. On one hand, there is an increasing flow of information from various digital sources (Edwardsson et al., 2021).

The combination of manual and digital techniques fosters a symbiotic relationship in which the strengths of both approaches are utilised, resulting in a comprehensive and efficient verification process. Journalists can meet the challenges posed by the enormous volume and rapid dissemination of content on social media by adopting a hybrid strategy that combines manual techniques with digital technology. This approach leverages journalists' critical thinking and expertise while harnessing the power of digital tools to streamline and improve the verification process. In an age of social media-driven news production, the combination strategy enables news organisations to deliver accurate and reliable news to their audiences on time while maintaining the integrity of the journalistic profession. Therefore, the following section discusses the need for new tools to help them hasten the verification process.

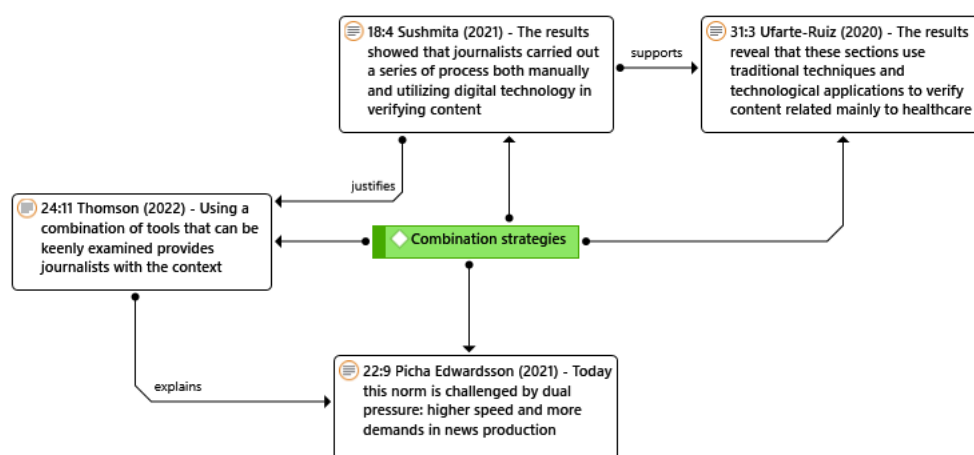


Figure 6: Network on combination strategies theme

Technology & Social Media Tools

Technology and social media tools include specific tools and platforms that help with social media content verification. Examples of these tools include social media monitoring and analysis platforms, image and video verification tools, fact-checking plug-ins and browser extensions, and other digital resources designed to assist in the verification process. The tools and platforms specifically designed for social media content verification are the focus of the technology and social media tools. Journalists reported that places that were too dangerous to visit physically could use information and communication technologies such as the internet, social media, messaging applications and digital tools that are now an essential aspect of journalism (Christensen & Khalil, 2021). These tools take advantage of advances in digital technology to provide specific features that aid in the verification process. Social media monitoring and analytics platforms provide journalists with valuable insights into trends, conversations and public opinion about content on social media. Journalists can use these tools to track discussions, identify emerging issues and assess the reach and engagement of specific posts. A study by Castellón (2021) shows that advances in verification procedures enable the incorporation of visual content from social media into mainstream corporate news topics, facilitating the transition from traditional newsrooms to cloud-based structures and the engagement of new audiences (Castellón, 2021). Social media monitoring and analysis

platforms provide a comprehensive overview of the social media landscape, making it easier to identify potential sources and assess the authenticity and relevance of social media content. Social media replace and enhance current sourcing and verification channels (Zhang, 2020), and journalists know that social media does not reflect reality. However, they can help find the truth and capture the reality of any situation (Christensen & Khalil, 2021).

Narratives on social media often contain important visual content, such as images and videos. Reverse image search, metadata analysis and digital forensics are advanced tools and techniques to identify visual content's authenticity, manipulation and context. Tools for verifying images and videos help journalists detect forgeries, manipulated images and other misleading visuals and ensure that only authentic and accurate visual content is used in news production. With these tools, journalists can overcome the difficulties caused by the wide distribution of manipulated and misleading visual content on social media platforms. However, few journalists use social media verification tools and services, according to research on newsrooms and surveys (Walker, 2019), because they fear the risks involved in using technology. In addition, mobile chat apps such as WhatsApp, Facebook Messenger and Telegram are popular as social apps among reporters looking for sources and facts on fast-moving stories. A study by Bautista (2021) found that media, journalists and verification media need to work through new scenarios like TikTok. Not only to ensure that a news story reaches a new audience but also as an innovative way to combat the phenomenon of disinformation, such as fake news and speculation, which are increasingly decentralised through digital channels.

Besides that, journalists can use fact-checking plug-ins and browser extensions to gain quick access to fact-checking databases, fact-checking guides and other resources from their web browsers. This way, journalists can keep up to date with trends and opportunities while learning new fact-checking techniques. Joining a large, global fact-checking movement gives them credibility, authority and presence (dos Santos, 2021). These tools enable journalists to verify claims, assess sources' credibility, and detect potential misinformation while browsing social media platforms or reading online content in real-time. Supported by Giomelakis et al. (2021), the study findings emphasise the importance of the online environment and the effectiveness of a semi-automated process for vetting video content and journalistic practices, as well as helpful verification features and procedures. However, a study by Haque et al. (2020) in Bangladesh found that newspaper journalists do not consider fact-checking online as part of their job. They suggest several ways to increase the impact of fact-checking efforts through collaboration, technology, and infrastructure development. According to Edwardsson et al. (2021), they are based on the responses of over 800 Swedish journalists to a survey about their attitudes towards verification (Journalist 2018) and an evaluation of the Fact Check Assistant (FCA), a prototype for verification in newsrooms. According to the survey findings, journalists are unsure whether verifying content from blogs and social media is possible, and there is a lack of routines. Therefore, fact-checking tools and plug-ins must be easily used and integrated into newsrooms' editorial systems by incorporating relevant information and resources into existing workflows. However, as these tools are imperfect and should be used with expertise and ethical considerations, journalists need to think critically and maintain a balanced approach to reduce the spread of misinformation and improve reporting accuracy.

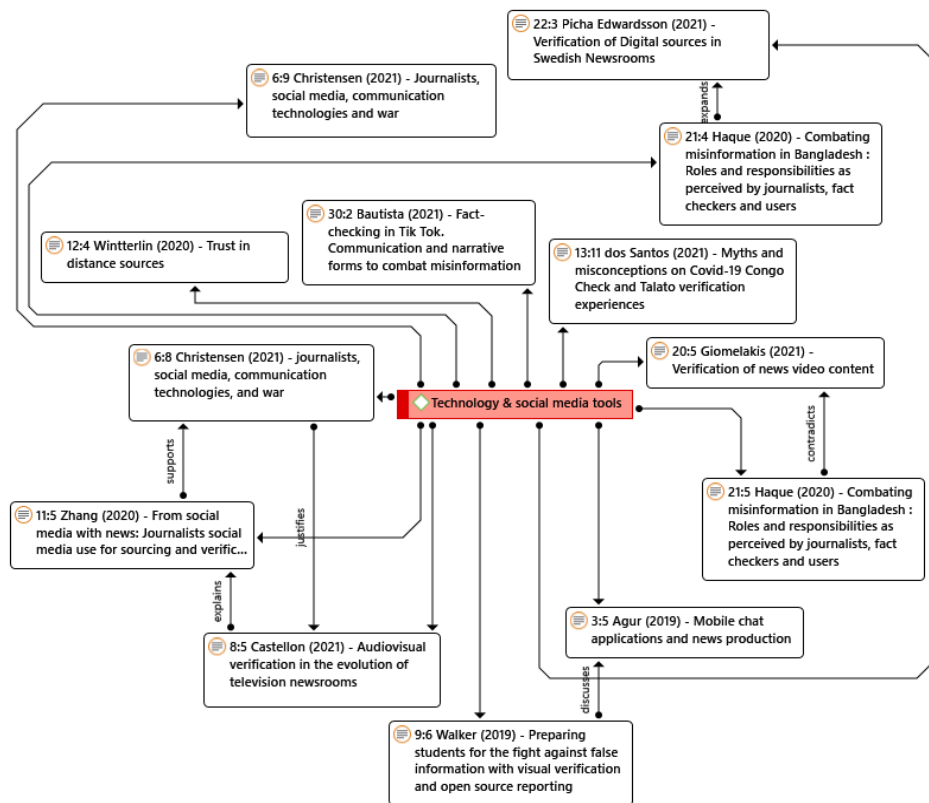


Figure 7: Network on Technology & Social media tools theme

Computational Tools

Computational tools have become a powerful tool in verifying social media content for news production. AI-powered algorithms, natural language processing, sentiment analysis, automated fact-checking systems, deep learning and image analysis are all examples of computer-based tools. In these tools, computer techniques are used to process and analyse large amounts of data, detect patterns and make predictions. In recent years, media professionals have been attracted to these tools, and the trend to use computer tools for fact-checking and verification is increasing (Khan et al., 2023). Verification tools are necessary due to the speed and extent of visual disinformation. It is the responsibility of journalists to conduct fact-checking and correct any rumours. Fact-checking is one of the most critical elements of professional journalism (Khan et al., 2023).

Machine learning algorithms are also crucial in developing automated verification and fact-checking systems. According to Tiwari and Thorat (2021), Machine learning algorithms are also important in developing automated verification and fact-checking systems. There are several tools for identifying manipulated visual UGC, such as FotoForensics, Forensically or fake media detection tools such as Deepware.ai. These algorithms analyse data from reliable sources, fact-check databases and external datasets to detect inaccuracies and inconsistencies in social media content. According to a study by Fletcher et al. (2020), the Truthmeter is a tool that can assess the credibility of posts in line with journalists' credibility scores. According to Papadopoulou et al. (2019), the analysis is not only a unique benchmark for research in the field of automatic verification but also offers insights into UGC dissemination patterns and possible telltale differences between fake and accurate content. At the European level and compared to the UK, news verification agencies strive to demonstrate their transparency and usefulness to the public (López-Marcos & Vicente-

Fernández, 2021). As a result, fact-checking has become a new journalistic genre, able to monitor the information disseminated on social media and transform complex information into knowledge for citizens.

Visual verification becomes clear when we consider previous incidents where newsrooms and professional journalists failed to identify misleading photos/videos and shared them as reliable content related to a newsworthy event (Khan et al., 2023). For example, during the cave rescue of a Thai football team in 2018, several news outlets shared videos of a diving rescue on social media. Unfortunately, these were videos of diving exercises in France and Wisconsin several years ago. Deep-learning algorithms provide journalists with powerful tools to verify the integrity and accuracy of visual content by analysing visual features, patterns and metadata, contributing to the credibility and reliability of news production. According to Khan et al. (2023), multimedia forensics helps determine whether a visual has been manipulated or is synthetic, and it is suggested that multimedia forensics tools be integrated into basic journalistic verification workflows. Manual verification takes much time, as it involves interviewing eyewitnesses and checking the digital footprint of sources sharing information on social media.

However, a study by de Haan et al. (2022) shows that algorithmic tools designed explicitly for the journalistic research process are rarely used, and they express specific beliefs about the use of algorithm-driven tools in the form of folk theories, the majority of which are pessimistic about the impact of AI on journalism. Moreover, according to Khan et al. (2023), the computer scientists who develop these tools are unfamiliar with manual verification procedures, and the capabilities of the forensic techniques proposed by the computer science research community to detect image/video forgery should be recognised by media practitioners. Therefore, journalists and fact-checkers must be trained to use social media content verification tools as an information verification strategy. Journalists can fully exploit the potential of these tools to combat misinformation and deliver accurate news to their audiences by combining computer-based skills with journalistic expertise.

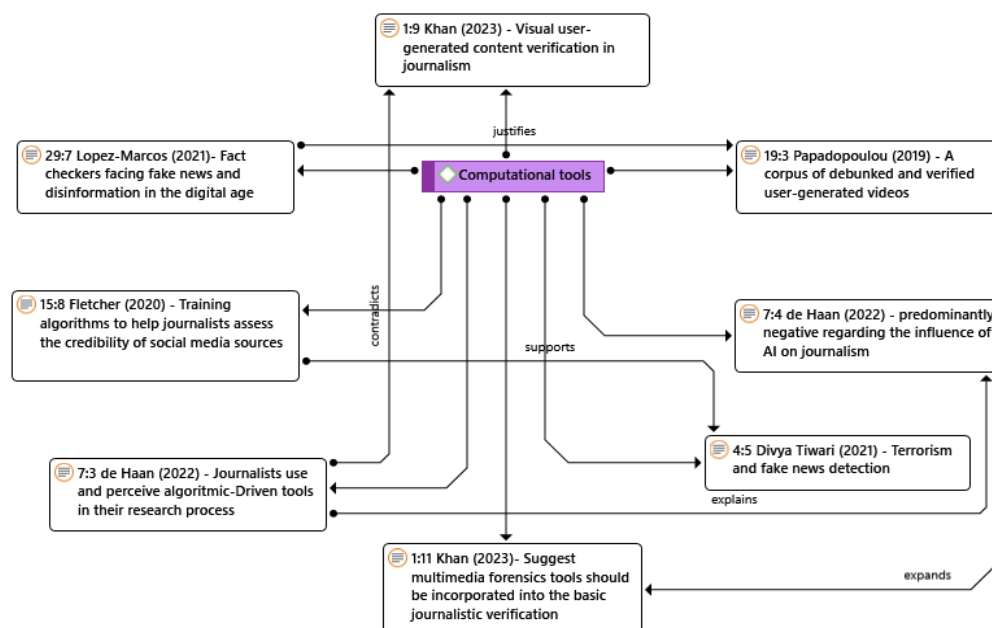


Figure 8: Network on computational tools theme

Training & Media Literacy

Training and media literacy are critical in providing journalists with the skills and knowledge to verify social media content for effective news production. Digital content verification often involves determining the accuracy of content such as texts, videos and images shared on social media. This highly technical verification requires unique open-source intelligence (OSINT) skills (Edwardsson et al., 2021). These training programmes cover source evaluation, fact-checking methods, digital forensics and critical thinking in the context of social media. By developing these skills, journalists can improve their ability to identify misleading or false information, cross-reference sources and critically evaluate the credibility of content on social media. Training programmes also promote responsible journalistic practices in the digital age and raise awareness of the ethical considerations involved in using content on social media. With few tools and little time to assist them in evaluating information, this equips journalist with the mechanisms, skills and knowledge they need to be effective gatekeepers and guardians of public trust (Thomson et al., 2022). Training journalists and teaching them media literacy is a strategy to verify the information in a digital age with a flood of online data.

A lack of time and knowledge hinders the introduction of new verification routines. According to journalists, it is not enough to introduce new digital tools. Management must also budget for training (Edwardsson et al., 2021), and journalists should be trained (Khan et al., 2023). However, Walker's (2019) study found that journalists and students do not learn basic digital verification skills. Moreover, in today's era of information wars, post-truth and social media as news sources, journalism education does not meet the ever-changing demands of verification and face barriers in adopting verification techniques (Shesterkina et al., 2021; Walker, 2019). Media literacy initiatives are critical to developing a critical and discerning mindset among journalists. These initiatives aim to improve journalists' understanding of the mechanisms and dynamics of social media platforms, such as algorithms, echo chambers and the spread of misinformation. Journalists can navigate the complex environments of social media, identify potential bias or manipulation, and engage with social media content more informedly by improving their media literacy. Media literacy initiatives also enable journalists to educate their audiences on the principles of media literacy, promoting a more critical and discerning culture of news consumption. Journalists must improve their media literacy and technical skills to verify and debunk missives using digital tools (Thomson et al., 2022). However, journalists and media organisations must have the skills, knowledge and resources to implement verification practises and management support.

Furthermore, Munoriyarwa and Chambwera (2020) advocate using professional practice first, then checking multiple sources. Second, fake news endangers journalism, so newsrooms need to work together, especially in uncertain times. Third, investigative journalism must be expanded to uncover news supported by evidence that authorities would prefer to keep hidden. This would ensure that professional journalists have incontrovertible evidence to debunk or refute speculative fake news. Journalist collaboration and sharing of knowledge are critical components of media literacy efforts. Workshops, conferences and online platforms allow journalists to learn from each other's experiences and expertise. Journalists can collectively develop strategies and approaches to overcome the challenges of verifying social media content by sharing best practices, case studies and experiences. Training programmes and media literacy initiatives can help journalists improve their ability

to verify social media content for news production. Journalists with the necessary skills and knowledge can be crucial in delivering accurate, reliable, and trustworthy news to the public.

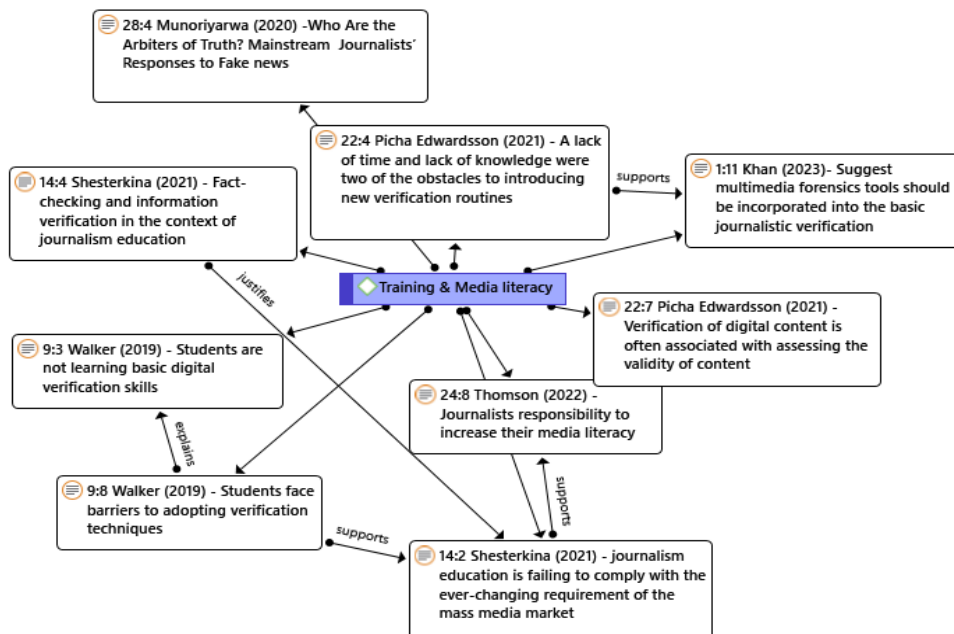


Figure 9: Network on training and media literacy theme

CONCLUSION

This article used two approaches from the 31 articles reviewed in this paper. The first section is quantitative and highlights the numerical data obtained from ATLAS. Ti 8. This article reviewed the journalist's techniques and strategies in verifying social media content for news production. The findings show that the journalist's techniques and strategies in verifying social media content highlight traditional techniques, combination strategies, technology and social media tools, computational tools and training and media literacy. Journalists' verification practices must adapt to computer-based tools such as AI technologies to verify the information and acquire specific skills for this new technology. However, in some countries, there is a lack of technology, resources and finances to adapt to the latest technology.

Training is a strategic management that must focus on improving the knowledge and skills of journalists today and in the future. The culmination of this study is that at a time when Covid-19 hit the world, the spread of misinformation is worse than the spread of the disease. Although this study has slowed down after that issue, the findings are of interest to the rising concern of verifying information of journalists in non-Western countries. This thematic review also revealed that no research was conducted to investigate the journalist's verification techniques and strategies used by Malaysian journalists. Most of the research was discovered in Europe, United States, Australia, India, and China. Hence, a study on journalist's verification practices in Malaysia is crucial because the internet penetration rate of 96.8 per cent of the population in 2023 makes everyone access and disseminate information quickly.

As for the qualitative part, traditional techniques such as triangulation and source verification are still crucial to ensure the accuracy and credibility of news reporting. Therefore, integrating digital and computational tools and developing media literacy and training programmes for journalists can significantly improve the quality of the verification process

and news production. Future studies should examine the impact of journalists' verification techniques on news content credibility, and it may be possible to identify new approaches that can further strengthen credibility in social media.

The study adds to the body of knowledge regarding journalists' verification techniques and strategies in the literature and may provide direction for future research on journalists' verification. The study's main contribution is identifying and analysing different journalistic techniques and strategies to verify social media content for news production. The study's findings can inform journalists' practices, policymakers and educators for social media verification in contemporary journalism and guide future research. The review emphasizes the value of traditional techniques, their continued relevance in the digital age, and the potential benefits of using technology and computational tools to streamline the verification process. In addition, the study emphasizes the importance of media literacy and training programmes for journalists to navigate the challenges of social media verification successfully.

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