E-LEARNING FRAMEWORK FOR SEMANTIC-WEB

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Abstract
Over the last few decades, growth in Information Technology field has been very rapid and the various Information Technology-dependent applications are also evolving very dramatically. Web learning and teaching might be one of the common Information Technology applications. The study's major purpose is to investigate and then compare several web-based e-learning systems.We are willing to include some recommendations about shortcomings that have been found based on empirical, comparative studies of such different frameworks. In order to create successful changes to the smart web e-learning frameworks structure to provide social dimensions of online classrooms, we therefore emphasize a few of the research challenges as well as design problems which have been pursued.
KEYWARDS: Information Technology, E-learning, Semantic Web Service,

I. INTRODUCTION

E-learning program requires the use of online tools or methods to access curricula outside of classroom practice. In general cases, it concerns any degree, program or course that is fully delivered online. While technology evolves, it improves, and has been transformed with the introduction of electronic gadgets like desktops, laptops, cell phones, tablets, and other similar technologies. Knowledge can be shared or available at anytime, anywhere, 24 x 7 through the web in the e-learning framework, thereby increasing the quality of educational approaches. Such an interactive web based leaning program has tremendous data concern in terms of text, video-readings, power-point presentations, etc. with specific educational curriculum. Interpretation of these enormous data requires specialized techniques or model-based methods to provide the correct solution.

The data mining techniques are concerned with discovering new trends by data processing of large volumes of data. Throughout the past decade, data mining methods have been primarily used in business applications, and now it has also been commonly used in educational systems. At this time, data mining can even be developed to remove information using e-learning systems via the gathering of data provided by users. However, due to the frequent increase in web users and their precise habit of retrieving information, it is a difficult effort for webpage producers to make accurate user-specific data available on demand and as needed, without the web user's prior awareness. Data should be given in an insightful manner to accomplish certain tasks. Mr. Tim Berners Lee, Chairman of the World Wide Web Consortium (W3C), announced a new prospective role of web technology called Semantic Web Technology. A Semantic Web is

indeed a contemporary World Wide Web platform which encompasses not just Web pages but also formalized semantics.This semantic web provides information in a well-defined significance, lettingcomputersas well as individuals to collaborate more effectively. The semantic web guiding premise is to delegate many jobs and choices to [1] computers.

The move towards modernization has permeated the internet - based e-learning system which is utilized to provide higher education through the use of the World Wide Web.Online e-learning as it is currently practiced, which mostly gives learning data on the basis of digital information, is fundamentally static data displayed through web-based software or installed in an optical storage device utilizing independent desktop computers applications. However, with in new information technology era, information will be given in more than just textual or multimedia formats, but is presented in an intelligent manner, much like human teacher, according to online learner's level of knowledge. So data mining tools allow tasks to predict future movements.

The current paper is organized as various researchers views about online e-learning and semantic web services is describe in heading II, The important online e-learning model framework is describe in heading III, Comparative study of various online e-learning frameworks is summaries in heading IV,Research issues and design problems for online e-learning framework enhancement is proposed in heading V and finally authors conclude the work in heading VI.

II. E-LEARNING AND SEMANTIC WEB SERVICE

An e-learning system have users on a social technology platform which enhances learning activities [2]. Online learning, web-based learning, computer-assisted teaching, distance learning, and Internet-based teaching are also called e-learning. “There have historically been two common e-learning styles: distance learning as well as computer-assisted instruction. Distance education incorporates information technology to provide learners who are in remote areas with guidance from a centralized venue. Computer-assisted instruction (also referred to as computer-based learning and computer-based training) incorporates computers to help deliver stand-alone multimedia packages for learning and teaching.”As even the World Wide Web has become the emerging paradigm, e-learning supports these two types of instruction [3].

E-learning is described as "the delivery in real time of individualized, comprehensive, dynamic learning content, aiding the growth of information communities, connecting learners and practitioners with experts"[4]. Drucker coined the phrase "just-in-time education combined with high-speed value chains" to define e-Learning. [5]This is a real-time distribution of personalized, dynamic learning materials, the systematic encouragement of the creation of knowledge communities, and the establishment of connections between learners or practitioners and experts.The purpose of e-learning is to replace outdatedplace,time, material, and predefined learning opportunity combined with a working environment or just-in-time or customizable or on-demand educational setting.E-learning systems have proven to be a viable platform that can easily and satisfactorily facilitate the learning process. In the future, they will build new worlds for us in the field of teaching that we have never seen before. With their support, the right person can receive the right knowledge at the right time.

Syntactically organized text archives with efficient search engines are learning objects and course databases. There is, nevertheless, no semantic link between user's information requirements and the material of the articles. Due to the obvious numerous limitations of using Web 2.0 to develop an e-learning management program, humans currently adopt Platform 3.0, also referred as the Semantic Web, on a daily basis.The most modern era of Internet technology is known as Web 2.0. User information in the framework of social network includes character, social graph information that identifies the person, and content data.Availability is still restricted to humans and not to computers for this vast amount of web content, and there are a range of problems with this limited accessibility.It's all about putting information and documents onto the Internet so machines can efficiently retain, interpret, assemble, and react upon this.It is an extension of the current traditional Web which allows machines and humans to collaborate. Its specifics have a very well-defined significance.The Web information should be structured in a machine-readable format to enable machines to conduct additional operations. This is accomplished through the development of new technologies as well as language in which web data can be represented bythismeans. The Semantic Web would be an addition to the World Wide Web whichallows individuals to access images far beyond limits of websites and apps. On what the Semantic Web is, there are several different theories. According to Robin D. Morris [6], the Semantic Web, also referred to as Web 3.0, is "not a new Web," but rather an enlargement of existing one where information is provided a well-defined framework, enabling machines and individuals to work together and to function better in cooperation"[6] and predicted that machines will be able to develop the information on the Website rather than just convey the results. Computers are able to analyze all web data, information, interactions as well as transactions between individuals and computers[7]. The Semantic Web has become a vision cantered upon his concept and is thought to become another step in the evolution of Web.It's all about getting information and documentation onto the Web because then computers can effectively store, interpret, analyze, and act on information.One of the most exciting aspects of Semantic Web is the flexibility with which it can be used to detect and recognize material. [8].

In a way that makes it easy to process computers on a global scale, the Semantic Web is a network of linked data. It is the most recent version of the Web which allows information to be gathered in a specified, machine-interpretable format that is ready to be processed, sharing, and reusing through software agents, and also enabling software agents to learn the significance of the terminology used to represent data. [9] The Semantic Web provides web-based application developers with new technologies aimed at providing smarter access and management of Web knowledge and semantically nuanced modelling of applications and their users. The Semantic Web's key job is expressing meaning. The Semantic Web is not a separate web, but it is also the extension of the existing web that makes it possible to exchange and reuse information. Semantic Web Technology (SWT) offers such an atmosphere, so that computers can communicate with each other by supplying the correct information to meet the users' needs. SWT uses a range of tools, such as XML RDFs and SPARQL, to achieve this mission.

Table 1: The benefits of using the Semantic Web as an E-Learning technology.

Requirements	E- Learning	Semantic Web
Delivery	Pull-Student specifies agenda	Knowledge objects (learning materials) are circulated on the internet, but are related to ontology(s) that are widely agreed upon. This allows, by semantic querying for relevant topics, the creation of a user-specific curriculum.
Responsiveness	Reactionary- Responds to the question at hand	A widely accepted service language could be used by software agents mostly on Semantic Web that allows communication among agents as well as constructive delivery of learning materials in the sense of real problems. The aim is for each user to have their own customized agent to interact with the other agents.
Access	Non-linear-Allows direct information in any series that makes sense of things at hand.	The user should identify the problem at hand (learning purpose, prior knowledge) and conduct semantic queries for the necessary learning content. The new user is provided for as well. Information access can be broadened by semantically specified control.
Symmetry	Symmetric-Learning takes place as an integrated practice.	The Semantic Web (semantic intranet) provides the ability for all business operations in an enterprise, such as learning practices, of becoming an integration platform.
Modality	Continuous – Learning synchronizes to company operations but never stops	Active knowledge distribution (based on customized agents) provides a dynamic learning experience that is incorporated

		into the processes of business.
Authority	Distributed-Content comes from the interaction between participants and teachers	As decentralized as practicable, the Semantic Web would be. This allows for successful co-operative control of content.
Personalization	Personalized-Content is driven by the size of the individual person as well as seeks to fulfill each user's needs.	A customer looks for learning material tailored to his or her needs (using his or her customized agent). Ontology is the relationship between both the needs of the user as well as the features of the learning content.
Adaptively	Dynamic- through user feedback, perspectives, new methods, business rules as well as heuristics, content constantly changes	The Semantic Web makes it possible to use shared information given in different ways, allowing the content to be annotated semantically. The Semantic Web's distributed design allows the continual development of teaching materials."

III. IMPORTANT ONLINE E-LEARNINGFRAMEWORK

Conventional online e-learning is basically a static web-based information display or the assembly of standalone personal computer applications on a CD / DVD, providing only electronic data pertaining to education.The modern concept of information systems, on the other hand, could go a step further in that it will categorize students in learning as per their level of knowledge, information is not only given but presented in a smart manner in text or multimedia format, just like human teachers.

Online e-learning seems to be a very challenging research method, with IEEE Learning Technology Systems Framework (LTSC), the Sharable Content Object Reference Model (SCORM), Blackboard, Moodle, Schoology, and Sakai are amongst the most frequently adopted standard online e-learning frameworks.

(a) IEEE Learning Technology Systems Framework (LTSC)

Basically, as seen in Fig.1, this IEEE Learning Technology Systems Framework" [10] model comprises6elements. A Learner Entity is indeed a graphical user interface (GUI) for learners who aim to establish information for a web-based e-learning system. The Learning Resources module includes catalog information that could identify how content has been delivered to a

student through the distribution component.The most important feature of this structure is the subsequent growth which constantly examines the conduct of the learners, progress in study by evaluating the tests, summative assessment, or any other type of test conducted by system.The final section, students' data, stores the user's personal details, including history and current data, and also professional and academic details.

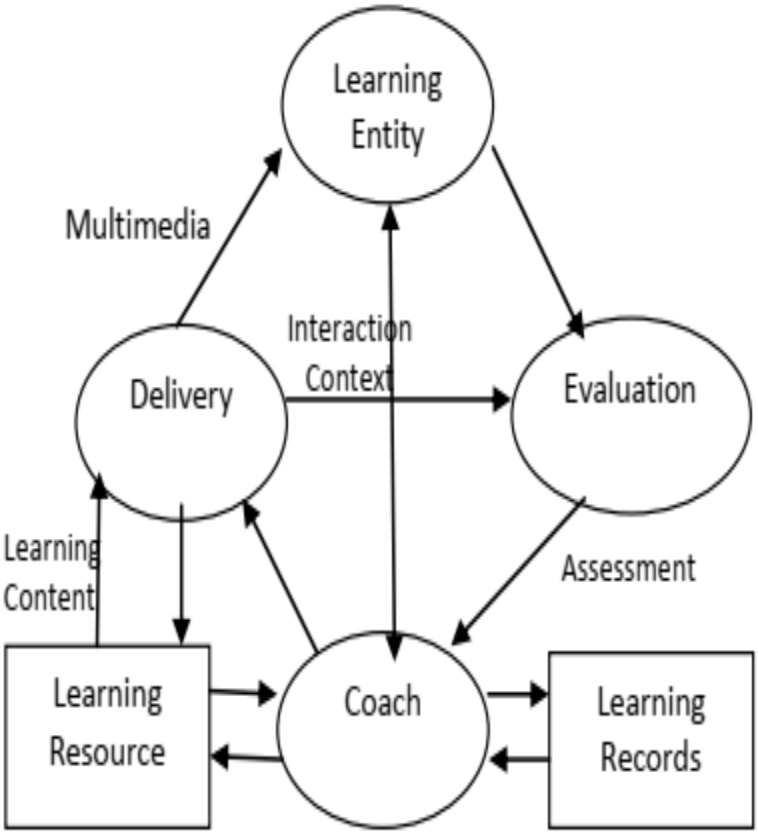

Fig.1: IEEE Learning Technology Systems Framework

(b) Sharable Content Object ReferenceModel

The architectural model of this Sharable Content Object Reference Model [11] is quite common amongst online web-based e-learning systems, as shown in Fig.2. The extra service provided by such a model is the content management system, among other things. The provider of the platform has the flexibility to make available the user-specific content of the learning material. It also has an API adapter which can provide an interface at the application level that is independent of programming languages.This only provides information through a web browser.

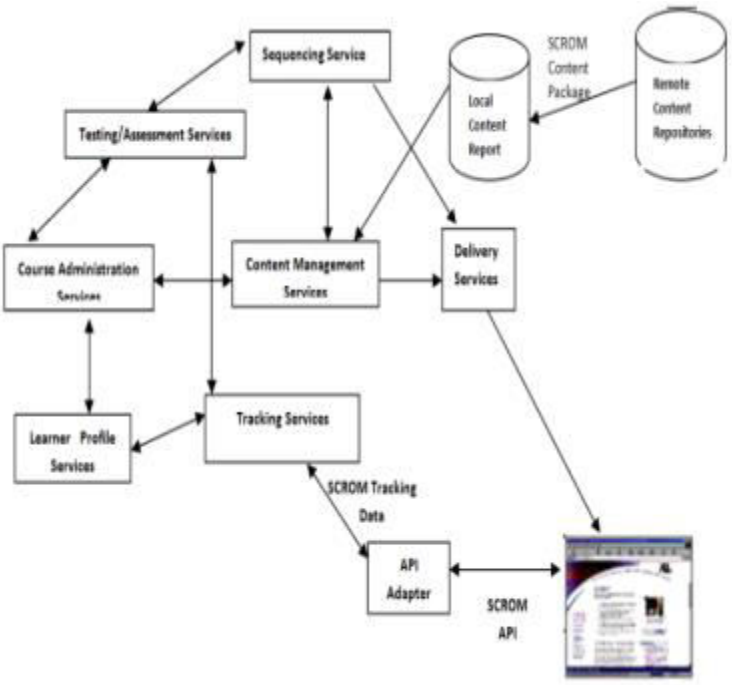

Fig.2: Sharable Content Object Reference Model

(c) The blackboard

Additionally, the blackboard [12] refers to an internet-based e-learning platform.One of benefits of this scheme was that it was using an Agent concept. Although it is not so powerful in its Agent definition. It is worth recognizing a fresh approach to adding an intelligent concept using agent technology. As shown in Fig.3, it has a client-server system for information sharing. It provides the teacher with the flexibility to upload as much information as is needed about subject to use the format of multimedia. Such system is split to 2 components. The first is an identity server that authenticates and authorizes the user to login. This then leads the authenticated person to blackboard teaching approach that contains all of the e-learning materials necessary to study a particular subject.

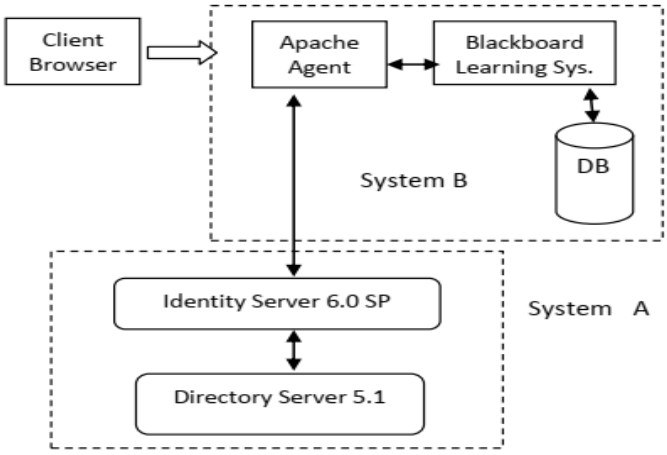

Fig.3: The blackboard

(d) The Moodle

Moodle [13] was among the most difficult web-based e-learning programs. It is the three-level design depicted in Fig.4. The 1st layer seems to be the presentation layer, which provides its users with an experience via an internet browser.The 2nd layer has become a domain-specific layer that varies according to the domain for which the organization desires to develop an online e-learning system.The last and most crucial layer for data management has been the layer which saves all data throughout the MySQL database.It contains a connection layer that allows external applications to be integrated for effective dissemination of educational materials to students.

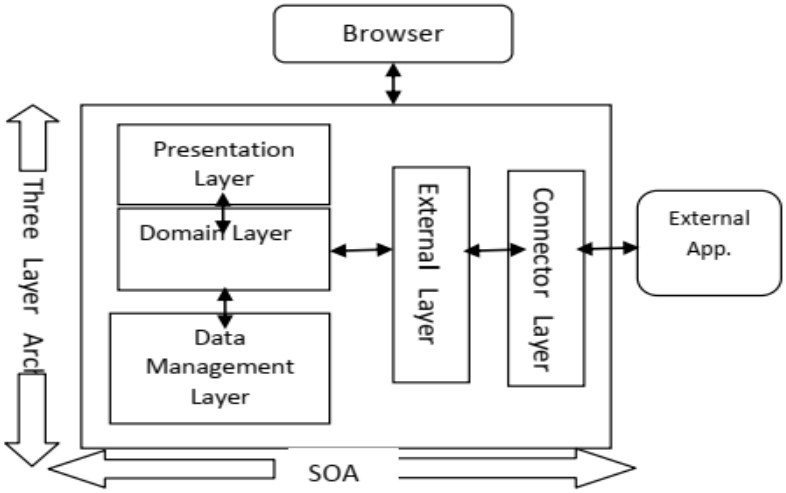

Fig.4: The Moodle

(e) Schoology [14]

In order to accomplish more enriching or customized learning experiences, this platform allows students to view creative digital content created by the instructor and allows them to choose between different researches modalities: classroom, semi-presence, distance or internet. It also provides teachers with a complete range of internal and external learning management resources, such as: managing existing content, creating and implementing new content, producing and reviewing questionnaires, assessing student results, engaging with students and teachers, as well as effectively encouraging them in an online environment.

(f) Sakai [15]

Sakai is a collection of Java-based web modules that are loosely connected to a service-oriented framework. The web server that is supported is Tomcat; Oracle as well as MySQL are indeed the databases assisted for storing data. Sakai has a structure of layers. Each layer is expandable: it's easier to put new services, software, as well as aggregators. Due to services, tools or user interfaces, it's indeed possible to write in languages apart from Java, though it does not occur in reality. In the form of online services, the Sakai kernel provides a common infrastructure then exposes it. For issues such as authorized users or site management, all of sub-applications, known as the tools in Sakai, rely on such services. In the type of instruments, almost all usability is incorporated. Tools include a section for the implementation of the business logic as well as a

section for the user interface, implemented using different Java technologies. Such frameworksso-called aggregators merge.

IV. COMPARATIVE STUDY OF VARIOUS ONLINE E-LEARNING FRAMEWORKS

After a study of the numerous research papers addressing the structure of the e-learning method, each structure has its own qualities, benefits, and drawbacks. Given comparison Table 2 is to take into account the most common parameters discussed in the literature referred to.

Table 2: Common Parameters

S.No	online e-learning frameworks	Objects of Learning	Advanced information representation technologies	Additional Features	Drawbacks
1	e-AULA[16]	Metadata from Semantic	RDF, Ontology	Customization	Pedagogical Non-Standardization
2	e-LKG[17]	-------	Open source	Mathematical students developing their engineering skills	-------
3	Adaptive e-learning System[18]	Item Response Theory	Ontology	Humanization Foundation	-------
4	ADL-SCORM[19]	Reusability of the object of previous material	JAVASCRIPT, XML, Agent Technology	Mobile Devices Access allowed	Lack of interactive design as well as smart approach
5	Distributed Framework as well as focused resources [20]	Web Service	SOAP, XML, WSDL, UDDI	Interoperability	-------
6	Conceptual e learning Framework CELF[21]	Self-guided	-------	Andragogy-the art and science of educating adults	Results of study have not been empirically checked
7	AEHS-LS[22]	Implement the	MySQL, Apache,	VARK	-------

		partnership principle	PHP	Questionnaire Used	
8	Auto recommended based system Framework[23]	Recommendation based on profile	XML, AJAX,JavaScript	Distributed environments Introduced	Implicit and explicit advice is needed
9	AeL[24]	Resources for Multimedia	SVG, XML,Mathematical Mark-up Language like MathML	Portable on cellular devices	------
10	FABULA[25]	Online E-learning-based programmes	Ontology, Multi-Agent System	Help for smart phones, AGORA for Agent cooperative work	-------
11	Collaborative ELMS[26]	The strategy of collective learning	Ontology, Multi-Agent System	Utilized as a model framework for collective learning	-------
12	Voting based e-learning Framework[27]	By Vote Answer	RMI,XML, JavaSpace, Autonomous Agent, as well as JATLite	Customization	The course selection criterion depends on whether another course is running or not.

It's been noticed that almost all smart e-learning frameworks are supposed to be domain autonomous as well as role autonomous after contrasting the various e-learning frameworks as well as services.

V. RESEARCH ISSUES AND DESIGN PROBLEMS FOR ONLINE E-LEARNING FRAMEWORK ENHANCEMENT

Some of the issues encountered pertaining to online learning are mentioned as under: (1) the development of a smart mobile agent framework for the online e-learning system focused on semantic web. (2) To bring as much information into a mobile agent if necessary. (3) In order

to create mobile agents function smarter as well as enjoy the benefits of semantic web technologies. (4) To build an online e-learning system that is flexible, interactive, as well as structured. (5) To render a much more customized as well as sophisticated online e-learning system. (5) Use of the Recommendation Officer to suggest relevant information as well as to suggest various e-learners in the teaching process. (6) Correct categorization of information about the learning capacity of the user.Although the design flaws for designing an efficient online learning system are- (1) The visual representation of topics should be given by the online e-learning system. (2) Before using the specific online subject, statistical analysis can be carried out and some perspectives must also be given on the subject. (3) They should be willing to collaborate and experiment with new knowledge on the issue. (4) Artificial Intelligence with the voice recognition can be used for user interaction. (5) It needs to have learning power. (6) Responses from internal database, Wiki, Web, previous communication should be given. (7) Information from many online databases, such as Ask.com, Google, Bing as well as others, should be searched for.

VI. CONCLUSION

As web e-learning study is an evolving process as well as the requirements of online learners evolves every day though. It's also been noticed that each and every digital e-learning framework does have drawbacks. This is a very difficult job for service providers as well as academics to meet all student requirements.Combining Semantic Web technologies as well as a smart software operator with ability to customize for each student is one way to this dilemma.It will be possible to construct successful however real-world digital e-learning initiatives with the support of both.

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