Policy responses to false and misleading digital content: A snapshot of children's media literacy

Jordan Hill

OECD

DIRECTORATE FOR EDUCATION AND SKILLS

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Policy responses to false and misleading digital content: A snapshot of Children's Media Literacy

OECD Education Working Paper No. 275

By Jordan Hill, OECD

This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

Jordan Hill, jordan.hill@oecd.org

JT03500902

OECD EDUCATION WORKING PAPERS SERIES

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Acknowledgements

Abstract

The digital environment offers opportunities that can enrich children's physical and mental well-being. Yet, false and misleading digital content, including disinformation and misinformation, is a risk. It can deepen political polarisation, erode public trust in democratic institutions and threaten public health. Media literacy is part of a suite of policies countries are using to maximise digital opportunities and minimise digital risks. This paper has four parts. First, it outlines current research and definitions relating to false and misleading digital content and looks at children's behaviour in the digital environment. Second, the concepts of media literacy, digital literacy and other relevant competencies are discussed. Third, research on children's experiences of false and misleading digital content and their perceived levels of digital media literacy is analysed. Finally, policies and practices which deliver media literacy are discussed. Research limitations and other barriers, such as teacher training, are described.

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1. Setting the scene

Online disinformation has emerged as a defining challenge of the Internet age. It is true that false rumours, misleading reporting, and conspiracy theories have existed for as long as there were people to create and spread them. However, digital tools have revolutionised the ways in which society consumes information, enabling easy creation and rapid dissemination of content. The challenge posed by misinformation, disinformation and other forms of false and misleading digital content is by now well-recognised in societal discourse, as illustrated by the selection of "post-truth"[1] and "infodemic"[2] as the Oxford English Dictionary's 2016 and 2020 words of the year respectively (Oxford Languages, 2016[1]; Oxford Languages, 2020[2]). These terms are in reference to the flood of online information and conspiracy theories, brought into focus by events such as the 2016 election in the United States and the COVID-19 pandemic.

Disinformation refers to false or misleading content that is spread with the intention to deceive and/or cause public harm (European Commission, 2020[3]). By comparison, misinformation refers to false or misleading information that is not intended to deliberately deceive, manipulate or inflict harm on a person, social group, organisation or country. Importantly, the spreader of misinformation does not create or fabricate the initial content (Lesher, Pawelec and Desai, 2022[4]). These two types of content form part of the wider OECD typology of *untruths online*, which includes a range of false and misleading digital content, such as propaganda (Lesher, Pawelec and Desai, 2022[4]).

Individuals, societies and governments must understand - and react to - this emerging information environment. This approach needs to effectively combine regulatory and policy measures with institutional and individual capacity-building. Stopping the creators and spreaders of false or misleading digital content is essential in order to reduce political polarisation, build public trust in democratic institutions, improve public health, and more generally improve the well-being of people and society (Lesher, Pawelec and Desai, 2022[4]). At the same time, policies that enhance the ability of the general population to recognise when digital content is authentic and fact-based - and when it is not – are crucial. Children in particular are often seen as ill-equipped to deal with the deluge of information, and discern the genuine and useful from the misleading and false (Huguet et al., 2019[5]; Edwards et al., 2021[6]; Howard et al., 2021[7]; OECD, 2021[8]).

The challenge of disinformation as a particular type of false and misleading digital content is high on the policy agenda in many countries. At the national level, a number of organisations have recently been established with the intention of countering the spread of disinformation. The United Kingdom Government announced the new Centre for Emerging Technology and Security (CETaS) in 2022, which aims to harness Artificial Intelligence (AI) to counter disinformation. In addition, the Swedish government created the Psychological Defence Agency, also in 2022. The agency is tasked with identifying, analysing and responding to disinformation directed at Sweden or Swedish interests. Yet, there remains disagreement among stakeholders about how to best deal with the distinct set of challenges posed by false or misleading digital content. The Royal Society in the United Kingdom, the world's oldest continuously operating scientific institution, advises against removing inaccurate or false claims regarding contemporary health issues, such as

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[1] *Post-truth* is an adjective defined as "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief."

[2] *Infodemic* is a noun defined as "a proliferation of diverse, often unsubstantiated information relating to a crisis, controversy, or event, which disseminates rapidly and uncontrollably through news, online, and social media, and is regarded as intensifying public speculation or anxiety."

vaccinations (The Royal Society, 2022[9]). Instead, this report argues that mitigating incentives in the spread of misinformation content requires further consideration on the economic and legal aspects of the digital information environment.

The challenge posed by both disinformation and misinformation is brought into focus in the context of the OECD Centre for Educational Research and Innovation's (CERI) 21st Century Children project by the increasing amount of time children spend in the digital environment. Even before the pandemic, the time 15-year-olds spent engaging with digital devices had grown in OECD countries by an average of around 60% between 2012 and 2018 (OECD, 2021[10]). More recent evidence suggests that the rate of increase accelerated in the period 2019-2021 (Rideout, et al., 2022[11]). However, emerging data from OECD countries indicates that the sharp increases seen over the course of the COVID-19 pandemic may be levelling off, as children return to a "new normal" (Ofcom, 2022[12]).

Work in the context of the 21st Century Children project has already looked at a number of digital risks, most recently cyberbullying (Gottschalk, 2022[13]). This working paper now turns to the emerging risk of false and misleading digital content and the role media literacy can play in empowering children.

1.1. What do we know about misinformation, disinformation and other false and misleading content?

As already mentioned, the key distinction made when defining both misinformation and disinformation is the intent behind how the false or misleading content is shared. Disinformation is intentional, misinformation is not. In this working paper the term *false or misleading content* will be primarily used. This term encompasses both disinformation and misinformation, along with a wide variety of other problematic digital content such as propaganda and misrepresentation of facts. A non-exhaustive list of various typologies for the challenge of false and misleading content can be found in Box 1.1.

A number of notable high-profile instances of disinformation highlight the varied contexts, incentives and aims of those creating and spreading false or misleading content. This also includes children in some instances. For example, the case of teenagers in North Macedonia who were creating and spreading disinformation in the 2016 United States presidential elections. The sole aim of the creators was to generate advertising revenue from website traffic and social media posts (Oxenham, 2019[14]). Other cases where children are also involved in creating and spreading false content have political motivations. This is illustrated by the election interference efforts of the United States -based youth group Turning Point Action, which led a co-ordinated effort to spread disinformation on topics such as mail-in ballots and the impact of COVID-19 (Howard et al., 2021[7]).

Box 1.1. What's in a name?

As the emerging challenge of disinformation has become more widely recognised in the policy discourse across OECD countries, a number of terms have come and gone. These terms try to capture the issue and situate it in the broader societal and political context.

Fake News: Perhaps the original nomenclature for the phenomenon, referring to false or misleading news stories. Scholars and policy makers have increasingly agreed that the term is fundamentally unhelpful, since it neglects the complexity of the different types of misinformation and disinformation. The challenge is not only about "news" but about information more generally and its place in societal discourse (Wardle, 2017[15]).

Information disorder: Taking into account the inadequacy of the term "fake news", information disorder has been proposed. It comprises three different types of information: misinformation, disinformation and mal-information. The term mal-information is distinct from misinformation and disinformation in that it refers to the sharing of genuine information to cause harm. This is often done by sharing private information publicly (Wardle and Derakhshan, 2017[16]).

Truth decay: A term coined for use in the United States which describes the blurring of lines between fact and fiction in public life. *Truth decay* refers to increased instability in political and civil discourse, related to a number of societal changes. These include: The increasing scepticism with which citizens view government, media and academia; the rise of 24-hour news coverage, social media and disinformation; changes in media content and media business models; and the increased volume and influence of opinion and personal experience across the media and communications landscape (Kavanagh and Rich, 2018[17]).

Untruths online: A term recently defined by the OECD when discussing false and misleading content in the digital environment. Comprising false, inaccurate, and/or misleading information which takes the form of misinformation, disinformation, contextual deception (refers to the use of true but not necessarily related information to frame an event, issue or individual), propaganda and satire. The definition notes that this content often assumes different forms based on the context, source, intent and purpose (Lesher, Pawelec and Desai, 2022[4]).

1.1.1. *Formats of false and misleading content*

The challenge of disinformation is highly complex, and different content presents different levels of harm for those exposed to it. It is also critical to distinguish between the various formats of false or misleading content to help policy makers design well-targeted policies and facilitate measurement efforts to improve the evidence base (Lesher, Pawelec and Desai, 2022[4]). In 2022 the OECD reviewed existing literature and proposed a typology of false and misleading content that can be found in Figure 1.1 below.

Figure 1.1. What counts as false or misleading digital content?
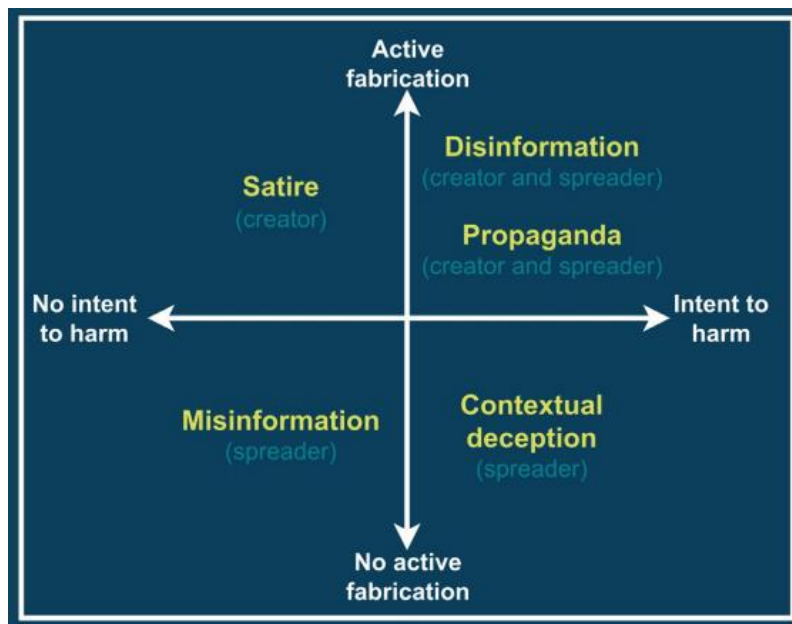
Source: Adapted from Lesher, M., H. Pawelec and A. Desai (2022[4]), "Disentangling untruths online: Creators, spreaders and how to stop them", *Going Digital Toolkit Note, No. 23,* https://goingdigital.oecd.org/data/notes/No23_ToolkitNote_UntruthsOnline.pdf accessed on 30 May 2022.

There has been a large amount of research conducted in recent years to identify where false and misleading information - in particular disinformation - is found. As a result of these efforts there is plenty of evidence suggesting social media platforms are one of the most common avenues. While dedicated disinformation websites do exist, evidence has shown that these websites actually received very little direct attention, and exposure to disinformation mainly comes via social media platforms (Fletcher et al., 2018[18]). In 2022 an open letter, signed by a number of different fact-checking organisations and addressed to Google, labelled YouTube as "one of the major conduits of online disinformation and misinformation worldwide" (Coleman, 2022[19]). This social media element brings into focus a key challenge of tackling false and misleading content. Since popular activities in the digital media landscape change rapidly, so do the digital spaces where false and misleading content is found. In December 2021 TikTok, primarily a mobile video-sharing application, surpassed Google and Facebook to become the most popular online domain (Moreno, 2021[20]). Video-sharing platforms have a specific set of challenges when it comes to false and misleading content (Box 1.2).

> ### Box 1.2. The challenge of video-sharing platforms
>
> Popular video-sharing sites such as YouTube are increasingly being shown to contribute to the spread of false and misleading content (Coleman, 2022[19]). They also present a distinct set of challenges for education systems. TikTok, another video-sharing platform popular with children (despite the minimum age restriction of 13) is characterised by short, ephemeral, highly stimulating, and visual communication. As with all social media, it is a vehicle which facilitates the spread of both misinformation and disinformation (Alonso-López, Sidorenko-Bautista and Giacomelli, 2021[21]). TikTok poses a particular challenge for false and misleading content due to the way in which information (i.e. the message) is tightly interwoven with visual creativity (Sidorenko Bautista, Alonso López and Giacomelli, 2021[22]).
>
> A 2021 study analysed TikTok videos referencing climate change and found that just eight percent of the videos in the sample included information from a reputable source (Basch, Yalamanchili and Fera, 2021[23]). One further example comes from fact-checking organisation NewsGuard, which tracked social media users' false claims that a wounded woman in Ukraine was a crisis actor and a photo circulating of her was actually taken in 2018, rather than 2022. The photo was genuine and the woman was not a crisis actor but a real victim of the war. A TikTok video spreading this false information was viewed more than 473 000 times and had received 22 000 likes as of 15 March 2022. It was also reposted to Facebook (Roache et al., 2022[24]).
>
> The nature of video content makes it difficult to detect disinformation. Although AI technology can help, fact-checking video content still relies heavily on human assessment (Jalli, 2021[25]).

Most disinformation that is spread digitally is multimodal. This means it is created by mixing different forms of media, for example an unrelated image with false or misleading text (in some cases video subtitles), to create a narrative. AI is increasingly playing a role in the creation of highly-convincing false content, since it allows for complete fabrication of images and videos rather than repurposing existing media content (Box 1.3).

> **Box 1.3. Deepfakes and Generative Adversarial Networks (GAN)**
>
> Deepfakes are hyper-realistic videos that apply AI to entirely falsify an event or situation. They use facial mapping and AI to modify or swap the face of a person in a video. Deepfakes target social media because of the enhanced reach and speed provided by the format (Westerlund, 2019[26]). Deepfakes are created using Generative Adversarial Networks (GAN), a type of machine learning able to create an image from scratch rather than simply manipulating an existing image. This makes it impossible to detect automatically without access to specific software and skillsets that are still experimental (Shu et al., 2020[27]). In contrast to their detection, the generation of deepfakes has now become relatively easy. Policy makers are increasingly placing an emphasis on the importance of transparency obligations for AI systems, for example through the proposed European Union (EU) Artificial Intelligence Act (European Commission, 2021[28]).
>
> While the technological and legislative means of combatting these are still in development, scholars also identify a number of additional ways that policy makers can respond to the challenge. These include the promotion of corporate policies and voluntary action (e.g. content flagging and removal) and education and training (e.g. by enhancing digital literacy, media literacy and critical thinking) (Westerlund, 2019[26]).

1.1.2. Actors creating false and misleading digital content

As outlined in the typology in Figure 1.1, disinformation and propaganda are distinct from other kinds of false or misleading content because they are actively created with the intention to cause harm. This section on actors therefore focuses on disinformation and propaganda.

Creators of content which intends to cause harm generally fall into two categories: official actors and non-official actors. Official actors are state-sponsored and often have more sophisticated methods of creating content (Wardle and Derakhshan, 2017[16]). They also have greater funding and a larger potential impact through systematic and co-ordinated media campaigns. Unofficial actors tend to be working alone, or with networks of other individuals, to create false content (Wardle and Derakhshan, 2017[16]). While these two categories are responsible for the creation of content, additional actors are needed to enhance its spread. These are usually defined as *trolls, troll factories* and *click farms*, which are all terms combining real humans, often financially motivated, and automated social media accounts (social bots) to enhance the visibility of disinformation on social media (Wardle and Derakhshan, 2017[16]). Social bots, found across social media platforms, mimic humans, post content, interact with each other and target specific people likely to accept disinformation or propaganda messaging. Research has shown that they do this in two ways. First, by increasing the number of interactions with content after its creation, generating momentum. Second, by targeting influential genuine users to encourage engagement from them, which serves to boost credibility (Shao et al., 2018[29]). This allows for the content's reach to be *amplified*[3] by algorithms, resulting in faster and wider spread

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[3] *Amplification* refers to the automated boosting of content visibility through engagement from social media users. This is manipulated in the case of disinformation by bots and click farms, which often engage with content in a coordinated way. This engagement enhances the chance that the algorithm, which promotes popular content, will serve disinformation to a user. While some legal frameworks

of both disinformation and misinformation. Reposts and shares of images, videos and articles on social media have been found to form the majority of disinformation engagement (Fletcher et al., 2018[18]).

1.1.3. Engagement with false and misleading digital content

The nature of the digital environment - and of false and misleading content as a form of digital content - are both relevant when understanding how and why people engage with it.

The rapid spread and wide reach of false and misleading content on social media has been documented by researchers using large datasets. One data set gathered from Twitter between 2006 and 2017 suggested that around 126 000 instances of false content were spread by approximately 3 million people (Vosoughi, Roy and Aral, 2018[30]). Furthermore, in this study, false content had a much further reach than genuine content, with the top 1% of false content diffused to between 1 000 and 100 000 people. By contrast genuine content rarely diffused to more than 1 000 people. Another study, conducted during the 2016 United States presidential election, identified that an average of 5.45 disinformation articles were consumed per United States citizen aged 18 or older between 7 October and 14 November 2016, and there was a strong association with Facebook usage (Guess, Nyhan and Reifler, 2018[31]). An additional study, also looking at the 2016 United States election, found that engagements with false or misleading content reached a peak of roughly 160 million per month at the end of 2016. By contrast, the top 38 major news sites, including the New York Times, Wall Street Journal, CNN, Fox News, average around 200–250 million Facebook engagements per month (Allcott, Gentzkow and Yu, 2019[32]).

It is important to recognise that false and misleading content as a feature of the digital landscape has many offline implications. Evidence from a cross-sectional sample of 125 countries between 2000 and 2019, showed that disinformation, often spread via social media, led directly to co-ordinated action, notably protests, based around the false information (Ruohonen, 2021[33]). This has wide ranging implications for the quality of democratic debate and societal discourse.

In terms of why individuals respond positively to false or misleading content in the digital environment, there are two interrelated elements to consider. Firstly, the commercial structure of the digital environment, in particular social media. This structure integrates a combination of data mining and adaptive media to personalise the experience, maximise the time users spend using digital tools and maximise revenue. This results in highly personalised content, including false content. Research shown that if users feel content is personalised to their tastes, they are less sceptical of its authenticity (Shin, Rasul and Fotiadis, 2021[34]). The commercial structure has also impacted the way mainstream media builds narratives and spreads genuine content. In order to stay popular, mainstream media increasingly mixes fact, fiction and opinion make users' experiences feel more personalised (Kavanagh and Rich, 2018[35]).

Secondly, evidence shows that false or misleading content tends to have a much higher level of novelty, provocation, emotion and shock than the truth. This gives it a cognitive advantage over genuine content and increases the likelihood of it being consumed and spread (Vosoughi, Roy and Aral, 2018[30]). Scholars argue that the cognitive desire for certain kinds of content is reinforced in the digital environment by algorithms. These algorithms can serve to generate new biases and reinforce existing beliefs (Kozyreva,

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have explicitly included amplification of disinformation into their definitions, such as France, there is perceived to be a lack of clear international definitions for the term (Ó Fathaigh, Helberger and Appelman, 2021[244]).

Lewandowsky and Hertwig, 2020[36]). Because of these commercial needs at the system level, machine learning algorithms often determine that provoking and polarising news items result in higher levels of engagement (Valtonen et al., 2019[37]). These cognitive vulnerabilities have been found to hinder an individual's ability to rationally evaluate information accessed in the digital environment (Kim et al., 2021[38]).

At the individual level, user engagement with digital content is often seen through the concept of both echo chambers and filter bubbles (Box 1.4), which are thought to reinforce pre-existing beliefs and, in some cases, have been found to make it difficult to access more diverse sources (Hussein, Juneja and Mitra, 2020[39]; Tomlein et al., 2021[40]). This is a particular challenge in the context of disinformation, since prior exposure to disinformation has also been shown to increase its perceived accuracy (Pennycook, Cannon and Rand, 2018[41]).

Box 1.4. Echo chambers and filter bubbles

A filter bubble is the idea that algorithmic curation of content, based on past behaviour and search history, reduces the breadth of digital content an individual is exposed to. This has the intention of maintaining engagement by serving content that an individual is more likely to want to consume (Fletcher, 2021[42]). There is the common perception that this leads to increased polarisation of ideas and reinforces confirmation bias, which also affects the extent to which an individual may believe or spread disinformation.

A recent literature review suggests that the picture is more nuanced, since older search engines and social media platforms may actually lead to slightly more diverse digital content (Arguedas et al., 2022[43]). However, this review crucially does not consider messaging applications, video-based platforms or new social media formats. Where research exists on these, for example on video-sharing platforms, empirical evidence reveals an enhanced influence of algorithms on content suggestions (Boeker and Urman, 2022[44]). Furthermore, personalised algorithms of video-sharing platforms were found to be serving false content (Tomlein et al., 2021[40]).

Echo chambers are defined as environments where an individual's opinion or belief about a topic is reinforced due to repeated interactions with peers or sources having similar tendencies and attitudes. Recent evidence shows these dynamics dominate the digital environment on social media platforms, with differences in severity depending on the platform (Cinelli et al., 2021[45]).

The extent to which these two factors result in audience polarisation is still debated (Garrett, 2017[46]; Kozyreva, Lewandowsky and Hertwig, 2020[36]) with some also arguing that the focus on filter bubbles may prevent discourse confronting the deeper causes of division in both politics and society (Bruns, 2019[47]). Yet, they still appear to be particularly relevant when discussing certain kinds of digital platforms, such as video-sharing sites.

Correction after exposure

Correcting someone who has been misinformed is an important practice which supports media literacy efforts. Corrections are reactive, and only useful if an individual has been exposed to false or misleading content. There are two main types of corrections that have been established for use against false or misleading content: narrative and factual.

A factual correction simply refutes the false or misleading content by showing the genuine content to the exposed individual. By contrast, a narrative correction intends to play to the cognitive desire for storytelling. It uses a narrative format to facilitate understanding and retention of complex information. These stories are defined by two elements: chronology and causality (Ecker, Butler and Hamby, 2020[48]). Numerous studies have outlined rules for narrative corrections, summarised by Ecker and colleagues (2022[49]) as the following:

- A correction must first provide a factual account that ideally includes an alternative explanation for why something happened.

- The correction should then repeat the false information to demonstrate how it is incorrect and to make the correction clear.

- Corrections must come from somewhere with perceived higher credibility and this may ideally be someone familiar to the individual who is receiving the correction.

- Corrections should be delivered with relevant social norms and expert consensus.

- Simple and empathetic language, use of pictures and other media can support the correction.

- Finally, delivering the correction with an identity affirmation, which could be a message or task, can help to highlight self-worth for the individual being corrected.

In terms of factual corrections, there are two main types: debunking and labelling. They are chiefly delivered by fact-checking organisations[4] via a browser or labels directly applied by social media platforms. Debunking is the provision of fact-checks after information has been presented to the user. Labelling is the provision of fact-checks while information is being presented (Brashier et al., 2021[50]).

The method through which the correction has been delivered to the user has been shown to impact whether factual or narrative corrections are more appropriate, although there is some evidence that narrative corrections are generally more effective than factual corrections (Sangalang, Ophir and Cappella, 2019[51]). A recent assessment of the research indicates that narrative corrections are more effective in changing attitudes and behavioural intentions if the correction is presented digitally via an algorithm (Edwards et al., 2021[6]). If corrections come from members of a social media network, then factual correction may be more effective.

The effectiveness of these correction models has several caveats. The speed at which the correction is delivered appears to be important. For example, there is evidence suggesting that debunking in real-time via social media platforms, immediately after exposure to disinformation, is more effective (Brashier et al., 2021[50]). A further caveat regarding corrections is the ongoing debate around the "backfire effect." This occurs when attempts to correct someone who has been misinformed lead to the incorrect beliefs being more widespread or held more strongly by the person who is being corrected. This has been shown to occur on a larger scale when professional news outlets engage with false or misleading content, most often with the explicit intention to correct the false information. Despite the intention being to refute false information, it can make the intended audience internalise disinformation, or become more suspicious of the facts (Tsfati et al., 2020[52]). Overall, the current body of research is still inconclusive as to the precise contexts and ways in which the backfire effect may occur (Edwards et al., 2021[6]).

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[4] For example NewsGuard's Google plugin is accessible via: NewsGuard - Chrome Web Store (google.com).

These caveats are compounded by gaps in the research base, where systematic reviews of the correction literature have shown that the current research lacks longitudinal measurements of effectiveness and a shortage of evidence from non-Western countries and children (Qinyu, Sakura and Li, 2021[53]). Unfortunately, a recent evidence assessment was not able to find a single high-quality academic study which assessed and analysed the impact of technical interventions on participants under the age of 18 (Edwards et al., 2021[6]).

Technical interventions, such as fact-checking and labelling, are largely delivered by specific organisations via browsers and platforms. Encouragement of their use and uptake does feature in media literacy education resources designed for both teachers and students (e.g. (MediaSmarts, 2019[54])). A key challenge therefore is the dissemination of the vast array of tools that are on offer to tackle false or misleading content in the digital environment (Hanot et al., 2019[55]).

Inoculation

In contrast to corrections and other technical interventions, inoculation theory (also known as pre-bunking), is the idea that false narratives can be combatted *before* exposure to false or misleading content. Research suggests that previous controlled exposure to the communication and cognitive techniques used by those creating false or misleading content can function in a similar way as vaccines (i.e. exposing an individual to information containing weakened or de-activated doses of a virus, triggering antibodies in the immune system) (Roozenbeek and van der Linden, 2019[56]). The approach is not new, and began to attract scholarly attention during the 1960s as a way of increasing resistance to persuasion in various settings (McGuire, 1964[57]). However, in response to the challenge of false and misleading digital content, there has been an increasing amount of attention investigating the usefulness of inoculation theory to support media literacy efforts.[5]

Evidence from Europe indicates that these inoculation programmes tend to consist of two main elements: An explicit warning of an impending threat and a refutation of an anticipated argument (McDougall et al., 2018[58]). Research on inoculation interventions has recently begun to focus on understanding how long the effects last (i.e. whether individuals need "booster shots") (Roozenbeek and van der Linden, 2019[56]).

Inoculation interventions, such as those outlined in Box 1.5, have shown to be effective in adults. However, as with the corrections, one of the challenges presented by current research on this topic is that there are a lack of studies specifically focused on children. As such, there remains a limited understanding of whether inoculation theory is effective against false and misleading digital content in childhood. Outside of the challenge of false and misleading digital content, there is some evidence which focuses specifically on the effectiveness of inoculation on adolescent substance-abuse prevention (Compton and Craig, 2019[59]). This research concludes that family communication patterns in inoculation-conferred resistance have interactions which affect the efficacy and duration of inoculation interventions. Furthermore, it finds that childhood has a specific set of socio-emotional conditions and pressures that affect efficacy. As such, scholars working in healthcare have encouraged more research to substantiate claims that inoculation theory initiatives have the same effect on children, in particular when it comes to media education (Compton, Jackson and Dimmock, 2016[60]).

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[5] This attention has recently been highlighted with the launch of initiatives such as the Cognitive Immunology Research Collaborative: https://cognitiveimmunology.net/.

> **Box 1.5. Example of an inoculation intervention**
>
> The Bad News Game was created in 2018 by the University of Cambridge Social Decision- Making Lab. The game was developed as a publicly accessible media literacy tool and its use is encouraged in educational settings. It generates text boxes, images and Twitter posts to simulate the spread of news and media in the digital environment. The game presents players with various options among which they can choose, that affect their pathway through the game.
>
> During approximately 15 minutes of playtime, players earn six badges by learning to apply six common misinformation techniques: impersonating people online; using emotional language; group polarisation; floating conspiracy theories and building echo chambers; discrediting opponents; trolling online and false amplification.
>
> Researchers found that playing the game once reduced the player's perception of the reliability of false or misleading content by an average of 21% (Roozenbeek and van der Linden, 2019[56]). The methodological shortcomings of this first study were addressed in a subsequent study and the significant impact of the game has since been confirmed and contrasted with a control group (Basol, Roozenbeek and Van der Linden, 2020[61]) The game has now been translated into 15 languages.
>
> A second iteration of the Bad News Game, called Go Viral, was launched in 2021. It specifically targets COVID-19 disinformation.

1.2. Children's behaviour in the digital environment

In order to understand how children may come into contact with false or misleading content, it is important to understand their behavioural patterns in the digital environment. It is also important to bear in mind that, although their behaviours may seem similar, children as individuals have unique and varying experiences of the digital environment. Scholars therefore urge caution when seeking to define a single model for children's attitudes towards digital media as an information source (Aillerie and McNicol, 2016[62]).

1.2.1. Access to the digital environment

Although their online experiences may be individual, almost all children increasingly use digital tools. The OECD Programme for International Student Assessment (PISA) 2018 revealed that approximately 90% of 15 year-old students from participating countries have access to the Internet at home (OECD, 2020[63]). There is some country variation in terms of access. In Austria, Denmark, Iceland, Lithuania, the Netherlands, Norway, Poland, Slovenia and Switzerland, over 95% of 15-year-old students report that they have access to a computer. However, in Indonesia only 34% reported having a computer at home (OECD, 2020[63]). Data from PISA further indicates that 15-year-olds' total time spent in the digital environment is now close to the number of hours in an average adult workweek in OECD countries (Suarez-Alvarez, 2021[64]). Among younger children, country data has shown that, in England (United Kingdom), Estonia and the United States, on average, 83% of five-year-olds use a digital device at least once a week and 42% use one every day (OECD, 2020[65]). In the United Kingdom, a survey by the media regulator Ofcom found that 99% of children aged 3-17 went online in 2021, with the majority using either a mobile phone or a tablet to access the digital environment (Ofcom, 2022[12]).

Ownership of digital devices is also increasing, especially among younger children. Rideout and colleagues (2022[11]) found that the number of eight-year-olds in the United States who own a smartphone has risen from 11% in 2015 to 31% in 2021. However, the averages hide socio-economic inequalities in many countries. Children from lower income backgrounds are less likely to have access to a digital device or an Internet connection at home (OECD, 2020[63]; Rideout, et al., 2022[11]).

1.2.2. Key behaviours and digital activities

In terms of what children are doing in the digital environment, evidence suggests there is variation between countries in the prevalence of different activities. One study of 19 EU countries noted that the percentage of children who use the Internet daily for watching videos ranges between 43% in the Slovak Republic to 82% in Lithuania (Smahel et al., 2020[66]). The percentage of children who report visiting social media sites daily varied between 38% in Spain to 73% in Serbia, with the average being 66% (Smahel et al., 2020[66]).

When it comes to social media, the platforms that are most popular among children are evolving constantly and vary for different age groups. For example, among 14-15 year-olds in Europe, YouTube, Snapchat and Facebook were previously found to be the most popular platforms (Smahel et al., 2020[66]). However, a more recent 2021 survey of almost 2 000 schoolchildren in Austria, Belgium, Germany and Luxembourg found that Tiktok and Twitch/Discord[6] have become most prevalent among schoolchildren, while Facebook's popularity has dwindled (Lie Detectors, 2021[67]). These results are also echoed in the United Kingdom, with the most popular platforms for children aged 3-17 being YouTube and TikTok (Ofcom, 2022[12]). The increasing appeal of TikTok over other forms of social media has been attributed to the "decision-free conveyor belt of short videos", requiring less decision making than other platforms, such as YouTube (Revealing Reality, 2022, p. 5[68]).

Despite the constant shifts in specific platforms' popularity, the preference for video content accessed through video-sharing platforms is a consistent trend. In the 1990s and 2000s, the number of television channels aimed at children grew rapidly. The growth of video content, which is specifically aimed at drawing and maintaining the attention of children, has now moved online (Madrigal, 2018[69]).

The popularity of YouTube is especially pronounced in younger children. A 2018 survey in the United States reported that 81% of children aged 11 watched YouTube, and 34% of parents said their child watched YouTube regularly (Pew Research Center, 2018[70]). In the United Kingdom, 95% of children aged 3-17 are reported to use video-sharing platforms (Ofcom, 2022[12]). Higher use of YouTube among children aged 0-7 has also been confirmed by research in Australia, the United Kingdom, across the EU and in Israel (Notley et al., 2020[71]; Smahel et al., 2020[66]; Marsh et al., 2019[72]; Elias and Sulkin, 2017[73]). Yet, it is not only younger children who prefer video-based content. In a recent survey of teenagers in the United States, when asked which was the site that they would not want to live without, YouTube was the most popular answer (32% of teens chose this response) (Rideout, et al., 2022[11]).

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[6] Twitch is a streaming service that enables people to live stream to others, especially broadcast video games where streamers are playing to an audience. Discord is an instant message app for gamers to communicate with each other. The two are often used in conjunction with one another during gameplay.

It is also important to note that a significant number of children access media platforms in breach of age restrictions. In the United Kingdom almost all participants who were using social media in an eight-year longitudinal study had begun to do so before the age of 13, despite the age limit (Revealing Reality, 2022[68]). Across Europe, the age limit for accessing digital platforms is 13 for some platforms (such as TikTok and YouTube) and 16 for others (such as WhatsApp). However, many children younger than this reported visiting a social networking sites every day (Smahel et al., 2020[66]). In the United States, Rideout and colleagues (2022[11]) report that use of social media by among 8-12 year-olds is growing.

1.2.3. Engagement with news

Children's general disinterest in news content has been recognised for some time (e.g. (Buckingham, 2002[74])). In recent years, scholarly attention has turned towards understanding these low levels of interest and children's relationship with the news media more generally. Where children do consume news, studies have concluded that this is often because of external pressure, either from parents or from school, rather than intrinsic motivation (Tamboer, Kleemans and Daalmans, 2020[75]). The prevalence of false and misleading digital content has further emphasised the need to better understand the nature of their engagement.

While there does seem to be some country variation, studies suggest that children get their news from the adults in their lives, with digital sources being the second most frequent source (Robb, 2017[76]). In the EU, the percentage of children using the Internet to read or watch the news ranges from 9% in Germany to 39% in Lithuania, averaging 19% (Smahel et al., 2020[66]). However, recent evidence from an Australian study suggests that, while the family is the preferred news source for younger children, social media is the preferred source for teens (Notley et al., 2022[77]).

Focusing specifically on digital sources of news, the majority of children have been found to receive some kind of news via social media in Australia, the United Kingdom and the United States (Notley et al., 2020[71]; Ofcom, 2022[12]; Robb, 2017[76]). In Australia, Instagram was the most popular site to access news for teenagers, followed by Facebook and YouTube (Notley et al., 2020[71]). In a more recent study, YouTube was the most popular source of news for children aged 8–12 years (Notley et al., 2022[77]). Evidence has shown that children's digital news engagement is often incidental or passive, for example briefly scanning a news article while watching viral social content on YouTube (Tamboer, Kleemans and Daalmans, 2020[75]; Revealing Reality, 2022[68]).

The difficulty in understanding how children access and consume news is also compounded by their broad definition of it. News content accessed through social media is increasingly relevant, yet evidence suggests that these digital news sources are mainly composed of "viral content."[7] For example, authors of a 2021 United Kingdom longitudinal study described the news being consumed by children as more like informal gossip from local sources than dedicated news stories (Ofcom, 2021[78]). A study of early adolescents (aged 12-16) in the Netherlands found that news was defined by what is "new", "extraordinary" or simply "different" and therefore a very broad range of information can be qualified as news (Tamboer, Kleemans and Daalmans, 2020[75]).

In addition to the content of the news, the way it is delivered matters. Notley and colleagues (2022[77]) propose the term "socially mediated news" as a conceptual framework for

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[7] Viral content is material, such as an article, an image or a video that spreads rapidly online through website links and social sharing.

children's news consumption. This is defined as news that is delivered in a personal, social and relational way. This definition is important because it recognises that children's information consumption is affected by what impacts them on an individual level to a large extent. This may be why traditional broadcasters and newspapers are struggling to reach or build relationships with younger people (e.g. (Flamingo, 2020[79])).

Personal connections to the source of news also appears to be a key factor determining whether children trust the information it contains. Research in different settings suggests that children are most trusting of the information they received offline. Robb (2017[76]) found that 66% of young people in the United States were very trusting of the information they receive from their families. A similar figure was found in Australia (Notley et al., 2020[71]). Outside of the family setting, 48% were very trusting of information from teachers and other adults (Robb, 2017[76]). This result was also echoed in the United Kingdom (Ofcom, 2021[78]). When it comes to mainstream news organisations, most children are in fact quite sceptical of the truthfulness of the content. In the United States, only 25% of children have high levels of trust in the information they receive from mainstream news organisations (Robb, 2017[76]). This figure was 19% in Australia (Notley et al., 2020[71]). The socially-mediated nature of information engagement, and trust in information, brings into focus the role adult media literacy as an important protective factor for children.

1.2.4. The role of parents and caregivers

Parents and caregivers are a crucial factor in shaping how their children see the world. However, evidence suggests that not all parents or caregivers have the necessary levels of digital and media skills required to guide their children.

Susceptibility to false and misleading content

Parents and caregivers are vulnerable to disinformation themselves, and often come into contact with information that seems false or untrue (Pew Research Center, 2018[70]). Even younger parents, despite being (mis)labelled as "digital natives", still struggle with the nature of the digital world (Box 1.6).

Box 1.6. The myth of the "digital native"

Early conceptions of the digital environment branded children as "digital natives." This frames them as having high-levels of digital skills, and being taught and guided by adults as "digital immigrants" with low levels of skills (Prensky, 2001[80]). However, concepts such as the "digital native" risk equating the familiarity children and younger adults have with technology with a deeper understanding of its implications.

At the same time, researchers have argued that acceptance of the myth of the digital native only serves to exacerbate digital inequalities within society. These inequalities are based on an uneven distribution of contextual factors, for example where someone lives, where they went to school or whether they have access to digital devices at home, that run the risk of alienating the disadvantaged (Burns and Gottschalk, 2020[81]). Researchers, policy makers and educators are therefore also required to actively reduce these inequalities, which impact both media literacy and digital skills at the individual level. This nuanced understanding can avoid feeding underlying socio-economic discord.

Evidence suggests that children with less digitally literate parents have fewer resources beyond school to support the development of their own digital literacy (Burns and Gottschalk, 2020[81]). In order for parents to be able to guide their children in the digital environment, they also need to have the necessary levels of digital skills. However, this brings with it a range of challenges including socio-economic inequalities, language and other participation barriers such as work schedules and childcare needs.

Research has suggested that parental socialisation and attitudes towards the digital environment are strictly connected to the socio-cultural context. Positive attitudes towards digital tools as information sources are more commonly associated with children from socio-economically advantaged backgrounds (Micheli, 2015[82]). Furthermore, evidence looking at news consumption and engagement with the digital environment found that adults from lower socio-economic backgrounds with lower educational levels tended to use social media more heavily as a news source (Ucar et al., 2021[83]). This increases the risk of exposure to false and misleading content.

Yet, the challenge of false and misleading digital content is about much more than socio-economic inequality. The picture in adult populations is more closely related to societal polarisation, which does have a socio-economic element, but is also part of broader challenges around the quality of political discourse, building public trust in democratic institutions, improving public health, and more generally improving the well-being of people and society (Box 1.7). Supporting media literacy efforts in children therefore requires a whole-of-society approach to be effective.

Box 1.7. Vulnerability to disinformation in adult populations

Vulnerability to disinformation in adults is not purely an issue of socio-economic inequality. The issue of disinformation belief is more closely related to societal polarisation which is connected to elements beyond socio-economic indicators.

Other individual and contextual factors, such as anxiety around different topics, pre-existing beliefs and previous exposure to disinformation, are also central parts of the challenge of media literacy education in children and adults alike (Edwards et al., 2021[6]).

Although there are studies suggesting that individuals with higher income and higher education status (e.g. a university degree) are less likely to accept and spread misinformation (Pan, Liu and Fang, 2021[84]; Khan and Idris, 2019[85]), the profile of a vulnerable individual is much more individualised. For example, political affiliation also plays a role. There is by now a large body of evidence showing that those who hold more conservative views are more likely to deem mainstream media as propaganda or disinformation (Michael and Breaux, 2021[86]). Furthermore, there is evidence suggesting that those adults who hold more conservative views have a greater tendency to accept and disseminate disinformation, regardless of the political orientation of the disinformation (Baptista et al., 2021[87]).

Parental mediation strategies and digital and media skills

Research considering the role of parental behaviours in the development of children's social media risks and opportunities is regarded as limited (Hayes et al., 2022[88]). Additionally, media literacy education, research and practice has primarily focused on

children and teenagers, and the role of adults has received less attention (Rasi, Vuojärvi and Ruokamo, 2019[89]).

Where parental strategies are assessed in relation to digital risks and opportunities, they most often do not include disinformation as an explicit risk. Instead, exposure to harmful content, children's data protection, radicalisation, disclosure of personal information and cyberbullying are far more commonly listed (e.g. (Ho et al., 2019[90]; Ofcom, 2021[91]; Hayes et al., 2022[88])). Following the updated OECD Typology of Risks, which now explicitly includes disinformation, the conceptual gap has been closed and empirical research gaps need to follow suit in coming years.

More generally, parental mediation strategies are widely recognised as playing a role in levels of children's digital skills. Livingstone and colleagues (2017[92]) have shown that parental mediation of children's Internet use revolves most commonly around two strategies:

- Enabling mediation: This strategy is associated with increased digital opportunities but also risks. It incorporates safety efforts, responds to child agency, and is generally employed when the parent or child is more digitally skilled. It is composed of two subtypes: active mediation and technical monitoring (such as parent control software) (Smahel et al., 2020[66]).

- Restrictive mediation: This strategy is associated with fewer digital risks and fewer opportunities. It frames media use as primarily problematic and was found to be favoured when the parent or child has lower levels of digital skills. This strategy may potentially keep vulnerable children safe but also exacerbate digital inequalities. It is associated with a number of selected restrictive strategies (Smahel et al., 2020[66]).

Active mediation involves a two-way channel of communication between children and parents, encouraging them to explore the digital environment and suggesting ways to use digital tools safely. Because of this, it is connected to higher levels of digital skills and enhanced understanding and interpretation of media content (Smahel et al., 2020[66]). Although it is also an enabling mediation practice, technical monitoring alone cannot be relied upon as it is not always effective (Ofcom, 2021[91]). Technical monitoring has also been found to be more common in parents of younger children (Ofcom, 2022[12]).

Recent evidence suggests that active mediation is increasingly popular in European countries (Kalmus, Sukk and Soo, 2022[93]). However, the prevalence and balance between parental mediation strategies varies between countries. For example, in 2017, parents in the Netherlands and Sweden were found to do the least parental mediation overall, whereas parents in Italy had higher levels of both active and restrictive strategies (Livingstone et al., 2017[92]). It is important to point out that very little parental mediation research has focused specifically on the modern disinformation context, including news and social media (Nathanson and Eveland, 2018[94]). Some studies do touch upon relevant elements.

One study involving the Flemish Knowledge Centre for Digital and Media Literacy, Mediawijs, found that restricting social media use is particularly prevalent for younger adolescents (between 12 and 14 years old) (Daneels and Vanwynsberghe, 2017[95]). Furthermore, parents showing stronger awareness and critical thinking towards the wider media ecosystem, including commercial goals of social media companies, generally chose more active social media mediation strategies (Daneels and Vanwynsberghe, 2017[95]). This study builds on a larger body of work, which found a similar relationship between parent's levels of critical thinking and their mediation of more traditional forms of media, such as television (Rasmussen et al., 2016[96]).

Active mediation is also associated with parents openly discussing the nature of digital risks with their children. Recent research in some countries has confirmed that many parents do speak to their children about digital risks (Ofcom, 2021[91]). Yet, evidence also suggests that both the overall context and nature of these conversations can be restrictive as well as enabling. For example, 80% of children in France report that their parents speak to them at least sometimes about what they do in the digital environment (Smahel et al., 2020[66]). Yet, France also has a high prevalence of restrictive mediation practices (Livingstone et al., 2017[92]). This sits within a broader context of restrictions on screen time for children, as advised by the French government. Parents of children aged 3 or below are advised not to expose them to any digital devices with screens. At age 6 they are advised to limit exposure. At age 9 the advice is to not allow screens or televisions in bedrooms (French Ministry of Health, 2018[97]).

Regarding the nature of parent-child conversations, Sciacca and colleagues (2022[98]) provide an example from Ireland. This study looked at over 500 parents and 500 children to examine the precise parent-child interactions associated with different mediation strategies. The results showed that restrictive mediation practices focused on setting rules, and the conversations often involved negotiation with the child. Whereas active mediation followed a more open discussion around online risks and appropriate behaviour. Furthermore, parents who applied more restrictive mediation strategies tended to have more negative attitudes towards digital technology as well as lower levels of digital skills, which shaped the conversations they had with their children (Sciacca et al., 2022[98]).

1.2.5. Balancing opportunities and risks in the digital environment

The increasing time children spend in the digital environment and the popularity of different forms of digital activity have, in turn, resulted in a growing body of research on children's exposure to digital opportunities and digital risks.

In terms of opportunities, the digital environment has been found to increase exposure of children to new ideas and more diverse sources of information, to help them become aware of different views. It can also be an important source of physical and mental health knowledge for children, as well as having a direct positive effect on mental health and well-being. Children who receive mental health support online, or who can talk about their problems with friends online, often have improved well-being, mental health and resilience outcomes (Stoilova, Livingstone and Khazbak, 2021[99]).

Children also use digital technologies for their education, to gain knowledge and information, and to develop their civic identity and engage in political issues (OECD, 2022[100]). A recent survey of United Kingdom children aged 12-17 revealed that, of the children who used social media or messaging app/sites, nearly a quarter said that they used these platforms to follow activists or campaigners who discuss causes that they care about. More than one in ten said that they use these app/sites to follow or interact with political parties or campaign groups (Ofcom, 2022[12]). Children are increasingly benefitting from the use of digital education platforms, deployed by schools to support the delivery of education in the classroom and to gain an enhanced understanding of students' learning needs (OECD, 2022[100]).

Many of these opportunities also bring with them risks including exposure to, and belief of, disinformation. These risks have been categorised in the revised OECD Typology of Risks (Table 1.1). While disinformation was not recognised in the original risk typology (OECD, 2011[101]), it has now been added in the revised typology under content risks, alongside hateful content, harmful content and illegal content (OECD, 2021[8]). This revised typology emphasises that children must be taught skills to successfully distinguish

between fact, opinion and fiction, as well as to critically analyse the content that they are consuming and detect disinformation.

It must be stated that current research on children's digital experiences disproportionately focuses on exposure to digital risks, rather than digital opportunities. There is a general need for more information about the positive effects of media engagement in order to strike the right balance in policy measures and teaching practices (Science Advice Initiative of Finland (ed.), 2021[102]).

Table 1.1. Revised typology of children's risks in the digital environment

Risk categories	Content risks	Conduct risks	Contact risks	Consumer risks
Cross-cutting risks	Privacy risks (interpersonal, institutional & commercial)			
	Advanced technology risks (e.g. AI, Internet of Things(IoT), predictive analytics, biometrics)			
	Risks on Health and Well-being			
Risk manifestations	Hateful content	Hateful behaviour	Hateful encounters	Marketing risks
	Harmful content	Harmful behaviour	Harmful encounters	Commercial profiling risks
	Illegal content	Illegal behaviour	Illegal encounters	Financial risks
	Disinformation	User-generation Problematic behaviour	Other problematic encounters	Security risks

Source: Adapted from OECD (2021), "Children in the digital environment: Revised typology of risks", https://doi.org/10.1787/9b8f222e-en.

1.3. Policy context of media literacy

The challenge posed by false and misleading digital content is high on the policy agenda in many OECD countries. Responding to this challenge, governments have a variety of complementary policy options. These policy options must take into account the geopolitical and social context of each country, including differing legal systems, precedents and approaches to the protection of freedom of speech (OECD, forthcoming[103]). At the most basic level, media literacy efforts must be couched within wider efforts to promote freedom of speech, reinforce the space for democratic debate and facilitate the independence of actors, such as civil society, the media and regulators (OECD, forthcoming[103]).

The OECD Recommendation on Children in the Digital Environment, adopted in May 2021, sets out principles for promoting a safe and beneficial digital environment for children. One of the key recommendations was promoting digital literacy to directly target misinformation and disinformation (OECD, 2021[104]). Similarly, the United Nations Committee on the Rights of the Child General Comment No. 25 (2021[105]) called for educational efforts to increase children's ability to find trusted sources of information, identify misinformation and other forms of biased or false content. The European Commission also held inaugural European Media Literacy Week in 2019 to promote best practices and discuss co-ordinated responses to a range of challenges, including disinformation.

This increased policy emphasis has contributed to an explosion of research literature. One systematic review, found that the number of publications related to media literacy and disinformation increased by 23% and 50% in 2019 and 2020 respectively, when compared

to the previous year (Farias-Gaytan, Aguaded and Ramirez-Montoya, 2021[106]). However, as already mentioned, this research landscape has a number of limitations that are further discussed in the course of this working paper.

It must be recognised that media literacy education is not a "silver bullet" to solve the disinformation challenge (Jang et al., 2018[107]). Media literacy is one part of a broader suite of policies that can help countries to respond. The OECD (forthcoming[103]) categorises this broader suite of policy responses along the following three pillars:

1. Governance policies and initiatives that help prepare for, and respond to, the publication and spread of false or misleading content. These include collaborating with media, civil society organisations, fact-checkers and social media platforms (ERGA, 2020[108]). They also involve building capacity for more responsive and effective public communication to counteract false or misleading digital content and improve media literacy through awareness campaigns and education.

2. Regulatory and policy measures to increase transparency and prevention. For example, data sharing requirements for online platforms; establishing an effective transparency framework around content moderation; increasing transparency and understanding of algorithms; and increasing authentic online activity (OECD, forthcoming[103]).

3. Policy and regulatory responses that reduce economic and structural drivers of false or misleading content. These include competition measures, as have been seen in Australia (Australian Competition and Consumer Commission, 2020[109]) and France (Autorité de la concurrence, 2020[110]); promoting quality and safety in platform design that, for example, promote the development of tests, standards and processes to support responsible business conduct and promote safety and quality of digital services (Forum on Information and Democracy, 2020[111]); and promoting and maintaining a diverse and independent media sector through anti-monopoly measures and fostering fair competition.

National context matters when responding to the challenge of disinformation because it emphasises where systems place accountability. De Blasio and Selva (2021[112]) theorised three main models of accountability for disinformation:

- Model 1: platform accountability set by law (as seen in France and Germany).

- Model 2: co-decision accountability, emphasising transparency and case-by-case response (as seen in Belgium, the Netherlands and the United Kingdom).

- Model 3: self-regulation by platforms. Within the self-regulation model two further sub-divisions are proposed - monitored self-regulation (as seen in Finland, Latvia, Lithuania and Sweden) and pure self-regulation (for example in the Czech Republic).

Despite variations in where systems place accountability, it was found that media literacy education and awareness campaigns are the most common instruments used in all of these models (De Blasio and Selva, 2021[112]). Part of the reason for this is because the opportunities it can bring cut across sectors. A recent study of Finnish media literacy policies outlined a number of policy approaches focused on these opportunities (Box 1.8).

> **Box 1.8. Eight media literacy opportunities**
>
> **Cultural participation** – media literacy can enhance an individual's ability to appreciate and choose diverse and responsibly produced content, which is increasingly transmitted through social media. This also means recognising the commercial pressures placed on professionally produced content (e.g. journalism).
>
> **Future working competencies** – Media literacy builds the requirements beyond technical skills, to create meaningful relationships with different forms of electronic media and the new contents, recognising the speed at which information spreads in the digital environment.
>
> **Inclusion** – By teaching specific population segments about the production and critique of media content their participation in society and the economy can be increased.
>
> **Broad media education** – Media literacy can teach competencies beyond information-seeking skills, which helps individuals to learn to exist - and live - with modern media.
>
> **Democracy** – Media literacy supports an informed citizenry, which is an indispensable precondition of an open, democratic society to enable broad societal public discussions.
>
> **National security** – The recognition that risks relating to national security can be minimised through media literacy that enhances national resilience to information warfare, disinformation, radicalisation, violence and extremism.
>
> **Cosmopolitanism** - The understanding that a media literate population is better able to consider different cultural perspectives.
>
> **Well-being** – The need to promote the physical and mental well-being of people in general, as well as certain groups, through informed engagement with a digital media environment and the information it contains.
>
> Source: Palsa and Salomaa (2020[113]) "Media literacy as a cross-sectoral phenomenon: Media education in Finnish Ministerial-Level Policies", http://dx.doi.org/10.19195/1899-5101.13.2(26).2.

2. Building an understanding of digital media literacy

Contemporary media literacy sits within the wider context of "competency-based education." A competency (sometimes spelled "competence[s]") is defined as an individual's ability to use knowledge, skills, attitudes and values to meet the complex demands of living and working (OECD, 2019[114]).

Because competencies are seen as a way to navigate contemporary demands on individuals, they are often grouped into different "literacies." They usually include competencies that are overlapping in terms of the attitudes, skills and knowledge they contain, yet distinct from each other in terms of the intended outcome of their use.

A recent systematic review sought to understand what the most common terms were when researching disinformation and education. Media literacy was the focus of almost 40% of studies, followed by information literacy and news literacy, while digital literacy had comparatively few studies (Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]).

It is important to recognise that detecting false and misleading content cannot be achieved through media literacy alone. Instead, the simultaneous combination of multiple "literacies", brought together under a clear framework, is required for the changing media environment (Jones-Jang, Mortensen and Liu, 2019[116]).

This section of the paper attempts to make clarifications regarding the most relevant "literacies" for false and misleading digital content, to prompt a discussion around the need to move away from the term "media literacy" and towards a more comprehensive form of "digital media literacy" when discussing issues such as disinformation.

2.1. Defining media literacy

The term "media literacy" has, at its core, the central concept that all media are constructed for a purpose, and this purpose acts as a filter which shapes the way information is transmitted (Huguet et al., 2019[5]). Media literacy is not a new term, and can be traced back to at least the early 20th century in a recognisable form (Leaning, 2019[117]). When mapping the state of media literacy as a scholarly field, Potter (2010[118]) found over 20 different definitions. Over the years, stakeholders have converged on a more comprehensive recognition of media literacy to include skills at multiple levels of media engagement but centred on accessing, analysing, evaluating and creating content in a variety of contexts (Livingstone, 2003[119]; Cortesi et al., 2020[120]). Each of these elements is explained as follows:

- Access: Rests on a dynamic and social process, not a one-off act of provision. Once initial access is established, developing media literacy leads users to significantly and continually alter the way they access media.

- Analyse: Shows an understanding of the agency, categories, technologies, languages, representations and audiences for media.

- Evaluate: The application of judgement gives meaning to the information, drawing in discussions on aesthetic, political, ideological and/or economic factors.

- Create: A deeper understanding of the conventions and merits of produced material can be obtained if the process of content production is included in media literacy skills.

Application of the above elements requires - and builds - critical thinking skills (Box 2.1). The majority of research on media literacy adopts a functional approach, focusing on the specific competencies needed (e.g. source evaluation, search capability, information evaluation and verification) (Edwards et al., 2021[6]). This was also the finding of a broader systematic review, which found that competency strategies represented the focus of almost 40% of all studies in a very large sample. This was followed by content-focused studies looking at topics such as media landscape and production (Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]). As a core component of many competencies, critical thinking is the most frequently mentioned specific skillset in reviews of literature (Potter, 2010[118]; European Audiovisual Observatory, 2016[121]).

> **Box 2.1. Defining critical thinking skills**
>
> Critical thinking is a core part of media literacy. A student's ability to think critically about the information they encounter in both the digital and non-digital environments influences their ability to determine the reliability and veracity of that information. By now, most curricula in OECD countries include critical thinking in various formats (Vincent-Lancrin et al., 2019[122]).
>
> Critical thinking involves carefully evaluating and judging statements, ideas and theories relative to alternative explanations or solutions, to reach a competent, independent position that may require action (Vincent-Lancrin et al., 2019[122]). An important element of developing critical thinking in the media literacy context is an ability to analyse the relationships and dynamics between institutions, including in the context of different forms of communication and new technologies (Vasquez, 2017[123]).
>
> One of the challenges with fostering critical thinking is that the classroom environment often poses standard problems that are best solved in a particular way, but many critical thinking situations in the real-world are unique (Willingham, 2019[124]). Critical thinking involves imagining alternative theories, counterfactuals and reasons that can lead to an action. It is a key ingredient of sound democracies in a digital era that allows for more ideas and successful discernment among facts, opinion and fiction (Vincent-Lancrin et al., 2019[122]).
>
> Researchers remain somewhat divided as to whether critical thinking is best characterised as a large number of specific skills or a smaller number of generic skills (Willingham, 2019[124]). Conceptual debates aside, evidence from cognitive science indicates that, in order to teach critical thinking skills more effectively, a key task is for curricula to identify the content knowledge that students must possess to think critically about a topic. This is because content knowledge has been found to be a crucial driver of critical thinking skills (Willingham, 2019[124]; Nygren et al., 2019[125]).

2.2. Intersections with the digital environment

The media landscape is now largely a digital one, with an almost infinite number of content creators and rapidly shifting popularity of different digital media platforms. In terms of education policy, an emphasis on both media literacy and digital skills began in the 1980s and 1990s, however the two areas did not overlap (Leaning, 2019[117]). As the digital environment evolved to include the different modalities of contemporary media, these parallel policy areas became fused in the 2000s with scholarly discussions around "multi-literacies" (Moore, 2005[126]).

Around the same time, the term "digital literacy" also emerged under the multi-literacy umbrella (Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]). A review of over 1 000 research articles from 2000-2020, notes that the number of digital literacy publications was over 100 in 2015, almost double than the previous year (Audrin and Audrin, 2022[127]). Digital literacy is a much younger field compared to media literacy, with much work still to be done on defining its boundaries (Audrin and Audrin, 2022[127]). Digital literacy explicitly considers the competencies needed to live and work in a society where communication and access to information increasingly takes place through digital technologies (OECD, 2022[128]). A recent systematic review used statistical analysis to map the key themes common in the digital literacy research literature (Audrin and Audrin, 2022[127]):

1. Information and communication skills. Outlined as the most important factor and confirms the importance of information and communication as the two major pillars of digital literacy.

2. Developing digital literacy, focused on the classroom and pedagogy.

3. Digital learning, which focused on the use of tools in schools and universities, especially in the context of language learning, reading and mathematics.

4. Information and communication technologies. This refers to learning tools that enable the development of information and communication skills.

5. Social media, seen as part of the "technological base" of digital literacy. This includes interacting on social networks, gathering information and communicating messages.

6. 21st century digital skills, which includes technology in education, training, knowledge and society.

As can be seen from the above list, the most prevalent theme of digital literacy is information and communication skills. These map heavily onto modern conceptions of media literacy. In actual fact, the two fields are becoming conceptually fused in the research literature by the nature of modern information and communication media. This impacts the nature of media literacy initiatives. For example, Canadian not-for-profit organisation MediaSmarts developed five "media literacy fundamentals" in the 1980s, which are still highly relevant today (Table 2.1). However, these were subsequently supplemented with additional "digital literacy fundamentals" to match the changing nature of modern society.

Table 2.1. Evolution of MediaSmarts fundamentals

Media Literacy fundamentals	Digital Literacy fundamentals
• Media are constructions	• Digital media are networked
• Audiences negotiate meaning	• Digital media are persistent, searchable and shareable
• Media have commercial implications	• Digital media have unknown and unexpected audiences
• Media have social and political implications	• Digital media experiences are real, but don't always feel real
• Each medium has a unique aesthetic form	• How we respond and behave when using digital media is influenced by the architecture of the platforms, which reflects the biases and assumptions of their creators

Source: Adapted from MediaSmarts, "Digital and Media Literacy Fundamentals", https://mediasmarts.ca/digital-media-literacy/general-information/digital-media-literacy-fundamentals.

Digital literacy is also much broader than media literacy, encompassing technological skills beyond just those required to access, analyse and communicate digital information. For example, the theme of 21st century skills, is connected to digital literacy in much of the research literature, often includes concepts such as positive and productive approaches to lifelong learning, entrepreneurship, leadership and science, technology, engineering and mathematics (STEM) skills (Kotsiou et al., 2022[129]).

Like media literacy, digital literacy is also changing rapidly with the rise of new technologies and innovations, which change the way people utilise digital technologies and perform tasks (Reddy, Sharma and Chaudhary, 2020[130]). Many researchers now emphasise the need to understand the large role that AI plays in facilitating and automating navigation through the digital environment. As such, there has been the recent emergence of "algorithm literacy" as an area of significant interest for scholars, not-fo- profits, international organisations and policy makers. As argued by Valtonen et al (2019[37]), in

order to gain the abilities for critical thinking and media literacy, algorithmic awareness should be tightly intertwined with computational thinking (Box 2.2)

Box 2.2. Digital media literacy, computational thinking and algorithms

Computational thinking involves solving problems, designing systems, and understanding human behaviour by drawing on the concepts fundamental to computer science. These concepts include problem decomposition (breaking down complex problems to simpler ones), developing step-by-step solutions and abstract thinking (Angeli and Giannakos, 2020[131]).

By developing these skills, students will be in a position to develop algorithm literacy as a part of overall digital media literacy. Algorithm literacy can be seen as a kind of "data literacy" or "data citizenship." These two concepts are defined as a cluster of skills required to take ownership over, and control, an individual's personal data (Pangrazio and Selwyn, 2018[132]; Carmi et al., 2020[133]). The field of algorithm literacy is emerging, however Shin, Rasul and Fotiadis (2021, p. 4[34]) offer a definition as:

> *"A set of capabilities used to organize and apply algorithmic curation, control and active practices relevant when managing one's AI environment."*

In order for media literacy to be able to counter false and misleading digital content, algorithm literacy is important for a number of reasons.

Firstly, at the most basic level, algorithms have a role in curating content that has been found to include disinformation and other forms of false or misleading content (Giansiracusa, 2021[134]). Secondly, algorithms enable the amplification of false and misleading content through user engagement, for example commenting or sharing. Any engagement in turn contributes to the likelihood of that content being shown to others (Ofcom, 2022[12]). Thirdly algorithms enhance the numerous cognitive biases that make both adults and children more susceptible to being convinced by false or misleading content (for more see sections 1.1.3 and 3.2). Evidence also shows that when users believe that news items are personalised, they evaluate the system as useful and respond positively (Shin, Rasul and Fotiadis, 2021[34]).

Although reference to "the algorithm" has become a cultural trend on various social media platforms among children and young people, this cultural awareness does not sufficiently translate to knowledge or skills. On the contrary, understanding of algorithms and their consequences appears to be uneven in children (Swart, 2021[135]). This further emphasises why it should be included in digital media literacy.

2.3. Intersections with other literacies

Media literacy shares a number of competencies with other literacies referred to by scholars to tackle false and misleading content. Most commonly, these are information literacy, news literacy, health literacy, digital literacy and coding literacy (Rasi, Vuojärvi and Ruokamo, 2019[89]). Scholars recognise that such a wide array of literacy concepts, developed from different scholarly traditions, pose significant challenges for policy makers trying to develop educational tools and processes to combat disinformation (Jones-Jang, Mortensen and Liu, 2019[116]). This section therefore attempts to clarify the overlaps and simplify the terminology.

Information literacy emerged as a term in the mid-1970s and overlaps with media literacy in that is stresses the skills needed to identify, locate, evaluate and use information. However, media literacy is focused on using those critical skills to become competent in understanding media messages, as opposed to using the skills to become competent in finding, validating and deploying information (Leaning, 2019[117]). Because of the perceived complimentary nature and degree of overlap with media literacy, many scholars have advocated for the holistic approach of Media and Information Literacy (MIL) proposed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2011 (Grizzle and Wilson, 2011[136]). Information literacy is a reaction to the digital environment, and in that sense it also overlaps with elements of digital literacy. Unlike digital literacy, it focuses specifically on the availability and accessibility of information provided through digital sources, rather than the building skills to use the digital tools themselves (Jones-Jang, Mortensen and Liu, 2019[116]).

News literacy is a specific configuration of both media and information literacy. News literacy targets the skills required to become a more mindful and sceptical consumer of the news ecosystem, now heavily composed of social media (Tully et al., 2021[137]). This means possessing knowledge on relationships between different actors and understanding the incentives and context behind news production and consumption (Vraga and Tully, 2019[138]). As illustrated by the evolution of terms from "fake news" to "information disorder" and "untruths online" (section 1.1), news media are found within the larger digital information landscape. Furthermore, as outlined in section 1.2, "news" is becoming increasingly difficult to discern from other kinds of media consumption in children. It may therefore be more appropriate to keep the broader scope of digital media literacy to fully cover false and misleading digital content.

Conceptually speaking, since the media landscape looks at the whole gamut of societal, economic and political topics, science literacy is an important part of media literacy. This is reflected in the 2018 PISA Assessment and Analytical Framework, where media literacy can be found in both reading literacy and science literacy competencies (OECD, 2019[139]). Developing science literacy allows individuals to analyse and interpret scientific findings. It is linked to health literacy and a child's ability to be discerning consumers of information and to make positive health and well-being choices (Burns and Gottschalk, 2019[140]).

Finally, citizenship education has historically been promoted by national education systems to encourage active and informed political engagement (Donbavand and Hoskins, 2021[141]). Because of the connection between information, society and culture, and the need to ensure children become responsible participants in the digital environment (OECD, 2021[104]), "digital citizenship" has emerged in research focused specifically on misinformation and disinformation. This term places a greater emphasis on childhood development, grouping media literacy as a cluster of skillsets for children alongside other clusters, including: Respectful and responsible behaviour in the digital environment; offline implications of digital activity; and digital safety (Burns and Gottschalk, 2019[140]). Recent scholarly work has added to this definition of digital citizenship to include wider interpretations comprised of computational thinking, digital literacy, AI, identity exploration and formation, and legal structures (Cortesi et al., 2020[120]). Digital citizenship is therefore often conceptualised as an umbrella term which, itself, is frequently seen as a component of 21st Century skills (Kotsiou et al., 2022[129]).

3. Children's experiences of false and misleading digital content

While children remain particularly vulnerable to false and misleading digital content for a variety of reasons, research into cognition and educational practice over the last 30 years

has led to an important conclusion: Children are more capable of thinking critically than adults have previously given them credit for (Willingham, 2019[124]). Yet, this statement comes with a number of caveats and preconditions, which are discussed in this section in order to understand the specific nature of the challenge.

3.1. Levels of exposure and engagement

There remains a lack of reliable and large-scale quantitative data showing the extent to which children encounter false and misleading content in the digital environment. However, the data that does exist suggests that it is a significant challenge for children of all ages. Survey data from the EU revealed that 77% of respondents between the ages of 15-24 reported seeing disinformation at least once a week (Eurobarometer, 2018[142]). More recent survey data gathered in the United Kingdom suggests that almost half of young people are exposed to misleading content every day, and 10% see it more than six times per day (Cawthorne, 2021[143]). While it is not clear whether children's exposure to false and misleading content is increasing or staying the same, surveys reveal it is already a substantial part of children's digital lives.

Looking specifically at video-sharing platforms, recent attention has been drawn to the low quality of much child-focused content. YouTube videos specifically targeting young children have been found to contain disturbing videos often in the form of parody or satire (Bridle, 2017[144]). In recognition of the challenge, YouTube recently announced plans to demonetise low-quality children's content (Provenzano, 2021[145]). In the context of the COVID-19 pandemic, recent evidence serves to further highlight the issue. An investigation focused on TikTok by fact-checking organisation NewsGuard found that almost 90% of the children aged 9-17 who took part were shown COVID-19 vaccine misinformation within the first 35 minutes of signing up to the platform (Goldin, 2021[146]). Regarding YouTube, a recent study looked at videos explaining COVID-19 to children. These videos were found to have high viewing rates but low information reliability (Azak et al., 2022[147]). Beyond health, the accuracy of child-focused content in terms of societal depictions is also a challenge. A study in the United States analysed the YouTube videos watched by children aged 0-18. It found low or no representation of different ethnicities in 75% of videos (Rollins et al., 2022[148]). Racial biases, negative portrayals of ethnic minorities, racist slurs and damaging stereotypes, such as inappropriate accents, featured in roughly 1 in 10 videos. By contrast, videos teaching about race and ethnicity were found in just 0.002% of the sample (Rollins et al., 2022[148]). While this content is not disinformation, it sits on the spectrum of false or misleading content since it does not depict a reliable or representative image of society to children. Furthermore, it exposes children at an early age to damaging stereotypes and unrealistic depictions of individuals or groups, on which disinformation can be based.

In addition to *exposure*, children also report *engagement* with false content, primarily through sharing. Sharing content (Box 3.1) is increasingly the most frequent form of digital information engagement by children, with the majority engaging in this activity (Robb, 2017[76]; Revealing Reality, 2022[68]). It most commonly involves liking, tweeting or reposting content created or posted by others. If the information that is shared contains false or misleading content, sharing it can amplify the reach of this content to an unprecedented extent (Marin, 2021[149]). Across different contexts, between one quarter and one third of children report that they have shared false or misleading content. Over 40% of United Kingdom children aged 8 – 17 reported to have seen misleading content shared by friends and peers, and 25% reported sharing it themselves (Cawthorne, 2021[143]). In Australia, 21% of children aged 8-16 shared false or misleading content, a significant increase from 7% in 2017 (Notley et al., 2020[71]).

> **Box 3.1. Sharing is caring?**
>
> Sharing content created by others is an increasingly popular type of content engagement by children. It takes different forms across different social media platforms but mainly occurs through "liking" or "reposting" content that was created by another person or an organisation.
>
> Sharing content can be associated with positive mental health benefits for children, for example by providing new opportunities for sociability and self-expression (Cipolletta et al., 2020[150]) However, individual factors, such as personality, also influence the extent to which a young person benefits from these potentially positive effects (Jackson and Luchner, 2018[151]).
>
> Sharing is an important part of the social media experience. It allows a straightforward measure of peer endorsement and the possibility of becoming a potential source of peer influence (Cipolletta et al., 2020[150]).
>
> However, studies have shown that this incentive system can increase vulnerability of children to disinformation. This is particularly the case as children tend to trust content on the basis of who is sharing it (for example their peers), rather than on the merits of the information itself (Herrero-Diz, Conde-Jiménez and Reyes de Cózar, 2020[152]).

3.2. Cognitive risk factors

Understanding the cognitive processes inherent in children's engagement with information is crucial for understanding the role of media literacy in teaching children how to react when they come into contact with false or misleading digital content. Teaching children about their own cognitive biases is a necessary precondition for teaching effective analytical skills, such as critical and computational thinking (Willingham, 2007[153]). These biases affect adults as well, yet children are regarded as more vulnerable than adults in the digital environment because their still-maturing executive functions mean that interactivity and built-in variable rewards systems are more difficult for them to regulate (Burns and Gottschalk, 2020[81]).

It is important to bear in mind that the same activity can have positive or negative consequences for a child, depending on the individual (Smahel et al., 2020[66]). Although children are spending an increasing amount of time in the digital environment, the type of activities, individual personality factors, motivations and preferences are all relevant in determining the associated outcomes of this digital engagement (Burns and Gottschalk, 2020[81]).

As already argued, human cognitive biases are served well in the digital environment, where echo chambers, obscure referencing and the presence of infographics, images and search prioritisation algorithms, can provide the appearance of legitimacy to sources regardless of their veracity.

Individuals all possess cognitive biases to different extents. The strength of these in an individual are seen as a predictor of disinformation internalisation (Tandoc, 2019[154]). In their review of effective teaching practices for media literacy, McDougall and colleagues (2018[58]) outlined the most relevant biases to address when countering disinformation:

- Confirmation bias – human beings generally seek information that confirms their existing beliefs.

- Disconfirmation bias – the tendency to ignore or reject information that challenges existing beliefs, even in the face of rational evidence.

- False consensus effect – the overestimation of how many people share the same opinion within a group.

3.2.1. Cognitive processes among different groups

Evidence has shown certain children have stronger biases, which in turn affect the extent to which they are likely to internalise disinformation. For example, Corbu and colleagues (2021[155]) sampled 1 221 secondary school students in Romania and concluded that confirmation bias was stronger in males who were less open to multiculturalism and lifelong learning. In addition to gender and attitudes, age may also be a factor and cognitive biases have different implications for digital media literacy education for younger children compared to older children. Research conducted before the widespread prevalence of digital content revealed that false consensus effect is stronger in younger children and decreases with age (Wetzel and Walton, 1985[156]). In more recent studies, it was found that young children (aged 5-6) prefer biased information over balanced information if it favours their perceived social group (Over et al., 2017[157]). Furthermore, they actively select biased information to share with others.

By contrast, Papapicco and colleagues (2022[158]) found that the cognitive processes behind teenagers' belief and dissemination of disinformation is more related to individual identity-building than perceptions of in-group belonging or group consensus. In their study, sharing of information was more connected to strengthening reputation, showing a wide sphere of influence and exhibiting the image that they are "informed" about new and relevant information. This feature of sharing disinformation more closely resembles patterns reported among adults (e.g. (Vosoughi, Roy and Aral, 2018[30])). Research suggests that sharing exaggerated or false information may still be perceived to be more useful for building social status among teenagers, even if it is known to be false and shared with the intention of revealing its deception (Herrero-Diz, Conde-Jiménez and Reyes de Cózar, 2020[152]; Papapicco, Lamanna and D'Errico, 2022[158]). However, as has already been noted, the activity of sharing false content with the intention of revealing its deception can be counterproductive.

3.2.2. Relationship between self-reported and actual abilities

Overestimation of one's own abilities is also an important cognitive bias in relation to digital media literacy. More generally, scholars assert that individuals often hold overly favourable opinions of their own (limited) abilities (Kruger and Dunning, 1999[159]). Overconfidence in one's ability to assess the truthfulness of information has been associated with higher susceptibility to false content (Lyons et al., 2021[160]). Overestimation biases exist in children to varying degrees, with age seen to play a role.

Overestimation of ability can be related to overestimation of levels of prior knowledge on a topic. Literature suggests that younger children tend to rely more on their prior knowledge when assessing the veracity of information (Kerslake and Hannam, 2022[161]). However, younger children may also overestimate their levels of prior knowledge. In one example from Switzerland, 9-11 year-olds overestimated their knowledge of school subjects (van Loon and Roebers, 2017[162]). This over reliance on pre-existing knowledge is one reason why specific digital media literacy skills, such as source analysis and lateral reading, are crucial complimentary abilities to critical thinking. As has already been

outlined in section 2, the evidence suggests that domain knowledge is a crucial driver of critical thinking skills. Children therefore need to be aware that they may overestimate their content knowledge, which in turn impacts their ability to think critically.

Similar to overestimation of content-specific knowledge, overestimation of digital media literacy skills is also a challenge when it comes to thinking critically. Nygren and Guath (2019[163]) studied teenagers' ability to determine digital news credibility and found that participants generally assessed themselves very favourably for their information sourcing and evaluating abilities. However, this was negatively correlated with their actual performance in detecting false news in climate change articles, and bias in digital news sources. In other studies, teenagers have reported that they see themselves as "immune" to believing disinformation simply because they are aware that it exists (Papapicco, Lamanna and D'Errico, 2022[158]). Evidence therefore suggests that teenagers who are more confident in their own abilities to detect false or misleading content actually exhibit an enhanced confirmation bias, which makes them less capable of recognising it.

3.3. Levels of digital media literacy in children

A significant percentage of children are consistently found to lack confidence in their own ability to detect disinformation. One 2017 survey in the United States revealed that less than half of children surveyed felt they were able to tell false news stories from real ones (Robb, 2017[76]). One quarter of children in Australia were unable to answer when asked whether they had shared false or genuine content in the past six months (Notley et al., 2020[71]). Results from PISA 2018 showed that, on average, that less than half of 15 year-old students in OECD countries were successful in distinguishing fact and opinion (OECD, 2021[10]). These averages also mask significant variations between countries. Ranging from around 60% in Australia, Canada, the Netherlands, New Zealand, the Republic of Türkiye, the United Kingdom and the United States to less than 20% in Georgia, Indonesia, Kosovo, Morocco, Panama and the Philippines (OECD, 2021[10]). Even in countries where children perform better, the averages mask an uneven distribution of the ability to distinguish fact and opinion, leaving much work to be done. Looking at younger children, further data shows that they have even lower levels of digital media literacy competency in this area. For example, the United Kingdom Government estimates that only 2% of United Kingdom children under the age of 15 have the appropriate digital media literacy levels to determine whether a news article is false (Department for Culture, Media and Sport, 2021[164]).

Media literate children understand the agency, categories, technologies, languages, representations and audiences for media. This requires them to apply judgement and evaluate information, drawing in discussions on aesthetic, political, ideological and/or economic factors (Livingstone, 2003[119]). Despite low levels of trust in digital sources compared to offline sources, too few children systematically seek to verify digital news stories. In Australia, approximately half of children and teens surveyed in 2020 pay "very little" or "no attention" to the source of the news stories they find in the digital environment (most commonly on social media but also including dedicated websites and mobile applications) (Notley et al., 2020[71]). Similar findings have been reported in the Netherlands (Tamboer, Kleemans and Daalmans, 2020[75]). In United States, the figure was reported to be lower, with 31% of children aged 10-18 saying they paid little or no attention to the information source (Robb, 2017[76]). Encouragingly, this figure was reported to be much higher for news found on social media, where 68% of children reported they pay at least some attention to the source of the information (Robb, 2017[76]). However, "attention" does not necessarily mean they employ the skills needed to recognise untrustworthy information. A longitudinal study in the United Kingdom found that most children's methods for assessing accuracy often did not go beyond asking a parent, or searching for

corroborating sources outside of social media (Ofcom, 2021[78]). Evidence from children aged 12-16 in the Netherlands supports this, concluding that parents are often trusted by children to know what is genuine and what is false (Tamboer, Kleemans and Daalmans, 2020[75]). Yet, as outlined in section 1.2.4, parents and caregivers' levels of media literacy, and their vulnerability to false and misleading digital content, are affected by a wide range of factors.

These varying levels of digital media literacy in adult populations is a further reason why asking a parent or caregiver it is not a proxy for the critical engagement with information required for digital media literacy. A longitudinal survey from the United Kingdom found that, when asked how they verify whether a social media post was truthful or not, almost 90% of children aged 12-17 choose unreliable identifiers (most often these were aesthetic indicators such as the overall look of a website) (Ofcom, 2022[12]). This is despite finding that the participants were overall very sceptical of information they see on social media.

At an OECD level, data from PISA 2018 shows that, in every participating country and economy, 15-year-olds from advantaged socio-economic backgrounds are more likely to have knowledge of reading strategies that help them judge the credibility of sources (Suarez-Alvarez, 2021[64]). This suggests that the digital media literacy levels exhibit similar characteristics to wider scholarly understanding of digital inequalities, where those from wealthier backgrounds benefit more from the same access and use of digital technologies as those from poorer backgrounds (van Deursen and Helsper, 2015[165]).

Heavy use of social media is also associated with stronger cognitive biases and lower levels of digital media literacy. Studies of the adult population have shown that self-perceived digital media literacy is associated with less scepticism towards information found specifically on social media (Vraga and Tully, 2019[138]). Evidence has also shown that those who perform poorly in terms of their ability to detect false and misleading content, but report high levels of confidence, were also more likely to use social media as sources of information (Lyons et al., 2021[160]). Focusing on children specifically, research has shown adolescents with more frequent social media use are less able to select reliable information based on source criteria (Macedo-Rouet et al., 2019[166]).

As previously discussed, media content creation is a key competency of digital media literacy because it provides a deeper understanding of the conventions and merits of media content, providing ample opportunity for enhanced critical thinking. Looking at the levels of content creation in children, there is room for improvement.

Although the majority of children engage in digital media for communication and entertainment purposes, content creation is still carried out by only a minority of children (Smahel et al., 2020[66]). This is despite the fact that a large percentage of children report having the skills to create content (e.g. knowing how to create and post a video or music on a digital platform or edit/make changes to digital content) (Smahel et al., 2020[66]). There does appear to be a discrepancy in the data between having these skills and actually using them. Overall, the literature suggests that that young people more commonly behave as consumers of the Internet, rather than active participants (Burns and Gottschalk, 2020[81]; Ofcom, 2021[78]).

Looking at the minority of children who are creating media content, there is an important nuance in the existing literature. Findings from a longitudinal study in the United Kingdom has noted for several years that the children aged 8-18 who were creating their own digital content, most often imitate content they had seen elsewhere in the digital environment (Revealing Reality, 2022[68]). While imitation can indeed be creative in its own right, the study found that the videos children were producing were often very close copies of existing videos.

Scholars see many important gaps in the literature on what exact processes children are undertaking to create this content (Drotner, 2019[167]). Given that so much of children's information consumption is socially mediated, low levels of data on how children create content - and if they collaborate with others when they do so - must be remedied. Even if individuals do not become active participants in the digital environment during childhood, they will need the skills to critically engage with media production in later life.

3.4. Research limitations

The research limitations on digital media literacy and children's engagement with false or misleading content in the digital environment sit within a larger knowledge gap regarding the longer-term impacts of the digital environment on children's cognition (Gottschalk, 2019[168]). Yet, these cognitive elements are crucial for understanding the issue and shaping digital media literacy efforts. There remains, for example, a lack of understanding of both the immediate and chronic effects of switching between different media (Firth et al., 2019[169]), which characterises much of children's Internet usage via mobile devices (Ofcom, 2022[12]). These gaps mean there is a tension between the available evidence and policy makers' need for robust knowledge to make clear and effective guidelines for digital technology use in children (Burns and Gottschalk, 2019[140]). The implications of this for digital media literacy are far-reaching. Targeted policy options for remedying potential harms from digital media remain unclear, as research evidence has not been able to consistently determine the source or implications of that harm (Science Advice Initiative of Finland (ed.), 2021[102]).

While much research has been conducted on children's use of YouTube and other digital risks, such as exposure to commercial advertisements, harmful videos and distressing content (e.g. (De Jans et al., 2018[170]; Thomas et al., 2018[171]; Neumann and Herodotou, 2020[172])) research does not generally explicitly consider whether the content contains false or misleading information. This could be because, despite a large number of studies investigating the challenge, scholars have found a high degree of fragmentation resulting from unclear definitions and approaches towards disinformation as a digital risk (Kapantai et al., 2020[173]).

This gap is also present in the field of parental mediation research. Much work has been done recently by researchers looking at the risks associated with the use of social media, for example, the parental social media mediation scale developed and validated by Ho et al. (2019[90]). Yet disinformation is almost never listed as a risk in the research literature, instead topics like cyberbullying and harassment are far more common. This was also confirmed in a 2018 meta-analysis of parental mediation literature (Chen and Shi, 2018[174]).

Illustrating this point well is the case of social media influencers[8] and digital marketing. Influencers and celebrities are often granted special privileges when it comes to their digital accounts, such as an [authenticity badge or specific moderation practices](). However, numerous celebrities and influencers with verified accounts have also been shown to spread misinformation (Ahmadi and Chan, 2020[175]). Furthermore, as would be expected, the reach of the misinformation that they spread is disproportionately large (Simon, Nielsen and Howard, 2020[176]).

Evidence from a recent study shows that adolescents consider sponsored brand posts by social media influencers to be trustworthy and honest, thus reducing their critical evaluation

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[8] Influencers are generally social media users with more than a million followers who exert influence over the digital and material consumption habits of their audience.

of the advertisements (Lin, Vijayalakshmi and Laczniak, 2019[177]). When comparing this to other sources of information, evidence also suggests that children aged 10-17 trust digital influencers more than they trust newspapers, social media or offline celebrities (Ofcom, 2022[12]). When it comes to parental strategies, findings have shown that parents who take a more active approach to social media significantly mediate the influence of influencers on their child (Lin, Vijayalakshmi and Laczniak, 2019[177]). These results also take into account parental digital skills and the child's age. However, there is a lack of research looking at active parental mediation strategies in relation to influencers and disinformation, to see if the same effect exists.

Perhaps most importantly, measuring digital media literacy remains a significant challenge in the research literature. This is part of the reason why a large number of studies remain conceptual or theoretical in nature, rather than empirical (Livingstone, Mascheroni and Stoilova, 2021[178]; Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]). Scholars have argued that this makes the challenge of well-defined educational objectives and adequate pedagogical methods even more difficult (Wuyckens, Landry and Fastrez, 2021[179]). Recent analysis has concluded that there is no empirically agreed framework for measuring levels of media literacy for a variety of reasons, including replication issues and monitoring impracticalities (Edwards et al., 2021[6]). As a result of the measurement difficulties, self-reporting surveys are the most commonly used empirical assessment tool. However, scholars agree that this does not directly assess media literacy knowledge and skills but only the *perception* of the respondent's level of knowledge and skills (McDougall et al., 2018[58]; Wuyckens, Landry and Fastrez, 2021[179]). This is a significant challenge because, as already discussed, children - in particular teenagers - who are more confident in their levels of digital media literacy, have actually been found to have lower levels of skills compared to their peers.

Further adding to this complexity, systematic reviews have noted inconsistent labelling of media and information literacy competencies in surveys and questionnaires, making comparability of results a challenge (Livingstone, Mascheroni and Stoilova, 2021[178]). Overall, media literacy, digital literacy and information literacy studies often lack key methodological details in how the research was conducted (Wuyckens, Landry and Fastrez, 2021[179]; Edwards et al., 2021[6]). Consequently, an understanding of the comparability of the research or its relevance for digital media literacy is lacking.

There are a number of options for gathering data on digital media literacy competencies for countering false and misleading content, each with their own set of benefits and drawbacks. These are explored further in Box 3.2.

The measurement challenges outlined above are also highly connected to the lack of available and open source data on user behaviour for researchers to analyse. Social media is a core component of how disinformation is consumed and spread, yet social media platforms often provide incomplete access to large datasets for researchers (European Commission, 2021[180]). There are efforts by policy makers to improve access to data, for example at the level of the EU with the recent Guidance to Strengthen the Code of Practice on Disinformation. Yet, research methods such as network analysis, large-scale data and observational data remain difficult to employ when it comes to digital media literacy competencies (Edwards et al., 2021[6]). These methodological challenges mean there is insufficient data available to researchers and policy makers to present a clear and comprehensive picture of how susceptible children are to false and misleading content and how it may affect their development (Howard et al., 2021[7]).

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Box 3.2. Current data collection methods for assessing digital media literacy competencies

Self-report measurements: Low-cost to collect, highly biased and do not depict causal links between digital media literacy education and growth in competencies.

Multiple choice and computer-based assessments: Low-cost, easy to evaluate data, limited response options which neglect the actual context in which children encounter disinformation.

Task-based assessments: Place children in more realistic situations where they may encounter disinformation, more costly and hard to evaluate the data.

Portfolio assessments: High human resource demand but captures a full body of work collected by a student over time. Gives a fuller picture of complex, process-oriented skills but costly and hard to scale.

Observational data collection: May be able to provide richer and more contextual assessment of behaviour but requires high levels of human and financial resources.

Collection of large-scale data: Looks at the level of society, and how society in general interacts with digital information, but cannot assess individual-level competencies.

Source: Huguet, A. et al. (2019[5]), *Exploring Media Literacy Education as a Tool for Mitigating Truth Decay*, RAND Corporation, https://doi.org/10.7249/RR3050

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4. Digital media literacy policies and practices

Incorporating digital media literacy into teaching and learning helps children to distinguish fact from opinion, assess the credibility of information sources, and detect biased or false information (McDougall et al., 2018[58]; Suarez-Alvarez, 2021[64]). This is the case for all students, even when taking into account whether they come from richer countries or poorer countries and whether they have higher reading performance, or a lower reading performance. Children should be able to understand the extent to which the information they encounter through media is trustworthy, and why.

Many OECD countries now have national or subnational agencies that are responsible for working with actors in the field to promote Internet safety and digital skills. Gottschalk (2022, p. 35[13]) provides an overview of these organisations through the lens of another digital risk, cyberbullying. Many of the organisations work on several digital risks, including disinformation.

In order to deliver digital media literacy in the classroom, teachers need access to resources and appropriate training on how to use them. Evidence has shown that facilitating discussions on the nature of contemporary media places an extra burden on teachers, who need to be sufficiently competent and confident to guide such processes in the classroom (McDougall et al., 2018[58]).

The policy mechanisms used by systems contain a mixture of strategies, curricula reform, funding, and support for actors and institutions to promote both digital and media literacies. The Council of Europe recommendations on media pluralism and transparency of media ownership specifically states that education systems should look to develop dedicated media literacy strategies (Council of Europe, 2018[181]).

At the system-level, a 2020 mapping of policies revealed that the topic of both digital and media literacy in education is comprehensively covered in many OECD member countries

Unclassified

in Europe (O'Neill, Dreyer and Dinh, 2020[182]). Over half of the systems in this study indicated that digital and media literacy is incorporated into broader policies. In 11 cases this was found to take the form of law or regulation (O'Neill, Dreyer and Dinh, 2020[182]).

4.1. Strategic coordination of the media literacy landscape

There are a large variety of ways in which the broader media literacy landscape is co-ordinated by countries. A non-exhaustive mapping of European countries can be found in Table 4.1. This mapping revealed that a small number of systems have dedicated national media literacy strategies. Aside from dedicated media literacy strategies, media literacy education is found, *inter alia*, in child protection strategies, school digitalisation strategies, national digitisation strategies, cyber security strategies and media development strategies.

A cross-analysis of three dedicated national media literacy strategies - which all explicitly mention disinformation - is outlined in Box 4.1. Interestingly, all these strategies target the population in general. For Finland, the latest version departs from earlier iterations, which targeted children specifically, by including all citizens. The limited scope of research on media literacy interventions specifically targeting children and other vulnerable groups means it is difficult to assess whether these national strategies sufficiently address the needs of children. Certainly, in the case of Finland, this national strategy is implemented in a variety of policy areas which are often specific to children and schools (see Section 4.6). However, the strategy is still relatively new and no evaluation has been found in the literature (Ministry of Education and Culture, 2020[183]).

More limited data on the legislative frameworks in the United States indicates that there were 14 states in 2020 with media literacy language in state laws, with varying degrees of implementation (Media Literacy Now, 2020[184]). For example, the California State legislature introduced a law on media literacy resources in 2018 which explicitly mentions concerns around fabricated news stories. This law requires the state Department of Education to make resources and materials on media literacy available to school districts, including professional development programmes for teachers. These resources aim to develop the safe and responsible use and consumption of media in children. They also aim to improve access to relevant and accurate information through media and support its analysis in a critical way by evaluating the comprehensiveness, currency, relevance, credibility, authority, and accuracy of media content (Dodd, Jackson and Mullins, 2018[185]).

Despite some overlaps with other relevant literacies, there is still an overwhelming focus on media literacy when discussing false or misleading content in strategic documents, which runs the risk of neglecting other competencies essential to combatting false and misleading digital content.

Table 4.1. The media and digital literacy strategic landscape in selected European countries

Country	Document names	Location of disinformation competencies	Year established
Cyprus[9]	National Strategy for a better Internet for children in Cyprus	Integrates media literacy themes across four pillars	2017
Denmark	National Cyber and Information Security Strategy 2018-2021 (NCIS)	Integrates media and digital literacy themes and targets society more broadly	2018
Estonia	Lifelong Learning Strategy	Integrates media and digital literacy themes and targets education and society more broadly	2020
France	Media Literacy Plan	Promoting media and digital literacy generally across society	2019
Finland	National media education policy	Dedicated media literacy strategy with dis/ misinformation as a central element	2019
Hungary	Digital Education Strategy 2016	Specific digitalisation strategies for education that encompass digital/media literacy in education	2016
Ireland	Online Safety Action Plan	Integrates media literacy through online risk reduction and opportunity promotion	2018
	Digital Strategy for Schools 2015-2020	Integrates media land digital literacy through the use of technology for research and presentation purposes and through optional subjects	2015
Italy	National Digital School plan	Integrates media literacy through a 'right' to Internet accessibility approach (digital skills and infrastructure)	2015
Latvia	Mass Media Policy Guidelines	Integrates media literacy education into five action lines for strengthening of the Latvian mass media environment	2016
Lithuania	Information Literacy Framework Programme for Primary Education	Integrated national guidelines prepared by the Ministry of Education and Science on skills and competencies for secondary schools, which include media literacy education	2015
	Information Technology Framework Programme for Basic Education		
Malta	National Digital Malta Strategy 2014-2020	Integrates media literacy from the perspective of reducing digital inequality and promoting inclusion	2014
	Malta Cyber Security Strategy	Integrates digital literacy themes as part of 'Cyber security Awareness and Education'	2016
North Macedonia	2019 media literacy policy	Dedicated policy with dis/misinformation as a central element	2019

Note: Table compiled by author with information from: European Commission, *YouthWiki*, https://national-policies.eacea.ec.europa.eu/youthwiki/countries (accessed on 15 February 2022) and O'Neill, B., Dreyer, S. and Dinh, T. (2020[182]). "The Third Better Internet for Kids Policy Map: Implementing the European Strategy for a Better Internet for Children in European Member States", https://www.betterinternetforkids.eu/bikmap (accessed on 15 February 2022).

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[9] Note by the Republic of Türkiye

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus

Country	Document names	Location of disinformation competencies	Year established
Serbia	Strategy for the Development of the Public Information System in the Republic of Serbia for the period 2020 – 2025	Integrates media literacy into various other skills and competency frameworks related to digital skills and introduces new optional curriculum elements such as 'Language, Media and Culture'	2020
	Strategy of Digital Skills Development for the period 2020 - 2024		2020
	Strategy for Development of Education in Serbia by 2020		2020
Slovenia	Strategy for media development up to 2024	General media development strategy which includes media literacy and a provision stating that 'media and digital literacy are part of compulsory curriculum in basic school'	2021
Sweden	Swedish National Digitalisation Strategy for Schools; 2017-10-19	Specific digitalisation strategies for education that encompass digital/media literacy in education	2017
United Kingdom	Online media literacy strategy and action plan	Dedicated media literacy strategy with dis/ misinformation as a central element	2021
	Ofcom's approach to online media literacy	Communications regulators implementation of the national dedicated media literacy strategy	2021

Box 4.1. Dedicated media literacy strategies – a country cross-analysis of strategic foci in Finland, the United Kingdom and North Macedonia

Risks: The 2019 Finnish media literacy strategy focuses on developing the agency of all Finnish people to prevent the spread of disinformation, anti-democratic messages, hate speech, mediated sexual harassment, and violations of privacy and data security. The 2021 United Kingdom strategy places disinformation and combatting online abuse as two central themes. The 2019 Republic of North Macedonia strategy explicitly mentions disinformation, democracy promotion, tackling hate speech and data privacy.

Children: The 2019 Finnish strategy made the fundamental departure from the previous 2013 Good Media Literacy Guidelines with the inclusion of all people of all ages in Finland. Both the United Kingdom and Finnish strategies note that children and adolescents are the population group that has been most comprehensively covered by current media literacy initiatives. The United Kingdom strategy outlines the central role that disinformation plays in these initiatives, with more than half of UK media literacy initiatives addressing two main issues: "Managing privacy, data, and the online footprint" (58%), and "recognising disinformation, misinformation, hoaxes, fake news, and use of technology for deception" (51%).

Teachers: The role of teachers in media literacy is a central element of both the United Kingdom and Finnish strategies. The Finnish strategy emphasises the role of the National Agency for Education, which is responsible for encouraging providers of early childhood education to develop child-oriented pedagogy and materials for planning and implementing broad-based skills, objectives and content. In the United Kingdom strategy, teacher's lack of confidence and/or capabilities to discuss media literacy with their students is explicitly addressed. In North Macedonia, the strategy mentions the need for teachers to access resources, but focuses more on raising national awareness, policy coordination and cooperation with stakeholders and international organisations.

Technology: The United Kingdom strategy is the only strategy to take a broader view of media literacy to also include what it terms "literacy by design", seeing design of the digital environment as having a disproportionate impact on children and other vulnerable users. As such, it aligns the strategy

with the Age Appropriate Design Code, enforceable since September 2021 and known commonly as the "Children's Code." All strategies recognise that media literacy in its contemporary form is mainly composed of digital media, yet none use the term "digital media literacy." The United Kingdom uses a closely related term: "Online media literacy."
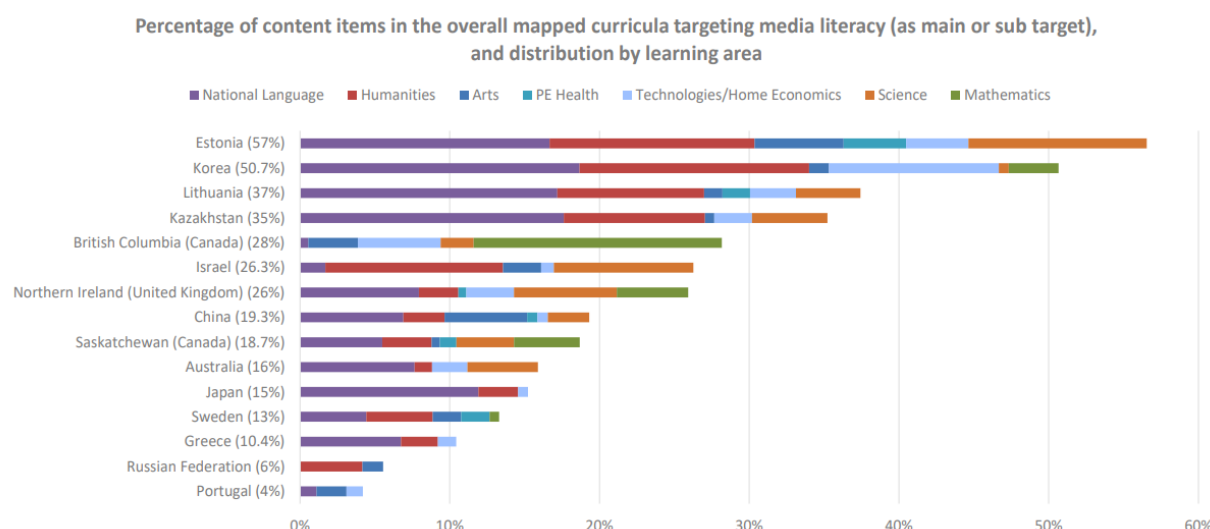
Sources: Paolo Celot, (2019[186]) "Media Literacy Policy", *Republic of North Macedonia Agency for Audio and Audio visual Media Services,* https://avmu.mk/wp-content/uploads/2017/06/Media-Literacy-policy_online-version.pdf (accessed on 10 January 2022), Palsa and Salomaa, (2019[187]), "Media Literacy in Finland: National media education policy", https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/162065/OKM_2019_39.pdf?sequence=1&isAllowed=y, (accessed on 10 January 2022), Department for Culture, Media and Sport (2021[164]), "Online Media Literacy Strategy", https://www.gov.uk/government/publications/online-media-literacy-strategy (accessed on 10 January 2022).

4.2. Curricula incorporation

Media literacy education is being increasingly integrated into national curricula. Figure 4.1 shows that this is most prevalent in Korea (51%) and Estonia (57%). When looking more closely at where it is embedded, national language is the most common subject, with nearly all jurisdictions reporting some degree of media literacy in this area of education. The extent to which learning to discern false and misleading content features in these media literacy curricula is unclear from the current country data. However, there is data from PISA showing that media literacy education targeting disinformation appears to be unevenly distributed. On average, 54% of 15-year-old students reported that they were trained at school to recognise whether information is biased or not (OECD, 2021[10]). These figures were highest in Australia, Canada, Denmark and the United States (more than 70%) and lowest in Israel, Latvia, the Slovak Republic, Slovenia and Switzerland (less than 45%). Evidence also shows that there is an uneven distribution within countries. PISA found that the percentage of 15-year-olds from socio-economically advantaged backgrounds being taught how to detect biased information was 8-14% higher, depending on the country, than students from disadvantaged backgrounds (Suarez-Alvarez, 2021[64]). This indicates that between and within systems, media literacy provision still has a long way to go before it fully reflects the nature of contemporary digital media.

There also remains a question in the data regarding the extent to which media literacy in curricula is explicitly connected to critical thinking in subject disciplines. For example, Nygren and colleagues (2019[125]) analysed the Swedish curriculum to assess how critical thinking was conceptualised in different subject areas. They concluded that there were two categories of critical thinking in the curricula for Swedish, history and physics respectively, and one category in mathematics. These categories included broader critical thinking skills which emphasised how subject-specific knowledge could be used by contemporary actors and how to discern fact from opinion. However, these broader skills appear to remain disconnected from explicit analysis of media landscape.

Figure 4.1. Media literacy in curricula

Percentage of content items in the overall mapped curricula targeting media literacy (as main or sub target), and distribution by learning area

■ National Language   ■ Humanities   ■ Arts   ■ PE Health   ■ Technologies/Home Economics   ■ Science   ■ Mathematics

Estonia (57%)
Korea (50.7%)
Lithuania (37%)
Kazakhstan (35%)
British Columbia (Canada) (28%)
Israel (26.3%)
Northern Ireland (United Kingdom) (26%)
China (19.3%)
Saskatchewan (Canada) (18.7%)
Australia (16%)
Japan (15%)
Sweden (13%)
Greece (10.4%)
Russian Federation (6%)
Portugal (4%)

0%   10%   20%   30%   40%   50%   60%

Note: The percentage bar next to the country name refers to the total percentage of the mapped curriculum that embeds the competency. Graph bars ordered by decreasing total percentage of mapped items targeting the competency across learning areas.
Source: OECD (2021[188])Future of Education and Skills 2030, Curriculum Database, E2030 Curriculum Content Mapping exercise, https://www.oecd.org/education/2030-project/curriculum-analysis/data/Distributions-of-competencies-across-learning-areas-subjects-data.xlsx. (accessed on 20 February 2022).

4.3. Competency frameworks

Over the past two decades, a wide range of competency frameworks have emerged which aim to help individuals think critically and engage with digital technology (Cortesi et al., 2020[120]). Frameworks are useful for education systems because they can inform curricular reform and development of independent bodies and teacher training programmes to enhance media literacy in students (Burns and Gottschalk, 2019[140]). However, there remains little agreement on the specific competencies that make up media literacy education as a tool to combat false or misleading content, such as disinformation (Huguet et al., 2019[5]). Encouragingly, there does appear to be a gradual convergence of different frameworks, which combine various "literacies" (see section 2) into a more holistic conceptualisation of the competencies required to engage with digital media landscape. This holistic view is broadly in line with needs identified by scholarly research on false and misleading information (e.g. (Jones-Jang, Mortensen and Liu, 2019[116])). There also appears to be a growing trend to foster the inter-operability of frameworks depending on the needs of policy makers, educators and other stakeholders. Yet, challenges remain. To illustrate these points, this section compares and contrasts at a number of different frameworks.

The first example is the European Commission's DigiComp 2.2 framework, updated in 2021 but first published in 2010. DigiComp 2.2 is not explicitly a media literacy framework, but contains a number of skills that specifically target disinformation, such as information and data literacy and communication and collaboration skills (Vuorikari, Kluzer and Punie, 2022[189]). It frames these skills in three main ways.

Firstly, it outlines the need for an awareness that digital environments contain all types of information and content, including misinformation and disinformation. Secondly, it emphasises the importance of understanding the difference between disinformation and

misinformation. Thirdly, it outlines that citizens should be inclined to ask critical questions in order to evaluate the quality of information in the digital environment, and be concerned about purposes behind spreading and amplifying disinformation. The framework also includes the need for citizens to have the digital skills to flag or report disinformation and misinformation to fact-checking organisations and to social media platforms in order to stop them spreading (Vuorikari, Kluzer and Punie, 2022[189]). DigiComp 2.2 also makes explicit reference to UNESCO's Media and Information Literacy (MIL) framework. It is therefore useful to compare these different policy perspectives.

UNESCO's MIL framework combines media literacy, information literacy and digital literacy. It is intended to capture citizens' engagement with communication and content forms, including their production, dissemination and the actors and contexts involved. The aim of the framework and its curriculum is to provide education systems with a method of constructing a programme enabling educators and learners to be media and information literate (Grizzle et al., 2021[190]). By contrast, the policy perspective for DigiComp is inclusive growth and the digital opportunities are development of human capital, employability and competitiveness.

Unlike the UNESCO Framework, DigComp 2.2 does not include the broader media literacy competencies related to fostering an understanding of the role and functions of media in society. These media literacy elements are instead found in the revised EU Audiovisual and Media Services Directive. DigiComp 2.2 therefore serves as an example to illustrate a discrete approach to competency frameworks for media literacy to combat disinformation, since the skills are split between digital media competencies and more general media competencies.

A small but growing theme among the literature on digital media literacy frameworks is the tendency to make competencies inter-exchangeable and define common elements to create meta-frameworks. For example, both the DigComp and UNESCO frameworks were included in the Digital Intelligence (DQ) framework, which combines 25 national and organisational digital competency frameworks and was endorsed by the IEEE Standards Association, OECD and World Economic Forum in 2018. In this framework, media and information literacy is included under the digital literacy pillar, where disinformation is mentioned. One further example illustrating this point is the Youth and Digital Citizenship+ (Plus) framework, which is informed by 35 frameworks around digital citizenship and intersecting concepts such as media literacy, 21st century skills and digital safety (Cortesi et al., 2020[120]).

Although there does appear to be attempts at conceptual clarity emerging recently with the creation of meta-frameworks and inter-exchangeable terminologies, there remain a number of challenges for policy makers. For example, there are still large variations in the vocabulary used when defining "literacy" vs. "competency" or "competences" vs. "competencies" (Cortesi et al., 2020[120]). Furthermore, evidence has shown that very few of these frameworks have been evaluated in terms of their efficacy or the extent to which they are used (Cortesi et al., 2020[120]). One additional consideration is that most frameworks are predominantly intended to be applicable at the societal level, rather than focusing on the specific media literacy needs of children or other vulnerable groups (McDougall et al., 2018[58]). This may have implications for their usefulness in the classroom. For example, scholars have suggested that media literacy interventions and curricula that aim to increase discernment of false or misleading content should focus more on showing children why critically consuming news is achievable and relevant for them (Tamboer, Kleemans and Daalmans, 2020[75]). This relevance may be more difficult for teachers to demonstrate if the frameworks they are using are not specific to children.

4.4. Teaching and learning about digital media literacy

Increasing demands on teachers to support the development of the knowledge, skills and attitudes children need to recognise false and misleading digital content require enhanced capacities within education systems. Research has shown that the field of media literacy is moving towards more robust teaching practices that embrace the complexity of the disinformation challenge (McDougall et al., 2018[58]). These include inquiry-based work, case studies, gamification, sourcing and textual analysis, group discussion, project or research-based work (such as conducting interviews with community figures), media production or inviting guests in to speak to the class (Grizzle et al., 2021[190]).

Scholars argue that media literacy and critical thinking can be taught through existing areas of the curriculum as well as a separate subject to help students recognise false and misleading digital content (Cherner and Curry, 2019[191]; Garcia, Seglem and Share, 2013[192]). In order to maximise the transfer of critical thinking skills, research on cognition emphasises that it can be taught more effectively through a number of practices. These practices include carefully constructing comparisons (i.e. showing students two solved problems which at first appear different but have deeper similarities) and determining the optimal sequencing in which to learn specific knowledge and skills (Willingham, 2019[124]). By using the right methods – in the right way - to provoke discussions of media representation, power structures, motivations and sources, teachers can empower students with the skills they need to be aware of, and recognise, disinformation.

4.4.1. Inquiry-based approaches

Inquiry-based pedagogy is a constructivist approach to teaching using various activities that facilitate reflective and ongoing conversations, research and investigations among students. The approach emphasises students' prior knowledge, proposes new experiences and takes into account how students construct knowledge (Cleovoulou and Beach, 2019[193]). These methods are becoming more widely recommended as a way of teaching the skills found in digital media literacy, for example critical thinking, information literacy, science and citizenship (e.g. (Chu, Tse and Chow, 2011[194]; Willemse et al., 2015[195])). An example of an inquiry-based learning approach which has been supported by strong research evidence in recent years is outlined in Box 4.2 below.

Box 4.2. 5E model of inquiry instruction

Engage: The teacher assesses students prior knowledge and generates students' interest on the topic.

Explore: The teacher asks questions to provoke children to explore the topic. This stage can often involve different interactive activities.

Explain: The teacher encourages students to explain what they have learned and provides further guidance and explanation on the topic to support this.

Elaborate: The teacher provides an opportunity for the students to apply the newly acquired knowledge to real-life situations, this helps make connections between the new knowledge and pre-existing knowledge.

Evaluate: The teacher assesses students to verify they have understood the topic.

Source: Garcia I Grau, F. et al. (2021[196]), "The long-term effects of introducing the 5E model of instruction on students" conceptual learning", https://doi.org/10.1080/09500693.2021.1918354

4.4.2. Source analysis and lateral reading

As outlined in section 2.1, analysing content in a digital world requires effective methods of evaluating the quality and validity of different sources, to build the competencies needed to distinguish between facts, opinions and fiction. Although the nature of much digital content that children engage with, including false or misleading content, is now video or image based, much of it still uses multiple modes of communication, including text. Because of this, individuals are increasingly required to acquire effective reading strategies and motivate themselves to persevere in the face of difficulties and conflicting information (OECD, 2021[10]).

Evidence has shown that children of all ages are still unable to select effective source criteria for discerning the truthfulness of digital content. For example, a recent study in the United Kingdom concluded that almost 90% of teenagers aged 12-17 wrongly focus on aesthetic indicators to discern authenticity (Ofcom, 2022[12]). Other studies in younger children have revealed that, although they are able to submit an Internet query and narrow an Internet search efficiently, many are unable to effectively evaluate information sources (Pilgrim and Vasinda, 2021[197]). Therefore, teaching strategies to determine reliable and trustworthy sources are important. This issue is especially crucial for reducing inequalities in educational outcomes, which can be a factor in children's ability to discern fact from fiction and often result from socio-economic inequalities. Evidence from PISA 2018 shows that, on average across OECD countries, about one third of the difference in reading performance between socio-economically advantaged and disadvantaged 15-year- olds is the indirect result of disparities in effective reading strategies (Suarez-Alvarez, 2021[64]). Those from socio-economically advantaged backgrounds tend to employ more effective reading strategies than disadvantaged students. Classroom-based interventions, such as the one outlined in Box 4.3 below, have been shown to build capacity in this area.

Box 4.3. Critical source dimension intervention

This intervention was delivered in French secondary schools for children aged 13-17. It included six one-hour sessions focused on source evaluation and was designed to respond to an existing large body of literature showing that primary and secondary students do not spontaneously evaluate source information when reading. The intervention aimed to remedy this and increase students' abilities to discern which websites and information were untrustworthy.

The sessions targeted three information source dimensions:

- *Author position*. This session sought to explain and emphasise how an authors' profession and training in the domain can affect the reliability of information. Students were given two texts and a practice task in which they were asked to rate the competency of various authors based on a specific statement. The reasons why one author should be rated low on a scale of author position were discussed and justified with the class until consensus was reached.

- *Author motivation*. Two websites were presented to participants in which two sources presented conflicting information. Both sources were competent in the domain, but one involved a conflict of interest (a commercial interest). The concept of author motivation was then explained to students by referring to the explicit conflict of interest that a specific source might have. Children were invited to rate the trustworthiness of the sources, discrepancies were discussed to further disentangle the constructs of author position and author motivation.

- *Media quality*. Students were shown a simulated forum on a topic, where a self-proclaimed expert (a contributor introducing himself as a "doctor") advocated for the health benefits of a specific product. Students were explained the difference between websites where information is validated before publication (e.g. academic journals or magazines), and websites where information is not validated before publication (e.g. blogs or forums). Students were invited to rate the quality of sources and the ratings were shared and discussed until the class reached consensus.

The intervention was shown to increase students' critical thinking skills regarding each of the three elements.

Source: Pérez, A. et al. (2018[198]), "Fostering teenagers' assessment of information reliability: Effects of a classroom intervention focused on critical source dimensions", https://doi.org/10.1016/j.learninstruc.2018.04.006

Checking and evaluating the reliability of sources is often included in wider resources called "checklists." Checklists are frequently contained in media literacy resources which aim at countering the spread of disinformation (Haider and Sundin, 2020[199]). They encourage students to check information sources against a list of criteria, such as the source, further information beyond the title, how professional any images or videos are, and whether there are spelling or grammatical errors (e.g. (UK Government, 2020[200])).

However, some scholars argue that checklists are not based on sound research about what digitally-skilled people do when searching for information in the digital environment (Breakstone et al., 2018[201]). The checklist approach focuses on the media source itself, which runs contrary to the way professional fact-checkers verify information. When confronted by new information on an unfamiliar website, professional fact-checkers

open new browser tabs and search across the web to find corroborating sources to enhance the trustworthiness of the original source of information (Wineburg and McGrew, 2017[202]). Following this initial step, they return to examine the original source more closely. However, debates around the efficacy of checklists in supporting media literacy remain open and their efficacy may depend on what the specific checklist contains. A recent literature review concluded that it remains difficult for researchers to develop quantitative methods to measure the efficacy of checklists (Bulger and Davison, 2018[203]). However, they remain widely used both inside and outside of the classroom and their use is often taught in conjunction with other media literacy tools, such as fact-checking websites.

4.4.3. Production and creation

Media production is a key competency of both digital and media literacy and can support deeper critical engagement with the media landscape by illustrating to children the relationship between the creator of media and the content itself. It encourages participation and avoids children being passive receivers of information to make learning more engaging and relevant (Hobbs, 2017[204]). In this way, it can enhance levels of media literacy and spark a critical approach to media content.

As discussed in section 3.3, there is a relative paucity of data on children's media production *processes* (as opposed to self-reporting surveys asking whether children feel they have the *skills* to create content) and this has ramifications for teaching and learning digital media literacy. One of the few empirical studies that investigates children's actual media production processes is Drotner (2019[167]). This study looked at the film production activities of 171 individuals in Denmark between the ages of six and 18. It revealed that production is not a neat sequence of phases and children move between social interaction, semiotic negotiation[10] and practice-based learning. The process of production invokes playful exploration, trains multimodal skills, and catalyses complex problem-solving, supporting its use as part of digital media literacy practices. The study reached three conclusions relevant for digital media literacy:

1. Out-of-school settings offer testing grounds that schools may learn from if they collaborate with other actors.

2. Media production skills are necessary if children are to exercise their rights of expression in the 21st century.

3. Playfulness is key for stimulating students' content creation skills, as a basic driver of collaborative creative processes.

Production is therefore useful for teaching and learning since the process triggers the combination of multiple other skills relevant for digital media literacy. One example showing how student media production can be combined with source analysis and critical thinking can be found in Box 4.4. This example is especially relevant since it combines conceptualisations of historical propaganda with the modern challenge of false and misleading content. In line with cognitive research showing the relationship between critical thinking and content knowledge, media literacy research has shown that teaching about the parallels between propaganda and modern media production can strengthen core concepts and instructional practices (Hobbs and McGee, 2014[205]). Contemporary media literacy efforts in the classroom must reflect the importance of creating media messages, in

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[10] Semiotic expression in filmmaking can be defined as a multimodal process (using words, images and sounds) of joint meaning-making that appropriates and material, formal and substantive properties through social negotiation to create a narrative.

order to enhance students' understanding and critical engagement with the digital information landscape. To strengthen this, further research may be required which focuses specifically on understanding children's media production *processes*.

Box 4.4. Using production to build students' understanding of disinformation

The Danish Film Institute's streaming service, Filmcentralen, developed the [Fake Bombing or Fake News?](#) resource for primary and secondary school children. This resource seeks to draw parallels between the propaganda landscape and modern disinformation context, targeting children 15 years and older.

It is designed to be used in history, civic education and Danish language classes, and targets the core media literacy competencies of source analysis, critical thinking, analysis of the media landscape and media production. The resource contains a database of over 3 000 short films and documentaries to show material about propaganda films during the World War 2 Occupation. The goal is for students to identify the messages and motivations of the propaganda films. It then asks students to apply the aforementioned media literacy competencies to information they find in the digital environment and complete exercises to create text, sound and images.

One key desired outcomes is that children will be able to participate in media production to express their thoughts intelligibly, clearly, appropriately and variedly in writing, speech, sound and image. Part of the exercise is addressed to the teacher, who can connect the students' activities to the teacher platform *Skoletube,* which provides a variety of other digital tools for teachers.

4.4.4. Algorithm education

In the context of interventions building the skills to recognise false and misleading digital content, algorithmic awareness is an important tool.

Algorithm competencies are markedly different to digital and coding skills in that they focus more on understanding the mechanisms by which information is served to users on the "front end" of websites. This is in contrast to the more detailed knowledge of coding languages which is itself often a separate school subject. Researchers are increasingly interested in supporting the development of algorithm competencies to empower students with knowledge and tools to understand the interplay between media, data-driven technology and the role of algorithms in processing information.

This feature of digital media literacy is perceived to be of particular importance in light of the growing connectedness of various devices, which can bundle several types of content (e.g. videos and social media) and software (e.g. apps and smartphone operating systems) to push content on to previously unconnected devices, such as televisions (Shin, Rasul and Fotiadis, 2021[34]). Scholars argue that functional knowledge (i.e. for children to understand how data is used to curate and create content and influence behaviour) of AI and algorithms is enough to be digitally media literate (Valtonen et al., 2019[37]).

The thematic gap in current digital media literacy competencies is closing, however dedicated intervention research is still a developing field. In particular, understanding the effects of AI (how the algorithms processing information are powered) is not provided by current digital literacy or information literacy literature (Shin, Rasul and Fotiadis, 2021[34]).

There is still a paucity of data showing the extent to which children are aware of, and understand, the role of algorithms in determining their vulnerability to exposure to

disinformation. However, some studies do exist which show the specific vulnerabilities of young people. One study utilised in-depth interviews and walk-throughs on social media sites, combined with inquiry and reflection methods with a diverse group of 22 young people aged 16–26 living in the Netherlands. The study found a wide variety of algorithmic awareness, with some never having heard of the word "algorithm" and others able to describe categorisation, profiling, and personalisation processes in detail. However, one consistent finding, regardless of varying level of awareness, was that interviewees rarely spoke about algorithmic curation until asked (Swart, 2021[135]). Media literacy stakeholders are aware of this gap, and initiatives are emerging that seek to build the capacity to curate algorithms in school children (Box 4.5).

Box 4.5. Gamified learning to support algorithm awareness in children

Kids Code Jeunesse (Kids Code Youth, in English), a Canadian not-fo- profit organisation based in Montréal, Québec. The Canadian Commission for UNESCO (CCUNESCO) have partnered with UNESCO on a project, called the Algorithm Literacy & Data Project. It aims to apply critical and computational thinking approaches to understanding of algorithms.

Launched in December 2021, the project has developed a series of gamified learning experiences for children such as "choose your own fake news". It has also launched educational guides and discussion resources to raise awareness of the role algorithms play in the online space, both in terms of curating advertising and also news consumption.

One of the distinct challenges with teaching algorithm education as a part of digital media literacy is the opacity of AI algorithms, and its uses and impacts. This is one area where the need to see digital media literacy as part of a suite of policy options is particularly evident, since regulations targeting greater algorithmic transparency is part of ongoing work by policy makers in many OECD countries (OECD, forthcoming[103]). By increasing transparency of algorithms in digital media, children and youth can gain access to the robust algorithmic literacy tools and resources they require (Brisson-Boivin and McAleese, 2021[206]).

Some scholars have also argued that the uneven knowledge of algorithms can serve to deepen existing social inequalities through the emergence of an "algorithmic divide." This may exclude those with low algorithmic awareness from the numerous social, political, economic and cultural opportunities provided by AI and digital media (Shin, Rasul and Fotiadis, 2021[34]). Digital media literacy can play an enhanced role in encouraging both explicit and implicit actions to help an individual understand and curate their algorithms. For example, a teacher may encourage the manual personalisation of the tools a platform offers or suggest adjusting browsing behaviour (Swart, 2021[135]). This means teaching students concepts such as tracking, recommendations and optimisation, dynamic content generation, deep learning, reinforcement learning, attention engineering and content filtering/ curation. (Valtonen et al., 2019[37]). Much of the intervention literature on algorithms still focuses on teenagers, where algorithm education has been shown to be effective. One example can be found in Box 4.6. This work requires further large-scale research and piloting which can show sustained effects on levels of digital media literacy.

Box 4.6 "In the Shoes of an Algorithm" design-based research intervention

This offline intervention was designed for students aged 14 or older and was implemented twice, in Belgium and Korea. Although the Belgian game was limited to music, the Korean version included games, music, and know-how/style, designed to reflect the actual use of YouTube content by Korean youth.

The game itself lasts two hours and is conducted with a pen and paper. It is centred on children acting as "algorithm designers" in teams, who then present and argue for their respective algorithms. The game is intended to foster a reflection on media practices and empower participants to critically discuss and reflect on the consequences that recommendation algorithms have on their use of digital media.

This intervention led to an enhanced understanding of the role of algorithms and a more critical approach to digital media. It also led to a greater understanding of the role of different cultures in attitudes towards digital technologies. For example, the Korean students rarely critically assessed the digital landscape and its actors, but focused on the interaction between engineering and social issues. The Belgian students more frequently focused on the choices made by the digital platforms themselves in designing the systems.

This research intervention has several limitations, including lack of measurement of longitudinal effects. However further empirical work is forthcoming.

Source: Jacques, J. et al. (2020[207]), "In the shoes of an algorithm", A media education game to address issues related to recommendation algorithms", https://doi.org/10.25020/joe.2020.3.1.37.

4.5. System requirements

Definitions, frameworks, data, policies and practices will have limited impact on the abilities of children to detect false or misleading information unless teachers have the right resources, partnerships, attitudes, skills and knowledge to deliver digital media literacy in the classroom. This section therefore looks at the evidence and tries to understand how the capacity of education systems to deliver digital media literacy may be further strengthened.

4.5.1. Resources and partnerships

A large number of varied actors have emerged in the field of media literacy in recent years. A 2016 report focused on the EU mapped 939 main media literacy stakeholders, 135 national networks, and 547 media literacy projects active across the EU. The most frequent competencies addressed by these projects were "critical thinking" and "media use" (European Audiovisual Observatory, 2016[121]). However, in the 2016 study, disinformation and misinformation were only the focus of two of the mapped projects, one in Romania and one in Sweden. Since then, the number of actors has undoubtedly increased, and the challenge of false and misleading content is becoming more central in media literacy efforts. A recent mapping of initiatives in the United Kingdom found that that more than half of the initiatives address two main challenges: recognising false or misleading content and managing data and privacy (Department for Culture, Media and Sport, 2021[208]).

These actors and projects often create media literacy resources for use in educational settings. One meta-analysis carried out in the United States found that the most common format was modules and lesson plans that can be broken down and integrated within an

existing course or curriculum (Huguet et al., 2019[5]). A selection of examples showing the kinds of curriculum resources available can be found in Box 4.7. These resources are created by a wide range of stakeholders including universities, governments, non-profit organisations, professional associations and private companies. International organisations are also active in creating resources. For example, the Council of Europe has been publishing its "Internet Literacy Handbook", targeting educators and users, since 2003. The Internet Literacy Handbook specifically takes an ethical, sociological and cultural approach to Internet use (Richardson, Milovidov and Schmalzried, 2017[209]). This includes concepts such as digital citizenship, as well as AI. Research suggests that at least half of these resources have children as the core intended audience (Huguet et al., 2019[5]).

Box 4.7. Example curriculum resources for teachers

- Common Sense Media has free K-12 curricula and lesson plans to focused on the promotion of "digital citizenship".

- KQED Learn, where students build media literacy and critical thinking skills while researching and discussing contemporary issues.

- The New York Academy of Sciences has a free Innovation Curriculum that supports teachers to encourage critical thinking, creativity, collaboration, and communication in students.

- Get digital – This is a free course providing research-informed lessons and resources to help children and young adults develop skills in media literacy and digital tools.

- The EduMediaTest – A digital questionnaire designed to assess media and digital literacy skills of students aged 14 to 18. The resource also contains training materials to improve their media skills, available for free.

- Learning scenario: Can I trust you? This resource approaches disinformation from the perspective of civic education. The learning scenario encourages media literacy, knowledge, and verification of data. It also contains information related to the topic of human migration.

Despite the proliferation of resources to build media literacy capacities, research in different systems suggests there is still a need for more publicly accessible *teacher-oriented* resources that specifically target false or misleading digital content. (Nettlefold and Williams, 2018[210]; Huguet et al., 2019[5]). For resources where evaluative data is available, uptake appears to be encouraging. For example the United States -based News Literacy project reported that over 33 000 educators and more than 1 275 000 students have registered to use their Checkology resource between 2016 and 2021, which targets disinformation (Mecklin, 2021[211]). Although there is demand for existing media literacy resources, the ongoing need for more publicly accessible teacher-oriented resources suggests that teachers may need a larger role in how these resources are created and deployed. This requires more collaboration between schools and the producers of the resources. Yet, evidence from OECD countries suggests that educators still lack partnerships with platforms, media organisations and governments to specifically target false and misleading digital content (OECD, 2020[212]).

Enhancing collaborations can help not just to deliver digital media literacy, but also to increase children's exposure to journalists and others in order to build children's trust in

credible information sources (Nettlefold and Williams, 2018[210]). Looking at the United States, Cubbage (2019[213]) argues that, although some media literacy university-school partnerships do exist, a greater emphasis on community partnerships and increased secondary and post-secondary interfacing is needed to advance the implementation of digital media literacy globally. Three evaluated practices are outlined in Box 4.8.

Box 4.8. School collaborations implementing media literacy resources

Ukraine

The Learn to Discern in Education (L2D-Ed) programme was designed to integrate critical information consumption skills into existing secondary school curricula and teacher training programmes at pre- and in-service teacher training institutes. It also designed and launched various educational resources. L2D-Ed worked in cities from each of Ukraine's 24 oblasts and aimed to reach 650 schools by 2021. It was a collaboration between the schools, media and education stakeholders and the Ukrainian Ministry of Education and Science.

Evaluations of the collaboration reveal that students showed better performance in skills such as distinguishing facts from opinions, detecting false stories and hate speech, and demonstrating deeper knowledge of the news media sector.

Portugal

The School Libraries Network (SLN) programme has been operating in Portugal since 1996, launched by the government with the aim of installing and developing libraries in public schools at all levels of education. The SLN programme operates as a portal for dissemination of best practices and collaborates with public schools to raise awareness of the importance and urgency of education for media and information literacy. They create teaching materials and other formative documents and act as an interface of teachers' educational practices and professional development.

As of 2021, the network consists of 2 524 school libraries and has approximately 1 400 teacher librarians. These teachers are almost exclusively dedicated to the network and are responsible for collaborating with teachers from different subjects and curricular areas.

Austria, Belgium and Germany

Lie Detectors is an initiative that creates resources for teachers and trains and deploys journalists in schools. Classroom sessions are free of charge and professional journalists and media experts teach the 90-minute sessions in the presence of a teacher. Sessions cover definitions, detection and analysis of incentives of disinformation. The initiative provides materials and resources for homework or follow-up sessions.

As of June 2021, they reported to work with over 250 professional journalists and media organisations. In self-reported surveys, the number of students reporting that they used media literacy practices such as source analysis increased by 30% following the sessions.

4.5.2. Teacher training

Despite the increased policy emphasis and growing availability of teacher resources, competency frameworks, guidelines and curricula, teacher education has not yet caught up with the demand. Research often concludes that more attention needs to be paid to teacher

education and professional development to support media literacy efforts (e.g. (Gretter and Yadav, 2018[214]; Botturi, 2019[215]; Mateus, 2021[216])). Box 4.9 outlines four common approaches to teacher professional development in digital media literacy education.

Hobbs (2017[217]) noted a relative paucity of scholarly literature documenting the different approaches to the professional development of teachers to deliver media literacy education. Although more research has been conducted since then, the results of this work indicate that media literacy is often treated as a cross-curricular topic in teacher professional development which lacks systematic attention to its contents, including the digital nature of most contemporary media (Ranieri, Nardi and Fabbro, 2019[218]). As a result, it is often overlooked and dedicated investment in teacher education and training for media literacy have been found to be limited in education systems.

Box 4.9. Approaches to teacher professional development in digital media literacy education

Trainings, summer institutes and conferences: Regarded as the oldest and most common approach to professional development in digital and media literacy. Further research is needed to better understand how participation in training and conferences supports the teaching and leadership skills of media literacy educators.

Learning Communities for media literacy education professional development. The characteristics of learning communities in media literacy typically include a demonstration of the model lessons, followed by theoretical framing, debriefing, analysis and reflection

Formal Education, these include graduate degree and certificate programmes which are usually paid and offer structured learning experiences. Also included in this category are Massive Open Online Courses (MOOCS).

Curriculum resources: Rather than directly delivering professional development, these are intended to support the professional development of teachers and their classroom practices. They are usually curated by experts working at NGOs or international organisations and rely on the teacher to find resources and implement them in the classroom with fidelity.

Source: Hobbs, R. (2017[217]), "Approaches to teacher professional development in digital media literacy education", http://dx.doi.org/10.4324/9781315628110

In terms of teachers' attitudes towards teaching digital media literacy, research in the United States suggests that pre-service teachers generally have positive attitudes towards media literacy and recognise its need to be embedded into the curriculum (Gretter and Yadav, 2018[214]). Positive attitudes towards digital media literacy have also been found for in-service teachers. One survey of 242 teachers in three European countries found that around 80% of teachers agreed that teaching media literacy in the classroom is important to combat disinformation. However, just 45% of respondents had actually taught media literacy (Lie Detectors, 2019[219]).

With the right support, teachers are well-placed to deliver digital media literacy education in the classroom. Evidence from a survey of 19 EU countries shows that teachers are a crucial motivator to encourage children to learn new things in the digital environment, often having a larger role than parents (Smahel et al., 2020[66]). When it comes to digital competencies, the OECD Teaching and Learning International Survey (TALIS) shows that around 60% of teachers in OECD countries felt they are already able to support student

learning through the use of digital technologies (OECD, 2019[220]). This figure is encouraging, yet still relatively low and comes with a number of caveats.

Self-reported use of digital tools in the classroom does not mean that teachers are able to use these tools as part of digital media literacy education to support children in accessing, evaluating and creating media messages. Use of digital tools in the classroom also does not mean that teachers are using them in a pedagogical way. For educators, digital skills are less about mastering the technology and more about integrating technology, tools, resources and outputs into their pedagogy (OECD, 2021[221]). Recent evidence shows that, although teachers are taught to use digital tools, their knowledge of the pedagogical uses of digital technology show room for improvement (Livingston, 2016[222]; Amhag, Hellström and Stigmar, 2019[223]; Lindfors, Pettersson and Olofsson, 2021[224]). This has also been highlighted by the COVID-19 pandemic, where one of the key lessons has been that teachers need to feel empowered to build their digital pedagogical competences (OECD, 2021[225]). Yet, even before the pandemic, a greater emphasis was placed on technical or operational elements of digital skills, as opposed to pedagogical (OECD, 2020[226]).

This point is emphasised by studies looking at media literacy levels of both pre-service and in-service teachers. For example, Cherner and Curry (2019[191]) studied pre-service teachers' confidence in using digital tools and found that teachers expressed the lowest levels of confidence in both their understanding of social media as a tool to engage in debate, as well as knowledge of the role of algorithms and data in spreading disinformation. Evidence in Türkiye found that prospective teachers struggle to analyse and react to digital media content and also lack awareness regarding their own competencies (Erdem and Bahadir, 2018[227]). Similar findings were reported by McNelly and Harvey (2021[228]) for more experienced teachers in the United States. In this study, teachers reported low levels of digital skills and confidence teaching about the contemporary media landscape, production, messaging and participation. In the EU, Ranieri and colleagues (2017[229]) found that the policy emphasis on both media and digital literacy had not yet resulted in sufficient levels of digital skills, and their training on digital education fails to meet teachers' needs.

The need to enhance teachers' digital pedagogical skills to teach digital media literacy is also highlighted by how quickly the media landscape changes for children compared to adults. A survey of 1 856 schoolchildren and 100 teachers from four European countries[11] showed YouTube and WhatsApp are familiar information sources for both children and teachers. However, Snapchat, Tiktok and Twitch/Discord are almost entirely absent from teachers' media use, but used by approximately half of the children in the survey (Lie Detectors, 2021[67]). Conversely, Facebook was used by over half the teachers, but was only used by around 15% of students. Teachers will obviously never have enough time to master each new digital trend, and therefore need ways of conveying the fundamental digital principles of media literacy against the backdrop of the challenge of false and misleading content. They must do this without necessarily having detailed knowledge of the specific platforms that are most popular among their students.

The policy emphasis on disinformation and digital and media education is also putting pressure on teacher education institutions. When broadening the scope of analysis to look at teacher educators, their confidence in training teachers to use digital tools, understand algorithms and the media landscape also appears to be low. One study in Sweden, found that teacher educators often mention disinformation and social media and the need for new types of critical approaches. However, they are unsure as to precisely the degree of training

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[11] Austria, Belgium, Germany and Luxembourg,

pre-service teachers should receive (Örtegren, 2022[230]). The research indicates that further work can be done to build the capacity of teacher educators and curricula for teacher training to show teachers how to embed concepts around false and misleading digital content into the classroom via pedagogies and lesson structures (Gretter and Yadav, 2018[214]). Scholars recognise that an entire course on media literacy for pre-service teachers may not be feasible for all teacher education institutions. However, evidence suggests that media literacy lesson plans and pedagogies can successfully be spread, shared and demonstrated via the traditional teacher training curriculum and coursework, as opposed to dedicated courses (Meehan et al., 2015[231]). Successful training interventions that can build teacher capacity to teach complex and interrelated media literacy topics do exist (Box 4.10). However, their use is still not widespread according to the literature.

Box 4.10. Research on teacher training interventions for media literacy education

eCoaching Media Literacy Intervention

eCoaching is a professional learning strategy that can be used to support pre-service teachers in their early field experience, to develop their media literacy skills and build it into their future classroom practices. The intervention is centred on an eCoach (e.g. university supervisor, university faculty, mentor teacher, administrator) who works with the pre-service teacher.

The eCoaching model uses digital tools to observe lessons and provide feedback and support to pre-service teachers in real-time. To achieve this, the pre-service teacher and the eCoach use a laptop, a Bluetooth hearing device, video conferencing software, or a web camera to establish and maintain contact during the lesson.

The idea behind eCoaching is to blur the traditional roles in teacher education (e.g. between the teacher educator, pre-service teacher and university) to encourage equal participation in the learning process through three types of feedback:

- *Encouraging feedback:* The eCoach provides specific praise that will increase the likelihood that the pre-service teacher will want to replicate the noted teaching behaviour.
- *Corrective/instructive feedback:* This allows the pre-service teacher to recognise opportunities for improvement and increase effectiveness.
- *Questioning feedback:* This is often used rhetorically as it allows the eCoach to remind the pre-service teacher of an instructional practice they already know.

The eCoaching is intended for use in early field experiences of pre-service teachers and was found to build confidence and increase independence to teach critical thinking and media literacy skills in the classroom.

Swiss "short-intervention" for Digital Media Literacy

This experimental intervention was delivered via a face-to-face course for pre-service pre-primary and primary school teachers in Switzerland. The course outline was co-designed with students in two steps and the study collected evidence of the impact of the course in the short and medium terms.

The course itself included 13 topics which build competencies to recognise false and misleading digital content: Media and technologies, A web of information, Coding, Educational robotics, Visual literacy, Audio, music and the radio, social media, movies, cyberbullying, media addiction, digital storytelling, social media and safety.

> This content knowledge was centred on accessing, analysing and creating media literacy competencies. The topics were taught through short contextualisation presentations, deeper lectures and guest lectures.
>
> The post-intervention survey assessed self-efficacy with the question "If you were to propose Digital Media Literacy activities in class, do you feel prepared?" Self-reported scores increased and teachers felt more confident in teaching digital media literacy.
>
> Source: Blanton, M., A. Cheek and E. Bellows (2019[232]), "Real-Time Support: Using eCoaching to Increase Pre-service Teachers' Confidence to Teach", https://doi.org/10.23860/jmle-2019-11-2-10, Botturi, L. (2019[215]), "Digital and media literacy in pre-service teacher education", https://doi.org/10.18261/issn.1891-943x-2019-03-04-05.

International organisations also offer professional learning opportunities targeting teachers, teacher educators and school leaders. For example, the Council of Europe offered a master class on media and information disorder in autumn 2020. The course aimed to teach participants how to define and identify the concepts of disinformation in theory and practice; how to analyse various media sources and tell fact from opinion and fiction; how to learn to apply news literacy concepts in real life; and how to develop and design a teaching programme to deliver competencies in the classroom.

Other examples include the Digital Literacy Professional Development Program at the University of Rhode Island (United States). This course has been offered to school educators, youth media professionals, school leaders, university faculty and librarians since 2013. The course takes a broad theoretical framework of digital literacy, informed by media and information disciplines of the organisers, and focuses on educating teachers about student motivations, collaborative learning and digital literacy challenges (Hobbs and Coiro, 2018[233]). Despite professional learning opportunities, dedicated teacher education reform, which can guide and incentivise the changes required in teacher training, appears to be lacking in many systems. Some systems have introduced reforms. For example, Norway introduced the Professional Digital Competence Framework for Teachers in 2017. This framework includes information literacy and digital literacy skills. Other systems have chosen non-statutory subject-specific guidance, such as the United Kingdom *Guidance on Political impartiality in Schools*, which suggests that teachers should be prepared to challenge factually inaccurate claims and may also wish to proactively warn pupils about common misinformation relevant to the political issues being taught (Department for Education, 2022[234]). However, the extent to which this example presents a reform of teacher education in media literacy is limited, since the guidelines are not legally binding and do not reference any research-based media literacy frameworks.

In the same way that partnerships are crucial for implementing media literacy in the classroom, research suggests that enhanced involvement from wider stakeholders, such as not-for-profits, results in better implementation of media literacy education into teacher training (Ranieri, Nardi and Fabbro, 2019[218]). Addressing the complex issues around false and misleading digital content, including navigating delicate political issues and confronting questions of AI, automation and economics, is no easy task. Teacher education institutions appear to be underserved in terms of policy emphasis and resources.

4.6. System case study: Finland

The above policies and practices outline a number of challenges regarding the implementation of media literacy in the disinformation context. The case study of the Finnish system illustrates how each of these elements can function in a co-ordinated approach.

In their review of public policy approaches to disinformation, De Blasio and Selva (2021[112]) concluded that Finland adopts a monitored self-regulation model. This monitored self-regulation is characterised by a context in which digital platforms can choose whether to intervene against disinformation, but must do so within the framework of governmental monitoring and law enforcement. This monitored self-regulation approach is support by a number of national attributes.

Finland has been consistently ranked as the country with the strongest resilience to disinformation due its performance on indicators looking at the quality of education, free media and societal trust (Lessenski, 2019[235]; Lessenski, 2021[236]). Finland's media education policy goes back as far as the 1950s, and by the 1970s the country was recognised as a pioneer in the area of media education following the success its curriculum for mass communication education (Rantala, 2011[237]). A further attribute is that Finland operates in a context of very high media accountability. Consequently, media organisations are in a position to implement many initiatives for fact-checking and debunking disinformation campaigns, such as Faktabaari (Fact bar in English) (Heikkilä and Väliverronen, 2019[238]). The role of the government in Finland's approach to disinformation is that of a main strategist (De Blasio and Selva, 2021[112]).

This role is reflected in the extent to which the issue features across the policy landscape. The Finnish Ministry of Education and Culture has drafted dedicated media literacy strategic policy documents in 2004, 2007, 2011, 2013 and 2019. In addition to these documents, a recent analysis revealed that media literacy education is found in at least 2 011 documents across ministerial sectors (Palsa and Salomaa, 2020[113]). In this policy context, it is reported that Finland has trained thousands of civil servants, journalists, teachers and librarians in media literacy education, which includes teaching them to recognise false or misleading content (Henley, 2020[239]). The country has also been building the capacity of young children (eight years or younger) through dedicated programmes such as the Media Muffin Project since 2006 (Rantala, 2011[237]). Although false and misleading content only explicitly features in more recent initiatives.

A large number of ministries make provisions for media literacy, however the national audio-visual institute (KAVI), within the Finnish Ministry of Education and Culture, is the governmental organisation responsible for coordinating the media literacy landscape at the system level (Alajärvi, 2022[240]). For example, by maintaining a national hub for media literacy and education resources called the Media Literacy School webportal.

Despite its longstanding history of media education, Finland is tackling a number of challenges.

- The Finnish education system is characterised by high levels of autonomy, with no inspections or national-level tests. Because of this, the content of teacher training also varies widely. A 2017 survey revealed that 70% of student teachers felt there was too little media education in their initial teacher education programmes (Alajärvi, 2022[240]). This has resulted in a lack of confidence in teaching media literacy.

- Media literacy education is seen as part of promoting good civic competency and is integrated across the Finnish national curriculum. However, mentions are not always clear and explicit. The most explicit mention of it is under a specific module of "multi-literacies" (Alajärvi, 2022[240]).

In response to these challenges, Finland has been conducting a programme to strengthen the curriculum since 2020 (Box 4.11).

Box 4.11. Finnish New Literacies Programme 2020

The New Literacies Programme aims to strengthen children's media literacy competencies in information and communications technology (ICT), and programming skills in early childhood education and care, pre-primary, primary and lower secondary education. In order to do this, it aims to help teachers develop their own competencies in media literacy and share best practices for teaching it based on curricula.

Children's ability to recognise fact from opinion and fiction is a key competency described throughout the programme and features across all age ranges.

The programme is based on survey data, which concluded that there was a need for better implementation of ICT skills and media literacy. It is co-ordinated by KAVI and via a dedicated steering group appointed by the Ministry of Education and Culture, which also funds the programme.

The programme itself is based on competency descriptions in three different areas:

- Media literacy (divided in three areas of interpretation and evaluation, production and the media environment).

- Programming.

- ICT.

Implementation takes place through stakeholders, with 46 development projects awarded in spring 2021 which will pilot competency descriptions in 2021-2022. The projects are carried out by a range of providers of early childhood education and care, pre-primary, primary and lower secondary education.

Between 2021 and 2022 the programme will produce Creative Commons-licensed case contents and training based on competency descriptions to support early childhood education and care and teaching. The learning materials generated in the programme will be published in the Library of Open Educational Resources.

4.7. Research limitations

The previous sections analysed some of the policies and practices which affect the shape of media literacy in OECD countries. However, there are a number of limitations regarding the scope, variety and range of the current literature on media literacy. These, in turn, have a range of implications for combatting false and misleading content.

4.7.1. Measuring teachers' competencies to deliver media literacy

In a similar way to children's media literacy, despite recent improvements, there remain few tools or instruments to measure the media literacy of teachers (McNelly and Harvey, 2021[228]). While some tools do exist, the extent to which they target media literacy is limited. For example, the European Commission's SELFIEforTEACHERS is a digital tool to help primary and secondary teachers reflect on how they are using digital technologies in their professional practice. However, it is based on the DigiComp framework and as such is more focused on teachers' digital competency and information literacy, rather than media literacy.

4.7.2. Teacher training

Further limitations exist specifically in the context of teacher education. While there is a fairly substantial amount of literature on media literacy practices and pedagogies, they are often informed by research which is of a limited scope. For example, some scholars argue that, despite the effects of globalisation, and increasingly culturally and linguistically diverse classrooms, this is not reflected in research on teacher education and their use of digital media in the classroom (Nagle, 2018[241]). This research is still overwhelmingly dominated by studies on white, middle class teachers, whose digital experiences are not the same as those of teachers from other backgrounds, or the diverse experiences children have using digital media in their everyday lives. With disinformation being so connected to societal polarisation, more research is needed to understand how teachers can best approach the diverse societal groups engaging and navigating the media landscape.

One further research gap lies in the evidence available on professional development and pedagogies used in media literacy. A recent systematic review looking at the content of teacher professional development programmes found that inquiry/discovery/problem-based training for teachers featured in only 15.4% of the research in the sample (Sims et al., 2021[242]). This naturally affects the degree to which there is sufficient understanding of "what works" in teacher professional development to teach media literacy.

4.7.3. Media literacy interventions

A number of limitations exist in the literature regarding measuring the effectiveness of classroom interventions. These are mostly centred on the limited scope of digital media literacy studies, where conceptions of digital media users are often stereotypical and user groups are viewed as homogenous (Science Advice Initiative of Finland (ed.), 2021[102]).

Evidence has shown that there is a dearth of literature examining marginalised communities and education, as well as the role of socio-economic background, cultural and political dynamics in the effectiveness of interventions (Huguet et al., 2019[5]; Edwards et al., 2021[6]).

Many reviews have also outlined the limited geographical coverage of studies, which are mostly focused on the United States, United Kingdom and certain European countries. As a consequence, knowledge of media literacy education and effectiveness of interventions remains limited (Edwards et al., 2021[6]; Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]).

Several reviews also noted the lack of research on specific educational profiles. The research has a strong bias towards higher education students, with a large gap between the volume of literature on this group compared to students in secondary education, primary education and teachers (Huguet et al., 2019[5]; Edwards et al., 2021[6]; Valverde-Berrocoso, González-Fernández and Acevedo-Borrega, 2022[115]).

There is also a lack of diversity in the delivery methods, media and contexts in which interventions are carried out. This includes less research on the effectiveness of using images, games, and newer social media platforms (such as TikTok) in interventions (Huguet et al., 2019[5]; Edwards et al., 2021[6]; Wuyckens, Landry and Fastrez, 2021[179]).

As outlined, algorithm education must be effectively integrated into digital media literacy practices. One of the challenges with this is the underdeveloped evidence base and largely untested skills scales to design robust interventions (Dogruel, Masur and Joeckel, 2021[243]). This is despite the fact that active curation of personal algorithms has a sound technical rationale for being included in for high-quality digital media literacy.

5. Conclusion

False and misleading digital content has emerged as a defining challenge of the digital age. Digital tools have revolutionised how society consumes information, enabling easy creation and rapid dissemination. Digital media literacy can help empower children and enable them to take advantage of the opportunities presented by digital tools. It can help them recognise fact, opinion and fiction, promote engagement in societal discourse and build digital skills.

However, much work still needs to be done to understand the specific risks posed to children and how digital media literacy education can be designed and implemented to mitigate them. This paper has tried to take stock of the current state of this challenge and propose some ways forwards.

Yes, there is change. But there is also continuity in children's digital behaviours

Data on children's media lives is more advanced in some OECD countries, yet the picture is less clear in others. Still, a number of trends can be identified.

Despite the constant shifts in specific platforms' popularity, the preference for content accessed through video-sharing platforms, often accessed via mobiles or tablets, is consistent. This brings with it the need to ensure algorithmic awareness is part of high-quality digital media literacy education.

The challenge of disinformation has further emphasised the need to better understand the nature of children's engagement with digital information. Children's information consumption, including news, is increasingly "socially mediated" and delivered through relationships with others. While the family is the preferred news source for younger children, country data suggests that social media is the preferred source for teens. Children also understand news in a different way to adults. Evidence suggests that digital news sources are increasingly composed of "viral content" which does not fit neatly into specific genres (e.g. news, gossip or entertainment).

Children, especially younger children, are still not applying enough rigorous verification processes to the information they receive from others. Even when they do apply verification processes to digital information, they often choose sub-optimal indicators. This needs to be fully addressed by comprehensive digital media literacy education.

Despite data suggesting they have the skills to create digital content, most children do not produce media content themselves. Those that do tend to imitate content they have seen elsewhere. Yet, supporting children to create digital content themselves at part of digital media literacy education would allow them to more deeply understand the factors at play in the digital media they consume. Greater emphasis on the methods of production and dissemination in media literacy would enable them to critically engage with digital media.

Strategic support and policy emphasis for digital media literacy is crucial but it must translate to more systematic and explicit coordination approaches

In 2021, both the OECD revised Typology of Risks and Recommendation of the Council on Children in the Digital Environment (III.3.b.ii) emphasised the need to increase resilience to disinformation and teach children the skills to successfully distinguish between fact, opinion and fiction.

Education systems must continue to build on the policy discourse through the development of strategies, reform of curricula and funding further research that explicitly and coherently addresses the topic. Attention must be paid to evaluating policies, frameworks and practices

to enable systems to take a co-ordinated approach built on a shared understanding of best practices and the contexts in which they are effective.

At the system-level, both digital and media literacy in education is covered in many OECD member countries through various policy mechanisms. There are also a large number of actors working in the field. Yet, the degree to which this landscape is being effectively co-ordinated to target false and misleading content remains unclear. There appears to be a growing trend to foster the inter-operability of both media literacy and digital frameworks, some of which also place disinformation as a central digital risk. However, this increasing conceptual clarity should result in robust implementation and evaluation of dedicated digital media literacy strategies which provide tailored policies for different sections of society, including children.

Digital media literacy policies must be complemented and co-ordinated with other policy mechanisms and approaches

Media literacy is not a "silver bullet" to solve the challenge of false and misleading digital content, nor should it be used to individualise responsibility for a collective societal issue. It is part of a broader suite of interconnected policies that can help countries respond to disinformation and other forms of false or misleading content. Effective algorithm education, for example, requires greater transparency about the AI that facilitates much of children's digital engagement. Greater transparency here would help develop more robust resources that can be delivered in classrooms as part of comprehensive digital media literacy education. Similarly, policies to ensure better access to data for researchers might allow evidence to move beyond self-reported surveys and the effectiveness measurements to be more robust.

More focused research is needed in a number of areas

Over a decade's worth of research has provided a strong understanding of the nature of disinformation, how it is spread, by whom and for what reason. However, the direct causal link between false and misleading content and harm needs further development. Furthermore, systematic reviews have shown that the current research has shortage of evidence focusing on non-Western countries and children.

These research limitations sit within a larger knowledge gap regarding the relationship between children's cognition and how they behave in the digital environment. A small number of studies do show that younger, school-aged children have more limited capacities to engage with false and misleading content, yet young children remain largely overlooked in the literature. Teenagers have been the focus of more research and this evidence has shown that they generally assess themselves very favourably for their information sourcing and evaluating abilities. However, this has been negatively correlated with their actual media literacy levels.

The role of adults can also be further leveraged to support children's digital media literacy, if more research is carried out. Where parental strategies are assessed in relation to digital risks and opportunities, they most often do not include false and misleading content as an explicit risk. Instead, exposure to harmful content, children's data protection, radicalisation, disclosure of personal information and cyberbullying are far more commonly listed.

All of the above requires more work to be done to develop robust methodologies beyond self-reporting surveys. This would allow systems to actually measure media literacy levels of both children and the wider population, and facilitate the evaluation of policies and interventions which aim to enhance digital media literacy.

These measurements must take into account that the broader context of socio-economic, digital and educational inequalities, where children from lower socio-economic backgrounds are less likely to have access to a digital device at home, less likely to learn how to detect biased or false information in school, and more likely to have parents with lower levels of media literacy and digital skills. This puts them at a disadvantage when it comes to their own digital media literacy levels and emphasises the need for a whole-of-society approach to support vulnerable groups.

Teaching and learning about digital media literacy can be enhanced through more partnerships, better training and resource co-development

By using the right teaching strategies and resources in the right way to provoke discussions of media representation, power structures, motivations and sources, teachers can empower students with the skills they need to be aware of, and recognise, false and misleading digital content. However, approaches to the professional development of teachers, both in terms of initial teacher education and in-service professional development, are still underdeveloped when it comes to digital media literacy.

Although more research is being conducted, the results of current work indicate that media literacy is often treated as a cross-curricular topic in teacher education, which lacks systematic attention to its contents. This is especially important since critical thinking requires teacher education to make deeper connections with content knowledge to be more effective.

Teachers on the whole recognise the challenge posed by false and misleading content, and are well-placed to deliver digital media literacy education with the right support. However, it appears that the policy emphasis on both media and digital literacy had not yet resulted in sufficient levels of teacher confidence. With false and misleading content being so connected to societal polarisation, more work is needed that supports teachers to approach sensitive topics and build the abilities of the diverse societal groups engaging and navigating the digital media landscape.

Resources and stakeholders outside education play a huge role. Despite the proliferation of resources to build media literacy capacities, research in different systems suggests there is still a need for more publicly accessible teacher-oriented resources. Teachers may need to be more involved in how these resources are created. This requires schools to have quality partnerships with a wide variety of stakeholders.

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