Abstract

The study aims of creating a knowledge society (KS) through e-learning (EL) with the support of web services. EL system with its elements is the matter of discussion at the beginning of the study. For effective EL system, integration of web services with EL system is essential which is emphasized in the paper. Web 2.0 services such as blogs promote the content creation, assessment and evaluation, wikis makes the user enable of creating editable contents in the form of highly searchable knowledge-bases. Group work, Question & Answer (Q & A) sessions are performed by social networking and discussion forums. RSS feeds, Tags, Podcasts and Videocasts are considered as supporting services to speed up the knowledge management process. Web 3.0 services can apply artificial intelligence (AI) technique to speed up the teaching/learning process. The integration is expected to create the KS and the global knowledge warehouse.

Keywords: E-Learning 2.0/E-Learning 3.0; Web 2.0/Web 3.0; knowledge society; interoperability; ICT; semantic web.

* Corresponding author. Tel.: 91-9437123692
E-mail address: juipattayak@yahoo.co.in
1. Introduction

E-Learning (EL) is just-in-time education providing individualized, comprehensive, dynamic learning content in real time thus intensifies communities of knowledge, linking learners and instructors with experts. EL aims at replacing old-fashioned time/place/content predetermined learning with a just-in-time customised/on-demand process of learning. It builds on several pillars, vis. management, culture and IT (Maurer and Sapper, 2001) [13]. The incorporation of web technology in the pedagogy of EL can create communities of practice where the community knowledge creates the knowledge society (KS). The second phase of EL provides collaboration, much improved interaction between users to build up individual as well as organizational knowledge and skills. From this collaboration community or societal knowledge is produced. Web services play significant role in collaboration to give a new essence to teaching and learning. Most of the web 2.0 tools and technologies is widely used in EL system to allow the learners to create personal learning environment (PLE), and social network. Web 2.0 refers to the social use of the web which allows people to collaborate, to get actively involved in creating content, to generate knowledge and to share information online (Grosseck, 2009) [7]. In addition, in 2004, Web 2.0 appeared as a new vision of the web which considered the user not a simple consumer of information but as a potential producer of the web content (Osguthorpe & Graham, 2003) [15]. The services of next generation of web i.e., web 3.0 supplements web 2.0 by using AI techniques. In short, web 3.0 is the concept of next evolution of World Wide Web about linking, integrating, and analyzing data from various sources of data to obtain new information streams. Also, Web 3.0 aims to link devices to generate new approaches of connecting to the web by several machines and exchanging data among machines (Bratt, 2004) [3]. This paper presents an idea of integrating web services with EL to create knowledge society (KS).

2. The E–Learning (EL) System

EL is defined as the learning activity utilising information transfer and knowledge utilisation with particular attention to computer-based technology. EL is also defined as the use of information and computer technologies (ICT) to develop learning experiences. It is an inclusive term that describes educational technology that electronically or technologically supports learning and teaching. "EL is just-in-time education integrated with high velocity value chains. It is the delivery of individualised, comprehensive, dynamic learning content in real time, aiding the development of communities of knowledge, linking learners and practitioners with experts" (Drucker, 2005) [5]. EL may either be synchronous or asynchronous. Synchronous learning takes place in real-time, with all participants interacting simultaneously, while asynchronous learning is self-paced and allows learners to exchange ideas or information without the participation of other learners at the same time.

Gradually EL becomes an essential part of education since it is identified as a positive and creative way for learning communities. With the help of different EL tools communities are reconnected (through internet) for learning (through the availability and production of online learning resources). With the incorporation of digital media into teaching/learning the learning environment is turned to virtual classroom which is termed as virtual learning environment (VLE). It provides any time/anywhere learning irrespective of geographical constraint. To fulfil the educational needs, the essentiality of EL is stated as follows,

2.1 Essentiality of E-Learning (EL) in Modern Society

- To provide consistent and customized information depending on need
  Every learner should get the same content, in the same form.
- To provide timely and reliable content
  Content should be updated instantaneously, to give more accurate content.
- To provide 24/7 learning
  Due to the web-based nature, EL is available to learners anywhere and at any time of the day.
- Standardization of Learning
  The web-based nature of EL can be able to provide virtually the same content at same time regardless of the different platforms and operating systems.
• Increasing the Scalability
  EL solutions are highly scalable. Programs can move 10 participants to 100 or even more participants with little effort and with low cost.
• Cost-Effectiveness
  EL is often the most cost effective way to deliver instruction or information as it slices up travel expenses and can also reduce teaching time, and significantly reduces the physical need for a classroom/teacher infrastructure.
• Creating Knowledge Society (KS)
  EL can enable learners to collaborate and form learning communities by sharing knowledge and create KS.

3. Elements of E-learning (EL) System

  Depending on the above essentialities number of architectures has been proposed for EL from time to time. Among those the framework given by Islam et al. (2011) [9] clearly describes the EL environment divided into three layers with nine different functional components. The integration of web services with these components can lead the society for the successful implementation of virtual learning environment (VLE) where continuous flow of knowledge can improve the learning environment with the hope to create a KS. The components are described as follows:

  • People (instructors/teachers or learners/students) and ICT experts
    This part emphasizes instructors and learners since they establish physical contact. Also, facilitators, IT administrators and personnel with experience in the adaptation of content for EL are vital components of EL system.
  • Technical infrastructure and suitable environment
    Technical facilities include hardware and software Different interfaces for users (instructors and learners) as major components of EL system. Proper technological infrastructures as well as a good learning environment for learning and teaching are major components of an EL system.
  • Communication tools and knowledge or resource sharing
    Communication tools such as the internet and a network of learners and instructors who exchange information are significant components of an EL system. From technological view, high speed of Internet or Intranet, as well as the computer and internet connection are significant components of EL systems. Resources and/or knowledge sharing is one of the significant components of an EL system for the creation of KS.
  • Knowledge content or digital resources and course management
    E-books, video and audio files are major components of an EL system. Digital contents/resources as well as content capture, shape, upload and share of the contents are major components of an EL system. Content development, content management and course/enrolment management are the significant components of EL systems.
  • Feedback or evaluation
    An evaluation and/or monitoring system is one of the important components of an EL system to ensure that the system is effective. Progress tracking, including assessment and feedback, etc. are significant components of an EL system.

4. Integration of Web Services with EL

  The tools and technologies of web 2.0 and web 3.0 could better facilitate new models of design for EL that will better enable the citizens and workers to create a KS. Web 2.0 is also known the wisdom web, people-centric web, participative web, and read-write web (Aghaei, et al., 2012) [2]. Downes (2005) [4] described the use of Web 2.0 technologies for teaching and learning as “e-Learning 2.0”. Web 3.0 is a series of combined applications and the core software technology of web 3.0 is artificial intelligence (AI), which can intelligently learn and understand semantics. Therefore, the application of web 3.0 technology enables the internet to be more personalized, accurate and intelligent” (Rajiv & Lal, 2011) [16]. Availability of new technologies, emergence of cloud computing, collaborative intelligent filtering, increased and reliable data storage capacity, higher screen resolutions, multi gesture devices and 3D touch user interface leads us into the next generation of EL (e-learning 3.0) (Hussain, 2012) [8].
4.1 Services of Web 2.0

The term Web 2.0 was coined by O’Reilly [14] as a common denominator for recent trends heading towards the ‘Read-Write Web’, allowing everyone to publish resources on the web using simple and open, personal and collaborative publishing tools, known as social software: blogs, wikis, social bookmarking systems, podcasts etc. The various learning applications of web 2.0 services are the following:

A blog (contraction of the term “Web log”) is a website that provides regular community in the form of postings with the most recent at the top of the page (often referred to as “reverse-chronological order”) (Stone, 2009) [18]. As blogs are highly text-centric and include most recent topics they can be integrated with knowledge/resources sharing and content management. The learners’ knowledge can be intensified about the topic not included in the courseware. From the learning perspective, microblogging fosters intellectual exchanges among students or between students and the instructors, through asking questions, giving feedback, exchanging ideas, sharing resources, and reflecting on learning (Ebner & Mauser, 2008) [6]. Using microblog in feedback/evaluation, knowledge sharing and course management can help the learner/instructor for asking questions, giving opinions, sharing resources, and transformation in both directions. Wikis basically refer to user-generated encyclopedia known as Wikipedia. As wikis help in collaboration their integration can be used in workgroup, department, division or organization to safeguard knowledge contents/digital resources in case of brain drain. Also it can help in content development. Forums allow for asynchronous communication between number of users. Furthermore, as all exchanged knowledge is stored within a forum, it can be explored or searched by all users at any time (Abel et al., 2010) [1]. Incorporation of forum into EL system can help in knowledge sharing, Q&A sessions, content sharing and to collect feedback and accordingly evaluation can be done. Individuals can stay connected with each other through online communities; can share their personal views, hobbies, etc. Social networking can be defined as a social utility that connects people with friends and others who work, study, and live around them (Lee, 2011) [12]. It can help the learners to enhance knowledge and clarify doubts by identifying experts outside their community. Also the content developers and instructors can collaborate with subject matter experts to improve the quality of teaching content development respectively. Tag basically refers to metadata descriptor. It is related to web content or digital image. For example, tags can be integrated with content development and course management at the time of preparation of lesson plan. Tags are used by IDs, Authors and SMEs to attach a description of the content. Social bookmarking can be used as supplement to wiki to add new links. It includes podcast and video-cast. Podcasting refers to learning by listening to audio files. Video-cast is same as podcast except that, it provides learning by watching to video files. Integration of multimedia can be done with three components of EL system i.e., knowledge sharing, content management and knowledge content to make the learning environment interactive. RSS feed stands for Really Simple Syndication and Rich Site Summary. RSS feed is a large collection of blogs, podcasts, and any other content sources in which frequently updated contents can be made available.

4.2 Services of Web 3.0

Web 3.0 is regarded as the semantic web which gives a twist in education by using smart interfaces. It uses all the technologies of web 2.0 along with its additional services. The web 2.0 technologies are capable of generating large amount of data, but they are all underutilized. AI techniques can be used to extract the patterns in the large amount of data and its use. To retrieve course content and knowledge/digital content can big data technique can be used. The data generated by web2.0 is in free-form with different forms. Thus, they cannot be linked, processed and utilized. Berners-Lee developed linked data for publishing content and connecting datasets on web. Thus, linked data can also help in knowledge sharing. Huge infrastructure is very much essential to process and analyze large set of data produced by web. Cloud computing services can be in technological infrastructure without purchasing the software/hardware by reducing financial burden. 3D visualization and interaction can make the learning environment much like physical classroom, by making a whole range of tasks easier including fine motor skill interaction, exploration of virtual spaces and manipulation of virtual objects. Augment reality is a live, direct or indirect view of a real world which is been augmented by computer (Kreizberg, 2007) [10]. Incorporating this technology can create a suitable learning environment by enhancing learner’s cognition on reality whereas the virtual reality can replace the real world with a simulated one. Semantic web is an extension to the www to allow machines to search and
process web contents, based on AI technique. Since it acts as a globally linked database, its integration into content management and knowledge content can help to find contents available in various formats. In distributed computing, a task can be tackled by various computers. As a technological infrastructure, distributed computing can speed up the process. Hand held and wearable devices can also serve as technological infrastructure to provide ubiquitous learning. Some of the devices can be PDA, smart phones, tablets, hand held, hand/leg worn, head worn etc.

The EL system can be adaptable one with the successful integration of web services. The proposed EL system is supposed to create more interactive VLE with this integration. The EL framework (Islam et al., 2011) [9]integrated with web services is given in figure 1.

Fig. 1. Integration of web services with e-learning.
5. Conclusion

The greatest educational challenge today is not only helping learners to acquire desired set of knowledge and skills, but also enabling them to learn how to succeed by working creatively with creativity and innovation to contribute to the creation of KS. Education in a knowledge society should enable learners to participate in the creation of new knowledge as a normal part of their lives (Scardamalia & Bereiter, 2003a) [17]. Recent changes in higher education, the demands of the knowledge society and the increased need for students to become autonomous, reflective e-learners has increased the need for academics to understand the learning process (Webster, Sudweeks, 2006) [19]. A KS is supposed to be formed with the successful of integration of web services and EL system. As such the integration of web services with each and every component of EL system gives a new direction to EL by allowing the learner as the potential content producer. eLearning for pluralism, therefore, should generate new forms and tools of gathering data, manipulating and storing knowledge, transforming information, and working together over distance and time to build a knowledge society efficiently, and transfer global knowledge effectively to the new contexts of social justice. Thus, the above integration is a global perspective that squeezes the gap between learning requirements and learner and will ensure a new dimension to VLE for creating KS.

References