



Chapter XIV

**Towards a Semantic Web of
Evidence-Based Medical
Information**

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INTRODUCTION AND OBJECTIVES

It is the vision of the protagonists of the Semantic Web to achieve “a set of connected applications for data on the Web in such a way as to form a consistent logical Web of data” (Berners-Lee, 1998, p. 1). Therefore, the Semantic Web approach develops languages for expressing information in a machine-processable form (“machine-understandable” in terms of the Semantic Web community). Particularly, the Resource Description Framework, RDF (Lassila & Swick, 1999), and RDF Schema, RDFS (Brickley & Guha, 2000), are considered as the foundations for the implementation of the Semantic Web. RDF provides a data model and a serialization language; RDFS a distinguished vocabulary to model class and property hierarchies and other basic schema primitives that can be referred to from RDF models, thereby allowing for the modeling of object models with cleanly defined semantics. The idea behind this approach is to provide a common minimal framework for the description of Web resources while allowing for application-specific extensions (Berners-Lee, 1998). Such extensions in terms of

additional classes and/or properties must be documented in an application-specific schema. Application-specific schemata can be integrated into RDFS by the namespace mechanism (Bray, Hollander & Layman, 1999). Namespaces provide a simple method for qualifying element and attribute names used in RDF documents by associating them with namespaces identified by URI (Uniform Resource Identifier) references (Berners-Lee, Fielding, Irvine & Masinter, 1998).

With the objective to facilitate integration of information from distributed and heterogeneous sources, this chapter describes the integration of an existing Web-based ontology on evidence-based medicine into the RDF/RDFS framework. Following the presentation of the application context, the applied conceptual framework will be introduced. The main part of the chapter will then describe the modeling of the ontology with RDF/RDFS. This will provide the basis for a planned re-implementation of the existing ontology. A discussion of the presented approach will conclude the chapter. The contribution of this chapter rests upon the application of methods which are to some extent already established to a real-world scenario. Based on this application, the scope of the term “ontology” within the RDF/RDFS framework will be redefined, particularly by introducing a Simple Ontology Definition Language (SOntoDL). This re-definition contributes to the implementation of the Semantic Web and to ontology modeling in general.

APPLICATION CONTEXT: THE EVIMED PROJECT

The term “evidence-based medicine” was coined at the McMaster Medical School, Canada, in the eighties. According to Sackett, a co-founder of evidence-based medicine (EBM), EBM is the conscious, explicit, and judicious application of the currently best evidence in making medical care decisions in favor of an individual patient (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996). Practicing EBM means integrating the personal clinical experience and the best available external clinical evidence, which can be derived from systematic analyses of published studies. The key issues differentiating EBM from other approaches towards providing high quality and relevant medical information are the significant contribution of humans adding value in terms of expert knowledge, particularly to downstream activities, such as judging the methods applied in a particular study, and the tailoring of the information according to the needs of the consultation hour.

Evidence-based medical information services are quite new on the Internet (Hersh, 1996). For instance, the Cochrane Collaboration offers free abstracts of

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