

# E-Learning Methodologies and Tools

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**Abstract**— E-learning is among the most important explosion propelled by the internet transformation. This allows users to fruitfully gather knowledge and education both by synchronous and asynchronous methodologies to effectively face the need to rapidly acquire up to date know-how within productive environments. This review paper discusses on e-learning methodologies and tools. The different categories of e-learning that includes informal and blending learning, network and work-based learning. The main focus of e-learning methodologies is on both asynchronous and synchronous methodology. The paper also looked into the three major e-learning tools which are (i) curriculum tools (ii) digital library tools and (iii) knowledge representation tools. The paper resolves that e-learning is a revolutionary way to empower workforce with the skill and knowledge it needs to turn change to an advantage. Consequently, many corporations are discovering that e-learning can be used as a tool for knowledge management. Finally the paper suggests that synchronous tools should be integrated into asynchronous environments to allow for “any-time” learning model. This environment would be primarily asynchronous with background discussion, assignments and assessment taking place and managed through synchronous tools.

**Keywords:** *E-learning; Synchronous; Asynchronous; Tools; Methodology; Knowledge management.*

## I. INTRODUCTION

In the last century, we have moved from the Industrial Age through the Information Age and now to the Knowledge Age. Knowledge and its efficient management constitute the key to success and survival for organizations in the highly dynamic and competitive world of today. Efficient acquisition, storage, transfer, retrieval, application, and visualization of knowledge often distinguish successful organizations from the unsuccessful ones. The ability to obtain, assimilate, and apply the right knowledge effectively will become a key skill in the next century. Learning is the key to achieving our full potential. Our survival in the 21st century as individuals, organizations, and nations will depend upon our capacity to learn and the application of what we learn to our daily lives.

E-learning has the potential to transform how and when employees learn. Learning will become more integrated with work and will use shorter, more modular, just-in-time delivery systems. E-learning delivers content through electronic information and communications technologies (ICTs). According to [2], the use of these facilities, involves various method which includes

systematized feedback system, computer-based operation network, video conferencing and audio conferencing, internet worldwide websites and computer assisted instruction. This delivery method increases the possibilities for how, where and when employees can engage in lifelong learning. Employers are especially excited about the potential of e-learning for just-in-time learning delivery.

By leveraging workplace technologies, e-learning is bridging the gap between learning and work. Workers can integrate learning into work more effectively because they use the same tools and technology for learning as they use for work. Both employers and employees recognize that e-learning will diminish the narrowing gap between work and home, and between work and learning. E-learning is an option to any organization looking to improve the skills and capacity of its employees. With the rapid change in all types of working environments, especially medical and healthcare environments, there is a constant need to rapidly train and retrain people in new technologies, products, and services found within the environment. There is also a constant and unrelenting need for appropriate management and leveraging of the knowledge base so that it is readily available and accessible to all stakeholders within the workplace environment.

## II. DEFINITION OF E-LEARNING

E-learning is not only about training and instruction but also about learning that is tailored to individuals. Different terminologies have been used to define learning that takes place online, a fact that makes it difficult to develop a generic definition. Authors agree that a single definition for e-learning has not yet been found. Terms that are commonly used to define online learning include e-learning, Internet learning, distributed learning, networked learning, tele-learning and telematics distributed learning [4], [1], virtual learning, computer-assisted learning, Web-based learning, and distance learning. It includes the delivery of content via Internet, Intranet, and Extranet, satellite broadcast, audio-video tape, interactive TV and CD-ROM [15]. Nonetheless, the different terminologies point to a similarly conceived educational experience. All of these terms imply that the learner is at a distance from the tutor or instructor, that the learner uses some form of technology (usually a computer) to access the learning material, and that the learner uses technology to interact with the tutor or instructor and other learners, and that some form of support is provided to learners[1].

E-learning refers to the use of information and communication technology (ICT) to enhance and/or support learning in tertiary education. However this encompasses an ample array of systems, from students using e-mail and accessing course materials online while following a course on campus to programmes delivered entirely online. E-learning can be different types, a campus-based institution may be offering courses, but using E-learning tied to the Internet or other online network (Lorraine M.2007). What is E-learning? E-learning is an education via the Internet, network, or standalone computer. E-learning is basically the network-enabled convey of skills and knowledge. E-learning refers to using electronic applications and processes to learn. E-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration. EL is when content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. E-learning was first called "Internet-Based training" then "Web-Based Training" Today you will still find these terms being used, along with variations of E-learning. EL is not only about training and instruction but also about learning that is tailored to individual. Different terminologies have been used to define learning that takes place online [1, 2].

#### A. Categories of e-learning

These are considered as follows:-

##### 1) Courses

Most discussion of e-learning focuses on educational courses. Educational course materials or courseware are usually modified and added with various different media and are uploaded to a networked environment for online accessing. Today, there are several popular learning management systems (LMS) such as WebCT and Blackboard which are commonly used by educational institutions. In achieving a more motivating courseware, courseware designers have begun to add innovative presentation such as simulations, storytelling and various unique traits into the materials. E-learning has distinct similarities with classroom environment whereby both of the learners and the instructors are together related to the common course arrangement and flow.

##### 2) Informal Learning

Information learning can be said to be one of the most dynamic and adaptable features of learning but nevertheless it is least recognized. Our need for information (and how we intend to use it) drives our search. Search engines (like Google) coupled with information storage tools (like Furl) and personal knowledge management tools like wikis and blogs present a powerful toolset in the knowledge workers portfolio. Cross [4] opined that in workplace we acquire more knowledge during break time than in a formal learning environment. We progress more in our jobs through informal learning, sometimes using trial and error and other times through conversations.

##### 3) Blended Learning

Integrated learning provides a good transition from classroom learning to e-learning. Integrated learning which is also referred to as blended learning is a combination of a face to face and online learning. The productiveness of this method cannot be over emphasized. It encourages educational and information review beyond the classroom settings. Blended

learning combines several different delivery methods, such as collaboration software, web-base courses and computer communication practices with face to face instruction [15]. Integrated learning utilizes the best of classrooms with the best of online learning.

##### 4) Communities

Learning is social [1].The frequent challenges we battled with in our business milieu are sophisticated and unstable. Because we are in the global era, our methods of problem solving are changing daily. Therefore people dialogue with other members of the same organization or network globally to other organization. Communities strongly contribute to the flow of tacit knowledge.

##### 5) Knowledge Management

Globalization is focused on e-learning because e-learning technology has the potential to bring improved learning opportunities to a larger audience than has ever previously been possible. [3] Suggested that a nation's route to becoming a successful knowledge economy is its ability to also become a learning society. Early KM technologies included online corporate yellow pages as expertise locators and document management systems. Combined with the early development of collaborative technologies (in particular Lotus Notes), KM technologies expanded in the mid-1990s. Subsequent KM efforts leveraged semantic technologies for search and retrieval and the development of e-learning tools for communities of practice. Knowledge management is an essential process which is concern with how to create atmosphere for people to share knowledge on distribution, adoption and information exchange activities in an organization[7], [16], [17].The semblance of knowledge management and the theory of e-learning reveals powerful relationship which is causing disarray between the two fields.

##### 6) Learning Networks

Learning network is a procedure of developing and preserving relationship with people and information and communicating to support each other's learning. Therefore (LN) is enhancing and it offers chances to its members to engage online with each other, sharing knowledge and expertise. [13] States that, the use of pen and paper in our educational system today is producing inadequacy and challenges in the global era that we are in today where subject matter is changing speedily. The application of personal learning networks will create connections and develop knowledge for workers to remain current in their field.

### III. WHAT IS REQUIRED FOR E-LEARNING TO BECOME AN EFFECTIVE KNOWLEDGE MANAGEMENT TOOL?

Several trends are spurring the momentum behind e-learning. There is the need for firms to keep up with the ever-changing businesses environment and shorter product lifecycles. Another trend is the growing importance of information sharing. E-learning can be taken outside of company firewalls and can be used to educate firm partners, customers, and suppliers, in addition to the firm's employees. In return, the firm can generate new knowledge through the use of chat rooms, surveys, etc. Knowledge partner's benefit from the information gained through e-learning, while the firm in

turn benefits from the capture of new information from knowledge partners. Once information is captured and categorized as useful knowledge, its sources become irrelevant in terms of value. Cisco Systems, one of the many companies that promotes e-learning as part of its knowledge management strategy, defines the benefits of e-learning as follows (Cisco Systems, 2001): "E-learning provides a new set of tools that can add value to all the traditional learning modes – classroom experiences, textbook study, CD-ROM, and traditional computer-based training." Old-world learning models do not scale to meet the new world learning challenges. E-learning can provide the tools to meet that challenge.

#### IV. E-LEARNING METHODOLOGIES

E-learning exploits Web technology as its basic technical infrastructure to deliver knowledge. As the current trend of academic and industrial realities is to increase the use of e-learning, in the near future a higher demand of technology support is expected. In particular, software tools supporting the critical task of instruction design should provide automated support for the analysis, design, documentation, implementation, and deployment of instruction via Web.

##### A. Interaction in Learning

Learner(s) - Tutors(s) Interaction, and Learner(s) – Learner(s) Interaction: these two types of interactions are among humans, and they are the interaction forms that people are most familiar with. Therefore, most research studies are focusing on these two types of interaction, especially in the research of Computer Supported Collaborative Learning (CSCL). According to [13], if collaboration rather than individual learning designs were used in an online class, students should be more motivated to actively participate and should perceive the medium as relatively friendly and personal as a result of the online social interactions. This increased active group interaction and participation in the online course, hence, resulted in higher perceptions of self-reported learning. Whereas individuals working alone online tended to be less motivated, perceive lower levels of learning, and score lower on the test of mastery.

In CSCL, researchers usually distinguish two types of interactions between learner- tutor and learner- learner. The first one, synchronous interaction, requires that all participants of interaction are online at the same time. Examples include Internet voice telephone, video teleconferencing, text-based chat systems, instant messaging systems, text-based virtual learning environments, graphical virtual reality environments, and net based virtual auditorium or lecture room systems. Synchronous interaction promotes faster problem solving, scheduling and decision making, and provides increased opportunities for developing.

In 2000, Heron et al. studied the interaction in virtual learning groups supported by synchronous communication. They found that learning in virtual environments can be greatly enhanced by content-related dialogues with minor off-task talk, coherent subject matter discussion with explanation, and equal participation of students supported by synchronous interaction [14]. However, the cost of synchronous interaction is usually very high, and synchronous interaction is more constricted due

to time differences. The second one is asynchronous interaction, in which learners or tutors have freedom of time and location to participate in the interaction, examples including interaction using e-mail, discussion forums, and bulletin board systems. It has been reported that by extending interactions to times outside of classes, more persistent interaction and closer interpersonal bonds among students can occur [12]. Thus, while one cannot totally simulate a real classroom with synchronous interaction, one can offer asynchronous interaction that provides time for better reflection, and allows global communication un-bounded by time zone constraints. Asynchronous interaction thus is more commonly provided in CSCL systems than the costly synchronous interaction.

#### V. E-LEARNING TOOLS

Here we discuss three types of e-learning tools: (i) curriculum tools,(ii) digital library tools and

(iii) knowledge representation tools. We can generally say that each type of tool emphasizes different parts of the process. Curriculum tools provide a systematic and standard environment to support classroom learning; their functions are particularly helpful in the initiation and selection stages. Digital library tools facilitate effective and efficient access to resources to support exploration and collection while knowledge representation tools focus on formulation and representation.

##### A. Curriculum Tools.

Curriculum tools are widely used in high school and college of education. Materials are selected and organized to facilitate class activities. Additional tools, such as discussion forums and online quizzes, are integrated to support collaboration and evaluation. A typical commercial curriculum tool includes three integrated parts: instructional tools, administration tools, and student tools. Instructional tools include curriculum design and online quizzes with automated grading. Administration tools include file management authentication, and authorization. Student tool functions include:

- Browsing class material: readings, assignments, projects, other resources
- Collaboration and sharing: asynchronous and synchronous bulletin boards and discussion forums.
- Learning progress scheduling and tracking: assignment reminders and submission, personal calendars, and activity logs.
- Self-testing and evaluation: tests designed by instructors to evaluate student performance
- WebCT and Blackboard are the most popular commercial curriculum tools. A review comparing these two tools suggests that Blackboard's flexible content management and group work support [3] make it more suitable for independent and collaborative learning. WebCT's tighter structure and fully embedded support tools make it more appropriate for guided, less independent learning. In general, these tools are tailored more to support class activities than independent research or self-study.

## B. Digital library Tool

While curriculum tools support class functions, digital library tools focus on locating resources. These functions support the exploration and collection phases of information search. Digital library tools help users find the right information amidst a huge amount of digital material. Digital library features usually include search, browsing, and discovering special collections or exhibits. Search and browsing are used to locate resources and explore related topics. Special collections or exhibits contain organized materials representing a unique treasure for interested users.

## C. 5.3 Knowledge Representation Tool

Knowledge representation tool help learners to visually review, capture, or develop knowledge. Curriculum tools rely primarily on a text-based, syllabus approach to describing course content. This approach often fails to delineate the relationship of concepts and skills covered in one course to those covered in another. It also fails to show the knowledge base that a learner will have acquired at the end of his/her course of study. A visualization tool can engage both learners and instructors in an active learning process when they construct spatial semantic displays of the knowledge, concepts, and skills that the learner possesses and acquires [22].

The e-Learning evolution proposes a good number of tools assisting the instructional designer during the analysis, design, implementation, and delivery of instruction via the Web [5]. If on one side an automated support should be provided by authoring tools [6],[16],[19], on the other side these tools should implement suitable e-learning process design methodologies [11],[21].

## VI. CONCLUSION

E-learning is among the most important explosion propelled by the internet transformation. This allows users to fruitfully gather knowledge and education both by synchronous and asynchronous methodology to effectively face the need to rapidly acquire up to date know-how within productive environments. E-learning delivers content through electronic information and communications technologies (ICTs). According to [2], the use of these facilities, involves various methods which includes systematized feedback system, computer-based operation network, video conferencing and audio conferencing, internet worldwide websites and computer assisted instruction. This delivery method increases the possibilities for how, where and when employees can engage in lifelong learning. Finally we conclude that synchronous tools should be integrated into asynchronous environments to allow for "Any-time" learning model. This environment would be primarily asynchronous with background discussion, assignments and assessment taking place and managed through synchronous tools that integrate into the asynchronous environment.

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