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Citation: Bawden, D. (2008). Information problems, digital literacy solutions. Paper presented at the International Conference on Human-Computer Interaction and Information Services, October 2008, Prague, Czech Republic.

This is the accepted version of the paper.

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Information problems, digital literacy solutions

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Summary

The increasing availability of large files of digital information, with ever-improving retrieval systems and interfaces, makes accessing information simpler and quicker than ever. Ironically, these improvements have brought with them a number of 'information problems'; information overload, information anxiety, information avoidance, infobesity, and so on.

This talk reviews some of these problems, and suggests that 'digital literacy', a variant on the older idea of information literacy, may offer solutions.

Keywords

Digital literacy; information overload; information anxiety; satisficing; paradox of choice

The new information environment

We now live in the age of the 'digital transition'; the move towards a situation in which most information, whether academic, professional or 'everyday life' information, is available in digital rather than printed form. Beginning in the 1970s, this trend has been greatly extended by the rise of the Internet, and more specifically the World Wide Web, in the 1990s, and latterly by the advent of the social networking tools of Web 2.0. These technical advances have led to a much more rich and complex information environment, with a vastly greater amount of information available, in a greater variety of formats and types of information resource, and accessible through a greater variety of media and interfaces.

So far, so good. Quick and simple access to a wide variety of information, usually available at any day and at any time, is self-evidently a great improvement on what has gone before. We may contrast it with the situation of, say 20 years ago, when there were only a very limited set of types of information resources available to any person (usually books, journals or magazines, the mass media, perhaps patents and specialist reports, and some limited computer files), and where there would usually be one and only one obvious source for any particular information request.

This modern, and highly desirable, diversity of provision, however, is typically delivered through a limited number of interfaces: most usually a web browser, whether on a computer screen, a mobile device, an e-book reader etc. The result is a 'homogenisation' of the information, with the look and feel of different resources of the print age - a text book, a newspaper, a hand-written diary entry, a photocopy of a journal article, a printout of a data file, etc. - being largely lost. It is this 'homogenised diversity' of information communication which lies at the root of the problems discussed here, as much as the expanded volumes of information which are available.

Furthermore, the sheer amount of information, variety of channels, and number of alternative sources now available may lead firstly to an extent of choice which may be a positive hindrance, and may also lead to potentially damaging expectations and behaviours.

Information problems and paradoxes

A number of named problems have been identified, largely stemming from this excess of information.

The idea that there is too much information to hand, exacerbated by the multiple formats and channels available for its communication has led to the concept of **information overload**, perhaps the most familiar of the 'information pathologies'.

There is no single generally accepted definition of information overload. The term is usually taken to represent a state of affairs where an individual's efficiency in using information in their work is hampered by the amount of relevant, and potentially useful, information available to them. In library settings, it has sometimes been termed **reference overload**. **Infobesity** is a term increasingly used to denote a situation of personal information overload, particularly if caused by a diet of information, akin to feasting on fast food.

In any of these cases, the information must be of some potential value, or it could simply be ignored, and it must be accessible, or the overload will only be potential, not actual. The feeling of overload is usually associated with a loss of control over the situation, and sometimes with feelings of being overwhelmed. In the extreme, it can lead to damage to health.

Various psychological conditions have been described associated with the overloaded state, such as **continuous partial attention**, a focus on being 'in touch' and 'connected' which results in stress, and **attention deficit trait**, a distractibility and impatience due to too much mental stimulus. A condition of **cognitive overload**, when information overload is added to multitasking and interruptions, has been recognised, while overload has been noted as a contributor to **technostress** in library settings.

Information anxiety, a term coined by Saul Wurman, is usually taken to be a condition of stress caused by the inability to access, understand, or make use of, necessary information. The cause of this may be information overload, or (paradoxically) insufficient information; it may equally be due to poorly organised or presented information, or a variety of other causes, including a lack of understanding of the information environment in which one is working. The rather similar condition of **library anxiety** was recognised and named as far back as 1986, and has been analysed further since then. This is a type of anxiety which leads to a sense of powerlessness when beginning an information search in a library, and in feelings of being lost, unable to find one's way around, and afraid to approach the library staff.

Naturally, people adopt a variety of heuristics to deal with these problems; but sadly these solutions, if too simplistic, may lead straight to new problems.

The simple, if brutal, tactic of **information avoidance**; ignoring relevant information and useful information sources, because there is too much to deal with, is extremely common, Savolainen has identified the similar phenomenon of **information withdrawal**, keeping the number of sources considered to a minimum, as well as more nuanced filtering strategy, with a rapid weeding of material of limited use.

The root cause of many of the problems appears to lie in the '**paradox of choice**'; the observation, in many social and economic settings, that while some choice is good and positive, too much choice leads to indecision and to bad decisions.

Satisficing is a popular heuristic way of coping, taking just enough information to meet a need, rather than being overwhelmed by all the information available: just enough information is good enough. This form of behaviour, also known as 'bounded rationality', was identified by the economist Herbert Simon. It is a way of making decisions and choices, when the full spectrum of options may not be known, and when it is not feasible to compare fully the benefits of each. In information seeking terms, it implies choices of information sources, and selection of information from within them, so that the information found is good enough, even if not the best available. The theory was popularised fifty years after its appearance by the

psychologist Barry Schwartz, who argued that the wide choices available in modern life caused anxiety, and that satisficing was a valid approach, and tended to increase happiness.

The information environment of the early twenty-first century certainly seems to offer the variety of choices to make satisficing a sensible option, and indeed the use of satisficing tactics, and the judgement of what is 'enough information', in information seeking has been investigated by several researchers. It is clear that this is a common, if not ubiquitous, way of dealing with a complex information environment. However, it is important to note that satisficing must be carried out rationally; there must be some clear judgement as to why decisions are being taken. If this is not the case - and one must suspect that often it is not - then this behaviour reduces to information avoidance, or a random and contingent selection of sources and material. We may distinguish these two cases as appropriate (good) satisficing and *inappropriate (bad) satisficing* respectively.

In order to overcome these problems, the often-quoted solution is to 'take control' of one's information input and processes. But in order to do so, it is necessary to have a full set of skills, to understand a good deal about the world of information, and to have the desire to do so. This co-occurrence of skills, understandings and attitudes has been termed 'digital literacy', and to this topic we now turn.

Digital literacy

The concept of digital literacy, as the term is now generally used, was introduced by Paul Gilster, in his book of the same name. Gilster did not provide lists of skills, competences or attitudes defining what it is to be digitally literate. Rather, he explained it quite generally, as an ability to understand and to use information from a variety of digital sources, and regarded it simply as literacy in the digital age. It is therefore the current form of the traditional idea of literacy *per se*; - the ability to read, write and otherwise deal with information using the technologies and formats of the time – and an essential life skill. This generic expression of the idea, although it has irritated some commentators, is one of the strengths of Gilster's concept, allowing it to be applied without concern for the sometimes restrictive 'competence lists' which have afflicted some other descriptions of the literacies of information.

Despite some continuing inconsistency in the use of the term, we see that several authors, following Paul Gilster, are using 'digital literacy' to denote a broad concept, linking together other relevant literacies, based on computer/ICT competences and skills, but focused on 'softer' skills of information evaluation and knowledge assembly, together with a set of understandings and attitudes.

This is also referred to by other names, particularly e-literacy and, by some, information literacy. However, the former has not gained popularity, while is strongly associated with various linear models espoused by the library community. These typically see the matter as a series of sequential steps, such as recognising a need for information

- identifying what information is needed
- finding the information
- evaluating the information
- organising the information
- using the information

While this is sometimes a useful concept, particularly for in planning training programmes, it is rather too prescriptive, and too limited to a library-style formal information request, to be useful for describing all that is needed in dealing with the modern information environment.

Gilster's idea of information literacy, as developed by a number of writers since, seems a more suitable candidate. 'Digital literacy' seems an appropriate name, in an age where information comes mainly in this form; though with the caveat that an important part of digital literacy is knowing when to use a non-digital source.

Digital literacy in this sense is a framework for integrating various other literacies and skill-sets, though it does not need to encompass them all; as Martin puts it, we do not need "one literacy to rule them all". And, while it may be possible to produce lists of the components of digital literacy, and to show how they fit together, it is not sensible to try to reduce it to a finite number of linear stages. Nor is it sensible to suggest that one specific model of digital literacy will be appropriate for all people, or indeed for one person over all their lifetime. Updating of understanding and competence will be necessary, as individual circumstances change, and as changes in the digital information environment bring the need for new fresh understanding and new competences; as Martin puts it, digital literacy is "a condition, not a threshold".

With these caveats, we might set out four generally agreed components of digital literacy, as agreed by most writers, in this way:

- 1 Underpinnings
 - Literacy *per se*
 - Computer / ICT literacy

These 'underpinnings' reflect the rather traditional skills, of which we may now need to regard computer literacy as one, which make up an older idea of literacy, and an ability to function in society. It seems an open question as to whether they should be regarded as a part of digital literacy (perhaps in its formulation as 'smart working' or 'basic skills') or whether they should be assumed, before digital literacy is grafted on.

- 2 Background knowledge
 - The world of information
 - Nature of information resources

This is the kind of knowledge which was assumed of any educated person, in the days when information came as books, newspapers and magazines, academic journals, professional reports, and not much else, and was largely accessed through physical print-on-paper libraries. The well-understood 'publication chain' – from author to archivist, passing through editors, publishers, booksellers, librarians and the rest – lasted as a sensible concept well into the computer age. Now, it is largely meaningless, and there is no clear model to replace it. Nonetheless, attaining as good an understanding of what the new forms of information are, and where they fit into the world of digital information, has to be an essential start in being digitally literate.

- 3 Central competencies
 - Reading and understanding digital and non-digital formats
 - Creating and communicating digital information
 - Evaluation of information
 - Knowledge assembly
 - Information literacy
 - Media literacy

These are the basic skills and competences, without which any claim to digital literacy has to be regarded sceptically. They are a remarkably wide set, and it would be sobering to try to assess to what degree they are possessed in the various countries of the world.

- 4 Attitudes and perspectives
 - Independent learning
 - Moral / social literacy

These attitudes and perspectives are perhaps what make the link between the new concept of digital literacy, and an older idea of literacy, in vogue over two hundred years ago. It is not enough to have skills and competences, they must be grounded in some moral framework, strongly associated with being an educated, or as our ancestors would have said, a 'lettered', person. They are arguably the most difficult to teach or inculcate of all the components, but they come closest to living up to the meaning of information from 'infomare'; the transforming, structuring force.

This may seem an ambitious set of competences and attitudes to demand of anyone. But this seems likely to be what is needed to cope and to succeed in today's information environment.

Some final thoughts

We have seen that the very success of information providers and technologists, in giving quick and easy access to a great amount of information in many forms, has led to a number of information 'paradoxes and problems'.

While some of these may be solved by technical means, or by suggesting simple rules to work by, a full solution is likely to mean the development of a new and wide-ranging set of information-related capabilities. The concept of digital literacy, as outlined here, seems to capture these clearly. Development of digital literacy may be the crucial factor in ensuring that full advantage is taken of the systems and interfaces now available, and those which will be developed in the future.

References and further reading

The material in this presentation is based on two published papers, which should be consulted for fuller discussion and a wider set of literature references:

- D. Bawden and L. Robinson, The dark side of information: overload, anxiety and other paradoxes and pathologies, *Journal of Information Science*, 2008, in press
- D. Bawden, Origins and concepts of digital literacy, in *Digital literacies: concepts, policies and paradoxes*, C Lankshear and M Knobel (eds.), New York: Peter Lang, 2008

For background on the 'information problems', see:

- M.J. Eppler and J. Mengis, The concept of information overload: a review of literature from organizational science, accounting, marketing, MIS and related disciplines, *Information Society*, 2004, 20(5), 325-344
- D. Bawden, C. Holtham and N. Courtney, Perspectives on information overload, *Aslib Proceedings*, 1999, 51(8), 249-255
- R. Savolainen, Filtering and withdrawing: strategies for coping with information overload in everyday contexts, *Journal of Information Science*, 2007, 33(5), 611-621, (2007)
- R.A. Wurman, *Information Anxiety 2*, New York NY: New Riders Publishers, (2001)
- N. Kwon, A.J. Ongwuegbuzie and L. Alexander, Critical thinking disposition and library anxiety, *College and Research Libraries*, 2007, 68(3), 268-278
- D.O. Case, J.E. Andrews, J.D. Johnson and S.L. Allard, Avoiding versus seeking: the relationship of information seeking to avoidance, blunting, coping, dissonance and related concepts, *Journal of the Medical Library Association*, 2005, 93(3), 353-362
- H. Simon, A behavioral model of rational choice, *Quarterly Journal of Economics*, 69(1), 99-118, (1955)
- B. Schwartz, *The Paradox of Choice*, New York NY: Ecco, (2004)
- Y. Mansourian and N. Ford, Search persistence and failure on the Web: a "bounded rationality" and "satisficing" analysis, *Journal of Documentation*, in press, (2007)
- C. Prabha, L.S. Connaway, L. Olszewski and L.R. Jenkins, What is enough ? Satisficing information needs, *Journal of Documentation*, 63(1), 74-89, (2007)

For background on digital literacy see:

- D. Bawden, Information and digital literacies; a review of concepts, *Journal of Documentation*, 57(2), 218-259, (2001)
- A. Martin, Literacies for the digital age, in A. Martin and D. Madigan (eds.), *Digital literacies for learning*, London: Facet Publishing, 2006, pages 3-25
- P. Gilster, Digital fusion: defining the intersection of content and communications, in A. Martin and D. Madigan (eds.), *Digital literacies for learning*, London: Facet Publishing, 2006, pages 42-50
- P. Gilster, (1997), *Digital literacy*, New York NY: Wiley
- Virkus, S. (2003), Information literacy in Europe: a literature review, *Information Research*, 8(4), paper 159, available from <http://informationr.net/ir/8-4/paper159.html>