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"A different kind of knowing": speculations on understanding in light of the Philosophy of Information

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This is a slightly updated and extended version of the paper presented at the 9th Conceptions of Library and Information Science conference, Uppsala, 28 June 2016. It includes some additional points raised in discussion of the paper.

Introduction

> 'This is a different kind of knowing… It's like understanding, I suppose'
> Lyra Belacqua in (*Northern Lights*, Philip Pullman, Scholastic, 2011)

Bawden and Robinson (2015) have argued that library and information science (LIS) should focus on the promotion of understanding, as much as on the provision of information, and the sharing of knowledge. But there is a lack of clarity and consensus, both in general discourse and in the LIS literature, as to what is meant by understanding. This short and speculative paper considers some philosophical approaches to understanding, particularly those related to Floridi's Philosophy of Information, and based on the general idea that understanding is, in the words of Pullman's Lyra, a special kind of knowledge.

Understanding is often associated in philosophical discourse with the hermeneutics of Gadamer, drawing on the thought of Husserl and Heidegger, and emphasising interpretation of texts; see, in order of accessibility, Zimmermann (2015), Gadamer (2008), and Gadamer (2013). Stock and Stock (2013) outline this approach, and its relevance to information science and information systems. We are not seeking to ignore or to contradict this approach, rather to suggest that there may be an alternative and complementary viewpoint.

We begin by noting that the information sciences have commonly fitted 'understanding' into a linear succession, or pyramid, of concepts, also including data, information, knowledge and (sometimes) wisdom. In the initial statement of this model, Ackoff (1989) placed understanding as a concept between knowledge and wisdom, characterising it as an 'appreciation of why'. The idea that understanding is associated with a form of knowledge sufficiently deep as to be able to provide explanation is attractive as a pragmatic way of dealing with the concept. But is has been largely excluded from discussion of these kinds of concepts in LIS (Rowley 2007; Frické 2009), while the whole hierarchy or pyramid model has itself been criticised on numerous grounds (Frické, 2009; Ma, 2012; Yu, 2015). It seems sensible

to look for a more firmly grounded explanation, and perhaps a definition, of the idea of understanding.

Methods

The study is based on a synthesis of philosophical literature, found from a selective literature review. Items dealing with the concept of understanding from an information-based or knowledge-based perspective were identified from searches on Web of Knowledge, Library and Information Science Abstracts, Philosopher's Index and Google Scholar, and by following references and citations. Close reading of a set of selected articles led to a synthesis of concepts.

Understanding in Floridi's philosophy of information

To be of value for LIS, as well as to be congruent with most pragmatically useful views of understanding, we suggest that such an explanation would have to involve the concepts of information and knowledge, and perhaps data, carefully defined. A philosphically rigorous analysis of these concepts which treats them in a way of use to LIS is Luciano Floridi's philosophy of information, and we begin with this as our basis. We are not thereby ignoring the Gadamer/Heidegger approach to hermeneutics; rather seeking an alternative, and potentially complementary, conception.

Floridi (2010; 2011), as is well known, defines information as well-formed, meaningful and truthful data, in his general definition of information (GDI). Knowledge, he regards as information formed into larger units: 'Knowledge and information are members of the same conceptual family. What the former enjoys and the latter lacks … is the web of mutual relations that allow one part of it to account for another. Shatter that, and you are left with a … list of bits of information that cannot help to make sense of the reality they seek to address' (Floridi, 2011, p. 288). The references to accounting and making sense suggest that knowledge may necessarily have explanatory power, often associated with understanding. Winograd and Flores (1986, p. 30) also emphasise this link: 'what we understand is based on what we know, and what we already know comes from being able to understand'.

More formally, Floridi (2011, chapter 12; 2012) argues that information may be upgraded to knowledge by being embedded in a network of questions and answers that correctly accounts for all of the information items. This is termed a theory of account, an idea going back to Plato, account here meaning simply giving reasons - causal explanations, logical deductions, didactic factual support, clarification through example or analogy, and so on - to link the individual pieces of information. The information items may be assumed to be compatible, and to form a coherent network, by virtue of their conforming to Floridi's GDI.

Does this equate knowledge with understanding? Floridi is rather cautious here, suggesting that although we would generally say that Wikipedia or a scientific textbook contain knowledge, not just information, 'it seems that knowing requires

understanding, or at least that the two are mutually related', and therefore textbooks, webpages and current artificial agents hold knowledge extensionally bit not intentionally, and therefore cannot be said to understand (Floridi, 2012, p. 450-451). Understanding, therefore, is a state of a conscious entity, when it has internalised knowledge, which is itself a collection of information arranged in a network of a particular nature, its nodes linked by account-giving interrelations. This is similar to the viewpoint espoused in Shera's early formulation of social epistemology; an individual person has an emotional interaction with knowledge, and can therefore understand in a way in a society cannot (Shera, 1970; see also Furner, 2002)

Other current philosophical perspectives

Floridi's is not the only current philosophical account of understanding which relates the idea to information and knowledge, and we now examine some others.

Jeroen de Ridder (2014) regards understanding as a kind of higher-order knowledge, in a network of knowledge with internal coherence and explanatory potential. Somewhat similar to Floridi's conception, in its emphasis on an explanatory network, de Ridder's idea of understanding simply takes the concept knowledge as a given, and makes no relation with information.

David Deutsch (1997) gives an explanation, though not a rigorous definition, of understanding, as distinct from knowing, describing and predicting. He states that understanding is hard to define exactly, but it encompasses the inner working of things, why things are as they are and having coherence and elegance; it is about deep explanations and simplicity. Again there is no direct relation to information, but there is a similar emphasis to Floridi on coherent explanatory capability.

Jonathan Kvanvig (2003) distinguishes understanding from information, knowledge and truth. He suggests that 'understanding requires the grasping of explanatory and other coherence-making relationships in a large and comprehensive body of information. One can know many unrelated pieces of information, but understanding is achieved only when informational items are pieced together' (Kvanvig, 2003, p. 192). The object of understanding (that which is understood) is not constituted as a number of single propositions, but rather as an 'informational chunk"'. He refers to the grasping of the structure within this chunk as an 'internal seeing or appreciating' (Kvanvig, 2003, p. 198). This approach is able to cope with ambiguity, contradiction, missing or false information, and all the other messy features present in real-world information collections. It is not inconsistent with the typical pragmatic understanding noted above, but it goes beyond it. It emphasizes that in understanding we are always: (1) dealing with a large and complex set of information; (2) going beyond a simple ordering and enumerating of the contents of that set; and, (3) gaining some holistic 'grasp' of the contents of the set. This seems to be the sort of conception of understanding of value for the pragmatic needs of LIS. There are many similarities here with Floridi's conception, but one distinct difference: whereas Floridi insists on that data must be true to count as information,

Kvanvig's approach allows for contradictions, and for false information to be managed on the way to understanding.

Adam Toon (2015) takes understanding to be a cognitive state; understanding *feels* different from just knowing it. requiring not merely possession of information or knowledge, but also an ability to see or grasp the connections between them. This is reminiscent of Floridi's ideas, though Toon does not ground his view in any distinction between information and knowledge, writing of what is to be grasped as 'relevant facts and theoretical principles', 'relevant information' and 'various items of knowledge'. Toon argues that understanding should be seen as extended cognition; not merely what happens in a person's mind, but also involving real world items. He exemplifies this with the use of pen and paper, but it is tempting to extend this to suggest that understanding may involve more complex information tools. However, as Toon points out, having the address of a website of a online course for a subject is not at all the same as understanding the subject.

Christoph Kelp (2015) uses a knowledge-based account of understanding to deal with the evident fact that there can be different degrees of understanding. He, like the other authors mentioned here, equates understanding to connected knowledge; the more comprehensive and well-connected the knowledge, the greater the degree of understanding. While most people's understanding of a topic will be less than maximal, because their knowledge is neither comprehensive nor entirely connected, Kelp suggests that we may argue that someone understands something if they can perform a contextually relevant task.

Understanding for LIS

Of the conceptions of understanding reviewed above, only Floridi's is rooted in carefully defined ideas of data, information and knowledge. Since this approach seems the most appropriate and acceptable for the LIS context, we suggest that Floridi's philosophy of information could be used as the basis for a conception of understanding suitable for LIS.

However, Floridi's networks of well-formed, meaningful and truthful information seem at first sight perhaps too idealistic for the situations encountered in LIS. In particular, the veridicality requirement seems onerous. We know that much information, even the best information to hand at any time, is not necessarily true. Even scientific theories, often held as the most reliable form of our knowledge, are open to correction and improvement. This was the point made by Karl Popper, when he insisted that his World 3 of objective knowledge must encompass error and contradiction (Popper, 1979). We may follow Floridi's terminology in seeing information science as dealing with 'semantic content', itself composed of information (true), misinformation (false) and disinformation (deliberately false). However, this is not how most of those involved in the information disciplines would naturally regard the contents of their collections.

For this reason, Kvanvig's conception of information, with its acceptance of the intrinsic messiness of most bodies of knowledge encountered in the real world seems more in line with Popper's ideas, and hence more helpful for LIS. What is needed, it seems, it a reconciliation of the ideas of Floridi and of Kvanvig, in providing an account of understanding helpful for LIS.

This may be approached, we suggest, by adapting the ideas of Kelp on degrees on understanding. Where Kelp takes the comprehensiveness, and the extent of connectedness, of knowledge as the criteria for degree of understanding, we may add truthfulness as a third criterion. Thereby, complete understanding is characterised by a collection of information which is comprehensive, optimally connected, and entirely truthful; when any of the three criteria are less than a maximum, the degree of understanding is thereby reduced.

Finally, we adapt Floridi's categorisation of understanding as a state of a conscious entity, by adding Toon's recognition that it may be enhanced and extended by availability and use of information tools and systems.

We are therefore able to propose a tentative account of understanding, to be of value for LIS as follows:

> Information is taken to be well-formed, meaningful, truthful data. Knowledge is taken to be information organised in a network of account-giving inter-relations. Understanding occurs when a conscious entity, supported as necessary by information systems, appreciates the totality of a body of knowledge, including its interconnections. The extent to which the knowledge is incomplete, contradictory or false determines the degree to which understanding is less than complete.

While this account is not formally stated, it does seem to satisfactorily reconcile the perspectives of Popper, Kvanvig and Floridi, in a way which should prove acceptable for the pragmatic purposes of LIS. It also poses a useful counterpoint to the hermeneutic conception, so that the complementary nature of the two could usefully be examined.

Conclusions

The pragmatic value of an account of understanding, of the kind developed here, is that it may useful in developing new generations of information systems and services which may directly and explicitly support the gaining of understanding. This will require systems which go beyond the provision of facts, knowledge fragments, and documents, and beyond the answering of specific queries (Bawden and Robinson, 2015). Development of such systems will require studies of the information behaviours and practices, and the information literacies, associated with the gaining of understanding, rather than simply the acquiring of information. A careful formal account of what we mean by understanding, of which the tentative proposal presented here is a starting point, is needed to underlie such

developments, and to contribute to their success. This is likely to require a synthesis of the conception outlined here, based on Philosophy of Information, and the arguably complementary conception based on hermeneutics.

Post-conference addenda

In discussion after the paper, it was pointed out that different groups might reach entirely different understandings, based on essentially the same body of public knowledge; climate change pressure groups were noted as an example (thanks to Geoffrey Bowker for sparking this discussion). Even more dramatically, conspiracy theorists may form entirely coherent and inter-connected knowledge frameworks, which have little to do with truthful information as generally understood. Maintaining these frameworks of understanding seems to rely on selective information seeking, and on active avoidance of potentially contradictory information, as shown in the paper presented at this CoLIS9 conference by Bhuva Narayan and Medina Preljevic on anti-vaccination pressure groups. It seems reasonable to regard such an understanding as deficient compared with one which is able to accept and consider all potential relevant information. Perhaps a further, fourth, criterion for the extent of understanding; a Popperian commitment to accepting, indeed actively seeking, potentially disruptive knowledge, which could amend and extend the framework of understanding.

The question was also raised as to whether the kind of understanding outlined here is necessarily an attribute of an individual, or whether it could also apply to the understanding of a social group. It is clear that the concept of understanding which we present here is that of a conscious entity; an 'inforg' in Floridi's terminology. Whether it is appropriate to regard a group of people as such an entity seems doubtful, and therefore this is strictly an account of individual understanding. However, where we find groups defined by a common knowledge-base, as in the socio-cognitive basis of domain analysis, it may be reasonable, and helpful, to apply some of these considerations to the understanding of the group as a whole, provided that we do not imply that we are dealing with a group consciousness.

References

Ackoff, R. (1989) From data to wisdom. *Journal of Applied Systems Analysis* 16(1), 3-9.

Bawden, D. & Robinson, L. (2015) Information and the gaining of understanding. *Journal of Information Science*, online first area, DOI 10.1177/0165551515621691.

de Ridder, J, (2014) Epistemic dependence and collective scientific knowledge. *Synthese* 191(1) 37-53.

Deutsch, D. (1997). *The fabric of reality*. London: Penguin.

Floridi, L. (2010), *Information – a very short introduction*. Oxford: Oxford University Press.

Floridi, L. (2011), *The Philosophy of Information*. Oxford: Oxford University Press.

Floridi, L. (2012) Semantic information and the network theory of account. *Synthese* 184(3), 431-454.

Frické, M. (2009) The knowledge pyramid: a critique of the DIKW hierarchy. *Journal of Information Science*, 35(2), 131-142.

Furner, J. (2002) Shera's social epistemology recast as psychological bibliology. *Social Epistemology* 16(1), 5-22.

Gadamer, H.G. (2008) *Philosophical Hermeneutics (2nd revised edition)*. Berkeley CA: University of California Press.

Gadamer, H.G. (2013) *Truth and method (Bloomsbury revelations)*, London Bloomsbury.

Kelp, C. (2015) Understanding phenomena. *Synthese*. 192(12), 3799-3816.

Kvanvig, J. L. (2003). *The value of knowledge and the pursuit of understanding*. Cambridge: Cambridge University Press.

Ma, L. (2013) Meanings of information: the assumptions and research consequences of three foundational LIS theories. *Journal of the American Society for Information Science and Technology* 63(4), 716-723.

Popper, K.R. (1979), *Objective knowledge: an evolutionary approach (revised edition)*, Oxford: Clarendon Press

Shera, J. (1970) *Sociological foundations of librarianship*. New York: Asia Publishing House.

Stock, W.G., & Stock, M. (2013). *Handbook of information science*. Berlin: de Gruyter, pp. 50-57.

Rowley, J. (2007) The wisdom hierarchy: representations of the DIKW hierarchy. *Journal of Information Science*, 33(2), 163-180.

Yu, L. (2015) Back to the fundamentals again: a redefinition of information and associated LIS concepts following a deductive approach. *Journal of Documentation*, 71(4), 795-816.

Winograd, T. & Flores, F. (1986). *Understanding computers and cognition: A new foundation for design*. Norwood NJ: Ablex.

Zimmermann, J. (2015). *Hermeneutics: a Very Short Introduction*. Oxford: Oxford University Press.