Abstract—Recent developments of e-learning specifications such as Learning Object Metadata (LOM), Sharable Content Object Reference Model (SCORM), Learning Design and other pedagogy research in semantic e-learning have shown a trend of applying innovative computational techniques, especially Semantic Web technologies, to promote existing content-focused learning services to semantic-aware and personalised learning services. This paper discusses such methods of e-Learning and gives the comparison of the same.

Keywords— e-Learning, Semantic search, context based e-Learning.

I. INTRODUCTION

INTERNET has become a major channel of the resources and information. All most all e-activities are based on the Internet. Among these e-Activities, e-Learning is the fastest growing activity as it has huge market potential. e-Learning encompasses the collection of different resources like Text, Image, Video, Audio, Web-Links etc. This inclusion makes it different than the web pages. Searching the Internet using the keywords for the expected text may be a simple task but integration of other multimedia resources which are semantically relevant to the e-Learning topic becomes a difficult task unless and until specific keywords are assigned manually. Being e-Learning as an organized information and knowledge base, it needs proper inclusion of available multimedia resources. This inclusion is generally based on the keywords. However, if a semi automatic methodology designed, the task of proper inclusion of the resource can be done efficiently.

The paper discusses the existing methodologies for efficient e-Learning process.

II. NEED

Internet being the largest database of the information available in public domain, the information is stored there in different formats with varied metadata assigned to the resources. For example, a photograph in e-News paper has some caption apart from the detailed news. This metadata can be used for searching the resources automatically on to the internet for its inclusion in appropriate e-Learning task.

Similarly, a speeches delivered by the eminent speakers are available on Internet in audio format. This audio again is assigned with some caption which follows the link of the actual audio speech. If the caption is selected such that the categorization of the audio data is easily possible, a semi automatic approach may be used for inclusion of such a resource in the e-Learning scheme for the related topic.

III. LITERATURE SURVEY

Traditional web-based e-learning systems use a web browser as the interface. Through run-time learning environments (either compatible or incompatible with SCORM) [2],[3], users could access the learning objects, which are directly linked to multimedia learning resources such as lecture video/audio, presentation slides and reference documents. A flow in traditional e-Learning system is given in Fig 1.

![Fig 1: Traditional e-Learning System](image)

This section details existing techniques available for e-Learning task.

A. An Intelligent semantic e-Learning framework using context aware semantic web technologies by Weihong Huang et al. [1]

Weihong Huang et. al. has proposed an intelligent semantic e-Learning framework which presents semantic information processing, learning process support and personalized learning support issues in an integrated environment. Architecture of the above framework is as given below in Fig 2. In addition to the traditional learning information flow, three new components namely semantic context model, intelligent personal agents and conceptual learning theories are introduced to bring in more intelligence Intelligent personal agents perform adequate personal trait information profiling and deliver personalised learning services. Semantic context model uses semantic information for static resource and
Dynamic process retrieves information from WWW and the future Semantic Web, referring to ontologies or knowledge bases. The context model also enables process-oriented learning activity description. By integrating dynamic and static learning-related semantic information in the same runtime learning environment, learning theories are to be properly supported in practice.

![Semantic e-Learning Framework](image)

**Fig 2: Semantic e-Learning Framework**

The semantic e-Learning framework consists of three stages, namely:
1. Pre Learning Process
2. Learning Process
3. Post Learning Process

Pre Learning process is designed for Instructors and learners. Instructors identify the multimedia resources on the web, assigns contextual information to it, design learning path for different types of learners and design learning activities and assessment for individual sessions and whole course. Learners are indentifies and are profiles based on the questionnaire given to it. This profiling is used to identify the personality of the learner based on which a course is catered to it.

Learning process contribute various kinds of learning activities involving, locating learning material, reading material, writing reflection, discussions with peers, self-evaluation and revision etc. More precisely this is a learner centric stage where complex learning activity is a combination of simple activities.

Post learning process is the final stage involving reporting and evaluation of learning outcome on both the sides i.e. learner and instructor sides.

B. An agent based Personalized Intelligent e-Learning model [4]

The object of this model is to provide the filtered and the relevant material to a learner, to save the time of a learner in searching the relevant content. The learner’s Queries are submitted to FTS (First Tier Search) i.e. available search engine and the search engine results pages are filtered through different agents such as MF (Middleware Filtering) Agent, WLP (Web Log Preprocessor) agent, WKD (Web Knowledge Discovery) Agent, Opinion Agent.

C. An Enhanced LTSA model Providing Contextual Knowledge for Intelligent e-Learning Systems by Hyunjong Choe et al. [5]

Hyunjong Choe et al. has concentrated on the IEEE Learning Technology System Architecture (LTSA) which represent a variety of learning system from different domains. Following figure show the model referred above.

In the figure, two squares shows ontology-based model containing adaptive sequencing plan and the ontology-based contextual knowledge. In this model learning resources is combined with ontological knowledge as a resource for contextual learning. Queries are used to search the resulted resources. The evaluation component is used to measure the learner’s performance and finally the result is stored in the database named “learner records”. Coach component uses learner records to locate a new context.

![LTSA with ontological and contextual support](image)

**Fig 3: LTSA with ontological and contextual support**

D. Distributed Leadership Collaboration Factors in e-Learning [6]

Niki Lambropoulos et al. presented a case study, aimed to discuss and analyze students’ collaboration as quantitative and qualitative engagement in Distributed Leadership (DL) in short e-courses. In Computer supported collaborative e-learning (CSCeL), teaching approaches plays important roles. Using the tools for such e-Learning course development can
be the easiest way of content development. Capabilities of the students can be used to developed the methodologies which can help develop the best content for e-Learning.


Isabela Gasparini et al. present an approach to user modeling in e-learning taking into account the cultural & contextual information context to improve personalization capabilities.

This methodology has two goals:

i) To describe a richer student modeling approach by adding several dimensions of context, in particular cultural context and modeling by different ontology.

ii) To explain how to integrate such context-aware to an ELE (e-learning environment) associating concepts of areas of HCI (Human Computer Interaction), user modeling, context-aware systems, and adaptive ELE.

This model has three levels of abstraction

a. The meta-model level is represented by an upper ontology, describing abstract concepts like user, application, situation or date.

b. The model level expresses the different contextual dimensions, with several ontologies to describe the elements to populate the context.

c. In the object model, the instantiations of the context ontologies i.e. a concrete name of a specific user, a specific discipline or a particular device.

IV. COMPARATIVE ANALYSIS

Table 1 below demonstrates comparative study based on the 5 parameters like Query Expansion, Learner’s profile, Web log pre-processing, web knowledge discovery and opinion.

V. CONCLUSIONS

All the disclosed architecture does not include all the parameters which are beneficial. Hence, hybrid approach using reference model with ontology support as well as agent base model for reference mining needs to be developed so that inclusion of the referential material should be dynamic. Meta data of the resource like news articles can be used to include the dynamism in the system. A repository of such resources has to be maintained so as to have centralized access.

REFERENCES


[7] Isabela Gasparini, Marcelo S. Pimenta, Jose Palazzo M. de Oliveira, “How to apply Context –awareness in an adaptive e-learning environment to improve personalization Capabilities?”