



Critical Media and Information Literacy to Combat Misinformation: Research Gaps and Future Directions

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ABSTRACT

This review article aims to provide insights to how effective critical media and information literacy can help in curbing the tide of fake news and misinformation in society. In this study, 55 research articles out of 2077 articles from the year 2010 to 2020 were incorporated from three databases – Sage Journals, Science Direct, Taylor and Francis, for quantitative and thematic analysis. A total of seven categories were developed and analysed in the quantitative analysis phase whereas the thematic analysis phase divided the studies into three major themes based on the ways to combat fake news and misinformation. The quantitative data and thematic analysis suggest the following measures to fight fake news and misinformation: (1) Critical media and information literacy as a tool to curb fake news, (2) Technological advancements to reduce fake news, and (3) Governmental regulations on fake news spread. Researchers propose media and information literacy as an effective tool to curb fake news and misinformation in the society.

1.0 Introduction

The abundance of information, which is available through digital technologies in present times, is unmatched in human history and this has given rise to the problem of fake news. Due to the variety of options available for news consumption today including the various online and social media sources, accessing credible and trustworthy information is a tough task for common people, especially youth. As media and the information it disseminates plays a vital role in the day-to-day life of common people, we need to scrutinize the new relationship structures, that emerge with media and therefore, the impact that media and the information has on us. Due to the emergence of various online websites and social media platforms, we have seen a rise in the creation and dissemination of fake news online. According to Vosoughi et al. (2018), fake news travels faster than real news on social media. It points to the fact that people get exposed to

fake news more than credible news online which is a serious issue.

According to Tandoc et al. (2018), the word 'fake news' is no longer new and covers a variety of typologies such as fabrication, news satire, propaganda, and manipulation. The academic meanings of disinformation include two axes, in particular, degrees of facticity and deception. 'Fake news' as discussed in the present study refers to fabricated news stories pretending to be true. The word came to the forefront in 2016, after the 2016 US presidential elections (Shin et al., 2017). According to Corbu et al. (2020), fake news can be harmful to society in general as it tends to polarize society, suppress social conflicts and even tend to distract the attention of the people from more important issues that needs immediate action. Fake news has become a challenge to both, the social and the democratic life of common man in three broad ways: (1) it leads to citizens being wrongly

informed, (2) it creates more echo chambers to let people live in their wrongly informed world, and (3) it evokes emotions and outrage among common people consuming false news that may ruin social harmony in the long run.

Over the last few years, we have witnessed incidents of mob-lynching, violence, panic, fear, communal and religious tensions, due to fake news being created and circulated online and on social networks. In some cases, broadcast media including television news channels have also spread fake news which further puts the public at risk of consumption of false news. Hence, there arises a need for measures to curb fake news. Past studies have observed that there is no one major solution to fake news. Some of the solutions as proposed by researchers are: technological advancements, critical media literacy among common public, government regulations, and fact-checking. All these solutions when work together can keep a check on fake news creation, detection and dissemination.

According to Moon & Bai (2020), information literacy is to find and access correct information responsibly to understand, analyse, and examine information; and also, to eventually use that information to remedy problems in real-life contexts. Mostly, an information literate person may be capable of examining among the strains of mass media messages. One of the widely accepted definitions of media literacy was given in 1993 by Aufderheide: "A media literate person – and all people need to have the possibility to become one – could be able to decode, evaluate, examine and produce both print and electronic media. The basic goal of media literacy is critical autonomy with regards to all media. The emphasis in media literacy training range widely, such as knowledgeable citizenship, aesthetic appreciation and expression, social advocacy, self-esteem, and client competence" (Yakub et al., 2020, p. 9).

In recent years, technological advancements such as artificial intelligence, advanced algorithms, neural networks, machine learning etc, are being developed and used for fake news detection and stop its dissemination (Shu et al., 2017). With developing issues about facts and information intake on social media systems contributing to the rise of misinformation and distrust of news, critical

media literacy has become a common call (Vraga & Tully, 2019). Hence, various media literacy campaigns are also being organized for people of various age groups to make them aware about fake news and how to detect and tackle it if they come across it. Many fact-checking initiatives have also emerged over the last few years, ranging from big organizations like Poynter Institute, Google News Initiative, to fact-checking websites like Politifact, Snopes, Alt News, BoomLive etc, and independent fact-checkers. Most of the news media outlets now have their own fact-checking desks to verify the truthfulness of any information before making it available to the public.

Fake news has an impact on the whole society, however, young adults (Hughes & Waismel-Manor, 2021) and older people are found to be the most susceptible to fake news (Brashier & Schacter, 2020). An observation by the Stanford History Education Group (2016) concluded that young people's ability to reason about the online information is bleak. According to McDowell and Vetter (2020), contemporary worldwide issues have highlighted that "disinformation" and "fake news" continue to be one of the fundamental threats confronted by current democratic societies, and our present day equipment and efforts for coaching and communicating effective information literacy needs a quick updating. Fake news has also lead to the disruption in the normal functioning of many governments. Hence, many countries and governments across the world have come up with regulations to curb its flow like shutting down platforms that disseminate fake news, punishing those culprits, or pressurising social media giants like Google, Facebook, Twitter to make and follow policies for fake news detection and dissemination on their platforms.

Given the level of consideration and concern about fake news, there has been an expansion of the subject in academics across a range of disciplines like political science, communications, psychology, economics, health sciences, etc, (Metzger et al., 2015). The scholarly discussion and debates increased after the events which were a result of an increase in the number of fake stories, online disinformation that appeared to have a profound negative impact on the society

(Humprecht, 2018). With the rise in interest to study fake news among researchers from various fields and increasing number of articles publishing on the subject, it becomes important to cohesively analyse the published work. This will lead to other researchers to have a comprehensive idea about the type of research being conducted about fake news across the world and analyse the research gaps on which future studies can be conducted.

The current literature review aims to find out the role of media and information literacy in curbing the fake news crisis. In the field of mass communication and media studies, most of the studies have tried to analyse the effects of fake news and to find an effective method to curb this using Media and Information Literacy. This systematic literature review will be giving an in-depth analysis of the studies conducted in the field of fake news, media and information literacy all over the world. This study provides numerous theoretical and realistic contributions to mass communication research.

Research questions

The SLR aims at answering the following two main questions:

RQ1. Does media and information literacy play any role in reducing the exposure of misinformation?

RQ2. What are the academic gaps on the subject of fake news which need to be explored further for conducting research in this genre in future?

2.0 Methods and Procedures

In the present literature review, 55 research studies from 2010 to 2020 were analysed. For the present study, the researcher has used the systematic literature review, which helps in the in-depth analysis of fake news crisis based on the previous researches conducted in the field (Sharma et al., 2019). According to Jabbour (2013), systematic literature review (SLR) is useful for integrating the results of studies on emerging issues, fake news being one such issue. Furthermore, an SLR helps in the identification, selection, and critical appraisal of research to answer a clearly formulated question (Dewey & Drahota, 2016). For SLR PRISMA guidelines have been followed, these guidelines clearly highlight the study protocols of SLR. In this study, to identify the rigorous gaps, researchers have

taken both quantitative and qualitative measures for analysis, results are presented in both ways, along with the gaps and the clear answers of predefined research questions. Thus, some reflections of bibliometric analysis are coming out of this study as quantitative analysis has been performed. Ahmed & Matthes (2016) have clearly given a substantial base of conducting SLR with Thematic Analysis; the same technique is implemented here for finding rigorous research gaps and themes for finding future directions of research in this area.

2.1 Inclusion/ Exclusion Criteria

The current study included only research articles and literature reviews for the analysis. Only those publications that have English as the primary language were selected. Materials which were excluded were book reviews, website articles, review articles and thesis/ dissertations. Researchers selected Sage Journals, Science Direct, and Taylor & Francis as the main databases from which articles were selected, as these databases are internationally reputed, rich in good quality publications, easily accessible, and convenient to use.

2.2 Development of a web search strategy

The key terms (or the combination of these terms) that were used for web searching were "Fake News", "Media Literacy" and "Information Literacy". At first, a general search of the combinations of these key terms was conducted. Afterwards, the studies were filtered out through an advanced search by including filters like time period and research area as 'media and communication'. The main technique used to get further filter out relevant articles related to our study, was to do a title and abstract search (Tamilchelvan & Rashid, 2017) followed by full text analysis that helped in tracing down the studies and articles that were relevant to our study.

2.3 Observation Protocol

Sage Journals, Science Direct and Taylor & Francis were the three databases explored for the collection of publications in the preferred area.

Following are the steps carried out by the researcher to conduct this literature review:

- At first, three keywords, that is, "Fake News", "Media Literacy" and

“Information Literacy” were selected for the study. Later on, an extensive search was conducted on the selected three databases for finding relevant literature for the analysis. Literature that was published within a time period from January 2010 to October 2020 was selected. The search results after following the already mentioned exclusion criteria and the extraction process led to a total of 55 articles relevant for the current the literature review.

- After analysing the 55 studies, seven categories for quantitative analysis and three themes for thematic analysis were developed.
- The data obtained from the coding and classifications were carefully analysed and presented in the results which showed the strengths and weaknesses of the analysed studies.
- Lastly, after a thorough analysis of the results, research gaps were identified and the suggestions and recommendations for future research in the area were presented.

The following PRISMA flow chart explains the steps through which the 55 research articles were selected from the three databases. PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses which is an evidence-based minimum set of items for reporting systematic reviews and meta-analyses ("PRISMA", 2020).

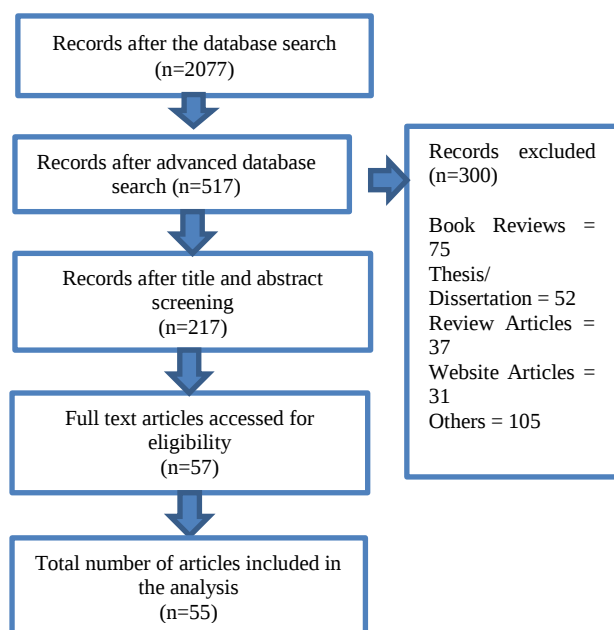


Fig. 1: PRISMA flow diagram

2.4 Analytical Process

For the present literature review, the two-step analysis proposed by Ahmed & Matthes (2017) has been used. In this analysis, the analytic process is divided into two: Quantitative analysis and Qualitative analysis. The quantitative analysis is the first step where the research gaps and present trends in the research area are found out to answer RQ2. Later, in the second step of qualitative analysis, the literature analysed is divided into major themes which are further analysed to answer RQ1. The Qualitative analysis identifies major themes from the total selected studies to find out the effectiveness of media and information literacy in combating fake news.

2.5 Quantitative analysis phase

In the first phase of the analysis, all the research studies were classified into seven categories as shown below:

- (1) Publication year & Journal
- (2) The geographical areas focused in the research study
- (3) The country with which first author is affiliated with at the time of publication of the article
- (4) Research method used in the study
- (5) Instruments used for data collection: This refers to the subsets of research tools used in a particular research method. For example, if a particular study has used a qualitative method, then the research tools/ instruments must be content analysis, in-depth interviews, focus group discussions, or others. Likewise, if it is a quantitative method, then, a survey could be a research tool.
- (6) In a mixed-methods approach, both these qualitative and quantitative methods will be combined.
- (7) Theoretical lens: Every research study was analysed in the light of a theoretical framework. The theoretical lens here refers to the major media and communication theories related to fake news and disinformation. Seven major theories that were taken into consideration were: Confirmation bias, Echo chamber effect, Filter bubble effect, Individual difference theory, Selective exposure, Third-person effect, and Conspiracy theory. Studies that explored one or more of the above-mentioned theories were

coded as “Theory employed” and the studies that do not have the reference of any theories were coded as “No theory employed”.

- (8) The solution put forward by the studies analysed: After the in-depth analysis of each study, the conclusions of each study were taken into consideration. The three main conclusions that were proposed in the studies were; (A) Information and Media literacy can impact fake news spread (B) Technological advancements is a solution to fake news crisis and (C) Both should be combined for better solutions. The percentage of studies which proposed each of these solutions were analysed quantitatively.

2.6 Qualitative analysis phase

The major solutions proposed by each study was analysed thematically in the qualitative phase. Apart from the three themes discussed during the qualitative phase, other themes which were less discussed were also identified.

3.0 Findings and Discussions

The main objectives of this systematic literature review were to identify the impact of media and information literacy in combating fake news, and to find the potential research gaps in the area of fake news and media literacy. This section presents the results and discussion of the present study.

3.1 Distribution (2010-2020) & Journals

Taking the overall mean of the research studies in the area of fake news, media and information literacy, 5 research studies per year seems low for a period of 11 years. Figure 1 shows an increasing trend in the number of research studies conducted in the field of fake news, media and information literacy in the second half of the decade. The first half shows less interest in this area, that is, till 2016 only (N=8) studies were there. But after 2016, (N=47) studies were available, in which, 2020 was the most fruitful year with (N=18) number of studies. The year 2019 (N=13) and 2018 (N=11) were the second and third most successful years based on the number of studies published on the topic respectively.

The increase in the number of studies after 2016 shows the impact of the US Presidential elections of 2016, after which the word “fake news” along with the crisis it caused came into

the limelight. The higher number of studies in 2020 shows the amount of effort researchers are putting forward to combat the fake news issue worldwide. It also signifies the alarming issues created by fake news around the globe towards the last few years of the decade. However, with the alarming rise of fake news and misinformation, the frequency of studies related to fake news is still low. Therefore, researchers from different fields across the world can focus more on the problem of fake news and conduct more studies in this area.

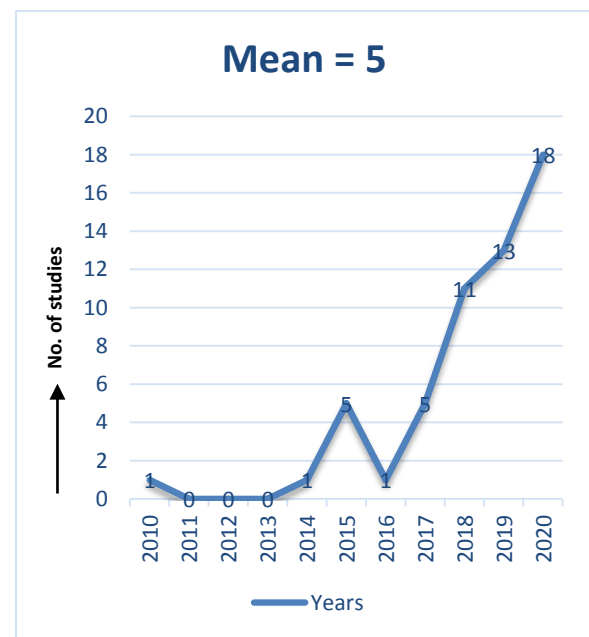


Fig. 2: Research trends since 2010

3.2 Geographical area focused

The researcher has used the categorization of geographic regions according to the World Bank to classify the studies analysed based on their area focused. They are A – East Asia and Pacific, B –Europe and Central Asia, C – Latin America and Caribbean, D- Middle East and North Africa, E – South Asia, F – North America, G- Sub – Saharan Africa, H – Worldwide. Figure 2 shows that most of the studies on fake news have been conducted in the North American region (F) (N= 23, 41.8%). This is followed by studies which are conducted in general or worldwide (H) in which no country or region has been mentioned (N= 13, 23.6%), then Europe and Central Asia (B) (N= 9, 16.4%). Few studies have been conducted in the region of Europe and Central Asia (B) (N= 6, 11%) Two studies have been conducted collectively in the regions of East Asia and Pacific, and North

America (B+F) (N= 2, 3.6). Only one study has been conducted in the regions of South Asia (E) and Sub-Saharan Africa (G) (N= 1, 1.8%). None of the studies was found to have been conducted on the subject in the regions of Latin America and Caribbean (C), and Middle East and North Africa (D) since last 10 years.

The quantitative study on the geographical region focused suggests that the regions of Latin America and Caribbean (C), and Middle East and North Africa (D) need to focus more on the problem of fake news in terms of research. India being a part of South Asian (E) region, although dealing with a rise of fake news and misinformation tend to have only one study published so far. Hence, researchers from these regions can conduct research in the area of fake news in the future. It will further help the research community to get insights into the problem of fake news in these regions and the necessary steps to curb it.

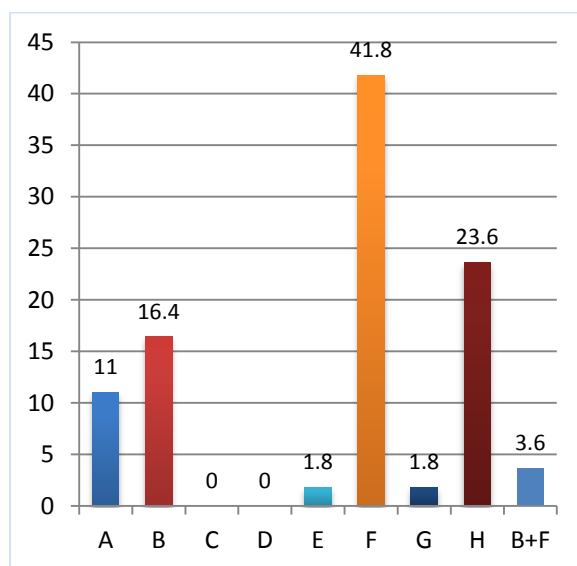


Fig. 3: Geographical regions focused in each study

3.3 First Author's country of affiliation

For the studies which had two or more authors, only the country of the first author has been taken into consideration for this analysis. This analysis gives no importance to the geographic regions inside a country; it is because researchers wanted to acknowledge the country as a whole for producing the research work. From figure 3, it is clear that the USA (N=28, 50.9%) leads the list of country-wise research out of 15 countries; half of the studies are concentrated in the US

region alone. Netherlands is the second in the list with (N=6, 10.9%) studies, followed by UK, Turkey and Germany, each having (N=3, 5.45%) studies. Australia and Singapore alone conducted (N=2, 3.63%) studies each whereas Sweden, India, South Africa, Switzerland, South Korea, Romania, Ireland, and China contributed (N=1, 1.8%) each of the total.

This analysis observes the lack of or negligible amount of research studies conducted in the area of fake news in almost all parts of the world except the USA. Even countries like China and India with a vast population where the fake news crisis seems to be difficult to combat have not seemed to have taken much effort to conduct research in the area. Researchers from these countries, where not much research on fake news has been conducted, need to focus more on the problem and come up with more studies in future.

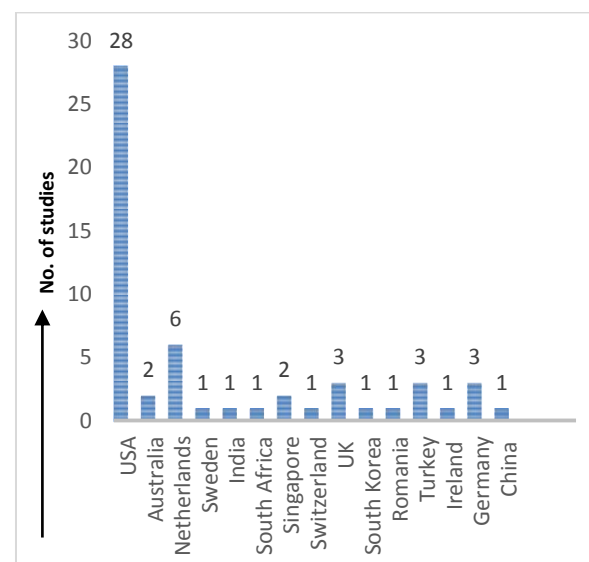


Fig. 4: Country of first author's research affiliation during the time of publication

3.4 Method used

Table 1 show the overall findings of the quantitative analysis whereas Table 2 shows the percentage and frequency of the methods used for research. From Table 1 and Table 2, it can be observed that qualitative methods were most frequently used (N= 32, 58.20%) in the study of fake news, media and information literacy, while quantitative methods were used in 25.4% of the studies (N=14). Comparatively, very few numbers of studies used the mixed method approach (N=9) which contributed to only 16.4% of the total studies analysed.

Table 1: Overview of the findings of quantitative screening

No.	Authors/ Year	Focussed Region	Affiliation	Method	Theoretical Perspective	Instrument used	A-Information & Media Literacy B- Technology C- Both
1	Metzger et al. (2015)	USA	USA	Mixed	Individual difference theory, Conformation Bias	Survey and In-depth interviews	A
2	McGeough and Rudick (2018)	USA	USA	Qualitative		Content analysis	A
3	Bakir and McStay (2017)	Worldwide	UK	Qualitative	Conformation Bias, Echo Chamber and Filter Bubble	Case Study	C
4	Yakub et al. (2020)	Australia	Australia	Quantitative		Content analysis	A
5	Vraga and Tully (2019)	USA	USA	Mixed	Selective Exposure	Survey and Content analysis	A
6	Hamleers (2020)	USA and Netherlands	Netherlands	Quantitative	Conformation Bias	Survey	A
7	Carlson (2018)	USA	USA	Qualitative		Content analysis	A
8	Saurwein and Spencer-smith (2020)	Europe	Austria	Qualitative		Content analysis	B
9	Moon and Bai (2020)	Korea	South Korea	Quantitative		Survey	A
10	Yu et al. (2020)	Worldwide	USA	Qualitative		Content analysis	B
11	Jankowski (2018)	Worldwide	Netherlands	Qualitative		Content analysis	A
12	Lim and Tan (2020)	Singapore and Indonesia	Singapore	Qualitative		Content analysis	A
13	Tandoc et al. (2017)	Singapore	Singapore	Mixed		Survey and content analysis	A
14	Corbu et al. (2020)	Europe	Romania	Quantitative	Third person effect and Conformation Bias	Survey	A
15	Shen et al. (2018)	Worldwide	USA	Qualitative	Echo chamber and Filter Bubble	Content analysis	A
16	Wasserman (2017)	South Africa	South Africa	Qualitative	Conformation Bias, Echo chamber and Filter Bubble	Content analysis and Case study	A
17	Straub (2018)	USA	Netherlands	Mixed		Survey and In-depth Interview	B
18	McDowell and Vetter (2020)	Worldwide	USA	Qualitative	Echo Chamber	Content analysis	A
19	Craft et al. (2017)	USA	USA	Quantitative	Conspiracy theory and Conformation Bias	Survey	A
20	Nelson and Taneja (2018)	USA	USA	Qualitative	Individual difference theory, Echo chamber and Filter Bubble	Content analysis	A
21	Tugtekin and Koc (2019)	Turkey	Turkey	Quantitative		Survey	A

No.	Authors/ Year	Focussed Region	Affiliation	Method	Theoretical Perspective	Instrument used	A-Information & Media Literacy B- Technology C- Both
22	Jang et al. (2018)	USA	USA	Qualitative	Individual difference theory, Echo chamber and Filter Bubble	Content analysis	B
23	Sisman and Yurthas (2015)	Worldwide	Turkey	Qualitative	Selective Exposure	Content analysis and Interview	A
24	Shin et al. (2018)	USA	USA	Qualitative	Conformation Bias and Selective exposure	Content analysis	B
25	Paor and Heravi (2020)	Worldwide	Ireland	Qualitative	Conformation Bias, Echo chamber and filter bubble	Content analysis	C
26	Lim (2020)	USA	USA	Qualitative	Conformation Bias	Content analysis	B
27	Van de Vord (2010)	USA	USA	Quantitative		Survey	A
28	Schmuck and Sikorski (2020)	Europe	Germany	Qualitative		Content analysis	B
29	Tagg and Seargent (2019)	Worldwide	UK	Qualitative		Interviews	A
30	Sample (2019)	Worldwide	USA	Qualitative		Content analysis	C
31	Diergarten et al. (2016)	Germany	Germany	Quantitative		Survey	C
32	Karaduman (2015)	Turkey	Turkey	Qualitative		Content analysis	A
33	Tewell (2014)	USA	USA	Mixed	Conformation Bias	Survey and Focus group discussions	A
34	Jang and Kim (2017)	USA	USA	Quantitative	Third Person effect	Survey	A
35	Lai et al. (2020)	China	China	Quantitative	Individual Difference theory	Survey	A
36	Tully et al. (2019)	USA	USA	Quantitative	Conspiracy theory and Conformation Bias	Survey	A
37	Lee (2018)	USA	USA	Qualitative		Content analysis	A
38	Robertson and Mourao (2020)	USA	USA	Qualitative	Echo Chamber	Content analysis	A
39	Cheng and Chen (2020)	USA	USA	Mixed	Third Person effect, Echo chamber and Filter Bubble	Survey and content analysis	B
40	Schaewitz et al. (2020)	Worldwide	Germany	Mixed	Individual difference theory and Conformation Bias	Survey and Content analysis	A
41	Wagner and Boczkowski (2019)	USA	USA	Qualitative	Conformation Bias, Echo Chamber and Selective exposure	Interviews	C
42	Das and Schroeder (2020)	India	India	Qualitative		Interviews	A

No.	Authors/ Year	Focussed Region	Affiliation	Method	Theoretical Perspective	Instrument used	A-Information & Media Literacy B- Technology C- Both
43	Humprecht (2018)	USA, UK, Germany and Austria	Switzerland	Quantitative	Conformation Bias	Survey	B
44	Sterrell et al. (2019)	USA	USA	Quantitative	Conformation Bias	Survey	C
45	Balod and Hameler (2019)	Phillipians	Netherlands	Qualitative		Interviews	C
46	Hobbs and Tuzel (2015)	Turkey	USA	Quantitative		Survey	A
47	Tamboer et al. (2020)	Netherlands	Netherlands	Qualitative	Filter Bubble	Focus Group Discussions	A
48	Seo (2020)	USA	USA	Mixed		Survey and Interviews	A
49	Leeder (2019)	USA	USA	Mixed	Echo Chamber	Survey and Content analysis	C
50	Bowe (2019)	USA	USA	Qualitative	Individual Difference theory	Content analysis	A
51	Ekstrom et al. (2019)	Worldwide	Sweden	Qualitative		Content analysis	A
52	Lecheler and Kruijemeier (2015)	Worldwide	Netherlands	Qualitative		Content analysis	C
53	Roozenbeek and Linden (2018)	Netherlands	UK	Qualitative		Focus group discussion	A
54	Bonnet and Rosenbaum (2019)	USA	USA	Qualitative		Interview	A
55	Flew (2019)	Worldwide	Australia	Qualitative	Echo chamber and Filter Bubble	Content analysis	A

Table 2: Comparative analysis of research approaches taken

Approach	Number of studies	Percentage
Qualitative	32	58.20%
Quantitative	14	25.40%
Mixed	9	16.40%

3.5 Instruments used

This categorisation identifies the research tools/ instruments used in the selected studies. As shown in Table 3 that in studies that used a qualitative approach, content analysis (N=22, 68.75%) was the most used instrument, followed by in-depth interviews (N=5, 15.6%). Only (N=2) studies used multiple instruments in the qualitative approach which contributes to 6.25%. 'Other' in Table 3 represents instruments like focus group discussions and case studies which are used in 3 studies (9.4%). In studies that used a quantitative approach, survey was the only instrument used (N=14, 100%). In the mixed

methods approach, content analysis, interview, and other instruments were used to conduct a qualitative portion of the research, and for the quantitative portion, survey was used.

Table 3: Instruments used in the studies analysed

Instruments	Frequency of studies	Percentage
	Qualitative Approach	
Content analysis	22	68.75%
In-depth interview	5	15.60%
Multiple	2	6.25%
Other	3	9.40%
Total	32	100%
	Quantitative Approach	
Survey	14	100%
Total	14	100%
	Mixed methods Approach	
	Qualitative Portion	
Content	5	55.60%

analysis		
Interview	3	33.30%
Other	<u>1</u>	<u>11.10%</u>
Total	9	100%
	Quantitative portion	
Survey	<u>9</u>	<u>100%</u>
Total	9	100%

From Table 2 and 3, the research gap which researchers observed was that most of the studies used a qualitative approach (N=32) which is more than half of the whole studies selected. Among these 32 studies, only 5 studies (15.6%) used the in-depth interview as a tool According to Tagg & Seargeant (2019), the data collected through interviews allows the researchers to find the various facets of individuals' critical media awareness. However, data collection only through content analysis (N=22) and without any hands-on information seems to be less reliable in the case of the spread of fake news and its combating strategies. Furthermore, more quantitative studies should be conducted in future because the large sample size in such studies makes it easier to generalize data and hence, we get a broader view of the research problem and its solution. Additionally, mixed methods studies should be encouraged as well in future as the combination of the two types of data further enriches the study, however, it depends upon the researchers how well they have blended both the data strategically and judiciously for generalization (Polit & Beck, 2010).

3.6 Theoretical Lens

For the present study, researchers have observed seven major theories used in the 55 studies analysed: Confirmation bias, Echo chamber, Filter bubble effect, Individual difference theory, Selective exposure, Third-person effect, and Conspiracy theory. Table 4 shows that 52.72% of the total studies employed one or more of the above-mentioned theories, among which confirmation bias is the most used theory (N=5, 9.13%). A total of 26 studies fall into the category of 'No theory employed', as there were no major theories mentioned in them which contributed to 47.72% of the total. Future researchers should conduct research based on theories and clearly mention the theories in their work. Figure 5 is the graphical representation of these results.

Table 4: Comparative analysis of the theories used

	Number of studies	Percentage
Theory employed		
Conformation Bias	5	9.13%
Individual difference theory	2	3.6%
Echo Chamber	3	5.5%
Filter Bubble Effect	2	3.6%
Conspiracy theory	1	1.8%
Selective exposure	2	3.6%
Third-person effect	2	3.6%
Multiple	<u>12</u>	<u>21.8%</u>
Total	29	52.72%
No theory employed	<u>26</u>	<u>47.72%</u>
Total	55	100%

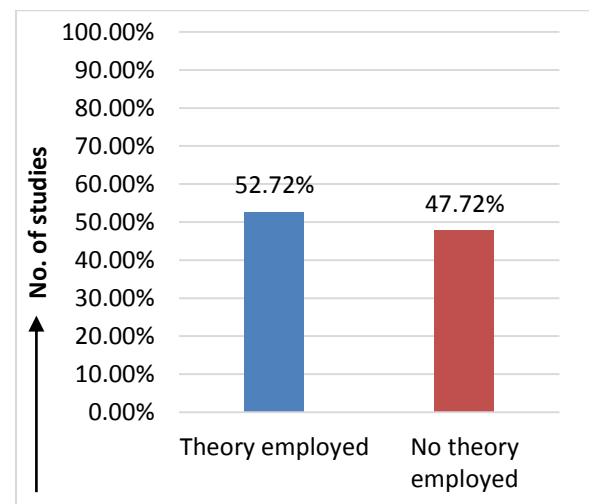


Fig. 5: The theoretical lens used in studies analysed

People tend to consume information that aligns with their pre-existing notions and beliefs rather than to accept new truth, this leads to confirmation bias (De Paor & Heravi, 2020). Also, the developmental stages of a person affects the way they evaluate information, because each individual has a unique perception of the same thing, suggesting that personal variations can also influence people's credibility assessment attitudes and behaviours. Today, online consumers are exposed to content material primarily based on an algorithmic technology that makes them personalize their newsfeed in the order in which they get exposed to information and news that they're already in allegiance with consciously or unconsciously. Selective exposure driven by personal decisions and friend's choice on what to post

also fuels this algorithm that decides what we often see on our feed (Vraga & Tully, 2019). “This approach of news circulation creates a “bubble” or “chamber” where content is filtered down via means of personal choice at the same time thoughts, ideals and opinions are echoed in the user’s online environment” (De Paor & Heravi, 2020, p. 102218). Not only does this phenomenon reinforce polarisation but also restricts other perspectives to come forward. Most of the conspiracy theories are made up and spread through such echo chambers and filter bubbles, which in a sense is difficult to diffuse. Then again, the majority of people these days has a misconception that fake news may fool others but not them. The theory of the third-person effect (TPE) proposes that people often think that the media messages’ most influential impact “will not be on ‘me’ or ‘you’ but on ‘them’ –the third persons” (Cheng & Chen, 2020).

3.7 Media and Information Literacy or Technological advancements

Table 5 represents the frequency and percentage of studies based on their conclusions. As Figure 6 shows, most number of studies (N=37) concluded that media and information literacy alone can make an impact on debunking fake news, which is found in 67.27% of the total studies analysed. The other two perspectives, that technological advancement and both technology and critical media and information literacy can help resolve the issue was proposed by the same number of studies (N=9) which contributed to 16.36% each of the total.

Table 5: Comparative analysis based on the conclusions given by the studies analysed

Conclusion	Number of studies	Percentage
Media and Information Literacy helps in combating fake news	37	67.27%
Technology serves the cause better	9	16.36%
Both should be combined for better results	9	16.36%

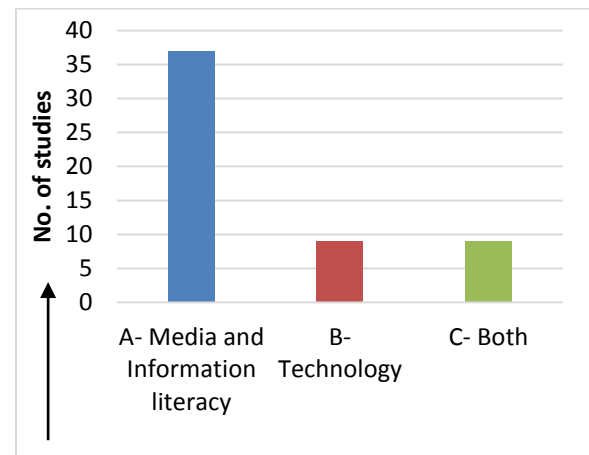


Fig. 6: Graphical representation of the conclusions proposed by the studies taken

3.8 Thematic Analysis

For the in-depth analysis of the research studies, three themes were identified that contribute to the effective strategies for combating fake news issue globally. This phase of the study will try to answer RQ1 and try to find out the gaps that need to be focussed in the literature being analysed so far.

Table 6: Overview of findings of the quantitative thematic analysis

No.	Author/s & Year	Theme Drawn
1	Metzger et al. (2015)	Information and Media literacy
2	McGeough and Rudick (2018)	Information and Media literacy / Governmental Regulations
3	Bakir and McStay (2017)	Information & Media literacy/ Technological Advancements/ Governmental Regulations
4	Yakub et al. (2020)	Information and Media literacy
5	Vraga and Tully (2019)	Information and Media literacy
6	Hamleers (2020)	Information and Media literacy / Governmental Regulations
7	Carlson (2018)	Information and Media literacy
8	Saurwein and Spencer-smith (2020)	Technological Advancements / Governmental Regulations
9	Moon and Bai (2020)	Information and Media literacy
10	Yu et al. (2020)	Technological Advancements

No.	Author/s & Year	Theme Drawn
11	Jankowski (2018)	Information and Media literacy
12	Lim and Tan (2020)	Information and Media literacy / Governmental Regulations
13	Tandoc et al. (2017)	Information and Media literacy / Governmental Regulations
14	Corbu et al. (2020)	Information and Media literacy
15	Shen et al. (2018)	Information and Media literacy
16	Wasserman (2017)	Information and Media literacy
17	Straub (2018)	Technological Advancements
18	McDowell and Vetter (2020)	Information and Media literacy
19	Craft et al. (2017)	Information and Media literacy
20	Nelson and Taneja (2018)	Information and Media literacy
21	Tugtekin and Koc (2019)	Information and Media literacy
22	Jang et al. (2018)	Technological Advancements
23	Sisman and Yurthas (2015)	Information and Media literacy / Governmental Regulations
24	Shin et al. (2018)	Technological Advancements
25	Paor and Heravi (2020)	Information & Media literacy/ Technological Advancements
26	Lim (2020)	Technological Advancements
27	Van de Vord (2010)	Information and Media literacy
28	Schmuck and Sikorski (2020)	Technological Advancements / Governmental Regulations
29	Tagg and Seargent (2019)	Information and Media literacy
30	Sample (2019)	Information and Media literacy/ Technological Advancements / Governmental Regulations
31	Diergarten et al. (2016)	Information and Media literacy/ Technological Advancements
32	Karaduman (2015)	Information and Media literacy
33	Tewell (2014)	Information and Media literacy / Governmental Regulations
34	Jang and Kim (2017)	Information and Media literacy / Governmental Regulations
35	Lai et al. (2020)	Information and Media literacy
36	Tully et al. (2019)	Information and Media literacy / Governmental Regulations
37	Lee (2018)	Information and Media literacy
38	Robertson and Mourao (2020)	Information and Media literacy
39	Cheng and Chen (2020)	Technological Advancements / Governmental Regulations
40	Schaewitz et al. (2020)	Information and Media literacy
41	Wagner and Boczowski (2019)	Information and Media literacy/ Technological Advancements
42	Das and Schroeder (2020)	Information and Media literacy
43	Humprecht (2018)	Technological Advancements
44	Sterrell et al. (2019)	Information and Media literacy/ Technological Advancements
45	Balod and Hameleer (2019)	Information and Media literacy / Technological Advancements / Governmental Regulations
46	Hobbs and Tuzel (2015)	Information and Media literacy
47	Tamboer et al. (2020)	Information and Media literacy / Governmental Regulations
48	Seo (2020)	Information and Media literacy / Governmental Regulations
49	Leeder (2019)	Information and Media literacy / Technological Advancements
50	Bowe (2019)	Information and Media literacy
51	Ekstrom et al. (2019)	Information and Media literacy
52	Lecheler and Kruikemeier (2015)	Information and Media literacy/ Technological Advancements
53	Roozenbeek and Linden (2018)	Information and Media literacy / Governmental Regulations
54	Bonnet and Rosenbaum (2019)	Information and Media literacy
55	Flew (2019)	Information and Media literacy / Governmental Regulations

Theme 1: Critical Media and Information literacy as a tool to curb fake news

Critical media and information literacy intends to make individuals who think, read, research, and criticize for which, most the studies analysed, suggested the need for a media literacy education which will, in turn, raise the awareness level. In today's world, there is a lot of risk in consuming fake news and alternative facts produced and spread by ill-intentioned individuals or groups through the internet and other digital tools, which may cause emotional distress, influence opinions and bring about severe responses (Shen et al. 2018). Media literacy instruction includes skills crucial for the present era digital media environment. It encourages audiences to recheck certain factors before believing in something, such as who the sender of the message was, what the purpose of the message was, what the persuasive techniques used in it were, and all the possible interpretations of the message (Lee, 2018). Media and Information Literacy (MIL), in general, is the ability of an individual to find access and judge the media messages and information that he/she is exposed to in day-to-day life. Lack of media and information literacy has proven to be a major cause of the extensive spread of fake news and misinformation.

According to Lim & Tan (2020), governments around the globe have taken the first step towards media and information literacy as a tool to build a more effective society that would be able to fight the fake news crisis in the coming generations. Media evaluation studies had been made obligatory for school-going kids from 2017 in Brazil. A current initiative, EducaMidia, was released in June 2019 to teach instructors on digital literacy talents that may be later imparted to kids and teens and are anticipated to influence 2 million students further (Lim & Tan, 2020). The French authorities have extended their investments for publications in the hazards of the internet world, including approximately 30,000 instructors with virtual literacy schooling annually. In Italy, the authorities, in collaboration with social media site Facebook, has been educating a new generation of college students about the secure use of the internet and additionally, in figuring out fake information and conspiracy theories. In Ukraine too, since 2018, high school students

throughout the nation had been skilled to perceive fake information stories, hate speech, and propaganda. Even technology companies have also come forward to teach media literacy as part of their corporate social responsibility. In 2017, Google started one such programme called "Be Internet Awesome" (Lim & Tan, 2020).

Many nations all over the world have recognised the importance of media and information literacy in combating fake news (Shin et al., 2018). Even media literacy courses are incorporated into the curriculum of the school and college-going students to build a more aware and conscious society to help them distinguish between a news and a made-up story. More than rectifying an already spread false information, it will be better to teach the media consumers to be more alert and media literate (Lee, 2018). According to Şişman & Yurttaş (2015), media literacy education not only just curb fake news but also keep away people, especially children, from the hazardous effects of media and thus, it was added to the syllabus of school students in Europe in the academic year 2006-07. In an experimental study conducted by Tewell (2014), it was found out that popular cultures, for example, comedy shows, can effectively contribute to building the information literacy level. The UNESCO has launched two initiatives for improving media and information literacy (MIL) all over the world, namely the Global Alliance for Partnerships on Media and Information Literacy (GAPMIL), and MIL University Network. These two mainly conduct research and networking in order to build a media and information literate generation (Media and Information Literacy, 2021). Media literacy education by UNESCO also includes educating individuals about their rights online, the wise use of information to tackle social inequalities, and the ethics on the usage of information.

Finland is another country where critical thinking skills are included in the curriculum to counter fake news. About 82 per cent of the teachers in the country are trained in promoting critical thinking skills (Ramesha, 2008). Singapore is one of the top countries in the world with high internet and mobile phone usage where the media usage has also risen considerably in recent years (Lim &

Nekmat, 2009). The National Information Literacy Programme (NLIP) is Singapore's way to fight fake news and misinformation. NLIP has created a campaign called S.U.R.E. (stands for Source. Understand. Research. Evaluate.) which aims to raise the cognizance about media and information literacy, and also to make people adopt MIL practices. The National Library Board has also arranged free MIL workshops for teachers, students and professionals to encourage research in the field as well (SURE for School, 2019). Vietnam took the help of the Swedish embassy in the country to set up a toolkit for the secondary school students and their teachers to promote digital media literacy. This initiative was started in January 2019 in the name "Fake ≠ Fact". The toolkit enables students to critically analyse the information given online through a certain set of instructions and exercises (Lim & Tan, 2020). In India, Cybermohalla was established in 2001 to make youth more aware of the information used online. Sarai, a programme that works for media and information infrastructure development in the country (Cybermohalla, 2019), conducts the project Cybermohalla. Several e-governance projects have also been initiated in the country for the public to access government information (Deshpande & Dakhole, 2011). With the ever-growing problem of fake news and misinformation online, most of the studies remain hopeful to find effective methods to raise the news literacy level among the youth.

Theme 2: *Technological advancements help to reduce fake news*

Fact-checking websites are one of the most used technologies to debunk fake news in this digital era. Due to the hike in fake news and misinformation, there is a substantial increase in the number of fact-checking websites available online, both independent and professional. The main objective of a fact-checking website is to collect and analyse all the mis/ disinformation circulating on online platforms and to prove them wrong with a considerable number of facts (Humprecht, 2018). The digital world has also threats from social bots. Social bots can be defined as a social media user account that appears to be handled by a human but, in fact, equipped with automated software that runs the account. These types of accounts are extensively used in the diffusion of disinformation (Schmuck & Sikorski, 2020). To

counter this threat, technologies that can use artificial intelligence should be developed (Seo et al., 2020).

"Be Internet Awesome" is an MIL education initiative started by internet giant, Google in the year 2017 (Lim & Tan, 2020). Apart from this, Google has always been in the frontline supporting causes for stopping fake news spread. During the COVID-19 spread, a lot of misinformation was communicated through various social media platforms that created panic among the common people (Kanozia et al., 2021), thus, the Google News Initiative launched a COVID-19 Vaccine Counter-Misinformation Open Fund. They also collaborated with potential fact-checking websites, established media outlets, doctors, and journalists to jointly develop technologies to fight misinformation (Mantzaris, 2021). As per the reports of Majumder (2020), the increased spread of health misinformation during the pandemic has also led to free global encyclopedia, Wikipedia join hands with the World Health Organisation (WHO). Wikipedia was allowed free usage of information and other media messages published by the WHO about COVID-19.

In 2016, when the term 'fake news' and its presence in media rose to prominence in social media platforms, social media giant Facebook, partnered with IFCN-certified international fact-checkers for a third-party fact-checking program to review and give ratings to the content published across the platform on both, apps and websites. This is a part of the three-part approach taken by Facebook's Journalism Project to fight misinformation (Facebook - Meld je aan of registreer je, 2016). Facebook also launched a digital literacy library and youth portal in the year 2018 (Lim and Tan, 2020). Bakir and McStay (2017) pointed out that the 2017 version of the globally well-known annual technological conference South-by-South West (SXSW) event, after debate and discussion pledged to find methods to combat fake news through technology. They also concluded the immediate need for governments to collaborate with leading technological giants to find alternative methods to fight misinformation.

Even though fact-checking can't really stop the spread of hoax information once it is diffused, it can reduce the effect of its further spreading

by a media literate society. Hamleers (2020) has observed the negative effects of fact-checking websites when they get into the hands of people who purposefully disseminate fake information. Even though young people are easy-going with digital gadgets, it would be foolish to assume that they can assess the authenticity and credibility of all the information they come across online (Lim & Tan, 2020). Technological advancements in the form of fact-checkers and automated fake news detection and omission software have helped to curb the fake news crisis to an extent on social media platforms.

Many platforms use technology to enable users to make better judgements about the content which appears on them. For example, Facebook has delivered a context button to links, which indicates the Wikipedia data about the author, the region wherein the hyperlink has been shared in addition to the range of instances of sharing. YouTube has a gadget that automatically highlights news videos from authoritative sources whilst some important news activities occur (Saurwein & Smith (2020). According to Bakir and Mcstay (2017), experiments in computerized fact-checking also are being carried out which will increase the quantity and speed of the fact-checking process. Automated fact-checking lets Google comprehend and highlight fact-checked articles and additionally, prepare a database of fact checks that may be used for voice search engines including Amazon Echo.

One of the effective things about Wikipedia in fighting fake news is that, in contrast to Google, Facebook, or other net giants, it does not use our previous search histories and interests to predict things according to our taste or for advertising. In short, it does not alter the search results in any way according to the user's interests algorithmically. Wikipedia, in sticking with these pre-monitoring internet technologies, has successfully combatted fake news with the aid of discouraging how fake information has been inflamed in every other platform (McDowell and Vetter 2020). On the other hand, even though Wikipedia does not encourage click-bait advertising, the fact that it can be edited by anyone at any time gives it a huge blow in combating fake news.

To make the fake news stories appear lower in news feeds, Facebook has been experimenting with its algorithms (Hameleers, 2020). Google alternatively is making an attempt to sort no longer to rank fake information more highly than fact-checked proper stories. They succeeded to an extent in 2017 when Google over-indexes fact-checked portions to elevate them artificially within the news feed. Although fact-checkers may also assist to correct misinformation, humans regularly display a bent to keep away from fact-checkers that don't align with their perceptions (Hameleers, 2020). This is where the proposed solution of technology helping to combat fake news fails to an extent.

Theme 3. Government regulation

Apart from improving media and literacy education and technological advancements, many countries have also focussed on imposing governmental regulations and restriction to curb the flooding of fake news online. A number of studies have supported this particular solution of combating fake news through regulations by government or governmental agencies. According to McGeough & Rudick (2018), it is the government's duty to give accurate information to the public. The history itself says that the governments have been capable of using mass communication tools very efficaciously in some periods. For example, radio changed into a completely effective propaganda tool, mainly in World War II (Sterrett et al., 2019). Governments play a crucial function in preventing the dissemination of fake news as they have got the power vested upon them to do so (Hameleers, 2020).

The European media governance wing has co-regulatory methods to reduce fake news, hate speech. Co-regulation is a method by which the media houses will adopt a self-regulatory measure as well as the government will regulate from their part (Saurwein & Spencer-Smith, 2020). With fake news having started influencing the political and decision-making processes of the country, the United Kingdom's parliament culture started a fake news enquiry (Bakir and McStay, 2017). The Russian government passed laws to penalize the spreading of fully or partially fake information that may possess a threat to the well-being of its citizen in any manner. In

China, it is a crime to produce fabricated content, especially the ones which creates panic during the time of any national emergency. France has the Freedom of Press Law passed in 1881, which restricts the distribution of any false news that disturbs the common peace of the country (Congress, 2019b). France is the first country in the world to have one such law. In 2017, the German Government passed Network Enforcement Act to fine all the social media sites up to 50 million, if they deny removing fake and illegal content (Bakir and McStay, 2017).

Israel government passed a bill to combat the fake news on their platforms that influence their political contexts. This bill gave the head of the Central Election Commission, powers of a Supreme Court justice to pass a verdict on such propaganda. The Singapore government in 2017 were planning to pass laws on fake news spread (Tandoc et al., 2017). Bangladesh has also passed bills that resist propaganda and fake news in their social space in October 2018. Brazil, on the other hand, has over 20 bills drafted by the government to resist election misinformation, and if proven guilty, the citizens may get imprisonment up to 8 years and a fine of \$400. The government of Canada has established a government task force to fight the cause (The Poynter Institute, 2019). When it comes to the government of India, a strange type of initiative has been seen on their part for stopping the spread of fake news during a national crisis or upsurging in the country. The government of India imposes an internet shutdown in the problematic regions. Although it can be seen as an effective way to reduce panic among common people as the government claims it is seen as an extreme violation of human rights by many. The Government of India has also brought about changes in the IT Act of 2000, in order to find the origin of fake news spread (Congress, 2019a).

Although it hasn't been made official by the UK government, the 2019 Online Harms White Paper provides a clue to government's plans to set up a brand-new statutory duty of care and a new platform regulatory body. In particular, the paper proposes a "code of practice that addresses disinformation" that would "ensure the focus is on protecting users from harm, not judging what is true or not" (HM Government 2019, p.72). This regulation not necessarily focus on removing

disinformation from platforms but it encourages them to lessen the visibility of such content and enhance social media literacy and transparency, to make and impose regulations in opposition to horrific actors promoting diverse news material and high-satisfactory news media, and involving fact-checking organizations (Bakir & McStay 2017). In Singapore, the Minister of Law announced that the authorities will be severely probing into the problem of fake news (Tandoc et al., 2017). Germany has introduced Network Enforcement Act in 2017 mainly to fight against online hate speech. This act instructs social media networks to remove or block reported content within 24 hrs or within seven days in less clear-cut cases. The platforms should additionally preserve a powerful and obvious complaints procedure. Failure to conform to the act can bring about a fine of as much as 50 million Euros (Saurwein & Spencer-Smith, 2020). Additionally, stricter governmental regulations with respect to the use of social bots to spread fake news are conceivable (Schmuck & Sikorski, 2020).

One of the most evidenced effects of third-person effect is that human beings frequently aid the governmental law and restriction on media including censorship. This is frequently because of the truth that people overestimate the impact of media over others. Thus, to prevent unwanted outcomes, they aid stricter rules from the government (Cheng & Chen, 2020). Jang & Kim (2018) recommend that there may be a raising demand for the authorities or media corporations to take action in opposition to fake news.

4.0 Conclusion

This systematic literature review conducted a quantitative as well as a thematic analysis related to the debunking strategies of fake news using media and information literacy. In the thematic analysis, three themes were identified which proposed solutions for combating fake news. The first theme was that media and information literacy can bring about a change in the spread of fake news. Although most of the studies propose this solution, no study assures that being media and information literate can fully reduce the impact of fake news. Experimental analysis of the solution is missing from the selected studies which can be focused on in future studies. The second theme concluded that

technological advancements can reduce the fake news crisis. Technological advancements, in this sense, mean fact-checking websites and designing algorithms of a specific platform in a way that automatically detects and reduce the spread of fake news. The credibility of fact-checking websites is a debatable topic these days which itself points to the fact that technology needs to be more advanced to resist today's fake news crisis. The third and last theme was the effectiveness of government regulations on media and news sources to curb fake news spread. This seems to be quite a good solution if used properly like the UK and German government initiatives.

The quantitative analysis phase observed that the number of studies on fake news increased after the 2016 US presidential elections which highlight the increase in the interest among researchers in this area. The analysis showed a lack of research studies on fake news in almost all parts of the world except North America, specifically USA. There are a limited number of studies available from South Asia, Sub-Saharan Africa, Middle East and North Africa, and Latin America and the Caribbean, which shows that these areas need to focus more on the problem of fake news in terms of research. Future studies should focus more on these regions. Most of the studies used a qualitative approach in which content analysis was the most frequently used instrument. This leads to another academic gap that without any hands-on information and primary data collection methods, fake news analysis seems to be less reliable. Future studies should use more quantitative or mixed method approach. Finally, most of the studies concluded that media and information literacy is the best tool to combat fake news, but they failed to propose practical strategies for making society, media and information literate.

Media literacy targets to raise individuals, who think, study, examine and criticize media messages. In this context, a systematic training on media literacy needs to be structured to elevate essential awareness. The findings endorse that media literacy has been capable of adjusting wrong beliefs and incorrect information perceptions to some degree. The present study shows that an effective method to curb fake news would be the one which combines media and information literacy

education with technological advancements in the light of essential but limited governmental regulations. With the ever-present and ever-evolving hassle of incorrect information online, we remain hopeful that future studies will find innovative and powerful methods to boom information and media literacy as a part of a broader attempt to fight the spread of fake news and misinformation.

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