Information discernment, mis-information and pro-active scepticism

Special dedication
This article is dedicated to the memory of Prof Mark Hepworth (1955 – 2016) for his invaluable help in the design and implementation of this research.

Abstract

A participatory action research (PAR) approach was employed to investigate school students' information discernment capabilities. Placing school student participants at the centre of the research process enabled them to define the problem in their own words and begin to find solutions to the issue of how to choose good quality information. Findings confirmed the results of many studies - that school students adopt a cognitive default position of trust and are relatively unquestioning when using information sources for their work (in this case the Extended Project Qualification or EPQ). Results also showed that with an appropriate embedded learning and teaching intervention, which includes aspects of information and digital literacy, school students adopt a cognitive questioning state, which leads to pro-active scepticism, enhancing their information discernment and in turn enables them to make better information choices. This has implications not only for school teachers and librarians but for educational policy makers also.

Keywords

Information literacy, information seeking, adolescents, information discernment, digital literacy, mis-information.

Introduction

Digital access is commonplace in the lives of today's learners; The Office for National Statistics (ONS) highlight that 99.1% of 16-24 year olds had used the Internet in the last 3 months (Table 2B, ONS, 2017), and only 0.9% of 16-24 year olds had not used the Internet within the last three months (ONS, 2017). However whilst today's children of the information age potentially have a wealth of knowledge readily available thanks to smartphones, tablets, etc. (Roberts and Samani, 2013), critically there are notable hurdles:
Firstly, the Internet is unregulated and therefore the information it contains can be of questionable quality (Obama, 2009);
Secondly, this unregulated information also exists in such volumes that it puts learners at risk of information overload (Bartlett and Miller, 2011);
Thirdly, just because the information exists does not mean that learners can necessarily find and/or use it effectively (Pickard et. al., 2014) as we go on to examine.
Whilst our research supports the notion that learners rely predominantly on digital resources, contrary to popular belief, adolescents are not as naturally digitally literate as might be commonly believed (Elliot, 2006; Rowlands et al., 2008; Pickard 2002; Pickard, et.al. 2013; Pickard et.al. 2014). As Shenton and Pickard (2014) observe, the raw information exists for learners to succeed - at home, in school and throughout their lives. However, the lack of information literacy skills and lower levels of patience (Elliot, 2006) unquestionably creates 'cognitive roadblocks' (Pickard, 2002). One possible explanation for this neglect could be attributed to the discursive construction of children

and young people as; ‘digital natives’ (Prensky, 2001, 2008), ‘ bathed in bits’ (Tapscott and Williams, 2008) and ‘Born digital’ (Palfrey and Gasser, 2008). These constructions became pervasive around the turn of the century in educational literature, the popular press and political rhetoric, despite the lack of empirical evidence to support such a construct. The emblematic role of children and young people as discursive sites for adults to conceptualize societal change is a very common phenomenon in Western society (Selwyn, 2009). The real cause for concern here is not with the emblematic role in itself but rather with the impact this particular conception of that role can have on educational developments. The emergence and proliferation of the ‘digital native’ myth has taken a profound hold on the public consciousness and it continues to resonate in library and information science and educational rhetoric (Herther, 2009; Detlor, 2011; Zimmerman, 2012). One issue here is with the blurring of boundaries between the use of technology and the cognitive ability to make sense of the information landscape presented by the technology (Markauskaite, 2006; Gwizdka, 2009). The reality of interacting with information in a digital landscape is complex, uncertain and much more demanding than previous landscapes which traditionally consisted of mediated information resources (Connaway et.al., 2013). The future for these children and young people *‘will be characterised by an increasingly complex and constantly evolving information landscape’* (Coombs, 2013, p43) which requires a level of cognitive interaction that goes beyond the use of digital tools and becomes a metacognitive activity of self-regulation (Walton and Hepworth, 2011).

What information literacy therefore strives to achieve in the context of this study is to facilitate a lifelong learning process that will allow students to update the skills, knowledge and understanding needed to make informed decisions and solve problems (Shenton and Pickard, 2014).

Forecasts only reinforce the importance of information literacy in a digital age; it is estimated that over the next twenty years 35% of jobs in the UK could become automated (House of Lords, 2015a). The analysis of the UK Digital Taskforce and TeenTech CIC suggested that *‘... well over half the workforce requires digital skills that extend beyond the basic skills of digital citizenship’* (House of Lords, 2015b, p1007). Ergo, in order for teens to progress and succeed successfully as adults they need to be able to engage critically with an online environment and become competent and fully functional digital citizens; as Yelland surmises these critical life skills are now part of ‘Living in the twenty-first century’ (Yelland, 2007, p17).

Establishing a wider context; a review of literature

There is widespread recognition of the importance of information literacy; the first international forum on Media and Information Literacy (MIL) considered MIL to be a fundamental human right capable of enhancing the quality of human life (UNESCO, 2011). *‘Media and information literacy embodies essential knowledge about (a) the functions of media, libraries, archives and other information providers in democratic societies, (b) the conditions under which news media and information providers can effectively perform those functions, and (c) how to evaluate the performances of these functions by assessing the content and services they offer’.*(Wilson et. al. 2011, p16).

Despite this recognition, there has been confusion and notable debate surrounding terms like ‘digital literacy’ and how they fit with ‘computer literacy’, ‘ICT literacy’, ‘e-literacy’, ‘media literacy’, etc. (Bawden, 2001). For this study the terms information

literacy and digital literacy are used in the main, with the emphasis on how these are relevant in a modern digital environment (Lankshear and Knobel, 2008). Bawden (2001) drawing on Paul Gilster summarises information literacy as the ability to deal with information using technology and its various formats. However, as we go on to illustrate, information and digital literacies stretch beyond merely a set of competencies *'and ascends towards high-level intellectual and metacognitive behaviours and approaches'* (Secker & Coonan, 2011, p20). Mackey and Jacobson (2011, p63) extend IL to 'metaliteracy' a *'redefinition of information literacy expands the scope of generally understood information competencies and places a particular emphasis on producing and sharing information in participatory digital environments.'* The latest iteration of a definition of Information literacy (ACRL, 2016) continues to fuel this debate. For example, the ACRL's use of threshold concepts to redefine information literacy has captured the imagination of librarians. Walton (2017), for example, maintains that this development provides an interesting new dimension to the notion of information literacy and has generated some discussion.

This blurring and confusion between terms is not new. Bundy (2004) identifies that terms such as 'information literacy' and 'computer literacy' having been used synonymously with differing, overlapping and even contradictory definitions, has created much confusion over the years. Whilst these disparities are not the focus of our study and the cause is beyond the scope of our research; recognition of the issues created by differing stakeholder perspectives is critical in understanding the context and influential factors at play, both at practitioner and at a political level.

Two separate distinct contexts and perspectives are reviewed here, as they have different sets of concerns and considerations relevant to our study. The first considers digital literacy from higher, national perspectives, whereas the second examines the views and experiences of those 'on the ground' from a practical delivery standpoint; this includes the views of teaching staff and parents as well as students themselves.

The Government's digital agenda

By 2017, 88.9% of the population had access to the internet within their homes (ONS, 2017). It is feasible once again to assume a level of digital citizenship comes with regular access to the internet and technology within the home. However, changes in behaviour are not solely reliant on accessibility. Seo and Bernsen (2016) have reported that despite the internet being global, user behaviour is still affected by local environment and social behaviours within different localities. Seo and Bernsen showed that urban and rural non-users were influenced by different factors and had different perceptions, both in the pre and post adoption phases.

A report released by the House of Lords makes plain its intentions to establish an ambitious digital agenda to make the most of the £105 billion that the Government estimated the digital sector was worth in 2011. As part of Objective 4 set out by the House of Lords in their report *Make or Break: The UK's Digital Future* (2015a, p15) no child should leave the education system without digital literacy. The report has failed to impress the media (Computer Weekly, 2015), special interest groups namely ILG (CILIP's Information Literacy Group) and InformALL (CILIP, 2015a and b), or even the chair of the House of Lords Select Committee on Digital Skills herself (Sarah Morgan interviewed in Computer Weekly, 2015).

Critically the report featured a plethora of 'buzz words' with no clearly identified and agreed upon definitions, and in some cases terms such as 'IT' and 'Digital Literacy' were used seemingly interchangeably (House of Lords, 2015a and b). It was simply not clear what different stakeholders meant when they employed such terms as 'digital literacy'; in some cases merely describing it as IT skills suggested that they had a limited, or even misplaced, understanding of the wider metacognitive behaviours, abilities and approaches that begin to encompass such a term (Secker & Coonan, 2011). This problem still remains as noted by the CILIP Information Literacy Group in their evidence to the Parliamentary Select Committee on Fake News (Goldstein et al., 2017).
Arguably in such a convoluted environment it stands to reason that no progress can logically be made until all parties are able to clearly define and agree upon set terms with conclusive definitions and unambiguous parameters.

Teacher perspectives

Bartlett and Miller (2011) highlight that teachers report concerns regarding the digital skills of learners and tend to rate their pupil's skills as below average. They found that 47% of teachers had experienced arguments during lessons or over schoolwork as a result of inaccurate internet-based content, 18% said that this happened at least monthly. As a result 88% thought that digital fluency should have more prominence in the curriculum.
Unsurprisingly given that teachers will be those responsible for delivering the curriculum there is a focus on teaching staff in recent government agendas. The Royal Society of Edinburgh for example:
'Scottish and UK education systems today must ensure that information and digital literacy … are recognised as being the responsibility of all teachers, across all subject areas and at all stages of learning.'
(House of Lords, 2015b, p909)
Making teachers 'responsible' for delivery and/or results however is recognised as a potential burden. The UK Digital Skills Task Force (2014) has noted that whilst teachers have an appetite for cross-curricular learning, time is a major problem, emphasising that digital literacy needs to be given the space it needs. Miller and Barlett (2012, p. 50), in their survey of 509 teachers found 'overwhelming support from the teaching community itself for the more prominent teaching of the ability to 'critically assess and understand different sources of online information'. Strikingly, 99 per cent of teachers surveyed consider this an important skill for young people to possess and 88 per cent that it should be given more prominence in the National Curriculum.

Parents

There is not a significant amount of literature to indicate where parents think digital literacy should sit within the curriculum; this would require both a comprehensive understanding of digital literacy and the curriculum itself. However, the following paragraphs provide an insight into the perceptions of parents on digital skills and Internet use:
There is something of a worrying disparity between parents' perceptions of their teenagers' online activity versus what is actually happening. A 2013 survey conducted by Roberts and Samani for McAfee found that 21% of parents believed that their child was not a member of any social media sites compared with 100% of children who said that they were. The same study found that 13% of children had lied to get around restrictions

their parents had put on the Internet and 19% had lied to their parents about online activities.

Given that it is unlikely that the popularity of the Internet will dissipate, it seems implausible that parents' future attempts to police or restrict the online activities of their children will yield different results. Digital literacy offers a different approach - rather than attempting to control or restrict young people's use of the Internet, we instead instil in them the capabilities to protect themselves. Parents (and teachers) still doubtlessly have influence over their children, but as Samsung has reiterated, 'Changing the views of parents and teachers will be especially important if we are to prepare young people for the digital future' (House of Lords, 2015, p922).

The receptiveness of parents to a digital literacy approach raises the question, to what degree they themselves might advocate it if they are not necessarily fully digitally literate? However, just because a parent does not speak French does not imply that they would not understand the benefits of having a bilingual child. Only just over 50% of parents thought that online safety should be taught in schools (Roberts and Samani, 2013); therefore, careful consideration should be given as to how the importance of digital literacy is communicated to parents so that they are included in the development and delivery of this critical element of their child's education.

Students

'... their apparent facility with computers disguises some worrying problems ... young people have a poor understanding of their information needs and thus find it difficult to develop effective search strategies'

(Nicholas, Rowlands and Huntington, 2008, p12)

Whilst teens might be the first generation to grow up in a cyber world, their mistakes, much like a tattoo, do not disappear if they make a mistake online (Roberts and Samani, 2013). Roberts and Samani's 2013 survey found that 21% of teens had sent or posted images online which they now regretted, 10% also reported having been approached online by an adult they did not know and 16% had been the victim of mean or cruel behaviour. The risks therefore are very real, and this places increasing importance on developing the skills and understanding required to navigate digital worlds safely. In essence, just because they have Internet access does not unfortunately automatically mean that they have the maturity, experience or ability required to protect themselves.

The work of Bartlett and Miller (2011) has particular relevance here. Their research concluded that young people were not careful or discerning online. They found that teens could not locate needed information, were unable to detect bias and did not apply fact checks, making them vulnerable. On a more dangerous level they noted that this meant that young people were more likely to be influenced by extremist and violent ideas. These findings reinforce the earlier conclusions of Nicholas, Rowlands and Huntington (2008), which examined the so-called 'Google Generation' reporting that increased access to technology and online information had not improved information literacy rates of young people.

As Lewandowsky et al identify in their mis-information theory, it takes more effort to be proactively critical than to be trusting (2012). He argues that people's default cognitive setting is to be trusting because their first source of trusted information was their parents. This implicit trust is then applied to others and carried through into later life. When using web-based information resources for academic purposes there is evidence to suggest that

young people rarely, if ever, look for external verification in order to trust what they have found (Pickard, et.al. 2010; 2011). A study conducted by Flanagin and Metzger in 2000 found that people rarely verified web-based information and considered it to be as credible as television, radio and magazines. Pickard et. al. (2013) found that sixth form students rarely questioned information found on the web and assumed that a search engine had somehow already carried out some form of verification. This lack of awareness can put individuals at risk of security issues such as credit card fraud (House of Lords, 2015a). This concern and the call for greater awareness and training here is not new or confined to educational establishments. Online security groups including Roberts and Samani (2013) have also identified and reiterated this need for education.

Whilst there is recognition from students that information literacy is useful in specific contexts (e.g. to locate answers needed for a learner's project), there is also a disparity in how learners perceive these skills (Andretta, Pope and Walton, 2008). There is an assumption in part that because they can use a computer, or, because they have no interest in computers that digital literacy is not needed. In the case of the study conducted by Andretta, Pope and Walton (2008), some learners either perceived information literacy as merely an extension of ICT, or, because they believed themselves to be IT literate, a waste of time. This misunderstanding of what digital literacy is and what it has to offer has also been identified by The Open University:

'If you ask people whether they need digital skills, they say, "Oh no, I don't need that", but actually they do.'

(Professor Martin Weller, The Open University, House of Lords, 2015, p770)

A lack of adequate information and support for learners raises questions, as Zimmerman (2000) points out, two decades of research have clearly linked self-efficacy as a predictor of student's motivation and learning. As Bandura (1977) stipulated, skills in themselves are not necessarily enough, learners also need to have confidence in the abilities they are developing. Nationally the House of Lords makes its intentions for learners clear in that they aim to deliver *'a cultural shift towards preparing learners to learn for themselves'* (House of Lords, 2015a, p12); however, despite this there have been few investigations into the psychosocial, social and cognitive effects of Information Literacy (Kumar and Edwards 2013; Walton and Hepworth, 2011).

Of particular note here is the 2011 study conducted by Walton and Hepworth, which found changes in the cognitive state of learners, especially the enabling of a cognitive questioning state, following information literacy sessions. Learners displayed lower degrees of uncertainty following instruction in evaluation skills and were more confident in their abilities. Subsequent studies such as those conducted by Kumar and Edwards (2013) concur with these findings. Given that there is a positive relationship between self-efficacy and performance (Bandura, 1986) this only strengthens the argument for the importance of information literacy and its role within the educational framework as a critical component to creating competent and confidence lifelong learners.

Digital literacy and the curriculum

'Digital technology will also challenge traditional methods of delivering education, meaning schools and teachers will have to adapt. New models of learning … need to keep pace with evolving technology and digital change.'

(House of Lords, 2015a, p7)

The English curriculum currently does not explicitly include information literacy (CILIP, 2015c). However, there are overlaps in terms of Functional Skills and PLTS (personal learning and thinking skills), which include such elements as ICT and critical thinking. Whilst the Government's digital agenda recognises the importance of digital literacy (House of Lords, 2015a) there still exists a wide range of opinion on the role and place it has within the curriculum. The House of Lords (2015a) states that digital literacy should be taught as a core subject alongside numeracy and literacy as well as being embedded across all subjects and the curriculum itself.

The Science Council (House of Lords, 2015b) supports the House of Lord's argument for both embedding and teaching digital literacy in its own right in that they suggest a 'twin track' approach for both schools and colleges. However, they make the clear distinction between students with a high or low demand for digital skills. For instance a student whose focus is languages would study 'core' digital skills, whereas, a computer science students would need to develop higher-level skills. However, they advise against the temptation to assign digital skills to the mathematics curriculum, which they describe as 'already crowded' (House of Lords, 2015b, p932).

Methodology

A toolkit was constructed for an initial case study of 16-18 year old students in a UK school and tested in-situ using Participatory Action Research (PAR) following Cornwall and Jewkes (1995) and Ponzoni (2016). Ozer (2017, p173) defines Youth Participatory Action Research (YPAR) as " an innovative, equity-focused approach to promote adolescent health and well-being. YPAR draws on the expertise of adolescents as they conduct research and improve conditions that support healthy development." The main research focus was to support students' development in information discernment (the evaluating information component of information and digital literacy).

Two workshops were conducted with students from a UK secondary school a day apart. The desired outcomes were to facilitate learners to be able to evaluate information, paraphrase and also to be able to reference their sources; all skills that could be used for their EPQ (Extended Project Qualification).

The digital toolkit formed the basis of the workshops the content for which had been informed by our previous research (Shenton and Pickard, 2014) and the baseline data collected as part of this project. Elements of the digital toolkit constructed during the project were:

The Source Evaluation Framework which was used to assess the quality of the source and the Meta-Evaluation Pro forma which was used to reflect on the value of each criterion to the situation. These were designed to encourage 'personal' models of information literacy. Lastly, the "Understanding the trusting self" Questionnaire was used.

Learning intervention protocol.

The intervention consisted of two workshops given one day apart after baseline data had been collected from all research participants.

Day 1 Two hour workshop

Day 2 Two hour workshop (one day apart)

We gathered evidence from follow up interviews with teachers and students 14 weeks after the workshops, during which time they had started work on their EPQ.

Data collection tools:

Pre-delivery questionnaire 1 to garner baseline data

Workshop outputs – flip chart group work
Post-delivery questionnaire 2
Post-delivery questionnaire 3 (after 6 weeks to measure learning)
Group interview with student focus group (14 weeks after workshop)
Individual interviews with staff (teachers and school librarian) (6 weeks after workshop)

The first session consisted of 44 students, and the second 35. It should be noted that of these 25 were present at both sessions. There were only 15 in total that attended both sessions and filled in all three questionnaires.

Questionnaires were devised to explore students' level of trust in teachers, parents, peers and media in order to test Lewandowsky et al's assertion. They were also asked to identify 3 information sources they had used recently and what was the behind their choices. Learners were given these short questionnaires; one at the end of the first session, one at the end of the second session, and the final one was conducted 6 weeks afterwards.

During each session students were seated in groups of not more than five or six and given poster paper and coloured pens; these were used for brainstorming and they were encouraged to capture their thoughts, views and to use the poster paper for their first attempts at referencing and paraphrasing. What was written on these sheets was not necessarily structured but did reflect the topics covered throughout the sessions. These posters were collected at the end of each session to triangulate data (Pickard, 2013) and gain a rich picture (Checkland and Poulter, 2006) regarding the participants contributions.

Follow-up interviews were conducted with seven students who had taken part in both workshops 14 weeks after the intervention. Students were interviewed together in one focus group meeting. Field notes were taken during the focus group meeting. These were open-coded and inductively analysed via manual content analysis. Each subject's response was qualitatively coded and categorised. As suggested by Miles and Huberman (1984, p. 9), the data were themed to identify "patterns and processes, commonalities and differences". In addition, two teachers and the school librarian were interviewed separately for approximately one hour, and on an individual basis 6 weeks after the workshops were delivered. These members of staff were directly involved in the delivery of the EPQ acting as supervisors for one or more students whilst they worked on their projects. Interviews were digitally recorded and transcribed. Again, open-coding as specified in the student focus group approach was used.

Initial findings

The following subsections highlight the key findings from the round of student questionnaires, the posters, and follow-up interviews with both staff and students:

Student questionnaires

When reviewing the questionnaires, the team primarily concentrated on students that had attended both sessions and successfully completed all three questionnaires. Their results are as follows:

Trust (Table 1)

There were 15 students (8 girls and 7 boys) that attended both workshops and filled in all three questionnaires (denoted as Q1, Q2 and Q3 in Table 1)

Table 1 Levels of trust

The Media	**Q1**	**Q2**	**Q3**	**Teachers**	**Q1**	**Q2**	**Q3**
1 - No trust	1			1 - No trust			
2 - A little trust	4	2.5	6	2 - A little trust	1		1
3 - Some trust	5	7.5	3	3 - Some trust	1	1	1
4 - Often trust	3	3	6	4 - Often trust	8	6	4
5 - Generally trust	2	2		5 - Generally trust	5	8	7
6 - Always trust				6 - Always trust			
Averaged score	3	3.3	3		4.1	4	3.5
Parents	**Q1**	**Q2**	**Q3**	**Peers**	**Q1**	**Q2**	**Q3**
1 - No trust		1		1 - No trust			
2 - A little trust	1		1	2 - A little trust	1	3	
3 - Some trust			2	3 - Some trust	6	4	6
4 - Often trust	1	2	2.5	4 - Often trust	7	7	5
5 - Generally trust	11	8	5.5	5 - Generally trust	1		2
6 - Always trust	2	4	3	6 - Always trust		1	1
Averaged score	4.9	4.9	4.5		3.5	3.5	3.6

Please note a few students did not give answers for all of the questions as a result not all answers total 15. For example, the fractional scores of 2.5 and 5.5 shown in Table 1 arose because respondents' answers fell exactly between their chosen answer, for example 'often trust' and 'generally trust'. It could not be ascertained whether the respondents intended this or simply did not fill in the form correctly. To this end the score has been allocated equally between the two responses. Highest scores for each questionnaire are highlighted in light grey.

Taking the average score (rounded to one decimal place) for each of the 4 categories across all three questionnaires, the different sources can be ranked in order of most trusted as follows:

Parents (4.5-4.9)
Teachers (3.5-4.1)
Peers (3.5-3.6)
The media (3-3.3)

Care should be taken when interpreting such a sample and, arguably, little has changed with the sole exception of the perceived trust in parents. In Q1 nearly all of the students stated they often, always or generally trusted their parents (14 of 15). Parents was the strongest category for students stating a broad level of trust. This does seem to add weight to the notion put forward by Lewandowsky et al (2012) that our default position of trust starts with our parents. However, this softened to 11 by questionnaire 3 with fewer 'often', 'generally' or 'always' trusting. There is a notable decrease in the 'generally' trusting category, in particular, by half of respondents from 11 to 5.5.

Teachers are the next highest category in terms of trust. They appear to be 'often' or 'generally' trusted and this changed little between the questionnaires. It is very interesting to note that the media gained the highest score for 'a little trust' in questionnaire 3 compared to Q1 and Q2. However, over the course of the questionnaires 'often trust' responses doubled in magnitude at the same time. This is perhaps because students were becoming more discerning regarding the media and were beginning to look at better quality websites for their information. For example, although one student put her trust in the media as relatively low ('some trust'), she had also stated that she regarded the BBC as trustworthy (along with four others – see Table 2 for information sources

used by students). This is a possible indication that this student in particular is beginning to become more analytical when reading websites. This suggestion of greater information discernment is reflected in the student and staff interview data discussed below.

Table 2: Sources of information used by students collated from questionnaires 1, 2 and 3

Type	Frequency
Internet/website (generic references) Not including: Wikipedia NHS website Google Research websites	18 5 2 1 1
Textbook	12
Immigration (source that was given to them as part of the workshop)	7
Books	6
Magazine	3
Media (generic references) Not including: BBC online Daily Mail online Sky News website Sky Sports Website	3 4 2 1 1
Newspaper	1
Show (it is unclear as to what this refers – it could allude to a TV programme such as a documentary)	1
Subject specific (no format identified) Psychology EPQ topic Feminism Fine Art IT Music Literature Politics	 6 1 1 1 1 1 1 1

Most learners either said that they used the Internet, a website or their college textbook for relevant information. At the time of the study AS and A level students were still largely being given set texts and did not choose their own material. This might account for the large number of students who gave the standard AS/A-level course text book as examples of information they use and also because they probably used it as a learning tool on a very regular basis. This explains why they appeared unable to give detailed answers as to 'why' they had chosen it, because at this stage in their educational career, they had not needed to select resources for themselves (i.e. they were still being 'given' their information).

Nevertheless, some students did give a rationale for choosing their preferred information source. There were wide spread reasons for choosing different sources. Their reasons for choosing resources are shown in Table 3 below. These reasons are amalgamated from questionnaires 1, 2 and 3.

Table 3 Reasons for choosing sources

Stated reason for choosing a source	Number of times each reason mentioned in collated questionnaires 1, 2 and 3)

Reliable	22
I needed that information/knowledge	11
Factual	7
Ease of use (generic) Not including: Easy to locate access Easy to understand	6 6 2
Detailed – It contained lots of information	5
For coursework	5
I was given it Not including: We were made to	4 1
I needed help – It was useful with topics	3
For revision (e.g. exam practise)	3
It was relevant	3
It was recent – Up to date	3
It had a wide varied range of information	3
Quotations	2
Teacher recommended it	2
Author Not including: It had multiple authors	2 1
Other: Good for my Extended Project Qualification Provided context for my study Had reviews It was a national publication It had data Contained statistics Citations Impartial References Contained case studies Had depth	 1 1 1 1 1 1 1 1 1 1 1

Here it was decided to show the range of reasons for choosing resources and not how they changed over time. The temporal change element did not show any particular increase in the range of reasons given. The explanation for this may be that for some students this would be the third time they had seen and filled in the same questionnaire so they would have become increasingly, and possibly over-familiar with the format. Lack of time was not an issue, which suggests that filling these forms in whilst seated in groups, may have led students to be extremely conscious of their peers and make short repetitive responses. Students were not always silent when filling in their questionnaires (there was also some active communication) which may have caused replication of responses from their group. This might explain why certain groups produced singular responses that just read 'book'. Perhaps the questionnaires may have yielded different results had students completed them under exam conditions. Alternatively, it is suspected that the lack of response was probably due to questionnaire fatigue (Pickard, 2013).

Summary

Student posters

The student posters contained theories about what they thought might constitute a 'good' or 'bad' source of information; these were particularly insightful given that, at the time,

in a large group they had been hesitant to share their theories and had actually written down far more than they had been comfortable voicing.

All of the comments, which the students identified as either ‘good’ or ‘bad’, were transcribed and coded using NVivo 10 software. Word-clouds and mind maps were produced from these comments to show the relationship between related trains of thought as well as strength of feeling.

‘Good’ information

The following illustration is a word-cloud how student comments had been coded. The size of the words/terms reflects the frequency of that particular comment. Figure 2 demonstrates the spread and grouping of comments in a mind-map format.

Figure 1 Students’ perceptions of what might characterize a ‘good’ source of information

Figure 2 Comments grouped into themes

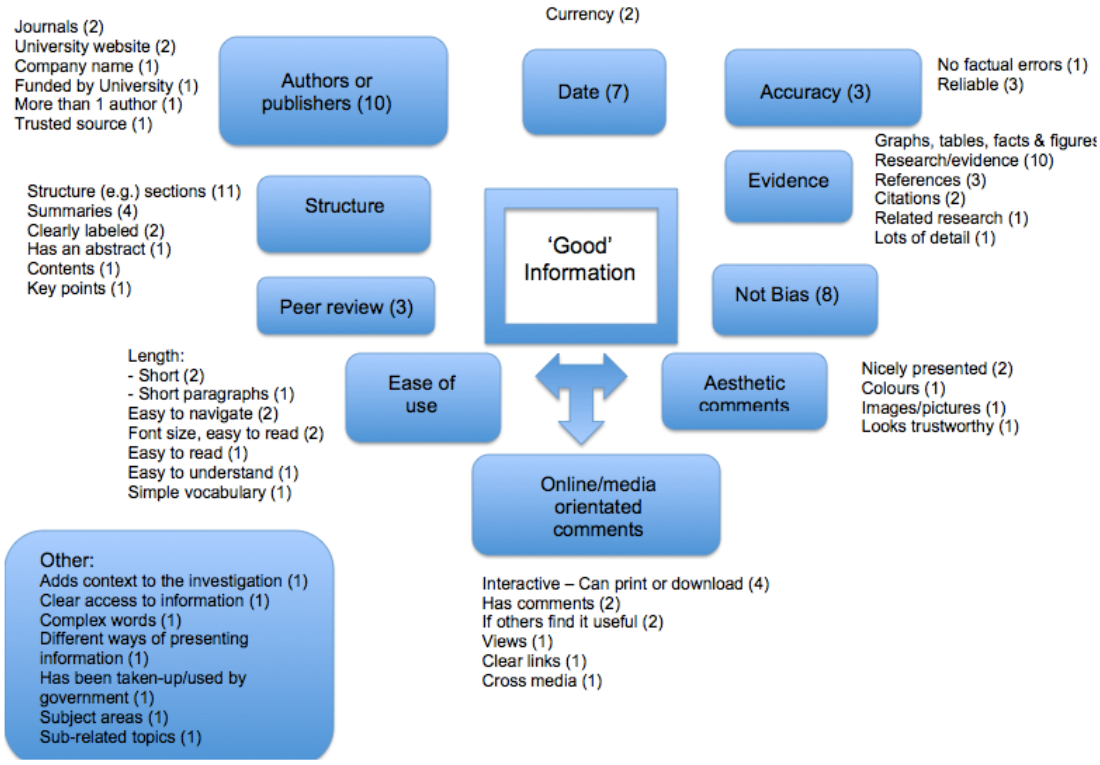


Figure 2 above demonstrates how these perceptions might be grouped into themes. The frequency of mentions is in brackets for all terms. For example 'Authors or publishers' had 10 mentions with additional sub-themes such as 'journals' (2 mentions) and 'trusted source' (1 mention). Those terms without a number are convenience labels created by the authors for clustering terms for example, the 'aesthetic comments', 'online/media orientated comments', 'ease of use', 'structure' and 'evidence'.

Learners were able to identify numerous qualities that they felt constituted positive attributes of content. Considering that most of the student groups appeared initially unsure and almost all required some guidance from staff; their responses are positive and show promising lines of investigation.

It is also significant to note that the students cognitively travelled beyond simply looking for 'the author' and had started to give some thought to the types of author(s) that they thought might be desirable. For instance, whether the source came from, or was funded by a university; or, wondering whether a source might be better (or more robust?) if it had more than one author?

What is worthy of note, and is reflected in the 'bad' posters (see below) and the student interviews are the number of comments around ease of use and aesthetics. However, as the interviews go on to show, there may be possible contributory factors, which may help to explain some of these baseline assumptions from the students.

'Bad' information

Students had far fewer ideas about what they thought might be an indicator of 'bad' content (see Figure 3); potentially an indication that they might find it more difficult to identify poor quality information.

Figure 3 Students' perceptions of what might characterize a 'bad' source of information.

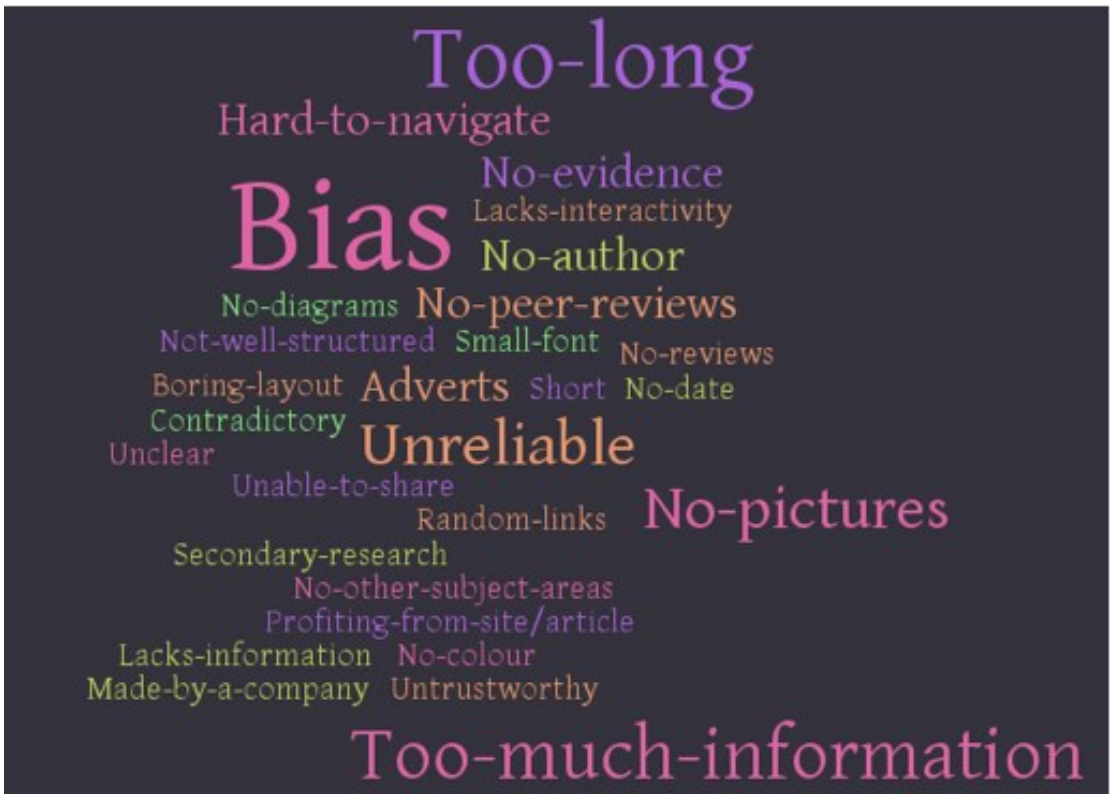
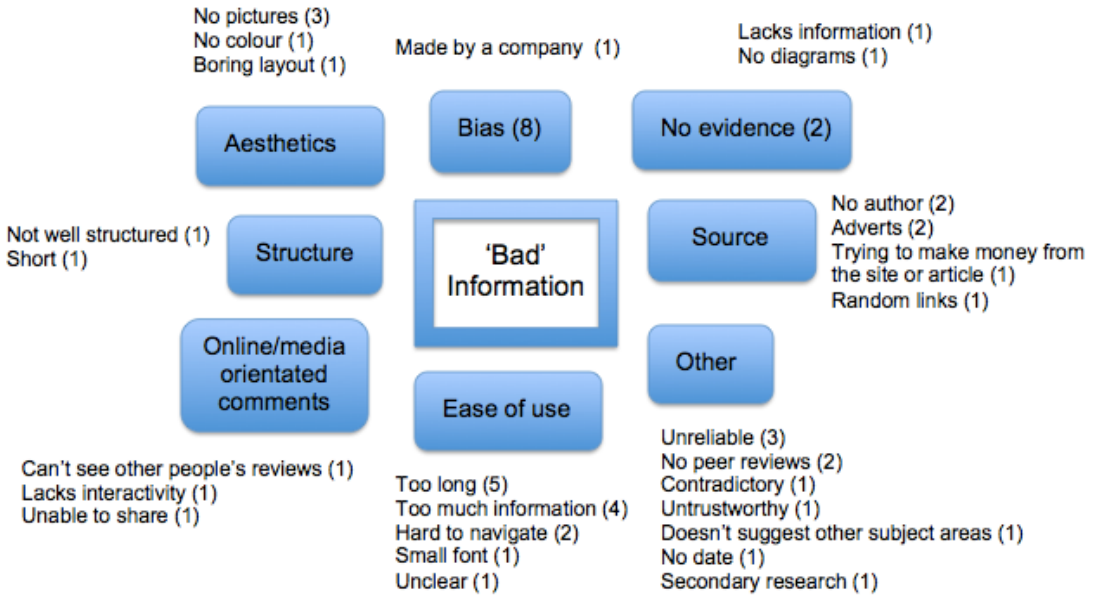


Figure 4 Diagram demonstrating student perceptions and related themes. (frequency of mentions in brackets)



Whilst ideas surrounding bias and source were anticipated, what is of interest is the ideas surrounding aesthetics and ease of use.

In terms of ease of use, students thought those sources that were complicated or difficult to use were bad. In particular they did not like sources that were either too long, or had too much information. Elliot (2006) has demonstrated that adolescents have lower levels of patience, so it's perhaps natural that in their information seeking habits that they might, hypothetically, follow the path of least resistance, and favour sources of content that are less cognitively demanding, confirming the observations made by Lewandowsky et al. (2012) regarding cognitive effort.

The aesthetics of an information source was mentioned in the workshop data and also in the students' one-to-one interviews. It would appear that good webpage design can influence students' judgements about content.

A small number of comments related solely to online behaviours which are typical of social media sites, for instance they regraded the ability to review and interact with the information source as an indicator of a good quality website.

Student interviews

Follow up interviews were conducted with seven students collectively as a focus group, all of whom had attended both sessions. This was approximately 14 weeks after the workshops had taken place and in the meantime the students had started their Extended Project Qualification work, giving them time to both reflect on and use some of the knowledge that had been initially discussed with them.

The interviews took place in an informal environment and the questions posed were open-ended, giving learners sufficient opportunity to talk freely. It is worth noting that it quickly became apparent that the students were not afraid to talk frankly; their willingness to critique as well as praise reflected an honest openness in their responses, which, demonstrates some sincere feedback.

The following sections reflect the key findings:

Data sources. All students reiterated that in terms of information sources they just used the Internet most of the time. Two students however displayed a desire to use physical

books but lamented that this did not arise very often. A third student whilst seemingly content with the Internet reflected that this reliance was due to lack of resources (e.g. because the library they had access to was small). In particular, the same student noted that interest in modern and/or emerging subjects was not being catered for. Ergo in order to find relevant material they predominantly relied on external sources (e.g. YouTube) instead which they accessed at home.

Information seeking. Student comments began to shed light on responses received via both the questionnaires and the posters, especially regarding the 'ease of use' collection of comments recorded in the posters. Three students mentioned that they tended to use whichever website came up first on Google and a fourth commented that they looked for sources that were shorter and had little writing. Only two students attending both workshops failed to mention any method of information discernment at all when talking about their information seeking habits.

Two students made the connection between familiarity and a 'good' source saying that they would prefer to use a source of information that was already known to them/that they were familiar with.

One student in particular displayed a curious disparity in their information-seeking behaviour observing there was a difference between what they did at home compared to at school. Whilst they clearly displayed that they knew how to recognize 'good' information (e.g. citations) they observed that this was a behaviour they only used at school. In essence, they knew how to identify 'good' information but did not always choose to apply this knowledge in other contexts. In other words they experienced difficulty in transferring their skills from one context to another.

Effects of the workshop on online information seeking behaviour. When questioned whether they believed that the sessions had influenced how they looked for information; all students believed that they had. Two immediately mentioned the change in behaviour and that it had benefitted their Extended Project Qualification work.

Two students reported, in a holistic manner, that they looked at websites now in a way that they never used to previously (e.g. becoming aware of things that they had not noticed before). Two other students noted that they believed it had changed their information-seeking behaviour with one now using more books and another that now avoided Wikipedia as their only source of information.

It was interesting here to observe that the learners, when reflecting displayed some proactive scepticism that was not present in the feedback, the posters or the questionnaires (where they found it easier to identify 'good' traits rather than 'bad' ones). Noticing things like citations now meant that they **avoided** 'unreliable' information. One learner mentioned that they now realized that not everything was 'true' and that this made them look more closely at what they used.

Inthe final question students were asked – "*Someone said in the workshop that they had, 'never thought about looking at a web page and analyzing it in that way before'. What would you say to that?"*

All students agreed with the statement completely; two went on to repeat the statement in their own words, and an additional two reflected they now considered themselves able to find reliable information as a result.

One student observed that this was not the first time they had been presented with loosely similar concepts (i.e. information discernment); however they did not feel the

initial experience of their earlier information discernment workshops (aged approximately eleven) as useful. They recalled that they had been asked to evaluate information sources about a 'farm for retired dogs'. However, students reported that one source was false, and based on stories that parents might tell young children to avoid them knowing that a pet had actually died. The student noted that the memory of that lesson had stayed with him, albeit not necessarily for the right reasons.

Additional observations:

Wikipedia. There was evidence of opposing views on the use of Wikipedia throughout the interviews, despite never having being asked about it or it being mentioned at any point. There was evidence of polarized views, with one student commenting that they used it on the grounds that they had never had a problem with it in the past. Conversely, the other student clearly stated that they would never use it because they wanted to know where the information had come from and who had written it (e.g. references and an author). The remaining students fell somewhere in the middle with an ability to appreciate both sides of the argument; for example one student reflected that whilst the site did 'get bashed', despite its popularity they remarked that it was not always completely correct.

Aesthetics. In relation to the aesthetical comments made on the students' posters (see above); one student hypothesized (unprompted) that this response might be, at least in part, a result of work completed in other classes (e.g. English). Part of their work involved learning to write news media-style articles. They were taught to make their writing look 'good' and make sure it was not 'boring', by replicating the writing and style of popular news pieces. Given that part of the focus and coursework marks in English were linked to appearance the respondent reflected that perhaps students had attempted to transfer this assumption to the source evaluation workshop; though they make no inference as to whether they thought this was a positive or negative outcome.

Teacher interviews

In follow-up interviews with sixth form teachers and the school librarian, all noted that the students had 'realized the need for quality information' possibly for the first time. There was a very definite view that the workshops had aided students in producing much better work for their EPQ. The school librarian noted that since the delivery of the workshop students no longer 'passively accept what they see'. The most notable and consistent remark that all interviewees made was that students had adopted a 'questioning' state when engaging with information sources (echoing and confirming the cognitive questioning state identified by Walton and Hepworth in 2011). Teachers reported for example that, 'It got them to question what their source was, where it was from, how credible was the source' and students were, 'questioning the credibility of the sources they used'. According to staff this was behaviour they had not exhibited before the workshop. Teachers mentioned that this questioning has led students to make far better decisions and consequently choose information sources of a much higher quality than previously. According to the Head of Sixth Form this was consistent amongst the majority of the cohort.

Conclusions

Proactive scepticism is not about being negative but rather than adopting a default setting of trust (Lewandowsky et al, 2012) being able to make independent judgements on the validity of information by, for instance, assessing the legitimacy of the source. The ability

to discern between different sources of information is an ever more vital cognitive and affective trait. It will become increasingly significant as we are exposed to information which comes to us from an ever diversifying range of digital media and social media beyond traditional academic sources.

This study has shown that school students, even up to the age of 16-17, approach their work with a default cognitive position of trust. In particular, they use internet resources without any regard to their provenance or quality. It is clear that school students require a better understanding of why they need to be more information discerning. By using a participatory approach, this research has shown that school students' engagement with information can be changed in very positive ways, enabling a cognitive questioning state (Walton and Hepworth, 2011), which enables them to improve how they make judgements about information and in turn how this can help create a better piece of work. Taking a PAR approach allowed the participants to recognize their own frame of understanding as well as the *frame divergence* between their fellow participants (Ponzoni, 2016). As well as the benefit to the Extended Project Qualification as used in the Case Study, raised levels of self-efficacy and understanding of the nature and diversity of information are transferable capabilities that will continue to be of use beyond the project.

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