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# An ontology for the description of and navigation through philosophical resources

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## Abstract

What does it mean for a student to come to an understanding of a philosophical standpoint and can the explosion of resources now available on the web support this process, or is it inclined instead to create more confusion? We believe that a possible answer to the problem of finding a means through the morass of information on the web to the philosophical insights it conceals and can be made to reveal lies in the process of narrative pathway generation. That is, the active linking of resources into a learning path that contextualizes them with respect to one another. This result can be achieved only if the content of the resources is indexed, not just their status as a text document, an image or a video. To this aim, we propose a formal conceptualization of the domain of philosophy, an ontology that would allow the categorization of resources according to a series of pre-agreed content descriptors. Within an e-learning scenario, a teacher could use a tool comprising such an ontology to annotate at various levels of granularity available philosophical materials, and let the students explore this semantic space in an unsupervised manner, according to pre-defined narrative pathways.

Currently, a search engine such as Google, even if it plays a crucial role in the evolution and usability of the Internet, still retrieves documents on the base of a string matching mechanism, (plus of course a link ranking algorithm). We all know the amount of “noise” (unwanted results) this kind of search can output: it is in some sense half-blind, since it is based on a purely syntactic analysis of the documents on the web [2].

The Semantic Web is an attempt to augment the web we have become used to with a layer of data, called metadata, which describes the contents of the familiar web. Research on the Semantic Web looks at ways to generalize this approach so that the web itself could be treated as a repository of content-structured resources, over which intelligent agents would perform various kinds of operations for the user [3].

As part of this effort, our research focuses on the definition of the appropriate metadata which could be used to describe philosophical resources. This set of descriptors, codified in an ontology (a powerful formalized way to express metadata) [4], would then be used to provide intelligent mechanisms for selecting and navigating through learning materials. At the same time, by providing links to relevant additional explanatory and exegetical material we will give students the means for contextualizing the resources they have found.

We will make a number of different types of narrative pathways available. For example, a student could undertake a journey towards:

- (a) the critical explanation of a concept/theory (via a learning path that highlights the opposing theories, and the problems on which they are focused),
- (b) the historical contextualization of a concept/theory (via a learning path that shows associated information about an author, or the historical period, or other contemporary important theories in different research areas),
- (c) an understanding of the whole body of work of an author (via a learning path that recollects all the activities and results of an author, and organizes them according to the user's preferences), or
- (d) the intellectual lineage of a concept/theory (via a learning path that follows the influence of ideas throughout the history of thought, across different areas and historical periods).

These are only examples of the possible perspectives (“narratives”) that can be derived from an appropriate metadata description of the domain. To this aim, we have created a first version of an **ontology of philosophy**<sup>1</sup>. This may sound odd or self-contradictory, so we remind the reader to consider it as an attempt to categorize philosophical resources, as if we were librarians trying to cleverly organize a very large amount of philosophical books (but at a finer grained level than that of individual books).

In the digital era, this imaginary library is the Web (and indeed much that goes beyond the boundaries of the web, since the central concept of *Universal Resource Identifier* can be used to refer to real world objects [6]). However, unlike traditional libraries, there could be many simultaneous, ever-changing criteria of organization because computers provide the means of dynamically re-organizing source materials in accordance with arbitrary perspectives.

Various discussions with domain experts and also an analysis of the implicit curricula formalized in philosophical textbooks were useful in the ontology construction process. The ontology, being engineered with a clear educational purpose, has therefore been divided into three top-level categories for describing philosophical resources: the material domain, the pedagogical domain, and the theoretical domain. All these dimensions are implemented using OWL in the Protégé tool [5].

- The material domain is used to describe all the knowledge related to a philosophical resource taken as a whole, such as *authors, dates, places, publications, genres, styles* etc.
- The pedagogical domain (not to be confused with an ontology of pedagogical approaches or strategies) abstracts the educational value of a resource, as well as its role in the overall network of resources from the educational point of view. From an analysis of the domain's learning materials we have identified classes such as *introduction, conclusion, theme* (and *sub-theme*), *vocabulary-lexicon, remark, exercise, explanation, bibliography-reference, historical-context*, etc.

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<sup>1</sup>More information on this work is available at <http://www.kmi.open.ac.uk/people/mikele/philontology/main.htm>.

- The theoretical domain, finally, is the most important. Its formalization is the central contribution of our work. The concepts represented gravitate around four fundamental categories: the philosophical *problem* (e.g., mind-body), the *approach* (the perspective taken on the problem, e.g., epistemological), the *theory* (a systemic answer to the problem, e.g., Descartes’ theory) and the *school-of-thought* (an agglomerate of theories and problems, e.g., functionalism).

As knowledge engineers (albeit of a strange and slippery domain) we attempt to reflect the way things happen in the real world. Our analysis of how philosophers actually go about their work, indicates that philosophical works (papers, monographs etc.) result from a process articulated between the formulation of questions and the creation of answers. Our formalization can be used to capture the relationships among problem and solution and the wider conceptual frameworks (*weltanschauungen*) that ground these. Students often find it difficult to separate different approaches or standpoints on the same subject. Thus, the set of metadata offered in our ontology aims at facilitating their understanding of the impact and role of different approaches, since it supports the navigation of the same source materials according to different perspectives.

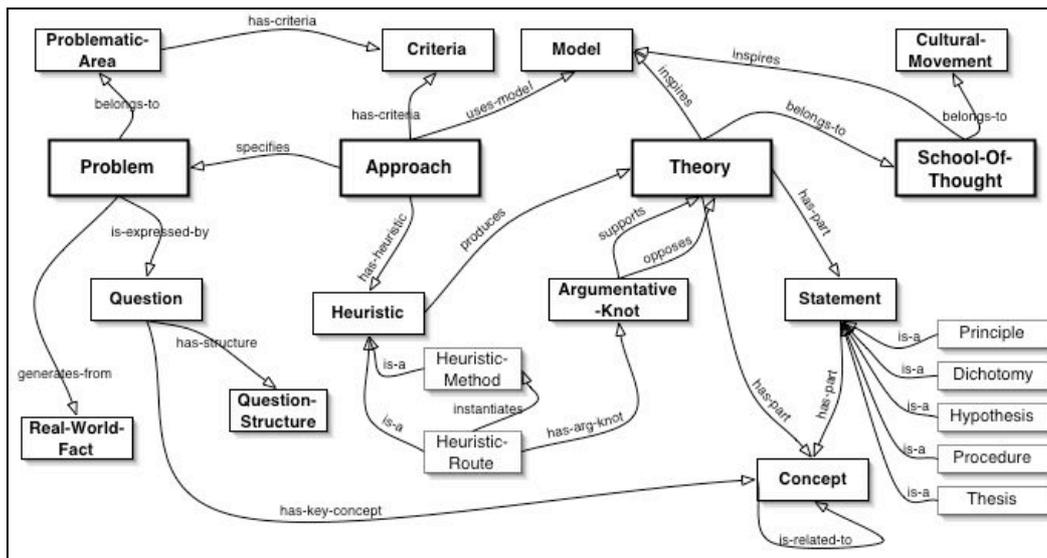


Fig 1. A representation of the major classes of the theoretical domain of the philosophical ontology and how they are inter-related.

Our work is located in the community at the cross-roads where e-learning and the Semantic Web meet [1]. It takes the domain of philosophy as a domain of special interest since it has not yet been analysed using such an approach (despite the large number of resources available). In the long run, our aim is to extend these results to other correlated domains in the humanities (history, literature, psychology). Ultimately (and appropriately given our own interdisciplinary origins) this could lead to a series of navigational pathways across tangential areas, supporting interdisciplinary research and realising an ideal of “lateral” conceptual browsing through web resources which lie beyond artificial disciplinary boundaries.

In the first instance our framework will provide an alternative means of searching the web but unlike Google and its kin our search will be contextualized to the concepts, needs, interests and activities of philosophers. Thus for example, when the budding philosopher types “duck rabbit” into our search box Wittgenstein’s discussion in the *Remarks* will be at the top of the list of results. But this is just the beginning; our ontological infrastructure will allow us to produce a range of tools tailored to needs of the philosophical community. We can envisage a course on the mind-body problem where the material is located using our search mechanisms, where links between items are made using our relations and where the resulting space of material can be navigated by learners using a range of our visualization tools. The tool thus will implement a contextualization process that we reckon fundamental to the learning activity, and will benefit both philosophers and their apprentices.

- [1]. *International Workshop on Applications of Semantic Web Technologies for E-Learning*, <http://www.win.tue.nl/SW-EL/2005/index.html>.
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- [5]. Stanford-Medical-Informatics, *The Protege Ontology Editor and Knowledge Acquisition System*, <http://protege.stanford.edu/>.
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