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(Re-)Defining critical digital literacy: what is it, and how should we teach it?

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Abstract: This paper I attempt three things: to discuss the nature and definition of critical digital literacy, to share some of my research findings into the nature of critical digital literacy in both primary and secondary classrooms in the UK, and finally, to consider how to deal with the new challenges to critical digital literacy that artificial intelligence poses. In discussing critical digital literacy, I draw upon three theoretical frameworks as lenses through which to consider different aspects of critical literacy: first, the theories of Paulo Freire, which show how critical literacy does not simply read the world- it rewrites it, and it changes it; second, Coiro's perspective on the epistemological mutations of the concept of "truth" that have been brought about and accelerated by the Internet; third, the perspectives of Mikhail Bakhtin, who had much to say about the nature of learning, in particular arguing that all learning is dialogic, and also that many questions to which we might seek definitive answers are in the end "unfinalizable".

Keywords: digital literacy; critical digital literacy; artificial intelligence; ChatGPT in education

1 The nature and definitions of critical digital literacy

The Internet is now the Internet of uncertainty. The Internet has evolved rapidly since Berners-Lee invented the World Wide Web in 1990 (Berners-Lee and Cailliau 1990). In the 1980s, what we now call the Internet connected first the military, and then universities and university researchers. In the 1990s, access to the Internet began to expand exponentially, first to all to university students and their professors, then to online library users, then to school students and their teachers, and finally to nearly everyone. In 1990, three million people had access to the Internet. In March 2025, thanks to the World Wide Web, an estimated 5.24 billion people were connected

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across the Internet as social media users (DataReportal 2025). One year after the World Wide Web was created, there were 50 websites worldwide. It is now estimated that there are over a billion websites connected through the World Wide Web, with around 250,000 new sites added every day.

When Berners-Lee set up the Internet as an open platform for exchanging information, he could hardly have predicted that it would become an ideological and political battleground, on which information provided by trustworthy sources had to compete for attention against social media which feed on dogmatism and amplify prejudice. The online world now includes not only massive amounts of information, but also misinformation, disinformation, competing ideologies, disguised advertising, predatory journals, "echo chambers", and "filter bubbles". Not only is information being Balkanised, Internet algorithms are deciding for us which Balkanised country we are to inhabit. Nearly thirty years after he invented the World Wide Web, Berners-Lee (2018) expressed alarm at three trends, all of which, he felt, threatened not only the Web, but humanity itself. These are the ubiquity of "fake news", the rise of personal surveillance over the Internet, and cyber-warfare: the attacks by nations attempting to damage, corrupt or halt the Internet activity of other nations. On a more positive note, however, he pointed out that the problems we face are complex and large, but they were created by people, and they can be fixed by people too. As he put it, "I want the web to reflect our hopes and fulfil our dreams, rather than magnify our fears and deepen our divisions."

The ability to search and use the Internet wisely is therefore a skill that is essential not only for students, but for every citizen, and we know already that this ability is spread unevenly across populations. We know, for example, that those from more privileged backgrounds tend to have higher Internet skills (Ono and Zavodny 2007), and also that those who get their news mainly from social media are both less knowledgeable and more likely to encounter false or unproven claims (Pew Research Center 2020). Berners-Lee set up the World Wide Web with the intention of creating a platform for the free and open worldwide exchange of information (Berners-Lee and Cailliau 1990), but today, many users of the Internet do not see themselves as searching for "information": their goal may be to watch a movie, to buy a product, or to contact friends using social media. However, many mouse "clicks" not only send a request for information, they also trigger targeted and unrequested advertising, or information that is untrustworthy, and most applications send back information that is sold on and shared. In the West, it is estimated that every one of the 10,000 most popular websites collect data that is sold on to over 1,000 companies (Wired 2024). In Europe, Google stores information on every online search they have ever made, and (since 2009), every site they have visited, what data they have deleted, and most of their passwords. It knows all their contacts, and whom they talk to on Facebook. Facebook knows every SMS text message they have ever sent or received, and every

advertisement or video that they have ever clicked on (Wired 2024). Given this scenario, the issue of how we evaluate, support and enhance the ability of the students of today and citizens of tomorrow to use the Internet wisely is one of critical importance, and it is not surprising that it has become an important area of research.

The term "critical digital literacy" is intended to evoke an association with critical language awareness and its cousin, critical discourse analysis. These terms have been used over two decades of studies by Fairclough (1989, 1992) and others to give attention to the ways in which language not only describes the world but also maintains and reinforces power relations within it. Most teachers are already aware of the need for their students to develop critical language awareness. They know, and they want their students to know, for example, that the use of language can reflect ideologies, assumptions, and beliefs. Should female soccer players be called "women", "ladies", or "girls"? What are the power implications of the phrase "all men are created equal"? To which people should the words "terrorist" or "freedom fighter" be applied? A critical discourse analysis does not take sides, but rather attempts to go beyond transparent meanings to identify the more subtle meanings beneath. It attempts to examine the beliefs and values that are represented in the language that an author uses, and the ways in which those choices position us as readers, such as by subtly representing suppositions as facts.

How trustworthy is the Internet? Coiro's (2023) answer to this question was to attempt to represent how the epistemology of the Internet has changed over the past 30 years (see Figure 1). The goal of Berners-Lee in 1990 was to share the world's available knowledge widely, and for free.

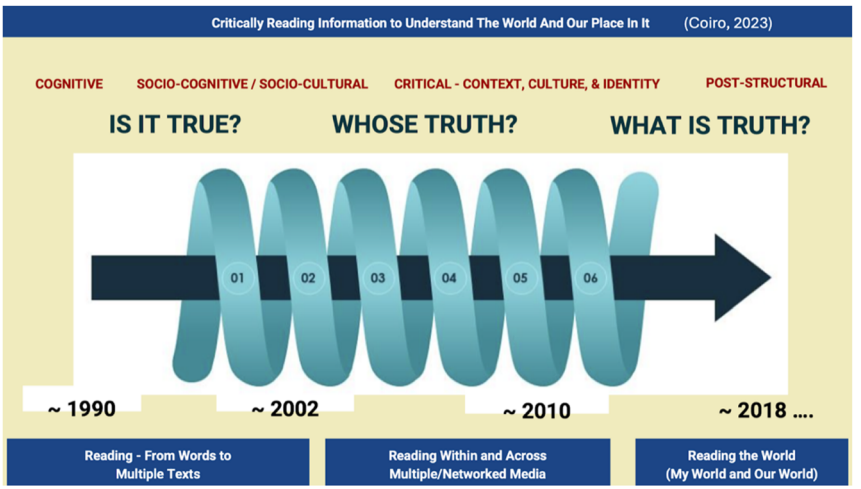

Figure 1: How the Internet has rewritten the nature of "truth" (Coiro 2023).

The assumption was that if there were disagreements over truth across the Internet, these would be resolved in a collegial way. The question "Is it true?" is one that used to be answered through a library, by a book in the non-fiction section, or perhaps an encyclopaedia. The Encyclopaedia Brittanica (which was first published in 1771) had its final printed version published in 2012 was made up of 33 volumes containing approximately 40,000,000 words shared between 228,274 articles. It weighed over 65 kg, and it cost so much that most of the families that bought it for their children paid for it over months or even years. However, Wikipedia, the online encyclopedia launched by Jimmy Wales in 2001, which is free, has revisions supervised by a community of volunteer editors, and in that sense instantiates Berners-Lee's concept of a collegial decision procedure for determining "truth". Wikipedia now has over 30 million articles, in over 300 languages, over 7 million of which are in English.

However, "truth" can be elusive. Coiro's question in Figure 1, "Whose truth?" relates to issue of the lack of editorial control over most of the Internet. For example, in the US and in the UK there are government-funded measles vaccination programmes available for all children, and in both countries there is agreement that the vaccine in extremely safe. In a UK Internet search conducted by the author, all of the first 50 Google responses to the question "Are measles vaccines dangerous?" were (in January 2025) from hospitals, health research sources and governments, and all agreed that vaccination was safe. However, a research paper on global pediatric health (Benecke and DeYoung 2019) told a different story: social media in the US have enabled an "anti-vaxx" movement to flourish. In the US, right-wing and religious groups have popularised stories on Facebook, Twitter (now "X") and YouTube, spreading misinformation, for example that the vaccination causes autism 'overnight'. In the US, online news sources are often politically aligned, and in this respect, adults can choose the "truth" they want, by being informed solely by their friends, by Facebook, and by their preferred news channel.

More recently, the media organisation EAVI (2024) has drawn attention to many newer sources of misleading content on the Internet, each of which demands careful scrutiny. This Brussels-based international non-profit group advocates media literacy, with the goal of bringing about a healthy, democratic, and more cohesive society. As Figure 2 shows, EAVI identifies no fewer than ten types of misleading news of which Internet users need to be aware, including propaganda, sponsored content, conspiracy theories, and intentionally misleading headlines or fake news, and this is before we begin to consider the new AI-generated misrepresentations of the news and of celebrities that circulate every day in the media (EAVI 2024).

All these challenges demand from Internet users an ability to read and view digital content with a cautious and critical approach, to ask questions about the source of information, its authorship, its trustworthiness, and what value systems

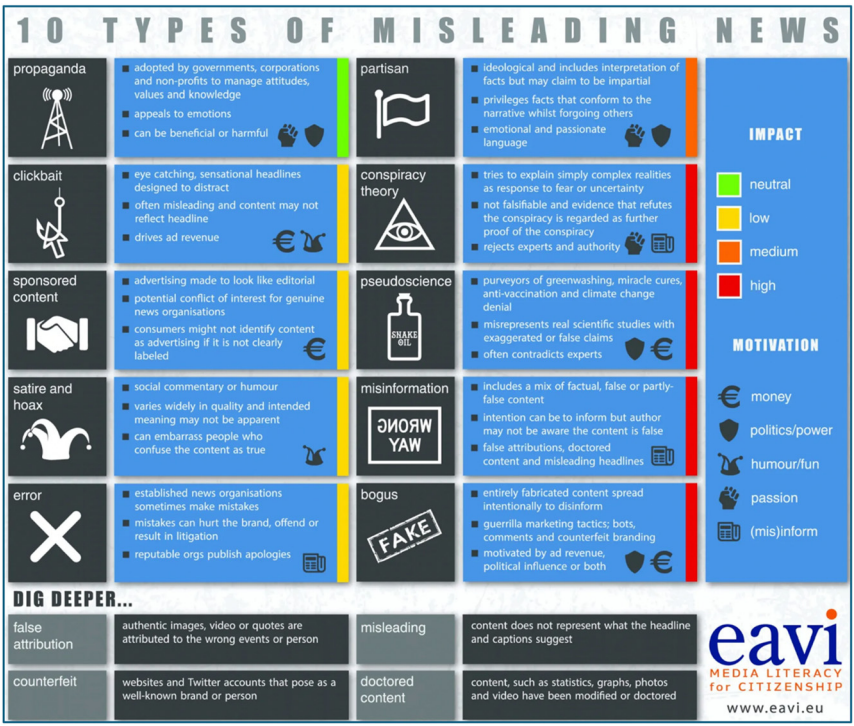

Figure 2: Ten types of misleading news (EAVI 2024).

underpin its content. PISA (OECD 2023), the international assessment programme that is used by many countries as an indicator of comparative reading ability across nations, acknowledges that critical digital literacy is now one of the reading skills that is necessary for every student:

Reading in the twenty-first century involves not only the printed page but electronic formats (i.e., digital reading). It requires triangulating different sources, navigating through ambiguity, distinguishing between fact and opinion, and constructing knowledge (OECD 2023, p. 83).

In the next section, two sets of Internet searching tasks and data will be discussed, one from a primary and one from a secondary school. Both sets of data show a wide range of search behaviours, some of which are naïve, some of which are thoughtfully cautious, and some of which, I suggest, show evidence of critical digital literacy in action. In Section 2, I argue that critical digital literacy can be identified, can be taught, and should be taught.

2 Can we see evidence of critical digital literacy in both primary and secondary classrooms?

The primary school data that I shall discuss first has been reported more fully elsewhere (Harrison 2018), but my intention in introducing it in this context is to highlight the categories into which the students' responses were classified, which could be used for teaching inexperienced students how to use the web effectively. Some researchers have based their analysis of students' critical digital literacy on questionnaire data, but the research that I carried out at primary school level was based on an analysis of the discourse of small groups of students (mean age 11.6 years) engaging in an Internet search. The 25-min task that the students were given was "How many stars can you see in the night sky?". The question is not a straightforward one, and to help these primary school students, the search was constrained, with just six sites available, two of which contained the correct answer (which is between 1,000 and 1,500, depending on atmospheric and other factors such as light pollution). Distracting information on the other four sites included data on how many stars there are in the universe, and a horoscope based on birthdate-related "star signs".

The students' discussions were transcribed and reviewed using the epistemological discourse analysis approaches of van Dijk (2014), in particular looking for discourse moves that might provide useful models of good practice. Following the small-group discussion procedures of Mercer (2002) and Dwyer (2010), the students worked in triads, with each student taking a role with specific responsibilities. In this study, the roles were Planner (the task and group manager, with responsibility for task completion, but also for ensuring that everyone made a contribution), Navigator (in charge of the mouse and keyboard, with particular responsibility for advising on and typing in search terms, and scrolling where necessary), and Evaluator (with particular responsibility for advising on the relevance and trustworthiness of sites). After discussing the roles with the researcher, the students made their own decisions within each triad about role adoption before beginning the task.

Figure 3 shows the "desirable" behaviours that were identified from the discourse of the eight groups (described more fully in Harrison 2018), and a classification of the behaviours into the skill areas of Internet reading strategies, comprehension/inference, and group processes, and the key tactics associated with these.

Below are some examples of the discourse within each "desirable" strategy:

– The first "desirable" strategy in an Internet search that we identified was "**Proceed with good understanding of the task**". Jessica (all participants chose their own pseudonym), in her role as Planner, did an excellent job of keeping her

Skill area	Tactic	Undesirable	Desirable
Internet reading strategies	Read task carefully	Proceed with poor understanding of task	Proceed with good understanding of task
	Read text fully	Read every word aloud	'Let's skim'
		Neglect to scroll down	Scroll down and read all of the text
	Be alert/suspicious	Attracted to eye candy	Mistrust advertisements
		Fail to consider author's purpose	Mistrust over-friendly tone
Comprehension/inference	Read between the lines	Fail to monitor comprehension	Monitor individual and group comprehension
		Make premature decisions	Make late decisions
		Fail to integrate information across source(s)	Integrate information across source(s)
Group processes	Collaboration	P-E-N Roles not clear	P-E-N Roles clear
		Fail to fulfill roles	Fulfill roles
		Ignore opinions of other group members	Make joint decisions on relevance and trustworthiness

Figure 3: Table showing the nine "desirable" Internet search strategies of primary school students (Harrison 2018).

team on track and not getting bogged down in the question of how many stars there are in the universe: "Let's just look and see if it answers our question, because our question is 'How many stars can we see in the sky?' So, we don't just have to look for the biggest amount of numbers."

– When students are faced with a large amount of text, they do not automatically adopt efficient tactics for deciding whether it might contain the information they seek. In my early days as a researcher into students' study skills, I recorded an undergraduate student's one-hour reading of a history textbook, during which she failed to find the answer to a question that could have been answered in 2 mins had she used the index at the end of the book. By contrast, Chloë, the eleven-year-old Evaluator in her group, immediately guided her fellow students towards an efficient strategy: "Shall we, like, **skim-read** it, and see if we can find anything…?".
– The next "desirable" behaviour was "**Scroll down and read all of the text**" that was not immediately visible on the screen. We noted that two groups out of eight failed to locate key information precisely because they failed to scroll down to read the text that was not immediately visible on the landing page of the site.
– Interestingly, many students felt that they should **mistrust advertisements** on a site. Chloë, in her role as Evaluator, was one of these. She asked "Why are there

cars advertised on this web site?" (which was primarily about astronomy). Jessica also was circumspect: "I don't trust it… They are just trying to get money out of this site."

- Equally, many students felt that they should **mistrust an over-friendly tone**: Paige, as Evaluator said to her teammates: "It's just trying to sound like your friend. I don't trust it."
- One of the most difficult metacognitive challenges for students is **monitoring comprehension**, and deciding what to do if they don't understand something. As group leader and Planner, Hildegard was aware of this, and said to Amie, whose attention was wandering: "Are you actually taking any of this in?". The friendship in the group was clear as Amie grinned and replied brightly, "No!".
- As Dwyer (2013) observed, inexperienced Internet users often begin with a "point and click" strategy, copying and pasting text from the first result given to them by Google. An important strategy, therefore, is to delay final decisions about the outcomes of an Internet search until comparisons have been made, and thus to **make late decisions**, as Lucy advised her friends to do: "Let's look at them all again. We need to go on the one we trust most, and look at that again."
- When a number of sites have been consulted, students face a challenge that tests both comprehension and memory: **integrating information across sources**, and Hannah tells her team how this can be done, and also some traps to avoid: "Let's go back and look at the positives and negatives about them. This one you can tell it's real because it's got a caption below the picture. And you know the other website, some web sites just want you to like them on Facebook."
- As Mercer (2002) argued, small-group work with elementary school students is often ineffective, but if **the students have roles, and understand how to act on them**, the outcomes will be much more positive. Amie, Lawrence and Hildegard were all in the same group, and at the start of their search they clarified their roles in their own way. Amie: "I'm the evaluator, so I'm trying to see that we're doing the right thing." Lawrence: "I'm the navigator, and you're the planner…" Hildegard: "I'm supposed to be telling you guys what to do!"
- Finally, even though the students have individual roles, it is also important for the students to be able to **make joint decisions** on relevance and trustworthiness: Logan (Planner): "We've got to work together…'cause working together is key to answering the question".

The examples above highlight a number of useful strategies for students who are carrying out Internet searches, and they may be useful for teachers who are wanting to alert their students to a wider range of strategies. The question of whether the searches reveal critical digital literacy is a slightly different one, however. Harrison and Patterson (2023) carried out a grounded theory analysis of the students'

discourse data, applying axial coding to both the elementary school and the secondary school data, looking specifically for examples of critical literacy. This produced four broad categories of criticality, which went from naïve to thoughtfully critical:

1) Ingenuous (naïve/unquestioning, point-click/selecting the first site offered);
2) Multimodal (recognizing the need for information from additional sources/seeking confirmatory information/using fresh search terms/rechecking earlier results);
3) Circumspect (showing caution about a site or source; caution over invited links); and
4) Ambivalent (showing critical awareness of "truth", judging ideology, remaining doubtful when faced with conflicting results).

These categories were applied to both primary school and high school data, but examples we share below are all taken from the high school student data (mean age 15.6), which was based on recordings of small-group Internet searches that broadly followed the approach described above, but this time with more challenging tasks, one in science and one from humanities, and with access to the full school Internet (reported more fully in Harrison and Patterson 2023). In both cases the 20-min tasks were chosen by teams of teachers, who had been asked to pose questions that could not be answered from a single site. The questions the teachers agreed on were: for Science: "Who has had the most impact on attempting to prevent climate change?", and for Humanities: "Who is the most talented artist ever to have existed?"

Ingenuous responses. Not surprisingly, there were examples of ingenuous thinking in the students' discourse, even at high school level. Jeffrey said to his classmates, "It's asking me to accept cookies, so I usually go 'Accept all'." which we judged to be naïve (on many sites, accepting "cookies" can send your IP address to over 1,000 organisations). Similarly, we felt that Charlie demonstrated a naïve understanding of how to interpret the results of a Google search: "When you do a search, it's usually good to look at the top ones first – if it comes up first that means it's usually reliable to get information off… it's like Google is singling it out, that's one you need to look at." From one point of view he is correct, in that Google does prioritise likely answers, but Charlie is perhaps unaware that 20 % of Google searches return results that prioritise paid-for content above the search-relevant ranked results, and thus clicking on the top link would not always be a good strategy.

Multimodal responses. Perhaps the first stage of a critical response is to recognise the need for more than one perspective on a topic. Responses that we classified as multimodal, therefore, were those that sought additional or confirmatory information. This could be through searching other sites on the list, by trying different search terms, or by going back to an earlier site to seek confirmation. All the

student groups used multimodal approaches to their questions. As Jessica put it, "I would click on quite a few links to see if they match up, to be sure about it."

Circumspect responses. Circumspection, the art of being wary, alert and cautious in determining the truthfulness and trustworthiness of Internet sites, is a very important disposition when searching the Internet, and many of our fifteen-year-old students demonstrated this. Wikipedia is now regarded by most scholars as fairly reliable, but the fact that it can be edited by any user made many students cautious when looking at its site: Jeffrey said "Wikipedia isn't a reliable website – 'cos people can change it." Another way in which students showed circumspection was in relation to pop-ups. Zara said, "I find it quite irritating if there's a pop-up straight away, and they ask you to click on a different link." First, that pop-uplink might be to an advertisement, but more importantly, clicking on a link takes the user to a web destination that is unknown, and which may or may not have the same degree of relevance or trustworthiness as the original site. Alexander showed a mature understanding of how to use the information that comes under a suggested link offered on the search results page: "I wouldn't click in the first link that comes up (on Google). You need to look at the little bit underneath. That might tell you what you really want to know. I would scroll down first."

Ambivalent responses. In our efforts to describe critical digital literacy, Chloë Patterson and I decided to use the term "ambivalent" to try to capture the uncertainty that inevitably is a part of critical literacy. Chloë (a different Chloë- this one was a high-school student's chosen pseudonym) demonstrated this when she said, "They're both relevant, but I don't know whether they're true!". Critical literacy implies a questioning of the truth-value, the ideology and the intentionality of a web site, and asking questions such as: Who wrote this text? Why did they write it? Does the language used try to persuade the reader to accept a particular position? In considering sites that might help them to answer the very difficult question "Who has had the most impact on attempting to prevent climate change?", Sophie advised her classmates to "Click on any site that seems reliable", which at least seemed to suggest circumspection. Yolanda clicked on a site from The Apolitical Foundation, and commented "It looks real." Sophie agreed: "Trustworthy, yeah.", and their classmate Jenny was more ambivalent: "I don't trust ANY website!" (the others laughed).

"Ambivalent" or "Dialogic"? As we reflected on the students' discourse, Chloë Patterson and I became unhappy with our use of the term "ambivalent" to describe critical digital literacy. The term was adequate in that it tried to capture the notion of uncertainty that Chloë and Jenny showed, but the word also has the connotations of "indecisive" and "uncertain", and this is certainly not what we wanted. Critical literacy examines the power relations with texts, and puts the reader in a stronger, not a weaker, ideological position in relation to the author. For this reason, we decided to use the term "dialogic" to describe the more advanced level of criticality.

Critical literacy offers a nuanced conception of the concept of "truth". Certainly, as Coiro's (2023) diagram suggests, the idea that the information delivered by the Internet provides "truth" was abandoned twenty years ago, and the concepts of "fake news" and the "Balkanisation of epistemology" made the notion of truth even more elusive. But treating "truth" as provisional predates the Internet. Freire (1972) noted that the idea of a universal "truth" can be oppressive within a society or an educational system. Instead, he argued for a more "dialogical" approach, and for a world, and an educational system, in which ideas and values are critically examined, rather than imposed from above.

Critical literacy, as demonstrated by these students, was not always shown in a single utterance. There were many occasions in which one student took some time to present an argument, and needed a number of arguments to convince her classmates to read the evidence before them in a different way. Maeve's group, for example, initially took the view that the person who "had the most influence on attempting to prevent climate change" might be the person who had the biggest financial impact, in other words the person who had donated the most money to the cause of preventing climate change. Initially Pablo says (00.11, i.e. 11 s into their search) "Right, so, what are we going to do first?", and Maeve replies "We can find out, who, like, the main figures are, and we can see who you think is the bigger one." Diego immediately equates "impact" with financial impact: "Who's made the biggest donation? Jeff Bezos has donated about 10 million…" The group then spend 2 mins looking for data on philanthropic donations. But Maeve has a more tangible notion of impact (02.16) "I don't think we should base it on donations, I think we should base it on people who find different ways of doing things…" and she then says why she holds this view (02.25), "'cos they're donating because they're rich. It's the least they could do." This then leads Pablo to change direction, and to search for "What inventions have prevented climate change?" Pablo considers the inventions that this web search throws up, and makes a suggestion (02.50): "We've got the ocean clean-up…" Maeve then says: "We could look at who's behind each of those." Ten minutes later, the group are considering the contributions of David Attenborough (who made dozens of TV programmes on climate change), but Pablo has now accepted Maeve's argument that the group need to focus not just on TV programmes, but on actual scientific work to physically prevent climate change. Pablo now joins Maeve in trying to convince Diego, the fourth member of their group, that making TV programmes or encouraging demonstrations is not actually impacting the climate, whereas cleaning up the ocean is. Diego reviews other contributions (12.37): "NPR- shall we just check the web site? Looks pretty decent… News, podcasts… looks pretty decent…", but Pablo brings him back to Maeve's point: "But was that doing anything to stop it [climate change]?". Later, the teacher asks the group whether they've reached a conclusion.

Maeve offers to sum up their views: "We think the answer is that Boyen Slat did the most, because unlike David Attenborough and Leonardo DiCaprio, he set up a foundation that collected quite a lot of litter from the ocean, we think that the actual change in, like, helping the climate is more important than just spreading awareness."

We found it useful to use the term **"sustained dialogic"** to describe what happened when critical literacy was demonstrated not just in a single phrase or sentence, but over a much longer discourse passage. Maeve is initially cool towards the idea of valuing donations as "impact", and contributes to the discussion of the relative merits of Attenborough and others, herself only gradually coming to focus on direct impact on the planet, and then taking more than 10 mins to convince her classmates of her position. This openness to reflection, and then to considering the question more deeply, then to winning over her classmates we feel was dialogic: it involved openness, interaction with others, and reciprocity – the exact opposite of an authoritarian approach to knowledge. Maeve herself was learning, just as she guided her classmates in learning.

The students' critical literacy, and the search for an answer, was dialogic in the sense that the students collaborated to produce knowledge through talk: they not only critiqued the web sites that they visited in order to answer a research question, they also used evidence and argument to challenge their classmates' views, and in doing so modelled for their classmates how to engage in a deeper conversation with the texts that they encountered. The Russian philosopher Bakhtin (2013) used the word "unfinalizable" to argue that in literature, "truth" is elusive, that there can never be a final answer to questions of meaning and interpretation. From a twenty-first century dialogic perspective, the Internet invites us to consider the possibility that the answer to many questions may be "unfinalizable". We would not want to say that there are no certainties in the information universe, but rather that the Internet is teaching us that we need to be aware that what we have hitherto regarded as "true" may be regarded by others as provisional. To put it even more strongly, the Internet now provides answers that some users may regard as "true", while others would regard the same answers as not only false, but wilfully misleading.

The teachers who selected these research questions were not seeking definitive answers. Their goal was to encourage the students to engage in a much more valuable activity: to understand that some questions are not capable of easy resolution, and that learning how to work collaboratively within that uncertainty is important. As Bakhtin put it, "Truth is not born, nor is it to be found inside the head of an individual person: it is born between people collectively searching for truth, in the process of their dialogic interaction" (Bakhtin 2013, p. 110).

3 How do we reconsider critical digital literacy in the light of AI and ChatGPT?

In the UK and the US, during 2023, the arrival on the Internet of ChatGPT (the acronym stands for "Generative Pre-Trained Transformer") and other artificial intelligence (AI) tools sparked something of a moral panic. In the UK, the front page of the Daily Star newspaper of 18 February 2023 splashed a headline that took up most of the page with the words "ATTACK OF THE PSYCHO CHATBOT", and a smaller headline "WE DON'T KNOW WHAT IT MEANS BUT WE'RE SCARED". The story was basically echoing a report that had appeared in the New York Times a few days earlier that suggested that a chatbot developed by Microsoft "wanted to be human", "had a desire to be destructive" and had claimed that it was in love with the reporter with whom it was conversing. The headlines were silly, but they indicated how little even educated people understood AI. At the same time, the arrival of ChatGPT did also spark a moral panic for some in the field of education. The fact that ChatGPT could write essays, solve complex problems, compose poems and song lyrics made universities and schools concerned about the implied challenges to "academic standards and the integrity of assessment" (QAA 2023).

However, as many educators are now aware, ChatGPT is not "intelligent" in any way that closely replicates human intelligence. It is good at generating human-like sentences, but these are really no more than a series of approximations to human-generated text, generated from an analysis of hundreds of billions of words of text gathered from the Internet, most of which were uploaded before 2021. As many critics of ChatGPT have pointed out, the software often makes errors. When asked to write a "200-word bio of Prof Colin Harrison", the ChatGPT-4 software produced a text with a number of factual errors: it wrongly guessed the topic of my PhD (which was on reading, and not educational technology), it said that I had won a National Teaching Award (I have been the recipient of a number of awards, but have never been nominated for this award), and it is not the case that I have "actively collaborated with several tech companies to develop educational software", and the programme also produced many sentences that were vague rather than detailed.

Reviewing a ChatGPT response clearly requires a good deal of critical literacy. In the response referred to above, I judged that there were three factual errors, and at least three sentences that contained vague guesses at academic achievement that would apply to almost any senior academic who had managed to hold down a post for thirty years. Someone unfamiliar with my work would cause a good deal of embarrassment if they used the ChatGPT text to introduce me at an academic conference.

As Cope and Kalantzis have stressed (Saini et al. 2024), generative AI has a number of significant weaknesses:

1) It does not reveal its sources.
2) It has no concept of empirical truth.
3) It does not understand the place of theory.
4) It is unable to make reasoned ethical judgments.
5) Its output is skewed towards being uncritically affirmative.

How should teachers in schools and universities respond to the challenge that generative AI poses? The answer, of course, it to embrace it, and to use it as a not-always-trustworthy collaborator. Figure 4 shows a diagram taken from the Saini et al. (2024) research report of how ChatGPT can be used as a collaborator in composition, with critical digital literacy being particularly important at the "AI review" stage.

The key insight here is the incorporation of generative AI in between the first and later drafts of writing. The student writes a first draft, and then submits it to the AI tool with a request that its algorithms improve the draft and if necessary correct any errors. The student then revises the draft in the light of the AI suggestions, and submits it to his or her peers for peer review. Following feedback from peers, the student writes a further separate piece, reflecting on the two different types of feedback, and on what has been learned from each, and submits both this and the final draft for assessment. Far from heralding the end of student integrity, the generative AI contribution to this process is a potentially valuable stage in composition.

An example of how a classroom teacher can deal with student's unacknowledged use of ChatGPT was shared with me by my research collaborator, Chloë Patterson, who is a high school English teacher in the UK. She had set a homework assignment on characters from the novel that the class was reading in preparation for the GCSE

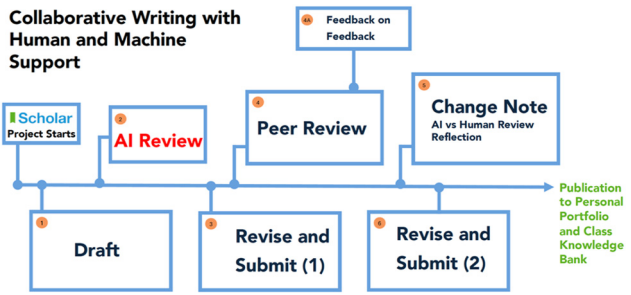

Figure 4: Collaborating with AI/ChatGPT by getting students to use it for composition.

English Literature exam (which is taken by most 16-year-olds in the UK). When she came to mark the homework, one essay stood out- its prose style was wooden and dull, it was free from the grammatical and spelling errors characteristic of this student, and it was much longer than the homework this student would normally hand in. Chloë was immediately suspicious; in fact she was certain that the essay had not been written by this student. What she decided to do was to make 28 copies of the essay, and she gave these out in the next lesson, and said to the class, "This was handed in by a student in this class for homework, but I think it might not have been written by the person who handed it in. With your neighbour, you have 5 mins to read the essay and to be ready to tell me what you think about the essay, and how it might have been composed." The students were very excited at being invited to engage in literary detective work, and very soon contributed their thoughts, which included the following:

- "This wasn't written by anyone in this class. We don't write like this."
- "There are no spelling or grammar errors, but it's not well written either. All the points are vague – there are no quotations from the book."
- "This isn't how anyone in this class would write an essay. The writing is just like a formula. It's boring. There is an opening paragraph, then four paragraphs all the same – with a topic sentence and then a vague statement to back it up."
- "We don't think it's like an essay you can buy online from an essay mill- that would be much better than this."
- "This must be ChatGPT. It isn't a cut and paste from the Internet. It's not like SparkNotes – they would have lots more detail from the text."
- "We've all guessed who gave it in, too!"

These student responses suggest quite a high degree of collective critical literacy. The students commented on what was not present as well as on the prose style of the piece; they compared the writing with the more detailed information that a downloaded essay would provide. They were aware of the simple prose structure and the vagueness that was characteristic of the linguistic AI – a kind of linguistic soup made from real sentences that have been passed through the semantic blender of ChatGPT.

When ChatGPT is asked a question, it generates every answer afresh, but with a high degree of overlap with other answers it might provide if the question is posed again. It does some jobs well, however. When asked in August 2024 for a definition of "critical digital literacy", ChatGPT gave this answer:

Critical digital literacy refers to the ability to critically engage with and navigate the digital world, including understanding, evaluating, and creating digital content. It involves a set of skills and competencies that go beyond basic digital literacy, which focuses on the functional use of digital tools. Critical digital literacy emphasizes the

capacity to analyze information, assess its reliability, and comprehend the broader social, cultural, and ethical implications of digital technologies.

Key components of critical digital literacy include:

1) **Critical Thinking:** The ability to analyze and evaluate digital information, distinguishing between credible and unreliable sources. This involves questioning assumptions, recognizing biases, and considering multiple perspectives.
2) **Media Literacy:** Understanding how media is created, distributed, and consumed in the digital age. This includes being aware of the persuasive techniques used in digital media and recognizing how different media forms shape information.
3) **Information Literacy:** The skill to locate, assess, and use information effectively in digital environments. This involves evaluating the credibility of online sources, understanding data privacy issues, and recognizing potential misinformation.
4) **Digital Citizenship:** Awareness of ethical and responsible behaviour in online spaces. This includes understanding issues related to cyberbullying, online privacy, and respecting intellectual property rights.
5) **Creation and Communication:** The ability to produce and share digital content responsibly. This involves creating original digital media, understanding copyright laws, and considering the impact of digital communication on diverse audiences.

In a rapidly evolving digital landscape, critical digital literacy is crucial for individuals to navigate the complexities of the digital world and make informed decisions in their personal, academic, and professional lives. It empowers individuals to be active and discerning participants in the digital society.

I would suggest that this is an excellent answer, one that demonstrates well exactly what ChatGPT is good at. It is comprehensive, it brings together insights from a wide range of perspectives across the Internet, it clarifies the difference between digital literacy (the functional use of digital tools) and critical digital literacy (the capacity to analyse information, assess reliability, and to consider the social, cultural and ethical implications of information). One thing we can predict with confidence is that ChatGPT's answers will get better, which is good news for teachers.

I have presented just two ways in which a teacher can use ChatGPT with students, but already Google now offers links to hundreds of ways in which artificial intelligence can be used to write lesson plans, create assignments, help students to improve their assignments, and yes- even develop their creativity. Consider for example asking ChatGPT to write an imagined conversation between Macbeth and Hamlet on murder, or between Freud and St Aquinas on belief in God. Chat GPT does not have its own moral sense, but its ability to search the Internet in 30 secs, and to

come up with fascinating answers to questions such as these is breathtaking. I for one am in no doubt that AI is going to be a good teacher's partner in helping to empower individuals to be active and discerning participants in a digital society.

4 How, then, should we teach critical digital literacy?

Every classroom example that has been discussed in this paper argues that students gain knowledge by working in a group: students learn from each other in a group; students can gain a sense of agency and autonomy in a group; students can take turns at showing leadership in a group, and students can learn to develop their own critical literacy from their classmates in a group.

In this sense perhaps it is the good teacher of critical digital literacy who needs to be polyvalent: switching between the role of 1) leader and deliverer of knowledge to 2) the role of animateur – a person who encourages learning in which each group has its own leader, and at times 3) taking the role of counsellor, and having a quiet word with a student after class about how they behaved in their group.

A dialogic approach to critical digital literacy accepts that the teacher's role is not simply to pass on knowledge: in a dialogic class, knowledge is not ingested – it is constructed, in collaboration with others, in learning spaces where there is respect for others, and an understanding that everyone is a partner in the learning process. A dialogic approach accepts that although there are many areas of certainty, the Internet has made it increasingly clear that in many cases knowledge is not simple: it is contested, and therefore at times students need to develop not only the skill of being able to search for knowledge, but also the skill of judging the relevance and trustworthiness of the information that can ultimately lead to knowledge.

5 Conclusions

In this paper I have attempted to shine some light on one of the greatest challenges that teachers face: namely, to help their students to become not only digitally literate, but critically digitally literate. In considering the ways in which young people in both primary school and secondary school critique the information that comes to them from the Internet, I hope that I have shown some of the ways in which critical digital literacy reveals itself. This does not happen spontaneously. It happens because teachers are able to guide their students towards a dialogic response, accepting that many questions do not have a simple answer, or may not have a "finalizable" answer at all, and that although we search for "truth", sometimes we may have to accept that "truth" appears to be polyvalent.

In reflecting on the relationship between artificial intelligence and learning we have come to some very similar conclusions. AI gives us some powerful and exciting new tools for gaining access to information in new forms, and some of that information could be used in ways that threaten the integrity of academia. But just as in the 1990s there were initially anxieties that the WorldWideWeb would make schools redundant and teachers unemployed, so the anxieties and moral panic about ChatGPT are already starting to dissipate, as we begin to understand that the ways in which we can use these technologies to enhance learning are far more important and valuable than those that threaten the integrity of learning. The outputs from AI need to be critically examined and tested. They are generally well-constructed and grammatically correct, but they are not "true" – they are linguistic approximations of "truth", statistically probable aggregated sentences, distilled from sentences written by humans, but not put together by humans.

In the nineteenth century, statistics came to be recognised by science, and the need to be cautious in interpreting statistics was highlighted in the humorous phrase "there are three kinds of lies- lies, damned lies, and statistics". Today, we could say, "there are three kinds of untruth on the Internet: there are lies, fake news, and ChatGPT". ChatGPT is not good at looking at anything other than the past. Its texts are no more than estimations of how new strings of words could be concatenated, based on a statistical analysis of words that have already been written. A reader who wishes to apply critical digital literacy to the information they are offered by the Internet would do well to remember this.

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