This is a pre-publication word version of the finished article, the full citation for this paper is:

Walton, G., Pickard, A.J. and Dodd, L., 2018. Information discernment, mis-information and pro-active scepticism. *Journal of Librarianship and Information Science*, p.0961000618769980.

Information discernment, mis-information and pro-active scepticism

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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) shows that highlights 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. (McAfee, 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 & 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) point out, 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 '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 being 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) 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 their 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, 2015). 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*' (p.1007, House of Lords, 2015). 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'* (p.17, Yelland, 2007*).*

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).

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). Within the context of this study it is being classed as information literacy in a modern digital environment (Lankshear and Knobel, 2008); and as Bawden (2001) summarises the deductions of Paul Gilster it is therefore the ability to deal with information using technology and its various formats. However, as we go on to illustrate, digital literacies goes beyond merely a set of competencies '*and ascends towards high-level intellectual and metacognitive behaviours and approaches'* (p.20, Coonan, 2011). Mackey and Jacobson (2011, p.63) 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. The use of threshold concepts to redefine information literacy and some for example, Walton (2017) maintain that it provides an interesting new dimension to the 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 is 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, parents as well as students themselves.

The Government’s Digital Agenda

By 2014 84% of the population had access to the internet within their homes. 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 & 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 & Bersen showed that urban and rural non-users were influenced by different factors and had different perceptions, both in the pre and post adoption phases. Both urban and rural non- users were influenced by geographical closeness to proceed with adoption of e-government services along with perceived facilitating behavioural control, (self-efficacy).

A report released by the House of Lords makes plain their intentions to establish an ambitious Digital Agenda to make the most of 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 (Digital Agenda, 2015) no child should leave the education system without digital literacy. The Agenda has failed to impress the media (Computer Weekly, 2015), special interest groups (ILG, CILIP’s Information Literacy Group and InformALL), 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, 2015). It simply wasn’t clear what different stakeholders meant when they employed such terms as ‘digital literacy’; in some cases in 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 (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

As Bartlett and Miller (2011) highlight, teachers are concerned about the digital skills of learners rating the skills of their pupils as below average. They found that a concerning 47% of teachers had experienced arguments in either lessons or 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 the ones 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.'*
>
> (p.909, House of Lords, 2015)

The stress on teachers as being 'responsible' for delivery/results however is recognised as a potential burden. The Digital Challenge for Schools (2015) has noted that whilst there is an appetite from teachers for cross-curricular learning, time is a major problem, emphasising that teachers need to be given the space they need. 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 great deal of literature making plain where parents think Digital Literacy should sit within the curriculum; this would require both an 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 parent's perceptions of their teenager's online activity versus what is actually happening. In a 2013 survey conducted by McAfee found that 21% of parents believed that their child wasn't 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 parent's future attempts to police or restrict the online activities of their children will yield different results. Digital literacy offers a different approach in that rather than attempting to control or restrict young people's use of the Internet, we instead instil in them the tools to protect themselves. Parents (and teachers) still doubtlessly have influence over their children, but as Samsung have reiterated '*Changing the views of parents and teachers will be especially important if we are to prepare young people for the digital future*' (p.922, House of Lords, 2015).

The receptiveness of parents to a digital literacy approach raises the question of to what degree they might advocate it if they themselves 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 (McAfee, 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'

(p.12, Nicolas, Rowlands and Huntington, 2008)

As McAfee summarized 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 (McAffee, 2013). McAfee'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/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 abilities required to protect themselves.

The work of Bartlett and Miller (2011) has particular relevance here, whose research concluded that young people were not careful or discerning online. They concluded that they 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 findings of Nicolas, Rowlands and Huntington (2008), which examined the so-called 'Google Generation' concluding that increased access to technology/information had not improved information literacy rates of young people.

As Lewandowsky identifies in his mis-information theory, it takes more effort to be proactively critical rather 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). A study conducted by Flanagin and Metzger in 2000 found that people rarely verified web-based information and considered it 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 result in safety issues (including security issues such as credit card fraud) putting individuals at risk (House of Lords, 2015). The concern and call for awareness and training here

is not new or confined to educational establishments, online security groups including McAfee (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.'*
>
> (P.770, Professor Martin Weller, The Open University, House of Lords, 2015)

A lack of adequate information and support for learners raises questions given that 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 their intentions for learners clear in that they aim to deliver '*a cultural shift towards preparing learners to learn for themselves*' (p.12, House of Lords, 2015); 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 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.'*
>
> *(p.7, House of Lords, 2015)*

The English curriculum currently does not explicitly include information literacy (CILIP, 2015). 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, 2015) there still exist a wide range of opinions on the role and place it has within the curriculum. The House of Lords (Digital Agenda, 2015) states that digital literacy should be taught as a core subject alongside numeracy/literacy ***as well as*** being embedded across **all** subjects and the curriculum itself.

The Science Council (House of Lords, 2015) 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 which a high, or, low demand for digital skills. For instance students whose focus is languages would study 'core' digital skills, whereas, presumably, those with higher demand (e.g. computer science students) could develop higher-level skills. However, they advise against the temptation to assign digital skills to the mathematics curriculum, which they describe as '*already crowded'* (p.932, House of Lords, 2015).

Methodology

A toolkit was constructed and tested in-situ using Participatory Action Research (PAR), (Ponzoni, 2016) with an initial case study of 16-18 year old students in a UK school. Ozer (2017 p1.) defines Youth Participatory Action Research as "*as an innovative, equity-focused approach for promoting adolescent health and well-being that draws on the expertise of adolescents as they conduct research and improve conditions that support healthy development."* In this research we were aiming to support development in information discernment

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

- Source Evaluation Framework
    - Used to assess the quality of the source
- Meta- Evaluation Proforma
    - Used to reflect on the value of each criterion to the situation
    - Encouraging 'personal' models of information literacy
- "Understanding the trusting self" Questionnaire

Learning intervention protocol.

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

- Day 1 Two hour workshop

- Day 2 Two hour workshop (two days later)

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:

- 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)
- Interviews with student focus group (14 weeks after delivery)
- Interviews with staff (teachers and librarians)

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

Questionnaires were devised to explore students levels of trust in teachers, parents, peers and media in order to test Lewandowsky's assertion. They were also asked to identify 3 information sources they had used recently and what rationale they had used to choose them. 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 being conducted 6 weeks afterwards.

During each session students were sat 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 record their thoughts, views and to use the 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 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.

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

The average ranks the different sources as follows:

1. Parents
2. Teachers
3. Peers
4. The media

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):

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			
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

- *Please note a few students did not give answers for all of the questions, as a result not all answers total 15.*

Care should be taken when interpreting such a sample, and arguably little has changed with the sole exception of the perceived trust in parents – Which has decreased significantly. As trust did not fall for all groups and no student, either in their questionnaire or their interviews mention parents it is unclear what may have caused this.

There is certain number of contradictions in the questionnaire responses. For instance, the same student, whilst only rating her trust in the media as a 3 on the same questionnaire said that her rationale for using a media website (BBC) was that it was reliable.

Sources

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	1
Subject specific (no format identified) Psychology EPQ topic	 6 1

Feminism	1
Fine Art	1
IT	1
Music	1
Literature	1
Politics	1

Most learners either said that they used the internet/a website or their college textbook. AS and A level students are still largely being given set texts – In terms of quality of marking set scripts are easier to standardise for the awarding bodies (e.g. Edexcel and hundreds of thousands of scripts). So 'choosing' source texts and topics tends to be more indicative of independent learning tools more commonly found in HE. This might account for the large number of students that gave the standard AS/A-level course text book as examples of information they use and also because they probably use it as a learning/reference tool on a very regular basis. But could not give detailed answers as to 'why' they had chosen it – Because in essence at this stage in their educational career they hadn't (i.e. they are still being 'given' their information).

Rationale for choosing their preferred information source

There was a wide spread of reasons for choosing different sources.

Rationale	**Frequency**
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	 1 1 1 1 1 1 1 1 1

Contained case studies Had depth	1 1

There was a positive spread of reasons 'why' students had used particular sources of information. However, there was a slight increase after the first workshop, comparing it with the results of the third, by one additional point raised. Given that 16 of the questionnaires had not, at the least, answered whether they were male or female and being reasonably confident that the students **are** capable of answering this question. This might suggest that the lack of, or, short answers are not a result of not being able to answer. Indeed for some students this would be the third time they had seen and filled in the same questionnaire so they would have been increasingly familiar with the forms.

It is unclear why there was a lack of engagement with the questionnaires. Given that we know it was not a result of time pressures and the students were not rushed, the short nature of the responses and repetition suggests that filling these forms in, whilst sat in groups, that students may have been extremely conscious of their peers. Therefore, seeing that the room was not silent when students were filling in their questionnaires and actively communicating it is possible that they replicated the responses from their group. This might explain why certain groups produced singular responses that just read 'book'. Therefore, the questionnaires may have yielded different results had they been completed 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 thoughts and 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.

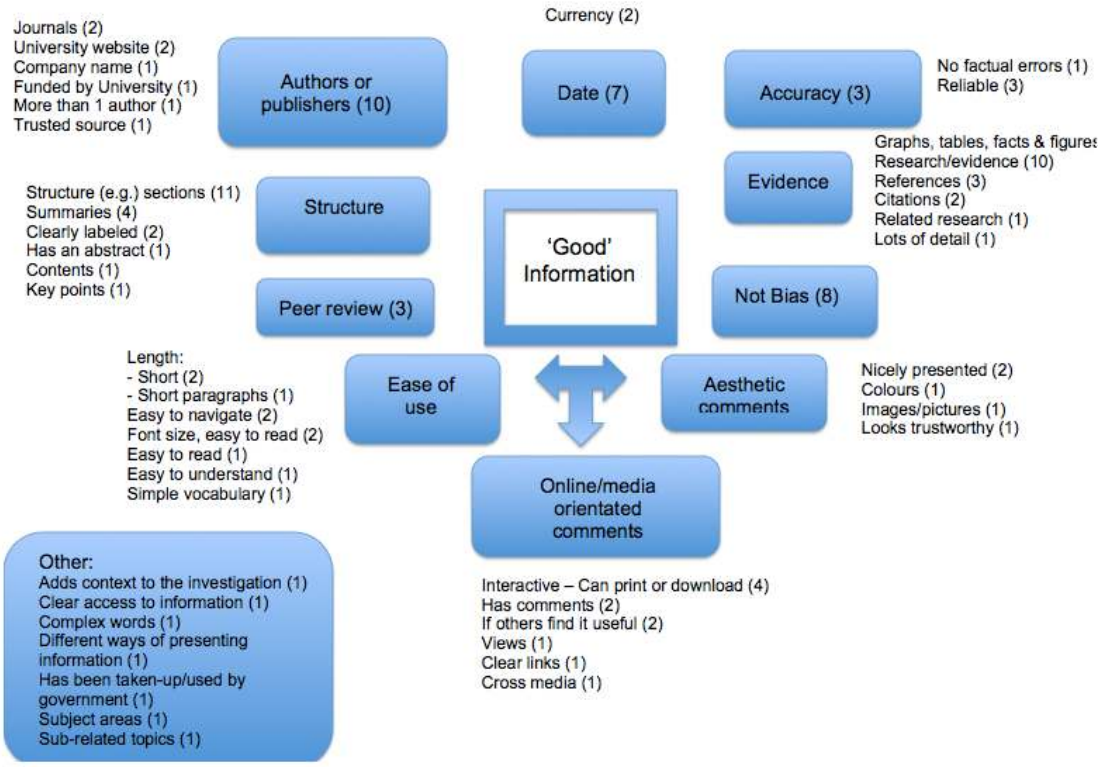
All of the comments, which the students had identified as either 'good' or 'bad', were transcribed and coded using NVivo 10 software. Word clouds and mind maps were made of these comments to show the relationships between related trains of thought as well as strength of feeling.

'Good' information

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

Figure 1) Students perceptions of what might characterize a 'good' source of information.

Figure 2) The following diagram demonstrates how these perceptions might be grouped as the comments tended to relate to a set number of themes.



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

It is also positive to note that the students cognitively travelled beyond simply looking for 'the author' and had started to explore 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 (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 comments around ease of use and aesthetics. However, as the interviews go on to show, there may be possible attributing factors, which may help to explain some of these baseline assumptions from the students.

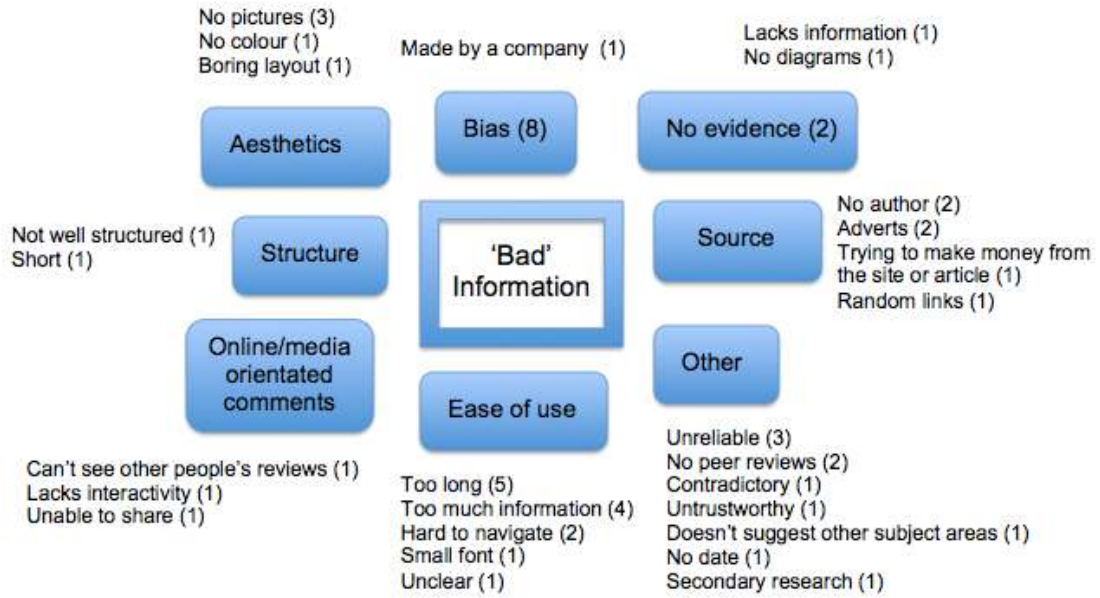
'Bad' information

Students had far fewer ideas about what they thought might be an indicator of 'bad' content; potentially indicative that they might find it initially more difficult in discerning information.

Figure3) Students perceptions of what might characterize a 'bad' source of information.

It was evident that many of the ideas did not come from any of the teaching staff present.

Figure 4) The following diagram demonstrates how these perceptions might be grouped as the comments tended to relate to a set number of themes.



Whilst ideas surrounding bias and source were anticipated, what is of interest is the groups of ideas surrounding the following:

- Ease of use. Students thought that 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.
- Aesthetics. This is also mentioned in the students' one-to-one interviews.
- Online/media related comments. A small number of comments related solely to online behaviours, typical to social media sites. For instance the ability to review and interact with the source.

Student interviews

Follow up interviews were conducted with seven students, 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 work; giving them some time to both reflect and implement some of the knowledge that had been initially imparted with them.

The interviews took place in an informal environment and the questions posed were open-ended giving learners sufficient room 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 for physical books but lamented that this was if they could and it was not 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 interests in modern and/or emerging subjects therefore were 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**. The responses started to shed insight into responses received via both the questionnaires and the posters. There was evidence of the 'ease of use' collection of comments evident in the posters coming from four students in relation to their data selection habits, more than half. Three students surmising that they tended to use whichever website came up first on Google and a fourth commenting that they looked for sources that were shorter and had little writing. Only two students following 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. So in essence, they knew how to identify 'good' information but did not always chose to apply these skills/knowledge in other contexts. In other words they experienced a difficulty in transferring their skills from one context to another.

- **Effects of the workshop on online information seeking behaviour**. Despite the Internet having already come up, interestingly when questioned whether they believed that the sessions had influenced how they looked for information; all students believed that they had. Two immediately related the change in behaviour and benefit to their EPQ (Extended Project Qualification).

  Two learners preempted their last interview question altogether and observed, in a holistic manner, that they looked at websites now in a way that they never used to previously (e.g. noticing things that they had not noticed before). An additional two 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 they were reflecting, displayed some proactive skepticism that was not present in the feedback either in 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 now **avoided** ‘unrealiable’ 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.

- For the 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/good information as a result.

  One student observed that this was not the first time that they had been presented with loosely similar concepts (i.e. information discernment); however did not recall the initial experience of their earlier information discernment workshops (aged approximately eleven) to have previously have been a success. They recalled that they had been asked to evaluate sources about a ‘farm for retired dogs’. However given that one source was false and based on the euphemism for the lie that parents might tell children about what happens when dogs/pets die – 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, having 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’d never had a problem with it in the past. The other student clearly stating 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 it’s popularity they remarked that it was not all right.
- **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 response to work completed in other classes (e.g. English). Part of their work involved, for instance, learning to write media-style articles as they were taught to make their writing look ‘good’ and make sure it wasn’t ‘boring’, for instance replicating the writing and style of popular news pieces. Given that part of the focus and marks in English were (at least as far as the student was aware) linked to appearance (e.g. their coursework) the student 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 positive or negative.

3.4 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. For example, '*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'* – 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, 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 a vital cognitive and affective trait that will become increasingly significant as we rely more and more on information sources outside of the 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 to enable 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 assessment used in the Case Study, raised levels of self-efficacy and understanding of the nature and diversity of information is a transferable skill that will continue to be of benefit beyond the project.

Acknowledgements

This work would not have been possible without the cooperation and support of Dr. Andrew Shenton and the pupils and staff of Monkseaton High School.

Funding

This study has been supported by the British Academy/Leverhulme Trust.

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