

# Semantic Web: A Boon for E-learning

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**Abstract:** The semantic web has led to a marvellous development of the current web. This paper presents a review of literature related to semantic web and e-learning. We discuss the current state of semantic web and e-learning to draw the attention of the related researchers to the problems in e-learning. We present a critical evaluation of semantic web in the domain of e-learning and to suggest that semantic web is boon for e-learning.

**Keywords:** e- learning, knowledge, learner, ontology, semantic web.

## I. INTRODUCTION

Knowledge is simply vital for every learner. Gone are the days when one had to depend only on printed books for their learning. The learning process is now available anytime and anywhere with the existence of an e-learning. The web is claimed to be one of the most powerful tools for providing information. Rapid popularity of the internet has become an important symbol of the information age. Web designed especially for people. The emergence of a web page is for people to read and share data. The internet and computer as being just as a simple intermediary tool. The web has developed into a million-level pages of distributed information space. There are situations requiring great effort in efficiently using the amount of information on the web for data integration, information sharing, knowledge exchange and discovery of new knowledge and to implement a content-oriented information management. Existing web is far from satisfying people's need for knowledge creation and knowledge representation. The existing web can neither understand the web content nor use the data by understanding the meaning of the context.

In this situation, there is one way which is known as semantic web. The semantic web [1] has a unique technology that can improve the current technology by using RDF, ontology, RDF schema etc. The ontology [2] helps in semantic search.

The purpose of this study is to present how a current web is not fulfilling the need of users and we need more advanced web, i.e. Semantic web to deal with the problems of user like a learner, searcher. Current web searches the result, according to page rank. In large and complex organizations such as universities it is hard to find out which search result is useful for learners. The literature on the semantic web is voluminous but is dominated by descriptions of longer and wider projects. To overcome the disadvantages of such case studies, this paper applies a perspective to the semantic web and e-learning process. The goal of our work is to illustrate that semantic web is a boon for e-learning.

For the usefulness of human users the natural language is used in the current web but software agent is not familiar with natural language so the usage of XML is increased to

encode the language despite the use of XML the software agents require to work with literal symbols by utilizing semantics.

The main emphasis is on the effects of semantic web. We explain that the semantic web is a boon for e-learning. In section 2 we are exploring the development and outcomes of semantic web and e-learning with the help of the literature review that reveals that the semantic web is helpful for e-learning domain and section 3 provides a critical evaluation and in the final section we provide the conclusion and suggestions for future research.

## II. LITERATURE REVIEW

In [3] authors have proposed focus on ontology maintenance for learning scenario by learners. The ontology maintenance is done by using collaborative tags. To sketch the ontology maintenance they presented ideas such as an ontology-folksonomy visualization as well as interaction, measures of semantic relatedness, ontology-based weighting of semantic relatedness and non-weighted measure of semantic relatedness. And to be capable of performing these ideas they initiate architecture of a semantic-rich e-learning environment and its implementation is an expansion of LOCO-Analyst tool which is used for learning feedback. They also examine the shortcomings of their experiments. Their work helps the learner, but they need to add more features in it, namely analysing and changing ability.

The structure of semantic web involves key parts, namely ontologies and applications. In [4] they suggest techniques for creating learning ontologies. Here they explain steps in which the last three are newly added by the author for their learning ontology. They explain the ontology based education applications and projects. In their work they give a brief overview of almost all ontology based projects in the education domain, but they only explain methodology for creating ontologies without any example.

The web is a means of worldwide information [5]. By using the internet we can share our documents. The strong point of this research work is that the author briefly describe the development of web 1.0 to semantic web on the basis of technology and application. However, the

researcher does not introduce any new approach for the development of web 3.0.

The ontologies are an essential feature of semantic web. It can improve the education process by contributing in e-learning. They used the LT4eL projects [6] in their work which is represented as a test case. The authors declare that the automation of NLP as well as semantic web area is now able to grant for semi-automatic development of ontologies, but the evaluation of this declaration is not done with their work.

The real huge issue which generally occurs in the unification of e-learning or in learning management systems is that their modules have an incompatibility with each other. The incompatibility of modules occurs because they have an absence of unification. These modules role is to unify the distinct learning management systems. In their project they prefer three learning management system platforms. The learning management systems use distinct standards, yet main module is identical in each standard. In their work authors [7] develop an ontology for learning management systems for identical modules. However the technique of executing in all learning management systems is varied in nature and this is the reason of incompatibility.

They describe the importance of the semantic web and ontology. They explain the ontology formation actions and different essential features. The ontology formation actions are divided into three main actions. They explain the ontology of university school of information technology [8]. The queries are used to get the information. However, this university ontology is specific in nature.

The authors [9] explain the concepts of university by developing university ontology. For their university ontology creation they use R.G.P.V. university as its class. Here the main relation which the authors considered in this ontology is course, department and person, but the created ontology is for a particular university.

When we are working towards the progress of education, then personalized education plays the important role in future development of education systems. Personalized education helps the learner to make use of very large quantity of multimedia learning content which is available on the current web. Here the author [10] introduces the concept of PEOnto which is the main element of personalized education. PEOnto consists of numeric types of educational ontologies which is connected to each other. These connected educational ontologies inform personalized education agents. These personalized education agents support a heterogeneous service of personalized education. In PEOnto the main function is on fact finding approach and create a structure which provides search according to the learner's profile and arrange along with the design education scheme as specified by educational programs. However, this proposed work is in its initial stage.

In education domain the significant aim of learning is the intellectual ability like problem solving ability. The authors [11] consider the use of knowledge representation methods to automatically create the design of e-learning content for intellectual ability. They work on building exercise problems for e-learning from domain specific subject ontologies. This automatic exercise problem is beneficial for learners as well as for the trainer. This application describes that for some of the problem solving ability we can create e-learning objects by using domain specific ontology. However the excellence of SQL query created by the system is not consistent.

These days user profiling is generally used to improve service and all the pivotal components of the user. In earlier work distinct types of application ontology are used for the representation of user profile. But all these earlier ontology representing user profiles are developed for certain application and domain. In [12] authors describe the design of a widespread ontology for representing user profile which will be capable of performing the corresponding demands of every application. This user profile model mainly focuses on features which are static in nature. Still for the extensive use of extensive use of applications they need to work on dynamic features.

### III. CRITICAL EVALUATION

The possible opportunities of semantic web application for e-learning is that semantic web services for Personal Learning Environments, Social semantic web, etc. Natural language search, we can get a relevant learning material more easily and quickly, linked data, agent based distributed computing, Learner-centered data, integration between different application across different educational organizations, collaboration of domain expert and knowledge engineer to make domain ontologies, automatic web-service search, usage of 3D virtualization, knowledge creation, knowledge storage, knowledge retrieval, knowledge representation and knowledge exchange, metadata annotates the web resources appropriately and thus it makes the maximum resource utilization, domain specific ontologies, intelligent agent, execution monitoring, semantic annotation enhances the search techniques as it is based on ontology so data is easily accessible in semantic search engine.

The possible pitfall of semantic web application for e-learning is that it requires an extremely large number of assistance, even some educational institutes are not willing to share data, privacy of data, security, the need to create standards for exchanging data and content, vastness, trust, ontology attempt to bring the educational organization into agreement problem, practical integration of knowledge creation still requires a certain number of ontology developer effort.

### IV. CONCLUSION

For futuristic e-learning it is very useful to understand the meaning of a text. At present e-learning is based on a vast number of data and obtaining exact information in a

limited time is a very complicated work. And by reviewing the literature we realized that semantic web technologies give the novel idea and prospect to advance e-learning to upgrade coordination among several applications. Finally, if the semantic web is used in future then we can share our knowledge with other learners who had no access to the information because they could not get the exact information by searching in current web. Sharing honors differences, while bringing learners and researchers together. In our work, it also gives us a glimpse into a future world actually. To bring in semantic web technologies, we have to be willing to try innovative ideas and develop an unusual strategy for e-learning. No matter what the advantages and limitations of all the literature, one thing is common in all the literature review is that they all point out one crucial fact that we could use semantic web for e-learning. And by reviewing literature we can easily say that the semantic web would be a boon for e-learning. Of course semantic web applications in the e-learning domain had his shortcomings like all other web applications, but semantic web will have advantages in the educational domain, where timely and relevant work is critical. We believe that it would happen through a gradual process of discovery in technologies.

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