E-Reputation Ontology for Adaptation in E-Learning

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Abstract. This paper presents an ontology, developed for e-Learning, which utilizes existing tools and methods available in the semantic web, as to further distribute personalized multimedia educational material into a private network environment. The ontology is enriched with a set of criteria inducing the consumers to evaluate the learning system. This collected e-Reputation metadata, through a mechanism based on KAON, anticipates for methods to provide adaptable learning objects.

1 Introduction

Current e-Learning systems exploit the technologies of the semantic web to provide reliable, commonly acceptable, semantically expressed and machine recognizable knowledge. One of the issues concerning the e-Learning systems is the adaptation of the learning material to the learner's profile. To provide personalized knowledge, current e-Learning systems are enhanced with knowledge presentation adaptation techniques. User modelling is also applied, classifying the learners according to their characteristics [1]. This paper approaches the issue of providing adaptable Learning Objects (LOs) in a P2P e-Learning network using semantic web techniques [5].

2 Adaptation through e-Reputation

To implement the semantic web based course creation and distribution process: 1) An ontology is developed (fig. 1) based on IEEE-LOM [2] standard, which classifies the two main concepts of a learning system: the **Learner** (that captures his profile) and the **LearningResource** (that annotates characteristics of the LOs aiding to its retrieval). 2) The RDF-based KAON-Toolsuit [3] is used to implement the ontology. KAON's underlined storage system in SQL-Server is used to maintain the metadata of these concepts. 3) A software is being implemented (fig. 2) that a) collects learner's profile metadata and content-providers' annotations of their LOs, and b) finds LOs asked by consumers, using metadata-based complex queries. 4) In this ontology two new concepts are introduced, which, in a final evaluation phase, are used to impress the opinions of the material consumers about the fetched LOs. Firstly, as e-Reputation is defined the process of i) collecting online evaluation feedback (concerning the whole e-Learning system as a whole: e.g. the learning material content, the metadata, the content providers, the distribution system etc), from authorized users, using, in parallel, mechanisms that assure the security (confidentiality and integrity) of the feedback data and the privacy of the evaluators, ii) the exploitation of this feedback from proper automated mediators using countable criteria. The concepts that

express the metadata of this e-Reputation phase of the course creation process are: a) the **e-Reputation** [4] concept, that represents the e-Reputation metadata the consumers use to critique those concepts and properties of the ontology that are used to characterize and retrieve the LOs, b) the **EvaluationCriteria** concept introduced to evaluate the e-Learning content using quality criteria.

Fig. 1 The Ontology

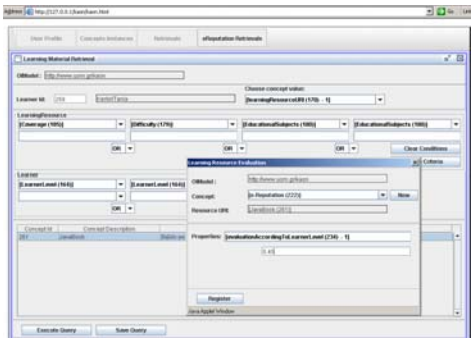

Fig. 2 The retrieval interface

The e-Reputation and EvaluationCriteria metadata is collected and re-feed the knowledge bases, creating a "veil" of metadata upon metadata (meta-metadata). Due to this metadata, the augmentation of some LOs grade is expected, because of the positive evaluations they may accumulate. This grade will affect these objects' participation in future courses, and can be used to LOs-providers evaluation as well. Because of the "flat" form of the model that represents RDF-triples, the "Online Analytical Processing" capabilities supported by SQL-Server, is proposed as mediator, to inference from the system. Future searches for LOs, using the OLAP mechanisms, can be based on this meta-metadata to retrieve suitable LOs for consumers having similar profile.

3 Conclusions – Future work

The proposed RDF-based ontology and the mechanism result to a) the outranking of the content metadata credibility grade, improving the candidature of proposed learning context to the individual learner's profile, b) the qualitative enhancement of the LOs content plus their accompanying metadata, c) the promotion of the course creation process into a fully open democratic activity. Future work involves the incorporation of a security layer to ensure the learner's privacy and the integrity of collected e-Reputation metadata.

References

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