



Digital literacy and the national curriculum for England: Learning from how the experts engage with and evaluate online content

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ABSTRACT

Educationalists' and policymakers' curriculum work on digital literacy in England has overlooked the expertise of digital specialists such as information, IT and media professionals. Given the lack of evidence, this article draws on semi-structured interviews with experts in the United Kingdom, enhanced by a diary methodology and a conversational approach to the think aloud method, to explore how they engage with and evaluate online content. In doing so, it addresses what digital literacy entails and how to promote it across the national curriculum for England. It is argued that the ability to evaluate online content involves not only reflections on the nature and origin of information, contextual knowledge and the use of multiple sources, but also functional and critical digital skills and knowledge about the internet and the digital environment. Relatedly, it is argued that the Citizenship and Computing curricula should be revised to promote digital literacy as a cross-curricular subject.

1. Introduction

Defined as the ability to access, analyse, evaluate and produce messages in a variety of forms, media literacy is advocated by academics and educationalists for contributing to well-informed citizens who engage with information critically and autonomously, participating in society and democracy (Aufderheide, 1993; Hobbs, 2010). In the UK, while information is highly mediated by digital technologies, only 2% of primary and secondary school children are able to identify false information online when taking a misinformation quiz. Three in five say misinformation makes them trust the news less, and half are worried about whether they can identify misinformation (National Literacy Trust, 2018). While half of 12- to 15-year-olds find it hard to tell whether content on social media is true, two in five have come across misinformation. Over four in ten think that social media provide trustworthy news. And three in ten aged 8–15 think that “if a website is listed by a search engine it can be trusted” (Ofcom, 2019, pp. 10–11).

Academics and practitioners think that media literacy needs to be embedded within the mainstream curriculum, since small-scale media literacy projects in school are not sufficient (Bazalgette, 2010). But countries like the UK and others in Europe lack a unified framework on how it should be taught (Frau-Meigs, Velez, & Michel, 2017). Relatedly, approaches to media literacy vary significantly, which makes it hard to identify what skills and knowledge children need to be literate in the digital age. Thanks to its interactive and creative features, the internet has made it possible for users to be not just consumers but also producers of information (Jenkins, 2006). When it comes to digital technologies, the term *digital literacy* is often employed as a variant of *media literacy*, with research focusing more on its functional or critical dimension. Functional digital literacy refers to the practical skills necessary to use digital technologies, including operational, information navigation, social and creative skills (van Deursen, Helsper, & Eynon, 2015). In addition, it can be understood as including general dispositions towards the internet, in relation, for instance, to its advantages and disadvantages for social interaction and online shopping (e.g., Reisdorf & Grosej, 2017). A few studies, however, have been more interested in users' knowledge of digital affordances (e.g., Dezuanni, 2018), which refer to how digital technologies function and can or cannot be used

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because of their technical features, digital design and the character of networks (Hutchby, 2001).

By contrast, the critical dimension of digital literacy is often approached as the ability to evaluate online content in terms of bias and trustworthiness (e.g., Kahne, Lee, & Feezell, 2012), with emphasis on dominant media representations (e.g., Kellner & Share, 2006). A few scholars, however, have argued that it should incorporate knowledge of how online information is consumed and produced in relation to issues of ownership, advertising and regulation (e.g., Buckingham, 2007). Furthermore, it can be approached as including an understanding of the internet's potentials and limitations for civic life and democracy (Fry, 2014). Not only does the internet facilitate, for instance, democratic participation, but it also undermines it through misinformation, fragmentation of political debate and surveillance (Coleman & Blumler, 2009; Fuchs, 2010; Oxley, 2012; Sunstein, 2007).

The national curriculum for England was designed by gathering evidence from teachers, young people, parents, employers, researchers and teacher training providers (DfE, 2013c; QCDA, 2010). But while digital literacy can be approached in different ways, educationalists and policymakers have hardly considered the expertise of digital specialists such as information, IT and media professionals to understand what digital literacy entails. These professionals, including, for instance, librarians, website designers, systems analysts, IT managers, editors and journalists, master a wealth of skills and knowledge, from the ability to use digital media to knowledge about how online content circulates in the digital age, along with the role of the internet. Nevertheless, research and curriculum decisions in England have overlooked how they draw on their expertise to engage with digital technologies and, more specifically, evaluate online content. Ideally, the deliberation process behind the design of a curriculum should include the voice of experts in the subject area (Levin, 2008, p. 17). In practice, however, curriculum work in England has neglected how digital specialists deploy their expertise in ways that could inform how to promote digital literacy through the national curriculum.

When it comes to the latter, educationalists and policymakers have long debated whether media literacy should be taught in school as a subject on its own or as cross-curricular (Wallis & Buckingham, 2019, pp. 196–197, 199). A look at the national curriculum suggests that multiple subjects have something to offer. Critical thinking, crucial to media literacy, applies to subjects such as English, History and Maths, which encourage students to develop balanced, evidence-based reasoning (DfE, 2014). Besides traditional subjects, the Citizenship curriculum encourages students to explore social and political issues critically and appreciate the role of the media and the press (DfE, 2015, p. 5). Furthermore, it approaches the internet as inherently positive for democracy, with little recognition of its limitations. Computing education teaches students the functional skills and knowledge necessary for using digital technologies, but places limited emphasis on how to evaluate online content (DfE, 2013a). By contrast, Media Studies encourages a “critical understanding of the media and their role ... in society” (DfE, 2016, p. 3). But unlike Computing, which is compulsory at every Key Stage, it is taught as an optional subject to students undertaking GCSEs (General Certificate of Secondary Education) and A-levels prior to higher education. As a result, Media Studies is taken by only a few students in England – 7.3% of GCSE students in 2017, for example (Cambridge Assessment, 2017, p. 6). And while it would be the most obvious choice if we were to expect only one subject to promote media literacy, it is perceived by policymakers as lacking academic credibility (McDougall & Livingstone, 2014).

Concerned about misinformation, the *Digital, Culture, Media and Sport Committee* (2018, p. 19) has recommended that digital literacy should be part of the Physical, Social, Health and Economic (PSHE) curriculum (DfE, 2013b). While the UK Government disagrees, confident that “digital literacy is already taught across the ... curriculum” (*Digital, Culture, Media and Sport Committee* 2018, p. 20), more than half of primary and secondary school teachers in the UK think the school curriculum “does not equip children with the literacy skills they need” in the digital age (*National Literacy Trust*, 2018, p. 4). But what type of skills and knowledge are crucial for evaluating online content? Accordingly, how should the national curriculum be revised? Most studies have addressed these questions by assessing lesson plans, learning activities and media literacy programmes (Hobbs, 2007; Pinkleton, Austin, Cohen, Chen, & Fitzgerald, 2008). By contrast, inasmuch as research and curriculum decisions have overlooked the expertise of digital specialists (DfE, 2013c; QCDA, 2010), this article explores how the experts engage with and evaluate online content. As a result, it draws on their expertise to discuss how the national curriculum for England may be revised to promote digital literacy. This article has therefore a theoretical and practical aim. It addresses the under-researched question of how digital experts engage with and evaluate online content to explore what digital literacy entails. In turn, it reflects on what skills and knowledge they deploy that could inform how digital literacy is promoted through the national curriculum.

2. Theoretical framework

2.1. Media education and the experts

Referring to the teaching of media studies and media literacy, media education aims to teach students how to become critical media users through media analysis and media production (Hobbs, 2004). While media analysis and production are two sides of the same coin, approaches to media education tend to prioritize one over the other. Stemming from the work of Paulo Freire (2005), the critical pedagogy tradition in media studies has advocated students' critical media analysis as intrinsically progressive, encouraging their production of alternative media which challenge dominant representations (Kellner & Sheller, 2006). However, some educationalists think that media education should promote “students' critical autonomy ... without pushing a specific agenda” (Hobbs & Jensen, 2009, p. 7). Furthermore, while learning media production can facilitate critical media analysis, some worry about promoting the former over the latter (Hobbs, 2004, p. 49). The New Literacy Studies tradition has advocated students' creative engagement with multimodal content integrating different media texts (Erstad, Gilje, & de Lange, 2007; Mills, 2010). But while a corpus of this tradition has drawn on critical pedagogy (e.g., Jenkins, Shresthova, Gamber-Thompson, Kligler-Vilenchik, & Zimmerman, 2016), the New Literacy Studies have often paid more attention to students' creative engagement with the media over their critical analysis (Pangrazio, 2016).

A binary understanding of media education as promoting students' critical media analysis or their employability based on media production competencies has underpinned the extent to which media education can benefit from IT and media professionals. While the role of librarians as information experts is generally welcomed in the context of teaching students how to engage with information, whether media education can benefit from IT and media professionals such as IT engineers, publishers and video makers has been contested. Educationalists worry that involving IT and media practitioners in the teaching of media literacy prioritizes students' employability in the media industry over their development as critical media users. They are concerned that media education could end up promoting functional over critical skills and knowledge about the media (Hobbs, 2004, p. 49). But not all educationalists reject input from IT and media practitioners. According to Hobbs (2011, p. 426), knowledge about the media ecosystem, however crucial for understanding consumption and production processes behind information, may not be necessarily helpful for evaluating practically its trustworthiness. Many educationalists, nevertheless, believe that "exposing students to industry practices" can enhance their understanding of how messages are constructed, improving their ability to evaluate media content critically (Christ & Potter, 1998, pp. 9, 10). From this perspective, when it comes to teaching students about the internet and digital media, media education can benefit from digital experts, provided functional digital literacy is subordinated to critical digital literacy (Buckingham, 1995, 2007; Butler, 2010, p. 31).

But how should input from IT and media professionals be incorporated into media education? And what can we learn from their expertise, which encompasses a wealth of skills and knowledge that are relevant to media analysis and production? Curricula are not meant to reflect the needs of experts, which is why the deliberation process behind curriculum decisions should involve policymakers and experts as well as teachers and the public. "By definition experts know more [...] but expertise in a subject area ... does not necessarily equate to expertise in constructing a curriculum" (Levin, 2008, p. 17). The question of what the experts know should come logically prior to the question of how education can benefit from their expertise. But when it comes to digital literacy, such a question has been overlooked by academics, educationalists and policymakers. The Department for Education has developed the national curriculum for England by gathering evidence from teachers, young people, parents, employers, researchers and teacher training providers (DfE, 2013c; QCDA, 2010). Restrictively, it has neglected the expertise of digital specialists, how they engage with and evaluate online content, what skills and knowledge are crucial to digital literacy, and how they relate to different subjects.

Such a lacuna also applies to research. Exceptionally, Wineburg and McGrew (2017) have found that professional fact-checkers tend to quickly scan a website and open up multiple tabs to compare information and judge its credibility. But research has generally limited itself to recognizing that digital literacy is essential within the IT and media industries (e.g., Leahy & Dolan, 2010, pp. 218–219; Stocchetti; Kukkonen, 2011). In addition, it has focused on digital practitioners' craft skills and the challenges that the convergence of traditional and digital media has posed for media professionals, including issues of authorship and production quality (e.g., Dewdney & Ride, 2014; Huang et al., 2006). Digital literacy has often been researched as lay expertise among ordinary users, especially students (e.g., Alvermann et al., 2012; Bulfin & North, 2007; Burnett, 2010). By contrast, teachers' digital expertise, including that of media studies and computer science teachers, has been under-explored or addressed in the context of their teaching practices (e.g., Savage & Barnett, 2015; White, 2015).

2.2. Research questions

As research and curriculum work on digital literacy in England have overlooked the expertise of digital specialists, this study addresses the following research questions:

RQ1: How do digital experts engage with and evaluate online content?

RQ2: What skills and knowledge do digital experts deploy that could inform how digital literacy is promoted through the national curriculum?

3. Methods

This study draws on a larger project that explores qualitatively what digital literacy is and how it intersects with civic engagement, focusing on 1) digital experts and 2) civic advocates such as political party candidates and activists in the UK. The project is based on the assumption that while the former are digitally savvy but vary in terms of civic engagement, the latter are highly engaged civically, with different levels of digital literacy. This article draws only on data about the digital experts. Of all the skills and knowledge that they have, it focuses on how they navigate and evaluate online content. While the broader study deals with content that is civic, from news to political posts on social media, how the participants engage with such content often transcends civic information *per se*.

The project is based on semi-structured interviews, enhanced by a diary methodology and a conversational approach to the think aloud method. Epistemologically, it is aligned with social constructivism, approaching digital literacy as contextually situated (Kress, 2003; Street, 2013). Relatedly, it looks at the cognitive dimension of digital literacy as socially constructed by drawing on cognitive sociology, which "does not run counter to the psychological focus of cognition, but rather emphasizes interpretative value and the fluidity of meaning" (Miller, 2014, p. 3). From such a perspective, experience- and context-based probing was employed during the interviews by asking the participants, for instance, "what was the context?" (Willson & Miller, 2014, p. 22). The participants were also asked to bring any of their digital devices (e.g., mobile phone, tablet, laptop) to the interviews to show and talk the researcher through how they engage online. Doing so allowed them to verbalize their engagement while discussing how they value the internet in response to active probing (Tamler, 1998, p. 12). To record and document for later analysis how the participants use their devices, they were asked to wear a subcam, that is, a miniature video camera mounted on a pair of glasses (Lahlou, 2011). The subcam was preferred to alternative video equipment as it is easy to use, making it possible for the participants to use their own digital devices. Collecting video

material was crucial for 1) gathering richer data on how they engage online; 2) capturing what they do when saying *this* and *that*; and 3) identifying discrepancies between what they say and do.

After the first interview, participants were asked to submit between two to four weekly diary entries on their civic practices, before being interviewed again to discuss their diaries. The diary method in media research allows the collection of “detailed information about an individual’s communicative relationships and practices articulated via ... media technologies” (Berg & Düvel, 2012, p. 71). As it can be burdensome on the participants, they were provided with regular feedback to sustain their commitment (Couldry, Livingstone, & Markham, 2007, p. 49). Additionally, £50 was given to all participants completing their second interviews, which was not deemed problematic as the target population is not low-income.

3.1. Sampling and participants

The sampling strategy was purposive to ensure heterogeneity in terms of age, gender and ethnicity, and relatedly, to capture a wide range of experiences, skills, knowledge and interpretations. The digital specialists recruited include librarians, media educators, website designers, systems analysts, social media coordinators, IT managers, editors and journalists. Participants were recruited by email from libraries, IT/media companies and schools ranging in size, location and year of establishment to maximize heterogeneity. Some were recruited on LinkedIn through profession- and location-based searches, and via word of mouth. Table 1 below provides an overview of the experts who participated in the project, including information about where they work.

The sample consists of 22 digital experts: one aged 18–24, six aged 25–34, eleven aged 35–44, three aged 45–54, and one over 55. Twelve participants are male and ten are female. Seventeen are Caucasian (including four participants from Europe and two from North America) and five are non-Caucasian (one and four participants of African and Asian origins respectively). This proportion was deemed sufficient, considering that IT and media professionals in the UK are mostly Caucasian. And while the population is predominantly male, the sample is balanced in terms of gender. As for income and education, the sample is homogeneous. Most digital experts in the UK are middle-class graduates. The predominantly middle-class nature of the sample reflects the nature of digital expertise in the UK. But it has implications for revising the school curriculum, which are discussed below under “5. Discussion and Conclusions.”

3.2. Data collection and analysis

The data used for this article is based on 32 interviews, including two interviews that were conducted to pilot the project. Out of the 22 digital experts who participated in the project, ten provided two interviews and 12 provided a total of 31 weekly diary entries of a couple of paragraphs each. The data also includes fieldnotes of two to four pages per interview, written by the researcher during fieldwork. This lasted nine months in 2018, during which public concerns about misinformation, Brexit and the Cambridge Analytica scandal were particularly resonant (Cadwalladr & Graham-Harrison, 2018). Data was collected mainly across London, with a few

Table 1
Overview of the experts who participated in the project, ordered alphabetically.

Pseudonyms	Gender	Age	Ethnicity	Profession	Workplace
Abby	Female	35–44	Caucasian	Journalist and senior producer	Media/news outlet
Anthony	Male	45–54	Caucasian (non-UK)	User experience designer	Library
Carol	Female	35–44	Caucasian	Lecturer in information science and former librarian	University
Chloe	Female	25–34	Non-Caucasian (Asian origins)	Senior IT analyst	Household goods company
Christian	Male	35–44	Caucasian (non-UK)	Cloud architect and former IT manager	Cloud services provider
David	Male	45–54	Caucasian	Information scientist and researcher in social informatics	University
Emma	Female	25–34	Non-Caucasian (Asian origins)	Technical business analyst	Bank
Frank	Male	25–34	Caucasian	Media publisher	Media outlet
George	Male	35–44	Caucasian (non-UK)	Librarian	University
Joseph	Male	35–44	Caucasian	Journalist	Freelancer
Linda	Female	55+	Caucasian	Media educationalist	Charity promoting media education
Matthew	Male	35–44	Caucasian	Senior learning technologist	University
Monica	Female	35–44	Caucasian (non-UK)	Librarian	University
Oscar	Male	18–24	Caucasian	Head of IT	Managing consulting provider
Peter	Male	45–54	Non-Caucasian (African origins)	Information consultant and former librarian	Freelancer
Rosie	Female	25–34	Non-Caucasian (Asian origins)	IT engineer and test consultant	Bank
Shawn	Male	25–34	Caucasian (non-UK)	Librarian	University
Simon	Male	35–44	Caucasian	Systems administrator	University
Sophia	Female	25–34	Non-Caucasian (Asian origins)	Social media coordinator	Clothing company
Tom	Male	35–44	Caucasian	A-level media studies teacher	School
Vanessa	Female	35–44	Caucasian (non-UK)	Senior learning technologist	University
Whitney	Female	35–44	Caucasian	Director of legal affairs	Media outlet

interviews across the UK. London's high-tech economy and cosmopolitan nature were ideal for recruiting IT and media professionals and for diversifying the sample.

As shown in [Table 1](#) above, pseudonyms were used instead of the participants' real names. Once transcribed and anonymized, the interviews, diary entries and fieldnotes were subject to thematic analysis using NVivo. Thematic analysis was used to identify themes and patterns by aggregating codes describing portions of the material under more abstract themes ([Guest, MacQueen, & Namey, 2012](#)). The researcher was the only coder. While this is a limitation of this study, it should be emphasized that unlike quantitative research, which aspires to reliability and replicability, qualitative research informed by interpretivism conforms to alternative validation standards. According to the criterion of dependability, data triangulation, which refers to the collection and confrontation of more than one single source of data, enhances the *reliability* of qualitative research ([Lincoln & Guba, 1985](#), p. 317). For the latter to also enjoy confirmability, the researcher's "interpretations [... need to be] consistent with the available data" ([Lobe, Livingstone, & Haddon, 2007](#), p. 12). With this in mind, the diary data was used to triangulate the interview data by checking for common themes and patterns. In addition, the material was read, and the codes were assessed, multiple times to maximize consistency.

The data was coded both deductively, by drawing on the larger project's theoretical framework, and inductively, by identifying new codes and themes. Prior to coding, nodes capturing abstract themes were generated deductively on NVivo, based on the project's research questions. Three overarching nodes were generated: 1) "what digital literacy is", 2) "how civic engagement provides opportunities for learning digital literacy", and 3) "how digital literacy facilitates civic engagement". For the purposes of this article, only the codes under node (1) were used; and only those that apply to the experts interviewed, not the advocates. Six nodes were generated deductively under node (1), in line with how digital literacy was operationalized. Drawing on the different approaches to digital literacy in the literature, three nodes about its functional dimension were added: 1) "digital skills", including operational, information navigation, social and creative skills ([van Deursen et al., 2015](#)), 2) "knowledge of digital affordances", in relation, for instance to digital design and the character of network ([Dezuanni, 2018](#)), and 3) "general dispositions towards the internet", in the context, for example, of social interaction and finding information ([Reisdorf & Groselj, 2017](#)). In addition, three nodes about the critical dimension of digital literacy were generated: 1) "ability to evaluate online content" ([Kahne, Lee, & Feezell, 2012](#)), 2) "knowledge about how internet corporations operate", in relation, for instance, to advertising and how they profit ([Buckingham, 2007](#)), and 3) "knowledge about the internet's civic potentials and limitations" ([Fry, 2014](#)).

What was unknown prior to fieldwork is whether the experts deploy any of these and/or additional skills and knowledge to evaluate online content. Relatedly, it was unknown whether and how these skills and knowledge intersect. Once the six deductive nodes above were added to NVivo, the material was read multiple times to generate inductively both descriptive codes and more abstract themes, under which the codes were aggregated. [Table 2](#) below provides an overview of the inductive nodes about digital literacy that were generated deductively along with the codes and themes that were added inductively, including practical examples based on the data.

4. Results

This study addresses the under-researched questions of how digital experts in the UK engage with and evaluate online content (RQ1 above) and, relatedly, what skills and knowledge they deploy that could inform how digital literacy is promoted through the national curriculum for England (RQ2 above). Once the thematic analysis was completed, the deductive nodes and inductive themes generated (see [Table 2](#) below) were aggregated into six categories, with emphasis on what the experts do, and the skills and knowledge they deploy, to evaluate online content. What emerged from fieldwork is that their ability to evaluate information, from online news to content on social media, relies on 1) reflections on the nature and origin of information; 2) the practice of using multiple sources; 3) contextual knowledge; 4) functional skills and knowledge about the internet; 5) knowledge about the digital environment in relation to the internet's civic potentials and limitations, and how internet corporations operate; and 6) the interrelation of (4) and (5) above, that is, functional skills and knowledge about the internet together with knowledge about the broader digital environment.

4.1. Reflections on the nature and origin of the information

To evaluate online content, the experts who were interviewed find it essential to reflect on the nature and origin of information. This is particularly the case for the information experts, most of whom stressed the importance of assessing its reliability regardless of whether it is mediated or not by digital technologies. For Monica, a librarian, information should be questioned "if it's too extreme ..., if the language wasn't hedged and if it wasn't bringing in lots of viewpoints", but also "if it didn't have any data to back it up" and if the source was unreliable. Ultimately, according to David, an information scientist, it is essential to reflect on whether you can trust who is behind a source. Talking about the owner of a local newspaper that he follows online, he remarked "that he's someone [he] can trust."

4.2. Using multiple sources

Evaluating online content also relies on the practice of assessing it against multiple sources, which emerged consistently as a valuable practice across different types of expertise. Christian and George, respectively a cloud architect and a librarian, diversify their news sources by using multiple news apps that vary ideologically. George follows *The Guardian* and the *Financial Times*, aware of their respective socially progressive and economically liberal agendas. Christian has a dozen apps, ranging also in terms of country of origin. As he put it: "I use multiple sources to get it right. So, if, for example, it's only on Fox News, something, I wouldn't believe it ... but if the same news is on multiple outlets with the same details, then it has more, like, credibility."

Table 2
Deductive nodes about digital literacy as functional (FDL) and critical (CDL), and inductive codes and themes about how the experts engage with and evaluate online content.

Deductive nodes	Inductive codes	Inductive themes	Examples
FDL1 – Digital skills	Deploying information navigation skills to use multiple sources and evaluate online content (i.e. CDL1)	Using multiple sources	Comparing and contrasting information on Google
FDL2 – Knowledge of digital affordances	<ol style="list-style-type: none"> 1 Deploying knowledge about how websites are designed along with information navigation skills (i.e. FDL1) to assess their reliability (i.e. CDL1) 2 Deploying knowledge of what search engines and websites afford along with information navigation skills (i.e. FDL1) to use multiple sources and evaluate online content (i.e. CDL1) 	<ol style="list-style-type: none"> 1 Assessing the reliability of websites 2 Using multiple sources 	<ol style="list-style-type: none"> 1 Looking at the URL of a website 2a Checking the origin of photos across multiple sources by using Google Reverse Image Search 2b Using the hyperlink to follow up on sources
FDL3 – General dispositions towards the internet	Deploying appreciation of the internet's potential for accessing information along with information navigation skills (i.e. FDL1) and knowledge of what search engines afford (i.e. FDL2) to check different sources and evaluate online content (i.e. CDL1)	Using multiples sources	Using Google Translate to access and compare news stories in different languages
CDL1 – Ability to evaluate online content	<ol style="list-style-type: none"> 1 Reflecting on the language, evidence, author and source behind information 2 Using multiple sources in synergy with trust in accredited media outlets 3 Deploying knowledge of a topic, the socio-political system and media bias to assess information 	<ol style="list-style-type: none"> 1 Reflecting on the nature and origin of information 2 Using multiple trusted sources 3 Contextual knowledge 	<ol style="list-style-type: none"> 1 Asking oneself whether the language is extreme or whether the author can be trusted 2 Using multiple news apps, appreciative of accredited media outlets 3 Understanding the topic and socio-political context of news stories, along with the bias of traditional media
CDL2 – Knowledge about how internet corporations operate	Deploying knowledge of how internet corporations operate, with what implications for privacy and what their platforms afford (i.e. FDL2), to use different search engines in synergy with information navigation skills (i.e. FDL1) to compare and evaluate online content (i.e. CDL1)	Using multiple search engines	Comparing and contrasting information on Google and DuckDuckGo
CDL3 – Knowledge about the internet's civic potentials and limitations	<ol style="list-style-type: none"> 1 Deploying knowledge about the internet's potentials and limitations for political debate along with information navigation skills (i.e. FDL1) and knowledge of what social media afford (i.e. FDL2) to check different sources and evaluate online content (i.e. CDL1) 2 Deploying knowledge about the internet's potentials and limitations for political debate, along with information navigation and social skills (i.e. FDL1), knowledge of how internet corporations operate (i.e. CDL2) and what search engines and social media afford (i.e. FDL2), to diversify exposure to information and evaluate online content (i.e. CDL1) 	<ol style="list-style-type: none"> 1 Using multiple sources 2 Diversifying exposure to information 	<ol style="list-style-type: none"> 1 Searching for tweets coming from reliable sources on Twitter 2a Looking beyond the first results on Google 2b Following Facebook and Twitter accounts with opposed views

Trust in media outlets is paramount when using multiple sources. For Whitney, a media professional, “a news story will first be brought to [her] attention” on Twitter. Then, “there are a handful of trusted sources that [she] would look to for more detail”, such as the BBC and *The Guardian*. For George, using multiple sources goes beyond relying on accredited media outlets. As he wrote in his diary:

There were interesting articles in *The Guardian* on Cambridge Analytica and how they possibly used millions of Facebook profiles illegally to manipulate voters ... I tried to better understand how this tool works and found an interesting webpage explaining the context in a very (at least it seemed) balanced but still critical way.

Ultimately, nevertheless, many value reputable media outlets. For Monica, their commitment to “fact-checking is really important” as well as their “ethical standards” and “quality of the reporting.”

4.3. Contextual knowledge

The ability to evaluate online content relies not just on reflections on the nature and origin of information, and the practice of assessing it against multiple sources, but it also requires broader contextual knowledge. Knowledge about a topic is necessary for evaluating information pertinent to that topic, and so is knowledge about the socio-political context. While George thinks that the *Financial Times* has “very good articles,” he admits: “sometimes I don’t really understand [them] because I’m not such a finance person.” By contrast, Anthony, a user experience designer, uses the internet to keep abreast of politics in his country of origin, feeling “pretty familiar” with its socio-political system, which he learnt about in school. As he put it, “[I] was required to take two civics classes ... about the way the government works – how it’s structured, why it does what it does, and who can have which power.”

When using multiple sources, knowledge about the socio-political system requires an understanding of the socio-political biases of traditional media outlets. One would expect this knowledge to be more pronounced among the media professionals interviewed. But fieldwork suggests that, as with the practice of using multiple sources, it transcends specific domains of expertise. Not only do librarian George and cloud architect Christian use multiple news apps that vary ideologically, as discussed above, but many know how traditional media outlets operate, which is why they value the BBC as objective and trustworthy. As Oscar emphasized, who is the Head of IT in a management consulting company: “during general elections, I only stick to the BBC ... It’s the most accurate source of information ... to me the BBC is very, very neutral ..., which is why I trust it so much.” Sophia, a social media coordinator who works for a clothing company, knows that its objectivity is based on “address[ing] multiple ... dimensions” in their stories. By contrast, when it comes to media outlets such as Fox News, Christian thinks you can find news about US President Trump in “every news outlet ... except for Fox News ..., especially if it’s negative to Trump or the Republicans or their agenda.”

4.4. Functional skills and knowledge about the internet

Knowledge about a topic, the socio-political system and traditional media outlets is important when evaluating online content. But as the latter is internet-mediated, practical digital skills and functional knowledge about the internet and what it affords are also essential. Conscious of digital affordances, Monica and Whitney, for example, look at the URL of a website to assess its reliability. And while George and David believe that misinformation can be well-presented, Christian appreciates that it can be helpful to look at whether textual information online is badly written or whether the layout of a website is badly designed. He also relies on his ability to differentiate news from opinion pieces. Navigating the Fox News website on his phone during one of his think aloud sessions, he said:

You have these opinions here [*pointing at “Opinion” under the headline of an article, next to the name of the writer*] ... you know that these opinion pieces ... they don’t even try to be objective.

Aware of what the hyperlink affords for following up on sources, Shawn, a librarian, explained: “you get redirected to an entry [*he clicks on an abbreviation that is hyperlinked, opening a Wikipedia page*]. It could be Wikipedia, it could be an article from a news media.” Many experts, furthermore, verify the trustworthiness of online content by deploying information navigation skills to search for and compare different results on Google, appreciative that the internet provides access to a wide range of information. This practice is particularly important for media professionals, who are used to fact-checking. While journalist Abby, for instance, uses Google Reverse Image Search to check the origin of photos, Joseph, another journalist, reads news in different languages by using Google Translate. He said: “if ... you’ve got Google Translate, you can go to a Russian site and look up the story. And you can get different angles on it and you can find different sources.” Chloe, a senior analyst who understands Reddit’s technical features, trusts content on Reddit only if it comes with photos or links to sources. Finally, user experience designer Anthony relies on his knowledge of what protocols like WHOIS afford to check the trustworthiness of a website. Most of the experts interviewed rely on their functional skills and knowledge about the internet regardless of their expertise. But IT professionals like Anthony are particularly conscious of what it affords for evaluating online content. During his think aloud session, he said:

There’s lots of WHOIS lookups [*scrolling up and down several Google results*] ... so if I find something that’s dodgy or I think it’s dodgy, I can at least ... Let’s just try ICANN. That’s this one [*he clicks on “who.is.icann.org/en”*] ... so, say you like a website that’s published by Joeblogs.com. I can find out where that website is, where it’s hosted, and who has registered that.

4.5. Knowledge about the digital environment

Not only do functional skills and knowledge about the internet enhance the ability to evaluate online content, but knowledge about

the internet's potentials and limitations for civic life and democracy is also crucial for understanding its implications for online information. This kind of knowledge transcends the different types of expertise that the experts enjoy, but it can also relate to their professions. It is not by chance that journalist Joseph, for instance, talked about the internet in relation to news reporting and misinformation. As he put it:

Information is more readily available ... you can see all the way around a story, obviously I suppose it's more democratic in many ways because anyone can write something online ... to put a story online you don't have to train as a journalist, get appointed, get it past the news editor, run it past the editor, run it past the owner. You can just write something and upload it, it's more democratic. But then with that comes obviously the whole problem of sort of validity, how valid are some of these stories and then the whole fake news thing.

In addition, according to Carol, a lecturer in information science, social media have facilitated citizens' interaction with politicians, while also making political content prone to trolling and hate speech. As librarian Peter remarked: "a lot of people on Twitter are not serious. They are called trolls. They just look for a way to start arguments."

Knowledge about the internet's civic potentials and limitations is often intertwined with awareness of how internet corporations operate. Oscar and technical business analyst Emma are worried about the dominance of the advertising model of corporations like Facebook and Google, which impinges on the vetting of online content, contributing to misinformation. Carol and systems administrator Simon are concerned about the implications for privacy and democracy inherent in tracking user-generated content for advertising purposes. Reluctant to post her photos online, Carol "worr[ies] about ... privacy and facial recognition in protests." Similarly, Anthony is concerned that "if this country ... would turn to be more authoritarian ..., we would be extremely and completely vulnerable to being rounded up in prison for just being left-wing or right-wing."

4.6. Functional skills and knowledge about the internet together with knowledge about the broader digital environment

Besides intersecting with a critical understanding of the internet, politics and democracy, knowledge about internet corporations is also intertwined with a functional understanding of what the internet affords. That is, a critical understanding of how corporations like Google and Facebook operate and profit through advertising and the collection of users' data is often blended with an understanding of what their platforms afford in line with their business models. Many participants are aware that their algorithms prioritize results and content on users' feeds based on what they like, who they interact with and their consumer habits. Relatedly, Shawn is concerned about the problem of the filter bubble, resulting from "how their algorithms edit what you see on the screen or edit out the kind of stuff that you should be seeing." Such a problem, he appreciates, prevents users from being exposed to content that is different from their pre-existing beliefs. In turn, as Chloe remarked, it undermines democracy by reinforcing the polarization of political debate.

Not only is understanding the broader digital environment necessary for appreciating the nature of online content in relation to how internet corporations operate and the internet's civic potentials and limitations, but it is also crucial for engaging with such content along with practical digital skills and a functional understanding of what the internet affords. Peter, for instance, relies on his social skills online to follow different media outlets on social media like Twitter to diversify what he reads and form a balanced opinion, appreciative of its potential to provide mainstream and non-mainstream content. As he values the latter for representing social minorities, he thinks, "it's good to hear both sides." However, he is concerned that political debate on Twitter is undermined by irrelevant, distracting content, which is why he also relies on his navigation information skills. During one of his think aloud sessions, he said:

When I am using Twitter and I want to find out about Brexit [*he types "Brexit" into the search bar*] ... if I just type the word "Brexit" ... [*he clicks on "Search"*] ... you can see there is quite a lot ... sometimes it might be irrelevant [*he scrolls down*] ... look at this tweet [*referring to a tweet that is related to Brexit but is not from a politician*]. I don't really want to look at this. I just want Brexit and politicians. I want politicians to be talking. So, one way I can do this is by adding the word "politician" [*he scrolls up, clicks on the search bar and adds "politician"*]. So I add "Brexit politician" ... it's reduced the end results, showing anything about politicians. If you look here [*referring to the first tweet that has appeared in the results*], this is about an MP.

Knowledge about the broader digital environment and what the internet affords shapes the ability to search for and compare information online. Concerned about privacy and the implications of tracking users' data, Carol uses Firefox as a web browser and DuckDuckGo as a search engine, which she values for being less privacy invasive. Nevertheless, she admits: "sometimes I just can't find [what I'm looking for] on DuckDuckGo so then I will use Google because normally it will find it for me ... so, I don't completely just eschew Google." Similarly, Simon compares information on both search engines, aware that DuckDuckGo's "index is ... not as comprehensive as Google's."

While diversifying sources is crucial for evaluating online content, engaging only with sources confirming one's pre-existing beliefs plays a deterrent role. Aware that Google customizes results based on users' preferences and search histories, Whitney looks beyond its top results when searching for information. Similarly, concerned about the filter bubble and the potential of social media to exacerbate the polarization of political debate by feeding users with what they like, Abby "look[s] at [the] Twitter accounts" of "people that have oppositional views" to her. Relatedly, as Shawn said:

We all have preferred ways of accessing information and sources, and there's nothing wrong with that, but it would be good to be in the loop of what other people that you don't normally agree with think. So, I guess it would help people to approach information with a more open mind, if their feed was like stuff they like ... and then the kind of stuff that they might be uncomfortable with.

5. Discussion and Conclusions

Insofar as research and curriculum decisions about digital literacy in England have under-explored the expertise of digital specialists (DfE, 2013c; QCDA, 2010), this article has a theoretical and practical aim. It sheds light on how the experts engage with and evaluate online content to understand what digital literacy entails. And it reflects on what skills and knowledge they deploy that could inform how to promote digital literacy through the national curriculum. Based on their expertise, what stood out from fieldwork is that the ability to evaluate online content, which is a critical dimension of digital literacy, relies on 1) reflections on the nature and origin of information; 2) the practice of using multiple sources; 3) contextual knowledge; 4) functional skills and knowledge about the internet; 5) knowledge about the digital environment in relation to the internet's civic potentials and limitations, and how internet corporations operate; and 6) the interrelation of (4) and (5) above, that is, functional skills and knowledge about the internet together with knowledge about the broader digital environment.

To evaluate online content in terms of bias and trustworthiness, the experts interviewed reflect on whether the information they encounter is one-sided and evidence-based, and who is behind it. Research on information literacy has emphasized the importance of reflecting on the nature and origin of information, as exemplified by the CRAAP test, which invites a close examination of its currency, relevance, authority, accuracy and purpose (Wichowski & Kohl, 2013). In line with this strand of research (e.g., Goad, 2002; Weiner, 2011), how the experts assess online content suggests consistently that the practice of using multiple sources, together with reliance on accredited media outlets, is also crucial for comparing and contrasting information. In addition, broader contextual knowledge that goes beyond the specificity of the information encountered is essential. George's unfamiliarity with news about finance shows that background knowledge about a discipline or topic is crucial for understanding and evaluating information. As Damico and Baidon (2007) have argued, it is essential to have "background knowledge to contextualize and corroborate sources of information [... , and] determine the credibility of claims and evidence" (p. 261).

Anthony's familiarity with the socio-political system of his country of origin suggests that contextual knowledge intersects with civic literacy. Recurrently approached as knowledge about history, the political system and current affairs, civic literacy refers also to the ability to participate in civic life and make informed judgements, which is why it overlaps with notions of information and critical literacies (Giroux, 2017; Lund & Carr, 2008, p. 14). From such a perspective, knowledge about the socio-political context requires an understanding of the ideological biases of the different media outlets, as captured by Christian's comments about Fox News and Oscar's appreciation of the BBC as objective. Such an understanding intersects with the critical dimension of media literacy and news literacy, which, approached as a subset of media literacy, refers to the skills and knowledge necessary for evaluating news media (Kellner & Share, 2006; Maksl, Craft, Ashley, & Miller, 2017, p. 231).

While knowledge about a topic, the socio-political system and media bias is fundamental, as online content is mediated by the internet, the ways digital specialists engage online reveal that a layer of practical digital skills and functional knowledge about the internet is also necessary, which underpins how they use multiple sources. Such a layer of functional skills and knowledge about the internet consists of functional digital literacy, which has generally been subordinated to the critical dimension of digital literacy (e.g., Buckingham, 2007). In line with research that has placed emphasis on users' understanding of digital affordances (e.g., Dezuanni, 2018; Livingstone, 2014), what emerged from interviewing the experts is that functional digital literacy intersects prominently with critical digital literacy. This finding builds on Wineburg and McGrew's (2017) study on how fact-checkers evaluate online content, who open multiple tabs to compare websites. As discussed above, many of the experts interviewed deploy information navigation skills to search for and compare online content, appreciative of the internet's advantages for accessing a wide range of information. Familiar with the affordances of its technical features and digital design, they check the origins of photos on Google or use Google Translate to read news from other countries. Or they look at the URL of a website or its layout to assess its reliability.

These findings resonate with Meyrowitz's (1998) notion of media grammar literacy, according to which "each medium [h]as its own language" (p. 99). They suggest that functional digital literacy is crucial for deploying critical digital skills and knowledge. Except for research that lies at the intersection of critical pedagogy and the New Literacy Studies (e.g., Jenkins et al., 2016), these two traditions have paid more attention, respectively, to users' critical media analysis and, based on functional skills and knowledge about the internet, creative engagement with multimodality (Pangrazio, 2016). By contrast, this article shows that besides information navigation skills, understanding the internet's technical features and what they afford, which is particularly important for online content creation (Dezuanni, 2018), plays a significant role in the context of critical digital literacy. Information, IT and media professionals master skills and knowledge that are relevant to media analysis and production. The way they deploy their expertise to engage with and evaluate online content suggests that digital literacy operates in both functional and critical ways.

Not only is functional digital literacy important when evaluating online content, but knowledge about the broader digital environment is also crucial for appreciating how, and with what implications, information circulates in the digital age. Such knowledge can be approached as a dimension of critical digital literacy. Exceptionally, a few scholars have interpreted the latter in ways that go beyond the ability to evaluate online content to incorporate knowledge about how internet corporations operate, along with the internet's potentials and limitations for civic life and democracy (e.g., Buckingham, 2007; Fry, 2014). Conscious of the importance of diversifying sources, Joseph appreciates the internet's potential for citizen journalism but also for misinformation, as addressed by political communication research (e.g., Beckett, 2008; Oxley, 2012). Peter values the possibility of accessing non-mainstream online content to form a balanced opinion, echoing research on the importance of engaging with both mainstream and alternative media (McCurdy, 2010). Anthony and Carol know that user-generated content is subject to tracking by internet corporations for advertising purposes. Consistent with political economy concerns within media research (Fuchs, 2010), they worry about the privacy implications for democracy inherent in their business models. Abby and Chloe, furthermore, recognize that online content also undergoes polarization and trolling, as discussed by Sunstein (2007) and Bishop (2014).

Ultimately, what stood out from interviewing the experts is that besides contributing to an understanding of how online content circulates in the digital age, knowledge about the digital environment shapes the ability to engage with and evaluate online content in synergy with functional skills and knowledge about the internet. The way critical digital literacy intersects with functional digital literacy has been under-explored by media research, even when the latter has exceptionally expanded on the critical dimension of digital literacy to incorporate users' understanding of the digital environment (e.g., Buckingham, 2007; Fry, 2014). What emerged from fieldwork is that such an understanding underpins the ability to search for information and intersects with knowledge of what the internet affords, shaping the ability to evaluate and diversify online content. This finding problematizes the idea that understanding the media ecosystem where information circulates may not be necessarily helpful, as argued by Hobbs (2011, p. 426), for practically evaluating its trustworthiness. Peter, for instance, worries about political debate on Twitter being subject to irrelevant and distracting content, which is why he relies on his ability to search for information. Knowledgeable about how internet corporations run their platforms, Whitney and Chloe recognize that because of how their algorithms function, as discussed by Vaidhyanathan (2018), online content is undermined by the filter bubble, which hinders democracy by reinforcing polarization. They are aware, indeed, that such a problem undermines the ability to evaluate online content by reducing the possibility of diversifying information that varies ideologically, as addressed by Johnson, Edmundson-Bird, and Keegan (2012). Concerned about the filter bubble, Shawn values the importance of deploying social skills when using social media to follow people and organizations that support different ideologies to minimize exposure to sources that confirm his pre-existing beliefs. Finally, Simon and Carol, conscious of the privacy implications of how internet corporations operate, compare information on Google and DuckDuckGo, knowledgeable of what these search engines afford, using the latter to minimize the tracking of their data.

This article reveals that layers of functional and critical digital literacy are essential for engaging with and evaluating online content in addition to reflections on the nature and origin of information, contextual knowledge and the practice of using multiple sources. The way functional digital literacy intersects with critical digital literacy is indicative of how digital specialists deploy skills and knowledge, which can vary depending on their professions, ranging from the practical ability to use digital technologies to knowledge about what the internet affords and its implications for society. But research and curriculum work in England has paid little attention to their expertise to understand what digital literacy entails. Given how the experts engage with and evaluate online content, how should the national curriculum be revised to ensure that children are equipped with the skills and knowledge necessary to be digitally literate?

Educationalists and policymakers have long debated whether media literacy should be taught in school as subject-specific or cross-curricular (Wallis & Buckingham, 2019, pp. 196–197, 199). According to the national curriculum, critical thinking, which is crucial to media literacy, applies to traditional subjects such as English, History and Maths (DfE, 2014). Not only do these subjects encourage students to think critically about the nature and origin of information, but they also provide them with contextual knowledge about different disciplines and topics, which, as discussed here, is crucial for evaluating information. In addition, the Citizenship curriculum encourages students to gain knowledge about the socio-political system and the role of the press, knowledge that intersects with notions of civic and political literacy and news literacy (DfE, 2013a).

As online information is internet-mediated, this article reveals that functional and critical digital skills and knowledge about the internet and the broader digital environment are also paramount. However, there is a mismatch between what digital literacy entails for evaluating online content, and the potential of the curriculum to promote it. At GCSE level, the Citizenship curriculum teaches students how the internet and “social media [...] can improve ... political participation” (DfE, 2013a). But it does not focus on how they can also undermine democracy, which, this article argues, is a fundamental dimension of critical digital literacy. While Media Studies allows students to develop a critical understanding of the digital environment, it is taken by few students as it is not compulsory (DfE, 2016). And it is perceived by policymakers as a subject that lacks academic credibility (McDougall & Livingstone, 2014). Computing, by contrast, teaches students functional digital skills and knowledge about the internet, but places limited emphasis on how to evaluate online content (DfE, 2013a). While it covers how algorithms function, it overlooks the social implications of the internet and, as discussed here, how functional digital literacy intersects with a critical understanding of the digital environment.

The National Literacy Trust (2018) has emphasized that more than half of primary and secondary school teachers in the UK think the school curriculum should be revised to equip children with the skills necessary for identifying online misinformation. However, besides recommending that the Department for Education should ensure that teachers are provided with training and resources, it has neglected how the curriculum could be revised to promote digital literacy. The Digital, Culture, Media and Sport Committee (2018) has recommended that digital literacy should be part of the PSHE curriculum, without specifying what this entails in terms of expected skills and knowledge. Finally, the Royal Society (2017) has recommended how to make computing education more inclusive, without discussing how to equip students with the skills and knowledge necessary for evaluating online content.

Given the gaps in the curriculum and what digital literacy entails in the light of how digital experts engage with and evaluate online content, this study suggests that digital literacy can only be taught across the national curriculum for England, provided Citizenship and Computing draw on Media Studies as a model and resource to teach about media bias and misinformation and promote knowledge about the broader digital environment. The Citizenship curriculum should take a more critical approach to teaching students about the internet and democracy. And Computing should place more emphasis on critical digital literacy and its interrelation with functional digital literacy.

As argued above, this study is limited by the absence of additional coders, besides the researcher. The predominantly middle-class nature of its sample, furthermore, is a limitation. While it mirrors the nature of digital expertise in the UK, it has implications for revising the school curriculum. Curricula should be designed in ways that are inclusive and culturally responsive so that students from all backgrounds can enjoy the same opportunities. This study paves the way for future research to focus on digital expertise within marginal communities. But what is ultimately paramount is that the deliberative process behind curriculum decisions on digital

literacy continues to involve multiple actors, including teachers and civil society, who represent the needs and interests of the different segments of society.

Media education is about media analysis and media production. The expertise of digital specialists includes skills and knowledge that are relevant to both, from practical digital skills to knowledge about digital affordances and the digital environment. This article is limited to understanding how they deploy their expertise to engage with and evaluate online content. On the one hand, it contributes to an understanding of the functional and critical skills and knowledge that are crucial to digital literacy. On the other hand, further research is needed on the interrelation of functional and critical digital literacy, as approached by this article, in the context of digital production. Although students cannot be expected to gain the same expertise that digital specialists enjoy, we should expect pedagogy to learn what digital literacy entails from their expertise. Future research should build on this study to explore whether, how and to what extent school children deploy the skills and knowledge identified here to engage with and evaluate online content. As for the national curriculum for England, research is needed to assess whether learning activities and teaching resources have been designed in ways that reflect the interrelation of functional and critical digital literacy.

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