INFORMED SOCIETIES
WHY INFORMATION LITERACY MATTERS FOR CITIZENSHIP, PARTICIPATION AND DEMOCRACY

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Chapter 8 – PREPRINT VERSION

Information literacy and the societal imperative of information discernment

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This chapter explores current research on how young people make judgements about the information they encounter. There will be a discussion on why some young people appear to trust, without question, online information whilst others show remarkable powers of insight and critique. Evidence on how this might affect their physical and mental well-being will be provided. Why this is important both in educational and political terms is discussed. There will then be an exploration of the approaches that can be employed to help young people develop a more discerning approach to engaging with the information they see, hear and read in any context.

Introduction

The discussion put forward here is based upon a synthesis of research findings involving three groups of young people from the UK, 16-17 year olds at a secondary school, 18-19 year old university students in their first undergraduate year and finally 18-24 year old men recruited for an experiment – mostly undergraduates – all carried out in the UK. For the first two groups there was a concern voiced by teachers and academic tutors respectively that their students exhibited a noticeable lack of the necessary capabilities to make well-calibrated judgements in order to select good quality information to support their work for assignments. The 16-17 year olds were

working towards gaining their Extended Project Qualification (EPQ)[1] – a mini-dissertation in addition to their A level study. Walton *et al* (2018) provides a comprehensive reflection of these studies. The 18-19 year olds were working towards completing their first assignment and had to find good quality information about a sporting issue of their choice (see Walton & Hepworth, 2011 and 2013 for a more detailed account). These two groups are quite similar in their context and we will see that their comments and experiences and our analyses align in an encouraging way. How? They both appear to indicate that most (but by no means all) students present with remarkably poor capabilities in making judgements about information which prevent them from making the most suitable choices. The third group were recruited to find out whether the cognitive process of information discernment has a physiological component. Why? We wanted to find out whether being good at information discernment is related to positive responses to stress. Conversely, whether being poor at information discernment was related to negative responses to stress. Given our findings, we argue that it is an educational imperative that information discernment (or indeed information literacy) should be taught as part of the school, college and university curriculum. We base this on the knowledge that, with the right kind of information literacy teaching, people can move from being poor to good information discerners. Also, making poor judgements about information could have far-reaching consequences for their education, health, political engagement and everyday life.

Why is this an important issue?

This is especially critical in our current context which has been described as one of a 'democratic crisis' (BBC, 2018a) where mis-information, fake news and conspiracy theories are in danger of becoming accepted knowledge. We use the term mis-information to mean inaccurate information of any kind either intentional or unintentional. We are aware that some writers use the term dis-information to describe deliberately misleading information whereas mis-information describes unintentionally misleading or inaccurate information. The intent is not an issue for us, the effect of such information on individual cognition that interests us and so we use mis-information to describe both types. In short misinformation is 'any piece of information that is initially processed as valid but that is subsequently retracted or corrected' (Lewandowsky *et al*, 2012, 124-125).

The mis-information carried by social media has been identified by the Department for Digital, Culture, Media and Sport (DCMS, which is the relevant government ministry in the UK), the European Union and the US Congress as a vehicle that represents an existential threat to the very foundations of our democratic order. Alex Jones and his poisonous InfoWars platform are a particular case in point (BBC, 2018b). Interference in the 2016 US Presidential election and the 2016 Brexit referendum in the UK by the Russian government, and the manipulation of voters by Cambridge Analytica, are instances of the ease with which unscrupulous organisations are able to attempt to affect peoples' behaviour for political ends. This is so much more prevalent because digital technologies and communications are everywhere, and the blizzard of online information challenges our ability to make sense of the world. This is particularly so for young people. Although many in the UK, but by no means all have smartphones (95% of 16-34 year olds in 2018 according to Statista, 2018), when confronted with a plethora of information of hugely varying quality, young people tend not to possess the skills or discernment to understand

[1] The Extended Project Qualification or EPQ is for students studying at A level stage in the UK – usually towards the end of their first year and is not compulsory. It involves a project chosen in agreement with the student's supervisor and includes structured reflection. The EPQ can enhance the chances of students gaining a place at university.

this variability. The variability in quality of information -- from blogs run by "spiritual healers" that expound the cancer-curing virtues of crystals to carefully curated health information provided by the NHS – is just one example of a phenomenon that renders young people particularly vulnerable to being misinformed and confused. Recent research (Brazier *et al*, 2018) confirms what we have known for some time: that young people are poor at searching for information and cannot tell the difference between the good and poor quality information that they find. In essence, what we need to be able to do is instil resistance to the effects of mis-information such as fake news and dubious health information (see chapter 4 of this book for more about 'inoculating' against mis-information). This is not just about digital information however. It is about information of any kind, whether hard-copy or digital. It is also about the spectrum of information ranging from the high quality information such as, but not exclusively, peer reviewed journals articles, to the deliberate mis-information spread by highly motivated individuals or organisations. It is becoming clear from the Brexit vote that people were misled on a number of issues (Carter, 2016; Watson, 2018). What is not clear is the actual economic, political and social significance of this vote. Only time will tell. If people had been taught how to be more information discerning (Walton, Picard and Dodd, 2018) perhaps the voting outcome may have been different. Either way, peoples' voting intentions may have been more informed and based on more accurate and balanced assessment of the information presented to them.

However, we also need to take care because there is a danger. Encouraging people to question absolutely everything can lead them to become cynical rather than critical. Consequently, a situation where people trust nothing could, in certain circumstances, collapse into, at best, unproductive relativism or at worst, anti-science and anti-intellectualism. It remains essential to make the argument that authoritative and credible sources of scientific and other information are out there to be found. We recognise that *all knowledge is provisional* (Thornton, 2018), but this is based on the notion that good quality evidence exists which is to be built upon and extended. In short, facts do exist, but questions such as who is stating them, when they were published, with what foundations (i.e. the research, the recognised practice and the evidence which underpins them) and what motivated their publication, all need to be taken into account. It does require more cognitive effort, but will help to begin to address the issue of what some believe is a looming 'democratic crisis' (BBC, 2018a).

What is information discernment?

Information discernment is a sub-set of information literacy and is primarily concerned with how people make judgements about information, well-calibrated or otherwise. Often expressed as 'evaluating information' in all of the major information literacy models (ACRL, 1989; Big Blue, 2002; ACRL, 2016; SCONUL, 2011; Secker and Coonan, 2011, CILIP, 2018). It is included as an important capability which CILIP has restated in its new definition of information literacy,

> "The ability to think critically and ***make balanced judgements*** about any information we find and use. It empowers us as citizens to reach and express informed views and to engage fully with society." (CILIP, 2018, bold italics added)

We have made several attempts at defining information discernment over the years (see Walton, 2017 for a summary of these endeavours) and each time it seems to become an ever more complex and challenging notion to pin down. Our latest iteration moves away from a normative to a more exploratory version. It can be thought of as a process which describes and analyses,

> The ways in which social, psychological, behavioural and information source factors influence peoples' judgements about information (Walton, 2017, 151).

A number of identifiable factors can help to understand the process of making judgements about information. First of all people generally are more inclined to trust information such as a TV news bulletin, a newspaper article or a blog post because it takes more cognitive effort to be sceptical than to believe (Lewandowsky *et al*, 2012). There is a very good reason for this. As children we are looked after by our parents or other significant adults; they tell us what we need to know and we trust them. We develop a cognitive default position of trust which it takes effort to undo. Ourwork with 16-17 year old school children confirmed this. A survey we carried out revealed that they were more inclined to trust their parents than teachers, peers or the media (Walton *et al*, 2018).

Context is a central factor in how we make judgements about information, particularly the social situation in which we find ourselves, the roles we have, the norms expected and the tasks associated with it. These are such strong influences that young people find it challenging to transfer information literacy capabilities from one context (for example school where they are students (role) studying for a qualification (norm) and completing an assignment (task)), to home where they are say, shopping (role) for a tee shirt (task) to wear at a music concert (norm). Our research indicated that young people did not think at all about using their newly-found capabilities outside the educational context. They did not for instance, think about questioning the reputation or security of a website from which they were purchasing items. Walton *et al* (2018, 10-11) noted that,

> "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."

This may be another reason why otherwise high information discerners can be less so outside the educational context. We believe that this can be overcome by ensuring that information learning and teaching interventions include a range of contexts in their content. We also need to ensure that we explain to learners that these are transferable capabilities that have an everyday application.

What has also come into sharper focus recently is the effect that the psychological factor of prior-knowledge has on the ways in which we make judgements about information. It is not just about expertise, it is about the way we view the world. It appears that there are four major factors which shape prior-knowledge and underpin the way people make judgements about the information they encounter: worldview, confirmation bias, epistemic beliefs and motivated reasoning. The underpinning factor is worldview, our political leanings appear to determine everything else in this process. Worldview is a person's deep-seated personal ideology (Lewandowsky *et al*, 2012). Confirmation bias (Campbell *et al*, 1960) is the behaviour we exhibit as a result of our worldview and of the social and political culture characterising that worldview. For example, people who are left-leaning will read a particular newspaper which shares their beliefs whilst those who are right-leaning will read another. It also causes us to seek out people with similar views and preferences to ourselves and can contribute to the echo chamber effect experienced in social media which can eventually lead to extremism. Worldview also shapes motivated reasoning. Kahan *et al* (2012) has shown that expert scientists' beliefs are shaped by their political leanings, with right-wing scientists tending to be climate change sceptics whilst left-

leaning scientists tends to recognise climate change as a phenomenon driven by human activity. This is because of a conflict between personal interests, where a person's beliefs are matched with those held by others with whom they have close ties, which are in tension with a collective interest of making use of science to promote common welfare. Personal ties and allegiances come first every time and consequently drive motivated reasoning. This is where very able scientists will cherry-pick the data to support their beliefs, those who are adept at using numerical information are more able to confirm their own biases and ignore inconvenient evidence (Jones, 2017). Finally, Trevors, Muis, Pekrun, Sinatra and Muijselaar (2017) noted that when people are presented with conflicting information, reading it can have an emotional effect leading them either towards resisting new ideas or viewing it as a chance to learn. Participants in their study who believed that knowledge is about comparing and contrasting many sources showed more surprise and curiosity when reading conflicting texts. This affective state appeared to motivate them to comprehend new information and recognise multiple viewpoints. In contrast, those participants subscribing to the idea that information is fact-based, from authoritative sources and should be digested like food, felt confused when dealing with a range of authorities. This feeling of confusion caused them to remember less information and ignore any controversial information. The belief that knowledge is certain caused participants to feel less surprise, and more anxiety, when dealing with these contradictions. This phenomenon is known as 'epistemic beliefs' and can have a bearing on a person's level of information discernment.

Other important psychological factors which influence information discernment include; the cognitive processes which we employ to analyse, apply and synthesise information, how we reflect on this process via metacognition and how we feel whilst engaged in these activities. Metacognition, or how we think about our own thinking and learning, plays a particularly important role in enabling us to become more aware of how we make judgements about information. Emotion, or affect, has been shown to be a critical component in information seeking (Kuhlthau, 1991) and also forms part of the information discernment process. This also ties in with epistemic beliefs discussed above. We will see later in this chapter that our most recent research confirms this view regarding the importance of emotions.

Where information originates from is also a critical factor in how we judge the information we encounter. These information source factors are important and it does not matter whether it is a search engine, database, newspaper or a person. People, for example, are more likely to believe President Trump if they are a Republican than if they are a Democrat (Lewandowsky, Swire & Ecker, 2018) – further demonstrating the very strong influence of worldview on how people make judgements about information. By the same token, because Google is, for all practical purposes *the* search engine to use, some people believe that the results they find, especially the first page of an organic search, are the most reliable information sources to use. For some, no further checking is necessary. Clearly, this is unsatisfactory and I (with various colleagues) have spent some time attempting to understand how people make judgements about information with a view to enabling them to improve their capabilities where such an improvement is necessary.

How young people make judgements about information

Our studies show that young people are not one homogenous group of either 'digital natives' capable of expert navigation through the online environment; nor are they completely bereft of any information literacy capabilities as characterised in the CIBER report (UCL, 2008). After conducting many studies, both qualitative and quantitative, we have concluded that there is a spectrum of information literacy capabilities within those aged between 16-24. Our research shows that high information discerners exhibit a number of defining characteristics. We found

that they are more curious about the world than low information discerners and this difference is statistically significant. This echoes the work of Trevors *et al* (2017) and shows that high information discerners have a different epistemological compass to those who exhibit low information discernment. Their epistemic beliefs are more flexible and they appear to be open to different ideas, even if they contradict their own. They use multiple sources to verify information and tend to include conflicting information which is in line with the 'curiosity' characteristic mentioned earlier. They are more likely to be sceptical about information on search engines such as Google. High information discerners do not believe that everything on search engines is true or of the highest quality. In tandem with this they do not regard the first page of results found by a search engine to be the most trustworthy information. They are also aware of the importance of authority and will check an author's background. Conversely, low information discerners are statistically significantly less likely to be aware of these issues and are generally less attentive to the content put in front of them (Walton, Barker, Pointon, Turner and Wilkinson, 2018).

We believe that the in-built curiosity exhibited by high information discerners leads them to readily question the information they read. This 'cognitive questioning state' tends to manifest itself as people questioning such things as, where the information was from (such as who wrote it and why) and its credibility (for example, was it well-researched with many references or an opinion piece without recourse to credible evidence). It also leads them to use a wide variety of information to explore more than one side of an argument. We know from previous research that this cognitive questioning state can be operationalised in young people by employing the appropriate learning and teaching intervention (Walton and Hepworth, 2011; 2013; Walton, 2017; Walton *et al* 2018). This is discussed more fully in the next section.

Eye-tracking research that we conducted during 2018 suggests that there appears to be a relationship between eye fixation (as of attention) when reading an online article and participants' level of information discernment. In short, high information discernment corresponds with high attention and low information discernment corresponds with low attention. The data from this research, outlined in brief above, has mapped out participants behaviour, primarily upon a purposive sample. These examples vividly display in particular how low levels of information discernment affect reading behaviour as characterised by the number of fixations and durations spent on areas of interests within the article. The areas of interests are drawn around key areas within an article (text and or images or graphics) to determine levels of fixation and gaze. Eye tracking data show that there appears to be a level of disengagement with the content, particularly for participants a low information discernment. Based upon gaze data gathered during our research, participants with low information discernment did not show a high level of fixation or concentration (measured by duration). It was also very apparent that low information discerners ignored factual information such as graphs and tables and tended to concentrate on emotive content. The behaviour shown by low information discerners displayed fixations that do not follow a logical order or seem to engage fully with the article. This type of unintentional or unordered fixation behaviour indicates that participants are scanning and looking for keywords rather than engaging with the text (Schmar-Dobler, 2003; Liu, 2005). Conversely, high information discerners tended to interrogate the whole document, text, graphs and images in a structured way, a process of information behaviour resonating with *"working memory capacity"* (Gere *et al*, 2017) where working time was applied to the more complex areas of the article.

What was perhaps most interesting about our recent research findings is the different physiological reactions to mis-information between high and low information discerners.

Overall, our results suggest that information discernment can affect our physical and psychological health in several ways. First, information discernment levels affect the way in which we approach stressful tasks. Individuals are challenged if they believe that their resources (i.e., self-efficacy, perceptions of control, and goal orientation) outweigh the perceived demands of a task, whereas they feel threatened if these resources are not sufficient to meet the perceived demands. When presented with mis-information, higher discerning individuals viewed the stressful situation as more of a challenge, rather than a threat to their well-being. Second, when presented with mis-information, higher information discernment levels resulted in more favourable (i.e., adaptive and healthy), physiological outcomes. Specifically, individuals with high discernment responded to stress with a more efficient blood flow, equating to a healthier heart response. Third, when given mis-information, higher information discerning individuals responded with more positive emotions before and after the stressful task, in comparison to lower information discerning individuals. It seems apparent that having a high level of information discernment is not only intellectually and socially useful but may actually have a beneficial physiological effect. Given these finding we argue that it is imperative that we attempt to enable all people to gain higher information discernment capabilities. Previous research (for example Walton and Hepworth, 2011 and 2013; Shenton and Pickard, 2014; Pickard, Shenton and Johnson, 2014; Walton and Cleland, 2017; Walton *et al*, 2018) has shown that this is achievable. The next section outlines a possible way of delivering effective information discernment teaching and learning.

How can we enable young people develop a discerning approach to information?

This can be achieved in many different ways. However, there are a few underlying principles which underpin the most successful approaches. We suggest that any learning and teaching intervention should follow closely the factors that impinge on information discernment. Therefore, the context for the situation that participants find themselves in should be fully recognised. Thus for learners finding out about a subject such as sociology, make the session as specific as possible, find out what their assignment brief contains. For learners finding out about job opportunities, find out what specific roles they are interested in beforehand and tailor the session accordingly. Should this not be possible, make the subject a topical or controversial one. Generic information literacy teaching does not work. Information literacy capabilities are enacted in a context, as we have seen from the discussion set out above.

Spend as little time as possible telling learners things and more on getting them to do things for themselves – whether that be searching for information or making judgements about what they have found. Learning by doing works best. This should not preclude the scaffolding of learning and teaching intervention, that is, give the learners more help at the beginning and gradually let them do more and more by themselves until they can search and make well-calibrated judgements without help from facilitators. In particular it is recommended that learners have a discussion regarding what constitutes high quality evidence in support of an argument. An interesting example could be the extent to which the stance taken say by Donald Trump (or any other prominent figure with a similar view) is supported, or not, by the evidence. Below is our recommendation based upon the workshop approach we took with 16-17 year olds at a school in the UK and reported in Walton *et al* (2018):

1. develop a series of participatory research workshops, in order to gain a rich understanding of the current information behaviour of school students;

2. use results to create an enhanced pedagogy to teach information discernment to school students;
3. involve school students and teachers in designing and improving the method.

Our approach relies on Participatory Action Research and Action (PAR), which places an emphasis on the participants' perceptions and interpretations of their own information needs and treats people as experts in their own experience to promote adolescent health and well-being (see Tavares, Hepworth and De Souza Costa, 2011; Walton *et al*, 2018) for more information on specific PAR techniques).

This approach boosts learners' skills of searching, discerning and selecting information. Participatory methods ensure that all voices are heard. Monitoring and evaluating activities by seeking immediate feedback from participants is essential. A final evaluation employing individual in-depth interviews with stakeholders is recommended. This approach will ensure that the strengths and weaknesses of the proposed methodology are evaluated and modified as necessary.

We recommend that the learning and teaching intervention be carried out by employing two two-hour workshops delivered on separate days at least one day apart. The desired outcome is to empower learners to be able to make well-calibrated judgements about information and misinformation. Initially, learners should be invited to explore and discuss how they currently evaluate information, using examples provided, and describe what criteria they use in that process, if any, to foreground their current practice.

Day 1 – Two hour workshop: This workshop can be delivered to up to 50 leaners (following Walton *et al*'s framework reported in 2018). For the teaching element, learners should be given the information discernment toolkit (based on previous research by Shenton and Pickard, 2014). Elements of the previous toolkit to be used as learning and teaching resources are: the Source Evaluation Model which provides a set of 10 information evaluation criteria which maps the criteria young people use when they place their trust in digital information. These criteria are grouped into various categories such as 'objectivity and motivation', for instance, 'why was the information published?' Learners should be given this Model and asked to compare their own current practice against these 10 criteria. The next task is to use the Meta-Evaluation Pro Forma which provides a means for learners to think about their own thinking to assist them in reflecting on the value of each criterion (from the Source Evaluation Model and their own practice) and how they might synthesise these to evaluate new information. These two resources are designed to encourage learners to develop their own 'personal' models of information discernment. Group work is encouraged in order to foster a collaborative approach to evaluating information. This encourages meanings to be negotiated and shared between learners.

For the workshop element, learners are directed to brainstorm in small groups and create posters to record their thoughts about how they make judgements about information. What is written on these sheets may not necessarily be structured but captures the topics and ideas learners will discuss throughout the sessions. These posters are to be collected at the end of each session to triangulate data and gain a rich picture of participant contribution.

Day 2 – Two hour workshop (one day apart): Learners are given a range of specially selected information sources of varying quality, including mis-information. We found that information sources that were controversial were most useful in promoting discussion. They are asked to use

their Meta-Evaluation Pro Forma which they completed in day 1 to judge the quality of a new set of information in Day 2.

It is recommended that follow-up interviews are carried out with a small sample of students 14 weeks after the workshops to establish whether learning has taken place. In addition, a sample of directly involved other stakeholders such as teachers, academics and other facilitators should be interviewed separately for approximately one hour, and on an individual basis 6 weeks after the workshops have been delivered.

Authority is contextual and contested but the most reliable information sources share particular characteristics.

Recommended data collection tools:

- pre-delivery quantitative information discernment questionnaires based on Walton *et al* (2018) to garner baseline data;
- workshop outputs – flip-chart group work posters;
- Source Evaluation Model;
- Meta-Evaluation Pro Forma;
- post-delivery quantitative questionnaire (after 6 weeks to measure 'stickiness' of recently learnt information discernment capabilities);
- group interview with student focus group (14 weeks after workshop);
- individual interviews with teachers (6 weeks after workshop) to triangulate with student data.

The workshops have been shown to work with 16-17 year olds and the collaborative working with 18-21 year olds. We argue that by combining the learning and teaching elements in this way there is a greater likelihood, although it is by no means guaranteed, that learners' information literacy capabilities will be improved.

Conclusion

In summary, we feel that the need for people to be high information discerners is a critical part of being a member of civic society and could also be a factor of a person's well-being. Why? It is essential because people are constantly encountering information and mis-information. Some individuals are very good at making well-calibrated judgements and probably do not need any extra help. However, on the basis of estimates drawn from our varied datasets, at least half of the population, and possibly more, need additional assistance to develop their ability to resist the effects of mis-information, whether this be for example, political, financial, scientific, commercial or health-related. What we cannot expect is for information discernment to lead people to think that one form of worldview (e.g., left or right-leaning) is superior to another. What we can expect is that when high levels of information discernment are engendered, people are able to sort the factual wheat from the polemical, toxic and mis-informational chaff. In so doing they can begin to make judgements based on a well-calibrated, balanced and detailed consideration of all points of view before making a decision or choosing to believe what they read in newspaper articles, blog posts, political exhortations or pieces of academic research. When a genuinely cognitive questioning state is instilled, people may begin to interrogate what they see and hear more effectively and act accordingly. Additionally, when presented with mis-information, those with higher levels of information discernment experience more positive heart

and emotional responses and exhibit a greater degree of concentration, which ultimately contributes to healthier psychological and physiological responses to mis-information.

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