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What Can We Say about Information? Agreeing a Narrative [†]

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Abstract: The nature of information remains contested. This paper proposes a set of principles for a narrative of information, and explores the consequences of taking these principles as normative in the present rhetoric of the information society.

Keywords: information; narrative; information society

1. Understanding Information

Despite decades of work towards a unified theory, information remains elusive. Perhaps, though, it is naïve to ask what information is. As Marcin Schroeder [1] eloquently put it:

“the expectation to find somewhere something awaiting revelation, which exists independently from those who ask about it and which necessarily should be called “information” is naïve. Equally naïve would be expectation that the question “What is matter?” has a unique “correct” answer.

Schroeder’s point about matter is similar Richard Feynman’s remarks [2] about our knowledge of energy in his Lectures on Physics:

[I]n physics today, we have no knowledge of what energy is. [...] However, there are formulas for calculating some numerical quantity, and when we add it all together we get “28” — always the same number

But if it is unreasonable to expect an answer to ‘what is information?’ what are we looking for? Feynman, for energy, argued that while it is not possible to know what energy is, measures of energy can be used in calculations to understand and progress physics. There is a consensus about how to use the idea of energy. There is not yet an equivalent consensus about the use of ‘information’.

This paper proposes some features of information that might be included in a consensus on to how we should speak of information. It is presented as a set of principles described as a narrative of information. Since concepts of information are so widely and variously applied, no narrative will encompass all existing use of informational concepts, so the proposal is normative and will exclude some current uses of the word. It will declare some uses as illegitimate, and others as non-rigorous uses or use by analogy only. The parallel with energy is instructive. There is a rigorous scientific use of ‘energy’ which is normative as to how the concept of energy may be used, but the word is also very widely applied more loosely or by analogy, such when it is said we lack of energy following an illness, or the slow progress of a project may be said to be due to the team running out of energy. The loose and analogous usage of energy are acceptable, but they rely on rigorous usage for the analogy.

For information, there is not yet an agreed rigorous definition. João Alvaro Carvalho [3] has suggested that the question that should be asked is not “what is information”, but “what is it that

you are calling information". This paper moves from analysis to prescription and says: "this is what you should call information".

2. Principles of the Narrative

Seven principles are proposed. Information:

1. requires a body
2. can be quantified
3. depends on context and (only) exists in a narrative
4. cannot be stored or transmitted
5. is about something
6. does something
7. is provisional

Principle #1 recognises that information is parasitic on something else, which we call data. Sometimes there is an implication that data is just 'out there' and giving it meaning creates information, but it works both ways. Differences—inhomogeneities—exist but are only data if there is some potential for them to have meaning (however that is defined), to convey information. Maybe this includes all inhomogeneity in the universe, but still data only 'exists' because of information.

Principle #2, that information can be quantified, emerges from the work of Shannon [4], extended through ideas of layers [5], and Kolmogorov/Solomonoff (algorithmic information theory [6]).

Principles #1 and #2 can be interpreted as saying that information is physical (c.f. Landauer [7]).

Principle #3, that information depends on context and only exists in a narrative, has important consequences which are often overlooked. Context changes by the moment, so to say that information depends on context is to say that information too changes by the moment, as reflected in the definition of Holwell [8] "data plus meaning (interpretation) in a particular context at a particular time". This feature of information demonstrates an important difference between information on the one hand and energy and matter in the other. Part of the context is 'narrative': interpreted in a wide sense are anything that gives entities identity. A narrative has entities and Information can only be the entities permitted by the narrative. Context and narrative are frequently understood within a hierarchy of layers, leading to the concept of the level of abstraction (c.f. LoA, Floridi [9], Chapter 3).

Principle #4, that information cannot be stored or transmitted is important but needs careful interpretation, because #5 can be interpreted as saying that information is always about communication. Data can be stored and communicated, but, as a consequence of #3 (information depends on context), information only exists at one place and one time.

Principle #5, that information is always about something, is to say that information always contributes something to the narrative. That 'something' must have come from somewhere. Or, rather, the narrative assumes the information to have come from somewhere: that is the point of information. It is always meaningful to ask where the information has come from. Principle #5 can be interpreted as stipulating that this is semantic information, but this paper avoids dividing information in a taxonomy [10] instead seeking the common features for a unified narrative.

Principle #6, in the language of semiotics, is about pragmatics. Or, in the Bateson definition of information, 'the difference that makes a difference' [11], it is about 'making is difference'. Information exists in a context (#3) but also changes the context [12].

Principle #7 arises from the veridical thesis of information ([9], Chapter 4): the insight that information has to be true. (Interestingly, the argument for the veridical thesis of information is based on the fact that information is quantifiable, #2. See [13] p. 229.) It is impossible to know if information is (and will remain) true, so instead we recognise that information is always provisional [14].

3. The Rhetoric of the Information Society

Naïve conflation of data and information, and bit-counts equated to a measure of information, are still occasionally encountered, but serious analysis has long sought a more sophisticated theory of information (for example, Webster [15]). It is also the case that writers are, increasingly, more wary

of the word ‘information’, preferring to talk of data (as witnessed by google trends, [16]) and, as in the name of this summit, favouring the language of digital or digitised rather than information. Nevertheless, talk of data and digitisation sometimes represents a sensitivity to the word ‘information’ without accompanying understanding of the underlying concepts. As noted above, data is data only insofar as it is the body of information and talk of data is meaningless without understanding the associated information. A collection of bits without meaning is not information, but it is not data either. Narratives incorporating the language of data and digitalization, therefore, need to be sensitive to the seven principles of information narratives whether or not they use the word.

To take one example, the rhetoric of Smart Cities talks extensively of data and the core of a Smart City is typically the ‘data hub’, while the word information is sometimes used for no reason beyond elegant variation of the text. For example, data might be derived from measurements drawn from traffic sensors around the city and it might be used to control traffic lights. This may be analysed informationally with the context a “traffic control” level of abstraction, and appreciation of the seven principles of an information narrative constrains the scope of what may be claimed and draws attention to the limitations.

Conflicts of Interest: The author declares no conflict of interest

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