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# **A dialectical approach to information retrieval**

Clare Thornley

*School of Information and Library Studies, University College Dublin,*

*Belfield, Dublin 4, Ireland*

Forbes Gibb

*Department of Computer and Information Sciences, University of Strathclyde,*

*26 Richmond Street, Glasgow, G1 1XH, UK*

## **Abstract**

### **Purpose**

The paper explores the question of whether the often paradoxical and conceptually contradictory discipline of information retrieval (IR) can be understood more clearly when it is analysed from a dialectical perspective.

### **Methodology/Approach**

Conceptual analysis and literature review.

### **Findings**

A dialectical understanding of meaning can assist in clarifying some aspects of the complex nature of current IR theory.

### **Research Implications**

Philosophy has the potential to explore the conflicts and contradictions in IR and should not be used just as a means of synthesis and resolution. The use of the philosophy of meaning should include a broader understanding of the philosophical oppositions which lie behind the nature of meaning.

## **Originality/value of paper**

This paper suggests a new perspective on the role of meaning in IR: the dialectical model.

**Keywords:** Philosophy, Meaning, Dialectic, Information Retrieval.

**Paper Type:** Conceptual paper.

## **Introduction**

The motivation for this paper is the observation that IR is a problematic subject area which has been characterised by conflict, paradox and a lack of conceptual clarity or theoretical coherence. The aim of the paper is to provide some clarification, using the concept of the dialectic from philosophy, as to why this might be the case.

These issues are tackled primarily at a meta-theoretical level because, it is argued, these conflicts have their source at this conceptual or philosophical level. If we want to understand the problematic nature of IR we need to examine the problematic nature of its central concepts. This paper focuses on the concept of meaning and argues that a better understanding of the nature of meaning, in this case as a dialectical process, can illuminate some of the ways in which IR is problematic. The view is taken that the relationship between information and meaning is central to IR and also often a cause of dialectical conflict (Thornley, 2005). This, however, is not discussed in any depth in this paper and will be the focus of a future paper.

Thus IR is analysed conceptually as a discipline, in a similar way to Frohmann (1992) and Ellis (1992a), rather than discussing the nature of conflicts between documents as discussed by Hjørland and Nissen Pedersen (2005). One reason for the conflicted nature of the discipline is the way in which IR manifests and exemplifies the dialectical relationships that exist within meaning. A dialectical relationship is one in which the two aspects exist in a state of mutual dependence and antagonism. An understanding of each opposing aspect requires an understanding of how it relies on its negation. Within philosophy this problem of how things seem to rely on ‘what they are not’ and how we can talk or develop theories about this without becoming mired in contradiction has produced a long history of debate. In Plato’s *The Sophist* (Trans. Warrington, 1961, 237) we hear the stranger discuss with Theaitetos the nature of Parmenides’s thesis: they are discussing whether falsehoods can have real existence.

“The statement implies a daring assumption that what is not has being; for that is precisely what the existence of a falsehood implies. But when we were lads, dear boy, the great Parmenides consistently proclaimed the impossibility of this; time and time again he would quote his own poem:

‘Never shall this be proved, that things which are not, are;  
And do thou, in thy inquiry, deter thy thought from this way.’

Such is his testimony, and the surest way of extracting an admission of the truth will be to subject the statement itself to a mild dose of torture.” (Plato, *The Sophist*, 237)

It is proposed that IR, as a discipline which seems to both contain conflict and also has difficulty discussing or analysing that conflict without often succumbing to contradictions and conceptual confusions, could benefit from using some of the insights and tools of the dialectical approach.

IR in this paper is discussed primarily as a philosophical problem by which is meant one that can be clarified and explored but not necessarily solved. This is in contrast to scientific problems which can normally be solved progressively by the collection of data to test theories which results in the exclusion of falsified theories (Popper, 1968). This broadly follows Wittgenstein's philosophy of meaning in so far as he argues that its complex nature can be described more accurately but that explanatory theories are normally unhelpful.

“The question is not one of explaining a language-game by means of our experiences, but of noting a language-game” (Wittgenstein, 1953, 655)

The first part of this paper critically examines the initial assumption: is IR really in as much conceptual trouble as is claimed? The next section then looks at meaning within philosophy and this is used as a basis for introducing a dialectical understanding of meaning. Finally this approach is used as a conceptual tool for analysing some theory problems in IR, and the extent to which this can clarify their nature is discussed.

## **The current state of IR**

There are really two questions here: firstly is IR in conceptual trouble, and secondly, if so, what exactly is the nature of this trouble? In terms of whether IR is in theoretical or conceptual difficulty it is argued that while the field includes many who have reservations about the theoretical structure of IR there are often different understandings of what exactly this means. These concerns about theory can be characterised as a complex and difficult relationship between conflicting perspectives.

This dissatisfaction with theory appears to be most prevalent in the more user orientated research tradition in IR and is seen, for example, in the work of Hjørland (1997, 2000, 2003) and Blair (1990, 2006; Blair and Kimbrough, 2002) which argues that IR has failed to utilise the theories of meaning developed in philosophy. This dissatisfaction has a long history as Brookes (1981, p.1) lamented over 20 years ago that despite having the “most analytically gifted and theoretically inclined minds in the whole information business” the level of theoretical development in IR was very disappointing. Ellis (1992a) uses Kuhn’s (1970) criteria for a successful research area, i.e. one in which a clever person cannot fail to succeed, as evidence of how far away from this happy state current IR research currently resides. This concern, however, is not totally restricted to the more qualitative tradition in IR. It also exists within the mathematical or objective tradition in IR. In her early work on IR testing Sparck Jones (1981) argues that the whole of IR can be seen as a largely unsuccessful attempt to progress from descriptive theories to explanatory ones. In her more recent review (2000) of the large scale IR testing

conference, TREC<sup>1</sup> (Text Retrieval Conference), she claims that progress has been made from descriptive statements about IR to prescriptive ones, but that explanation has still not been developed. Finally researchers, such as Ellis (1996) and Kuhlthau (2005), who have attempted to synthesise work in IR have noted their frustration at the disparate and conflicted nature of the field, with Ford (2000, p.636) describing IR as being in a “pathological research state”.

It is argued, then, that within IR there is a concern about its theoretical development and also a persistent difficulty in synthesising the different aspects of its theories into a coherent framework. This is perhaps not particularly surprising in what is a relatively recent discipline. Indeed Kuhn (1970) observes that newer disciplines are often characterised by conflicts and disagreements concerning their central nature, as opposed to more established disciplines where disagreements tend to take place within a broadly agreed framework. The thesis of this paper is that, in addition to the relative immaturity of the discipline, the difficulties and conflicts within IR are caused by the difficulties and conflicts within a central part of its subject matter, i.e. meaning. Thus it is argued that there is what could be called a ‘theoretical deficit’ in IR, that attempts to solve it involve many conflicting views about both which is the best theory and also what theory means and how it should be tested, and that, finally, attempts to provide a convincing synthesis of these different perspectives have been persistently difficult to achieve. This could, of

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<sup>1</sup> TREC provides a large-scale document collection which different research groups use to test their IR systems and the results are presented at the annual TREC conference. See: <http://trec.nist.gov>

course, just be because computer scientists and information scientists tend to have very different approaches and backgrounds. Any moves to increase collaboration, as recently suggested by Kuhlthau (2005), are certainly a positive development. It is argued, however, that these intractable conflicts run at a deeper conceptual level and often exist as much within these approaches as between them.

Thus in terms of the question of the nature and reasons for IR's theoretical difficulties these may be caused, at least partly, by the contradictions inherent in meaning. Our understanding of why this is the case can be progressed by developing a model of meaning as a dialectical process and using this to reveal how many of the conflicts within IR are often a product or manifestation of this process. Thus, in one sense, collaboration can be best progressed by increasing our understanding of the conflicts within IR.

### **Meaning in philosophy**

In developing a dialectical model of meaning for IR the philosophy of meaning has been used along with its struggle to resolve the ways in which meaning is both a subjective experience and also about an objective reality. Within the philosophy of language the subjective aspect of meaning is often referred to as its intension and the objective aspect of meaning as its extension (Putnam, 1973). Meaning is a difficult philosophical problem because one has to devise some way of explaining how these very different aspects of meaning, with conflicting properties, can manage to have a relationship that produces what we

understand as meaning. In what ways can meaning be understood as a dialectical process?

The nature of the subjective/objective divide within meaning is characterised by a relationship between two aspects which both require each other but also have very different and often opposing qualities. Frege (1892, Trans. 1952, Geach and Black) introduced the distinction between sense and reference. The sense of a word is the experience of understanding its meaning (an internal experience) and the reference of the word is that to which it refers. Frege distinguishes between a sense and an idea. Ideas he understands as individual experiences. A sense, whilst experienced individually, is made possible by the “common store of thoughts which is transmitted from one generation to another” (Frege, 1892, In: Moore, 1993, p.26). Words must have a reference, in Frege’s argument, because that is the only way we can judge their truth value. Thus his theory is an attempt to show how meaning appears to be both something that we understand, both individually and collectively, and also to be something that relates to external objects. How exactly this relationship works, however, is difficult to explain. In some way the sense of a word makes us think of the reference in a certain way: it is how we grasp our understanding of the reference, or as Frege describes it “the mode of presentation” (Frege, 1892, In Moore, 1993,p.24).

In Moore’s (1993) introductory essay to his anthology of work on the philosophy of meaning he claims that Frege’s distinction between sense and

reference, and attempts to explain how exactly their relationship works, form the framework of most of the subsequent debate.

“Though this distinction is anticipated elsewhere, Frege is the first person to articulate it so clearly and so forcefully.... Thereafter, each essay in this volume is a more or less direct attempt to develop, clarify, amend or reject it.”  
(Moore, 1993, p.1)

It is argued here that it is indeed the case that the philosophy of meaning can be understood broadly as a series of proposed theories about how the subjective and the objective are related and that this has important implications for IR. Wittgenstein (1953) is a philosopher who has been well used within IR, in most cases as a way of resolving the difficulties of indeterminacy in representing meaning. Indeterminacy, or the way in which there are different and sometimes conflicting ways of understanding what something means, can be understood to arise from both the division between the subjective and the objective (we are separate from and thus potentially different from that which is described) and from the divisions between different individuals (we are separate and thus potentially will have different interpretations from other people). Wittgenstein's view that the meaning of words is in their use and made possible by our shared context and 'form of life' is one way of resolving or, more accurately, dissolving these difficult relationships. Rather than providing an overall theoretical solution he argues that we should observe how meaning works on a case by case basis. In his view the way to resolve the conflict between the subjective and objective within meaning is to abandon any attempt

to explain how these different aspects of meaning might relate and instead just to observe how we resolve this issue on a day to day basis during our ordinary daily activities. The apparent difficulty of meaning is, in one sense, caused by our desire to develop an overall explanatory theory of meaning and to explain once and for all how it works. An ambition for an abstract theory exaggerates the importance of conflicts and difficulties whilst, if we observe meaning in action, it is normally perfectly clear to us what is going on. At the same time, however, the desire for an abstract theory of language is a very strong temptation, ironically of course made possible by language, and work in language will normally struggle between careful description and the desire for a more elaborate theory. Thus for Wittgenstein the conflict between the subjective and the objective can be seen as the struggle to remain close enough to meaning to observe it accurately and also to both acknowledge and resist the desire for abstract theory.

“But it is worth remembering that Wittgenstein himself would have had a much less profound interest in language if there had not been an urge to indulge in precisely this kind of systematic theorising, an urge which was as strong in his case as it was in anyone’s. Even if his views are correct, and certainly if they are incorrect, that urge should itself command our respect.” (Moore, 1993, p.22)

### **Dialectical model**

Much of the philosophy of language can then be understood as an attempt to either resolve or dissolve the problem of how the subjective and objective

aspects of meaning relate. This includes many related oppositions, such as: general versus specific; abstract versus concrete; individual versus collective. These oppositions create a complex and multi-faceted web of related and conflicting perspectives. This paper, however, focuses on the broader theme of the subjective versus the objective, which can then provide a framework for more detailed future discussion.

One important feature of this opposition, and of the concept of dialectic in general, is that each aspect relies for its existence on 'what it is not'. In one sense the whole point of language is what it is not: meaning must be abstracted or different from that which it discusses, but it also relies on it. Meaning is both present and absent simultaneously. It is elusive and clear, fluid and fixed. How it appears at any one time will depend on one's particular perspective or viewpoint at that time; this can be understood as a position within the dialectic. A representation of meaning is some kind of continuity in a process of change. Representing this process is, as described by Neill (1987), an irresolvable dilemma. Thus it is argued that these two aspects of the dialectic, the relationship of mutual oppositions and the reliance of each aspect on its negation, are appropriate conceptual tools for unravelling the nature of some areas in IR.

In summary the dialectical model can be understood as a way of understanding meaning which focuses on the nature of these conflicts and explores the ways in which they are both antagonistic and mutually dependent. It suggests that perhaps it is not always possible to resolve these conflicts and contradictions

because paradox is part of their nature. The concept of the dialectic within philosophy provides one method of examining this kind of problem. Thus it provides some new questions and conceptual tools for IR.

## **Implications for IR**

Are there any problems in IR which seem less baffling when we see them as a series of relationships between contradictory and mutually dependent properties? Are there any problems in IR which are hard to discuss or debate without succumbing to contradiction and could this be because of their reliance on their negation? There are, of course, many but this paper takes one problem in IR, its (perceived by some) theoretical impasse, and shows how its nature can be clarified by interpreting its conflicts as dialectical in nature. It is argued that one of the main difficulties in IR theory is one of unacknowledged and unresolved conflict and that the reason that these conflicts are so resistant to resolution is because they involve dialectical oppositions, i.e. contradiction and conflict are an essential part of their nature.

Firstly there is perhaps the most fundamental conflict in IR theory: the one between those who regard theory as unimportant, as observed in Sparck-Jones's analysis of the TREC experiments (2000), and those that regard theory, and often particularly a theory of meaning, as absolutely crucial to IR (Blair, 1990, 2006; Hjørland, 1997). How can there be two such radically different approaches to what appears to be the same problem, i.e. which is the best way to represent the meaning of documents? If the process of theorising about

meaning is seen as a manifestation of the dialectical conflict within meaning this dichotomy becomes slightly clearer. Meaning is both a 'day to day' activity which does not require much abstract thought, but just continuous practice to master, and also a powerful abstract tool allowing us to formulate metaphysical and far reaching theories. As such it is, as Wittgenstein noticed, a reflection of the human condition: we are both creatures and thinkers. Both these aspects of meaning are valid and they do both rely on each other: practice requires thinking of some sort and *vice versa*. However, when we are immersed in either theory or practice the other aspect of meaning is often hidden from us, even though it is present. Thus part of the dialectical quality of meaning is that, when we are focussed on one aspect of it we tend to be blinded to other aspects of it; in Wittgensteinian terms (1953, 109) we are 'bewitched' by language. Any attempts to theorise about meaning or attempts to denounce or ignore the importance of theory are equally caught in this conflict. The abstract nature of meaning allows us ways to generate general theoretical frameworks but these often take us away from how meaning tends to operate in practice. Thus in one sense theorising about meaning is a reflection of the problem in IR of representing meaning: one has to take a 'snapshot' and this will both reveal and conceal the nature of an elusive dialectical process.

Secondly within those in IR who regard theory as having some kind of importance there is a broad divide, as discussed by Ellis (1996), between the subjective (qualitative) (e.g. Ingwersen, 1992) and objective (quantitative) research traditions (e.g. van Rijsbergen, 1979). This is a very complex conflict as it appears to revolve around different views of what meaning is, i.e. either an

objective property of texts which can be measured through various statistical methods of measuring terms, or a subjective experience of an individual operating in a particular context. This appears to be reflected in different methodologies of evaluating or testing IR systems, with the quantitative tradition favouring large-scale test collections based on fixed relevance judgements, and the qualitative tradition favouring more in depth studies of users in particular contexts, for example Borlund's (2000) research on IR in work-task situations. Thus the quantitative tradition stresses the importance of reliability and the qualitative tradition stresses the importance of validity. In some cases, however, research in IR can fail on both these counts. In Ford's view (1999, p.1151), for example, the quantitative approach produces highly reliable answers to highly meaningless questions and the qualitative approach produces highly meaningful questions with highly unreliable answers. This seems to echo Ellis's arguments (1992b) that the physical tradition has data but no paradigm and that the cognitive tradition has a paradigm but no data.

It is argued that this is perhaps because the concepts involved in theorising about IR, the nature of meaning, and the nature of relevance, are often dialectical in nature, and that attempts to theorise about them, or create general frameworks about how they operate, often bring these contradictions to the fore whilst simultaneously attempting to underplay their importance. Relevance, as has been extensively discussed in IR, see for example (Mizzarro, 1997), is a very problematic concept and both closely related to and also distinct from meaning. It both depends on the content of the document, which is objective, and the particular experience of the user, which is subjective. It is both a

quality of similarity between a document and query (they need to share some kind of aboutness) and of difference (the document must not be identical or it will fail to inform). Thus in a dialectical sense relevance relies on ‘what it is not’ and this relationship is constantly shifting depending on the changing perspective of the user.

The phenomenon which relevance is meant to measure, the effectiveness or otherwise of meaning representation, can also be understood as a dialectical process. Representation by its very nature is defined partly by ‘what it is not’, i.e. what has not been included in the representation. Ideally in IR a representation should somehow contain more meaning because it contains less, i.e. the terms chosen should focus the meaning by omitting or reducing the weight of insignificant terms. Thus although the meaning representation must rely on the full text it is also defined by its rejection of parts of it.

Thus it is argued that theoretical conflict in IR is not just about different perspectives on meaning but rather a reflection of the dialectical conflict within meaning and that the process of testing or evaluation, normally a method of resolving conflicts between theories, becomes just another arena in IR where these conflicts are played out. These two traditions in IR tend to deny the importance of the aspect of meaning which their method does not explicitly cover, but each methodology relies on both aspects of meaning. Thus they depend on ‘what they are not’. The quantitative tradition must still rely on the perennially difficult problem of relevance judgements and this requires the comparing of a subjective user judgement with a system ‘judgment’. Thus for

all the appearance of experiment and large-scale reliability these tests are not and indeed cannot be built on objective foundations. The qualitative tradition's basic assumption that it is individual context which matters is still reliant on the fact that, apart from in very specialised domains, IR systems cannot effectively take this context into account when presenting results. The user, however, can use objective terms to describe subjective context. Context is not mysterious; it can normally be articulated objectively in terms by the user, and used to refine their search. Thus the individual experience of meaning can both be described in language and is dependent on a shared objective language. The subjective and objective aspects of meaning are therefore both fundamentally different in some ways, as the divided research tradition in IR testifies, but also in a relation of uneasy dependence. Combining these approaches through greater methodological cooperation as, for example, Ford (2000) and Kuhlthau (2005) propose, has been difficult, and this may be because the exact nature of the differences has not yet been adequately explored. However, the very concepts at the heart of IR theory and methodology, relevance and meaning representation, contain dialectical conflict and talking about or theorising about these concepts has often exacerbated this difficulty. It is interesting that one proposal for a general IR theory, Ingwersen's (1992) suggestion that the "dark matter" of unrecalled relevant documents (and therefore those unknown and not present, but still influential) should be the focus for a universal aspect of IR theory seems to acknowledge IR's reliance on the importance of absence or negation. His proposal could be interpreted as an appeal for unification through a dialectical relationship between 'what is' and 'what is not'.

## **Conclusions**

This paper has outlined an introduction to a different perspective on the way in which the complex nature of meaning is manifested in IR. In this model of meaning it is the conflicts and contradictions within the subjective/objective relationship which are used to provide some new insights into the often frustrating process of developing a clear understanding of IR. The assumption that these conflicts can be resolved or synthesised through the use of philosophy is challenged by this approach which suggests that, in contrast, conceptual clarity may best be developed through an exploration of their intractably contradictory nature. This makes a new contribution to IR in so far as it raises a new question: how can an exploration of conflict and mutual dependency within IR's central concepts and research traditions help us to understand their intractable nature? It also suggests a new relationship between philosophy and IR by revealing how the dialectic tradition can be used to explore meaning and other aspects of IR.

In terms of future developments the complex relationship between meaning and information provides a potential use of the dialectical model. Representing meaning requires the fixing of a fluid phenomenon and the provision of information requires some kind of change, normally of a knowledge state or capacity of a person. The question of how change happens and its complex connection to similarity and difference has been discussed in philosophy using the dialectic in a number of different ways (Aristotle, Trans. Williams, 1982;

Hegel, 1807; Marx, 1897) and this could be used to provide some new theoretical insights for IR.

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