

# The Evolution of E-Learning and New Trends

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## Abstract

The electronic learning (E-Learning) considered as computer assisted learning has been around since the 1960s but its adoption and popularization mainly started after the popularization of the internet and the web. Since its introduction till present days the e-learning rapidly evolved regarding the technology and the e-learning methods/tools used. Having in mind that it has many benefits for the teacher/instructors from one side and the learners on the other, the e-learning found its application in education, business and the military or wherever is needed. The purpose of this paper is to outline, examine and discuss the evolution, the current state and the new trends in e-learning. The research showed that there is abundance of available technology and e-learning tools that foster and support the learning process. It is evident that e-learning is widely used in education and business and it is expected to grow further. On the other hand there is insufficient evidence of the particular effectiveness of the various pedagogical methodologies used for e-learning. Current state in e-learning and prevailing new trends form the foundations for future direction and development of this field for educational and training purposes. These trends include but are not limited to: blended learning, micro learning, gamification, personalized learning, Massive Open Online Courses, etc.

**Keywords:** E-learning, Learning Management Systems, Education, Training, Distance Learning

## 1. Introduction

E-learning is the practice of using information and communication technology to create learning experience that can be formulated, organized and created with ample freedom without any boundaries (Horton, 2006). It is a process where a set of lessons is provided on digital devices like computers or any mobile devices that supports the learning. E-Learning is interactive learning in which the learning content is available online and provides automatic feedback to the student's learning activities (Paulsen, 2003). Besides acquiring general knowledge one of the other main goals of e-learning is to develop professional skills and understanding to help learners to achieve their learning objectives (Clarke, Mayer, 2008). In an era where educational and technological modernizations are redefining the standards of higher education, the converging point of interconnection is e-learning (Garrison, 2002).

The concept of E-learning has been here for more than two decades. What once was just a radical idea now evolved into mainstream phenomenon. The manner in which the e-learning methodology evolved can be approached as a chain process. When the internet started to change, people using the internet started to change and just importantly e-learning pedagogy techniques originated to evolve. Modern e-learning trends are stated as "learner oriented design". Not only the student can control the appearance of the virtual elements but also have full control over the entire learning process (Downes, 2005).

E-learning has evolved a lot from its older style; the tools are combined, making the content creation easy and delivering directly to the Web with increased integrated collaborations, describing future e-learning makes learning "More organic". In corporations, e-learning is used in elevating sales, technical expertise, professional capability, training and legal compliance preparation. As the organizations vie for profit growth and lesser economical expense; it pays more attention to employee education which can be gained by effective e-learning practices (Tai, 2008).

The basic elements of an eLearning process can be identified as: technological infrastructure, e-learning platform, e-learning content and participants. The two major perspectives/aspects of e-Learning are technological and pedagogical (Devedzic, 2006). The technology including the infrastructure and the platform should enable development, hosting and delivery of e-learning content for its users. The pedagogical aspect concerns the e-learning content and its use for expanding the knowledge of the learners. The two significant modes/types of e-learning are synchronous training and asynchronous training. When both, the instructor and the learner participate in e-learning activity at the same time, via internet is known as synchronous learning. Communication between them can happen in various means such as webinars, instant messaging, video chat etc. Whereas in asynchronous learning, the instructors posts the content in advance then users can engage in web based training at their own pace whenever they need it (Rosen, 2009).

The process of E-Learning is not always supported by and only by LMS. The technologies that enable E-Learning are personal computer, internet connection, web browser, media players, e-mail programs, client software for online meetings, microphone for audio conferencing, video camera for video conferencing (Horton & Horton, E-learning Tools and Technologies, 2003). Audio broadcasting methods like webcasts and podcasts;

video broadcasting methods in YouTube, Skype, Adobe Connect and webcams; using tools like Microsoft Word, PowerPoint, Excel and PDF and through blogs, whiteboards, screen casting are some of the technologies also used in E-Learning (Patil, 2014).

E-learning has several advantages but also some disadvantages when compared to traditional learning. The study by Welsh et al. (2003) found that organizations can accomplish numerous benefits from implementing e-learning programs, including consistency in training, reduced cycle time, increased convenience for learners, improved tracking capabilities, and reduced cost. Potential drawbacks, according to the authors, can include higher up-front cost, lack of trainee interaction, etc. Some of the disadvantages of E-Learning are compensated with the introduction of blended learning a combination of e-learning and traditional learning

## 2. Historical development of E-Learning

As the origin of the word e-Learning is not certain; it is proposed that the term probably originated during 1980 (Moore, et al, 2011). In this digital Era, e-learning is becoming more viable and approachable. What once was just “Computer based training” now became “Take your class anywhere you go”. E-learning can be considered as natural evolution of distance learning. It has always taken advantage of the modern technology to develop and adapt the framework of educational tool for shaping education (Sangra, et al, 2012).

E-learning has its origins from mail-learning method through correspondence courses. Sir Isaac Pitman’s mail courses used shorthand technique to teach in 1840. It has said to be the first distance learning course. The concepts remained the same throughout the history, but medium multiplied as the technology developed (Horton, 2001). Evolution of distance learning can be described as an inconsistent pedagogy method which uses unconventional, conventional and new communication medium to deliver instructional material without any geographical constraint. Since distance education began its course, authors and academics have diverse definitions for it. Content delivery format for distance education have taken various forms such as mail delivered instructions, materials in print format, classes over electronic medium, via mobile devices and now, virtual classes (Moore, 1990). Distance education has been around for centuries, but it was only since 1960, e-learning has started to evolve. It influenced its way over Corporations, Academic institutions, in Training, and in Military (Fletcher & Rockway, 1986).

Sidney Pressey’s concept of ‘teaching machines’ emerged in 1920’s. It was only later in 1950’s it was widely popularized by the works of B. E Skinner . As, the cumulative demand for education cannot be met by building more schools and teachers, the teaching machines empowered schools to direct programmed instruction to their students. Later in 1980, the era of personal computers began which paved the way for e-learning. Over the past 50 years a number of new approaches have been in practice to aid the instructor's role in the classroom (Benjamin, 1988).

Computer-based training (CBT) is a training method in which the primary data transfer takes place in a computer through software over internet or intranet (Rouse, 2011). In 1960’s, Computer assisted instruction (CAI) progressed into computer bases learning (CBL). Computer-based learning was not only used for education but also for communication. Computer- based training’s pioneer system is PLATO (Programmed Logic for Automatic Teaching Operation) which began in 1960. It had the basic layout that is used in modern e-learning method, comprising of graphic elements, text along with graphics, forums and chat rooms (Shimura,2006). Multimedia learning models have created a number of ideologies and guidelines to ease the design of computer-based training (CBT). With computer-based training practical training can be made more operative, where student-teacher ratio is one to one and where the training is workshop based or job based (Dean, Whitlock, 1992).

In early 90’s CD-based training was considered as the new training technology of e-learning. Occasional workshops were held as a part of CD-ROM based training. More than 95% of the content comprised of Information Technology lessons. Public chat boards were created in websites and it was called “mentoring”. Around 1998, Web took over CD based training not only by providing learning instructions and materials over the web, but also by providing a ‘personalized’ learning experience aided with chat rooms, study groups, newsletters and interactive content (Cross, 2004).

When internet and personal computers became phenomenal and started to flourish in the late 20th century, it was really when the concept of e-learning began to take form. The technology, the concept and the device complemented each other well, providing new learning trend. The first web based Learning management system (LMS) named Cecil was launched in 1996 (Sheridan, et al, 2002). LMS is a software application that organizes, documents, records and delivers e-learning courses. The modern LMS are mainly web based and enable hosting and/or delivering of different types of learning content including but not limited to: reading materials, video and audio, wikis, web conferencing, chats, forums, blogs, learning games, testing, grading etc.

Around 2000’s corporations, business and military took advantage and adapted the e-learning concepts to their necessities. The new e-learning methods gave open access to information and provided communicative and interactive features. The learner experience became cohesive with upgraded pedagogy. Affirming, education is more about ideas and not facts. ‘The passive information transfer’ of academia distinguished from ‘interactive

and constructive' e-learning methods (Garrison, Anderson, 2003).

The development of the mobile technology brings a new era in E-Learning known as m-learning. Mobile learning can be defined as the portable and lightweight platform where the learner can engage in learning activity without having any geographical constraint. Mobile phones, smartphones, palmtops, handheld computers, Tablet PCs, laptops and media players are aided in Mobile-learning technique (Kukulka-Hulme, 2005). In 1990's 'Palm Pilot personal digital assistants (PDAs), a handheld device was developed which performed multi tasks like calculator, calendar and notepad. When technology and 'learner-centered design' started developing, Mobile learning started to flourish simultaneously (Berge & Muilenburg, 2013).

Having gone through numerous diverse evolutionary phase, e-learning is still evolving mutually alongside the upsurge in modern technology. Advancement in new technology makes it practical to blend synchronous and asynchronous training into one. Modern e-learning methods are considered to be revolutionizing contemporary learning systems. But history shows that education can only be developed by evolution and not by revolution (Sir John Daniel, 2014).

### **3. The current state of e-Learning**

#### *3.1 The E-Learning market and LMS*

The global e-Learning market, according to a report developed by the Global Industry Analysts, is estimated to reach US\$107 billion by 2015, and is expected to rise by 23% till 2017. (Chuo, et al, 2015). The demand for Learning Management Systems will grow from \$2.65 billion in 2013 to \$7.8 billion in 2018. (Pappas, 2015). With more than 500 providers of LMS on the market, only four have market share higher than 5%. (Clarely & Mallon, 2012) These providers are SumTotal with 9%, SAP with 8%, Oracle 7% and Cornerstone OnDemand with 5% market share. Regarding the user base of LMS, Moodle has the highest number of users with 73.8 million, Edmodo is second with 58 million followed by Blackboard, having around 20 million users. (Pappas, 2015).

Regarding the industry type, the educational sector with 21%, comprises the larger part of the LMS market. The industries that follow are: technology 12%, manufacturing 9%, consulting and healthcare 7%, and software development companies 4% etc. (Medved, 2015) It is estimated that 80% of Higher education institutions in USA are offering at least several courses online and more than 50% are offering a significant number of courses online (Bichsel, 2013) while 32% of higher education students took an online course in 2011 (Allen, Seaman, 2013). The same year, 77% of US corporations were using some form of e-learning to educate or train their employees. (The Growth of Global E-Learning., 2013).

In their 2015 survey, Learning and Development 2015, the Chartered Institute of Personnel and Development (CIPD) surveyed the growth of various E-Learning methods in organizations. The key findings of the survey are that there will be, 59% growth in 'E-Learning courses', 40% in 'Blended Learning', 36% in 'Virtual Classrooms and Webinars', 29% in 'Collaborative and Social Learning', 25% in 'Mobile Based Learning', 13% growth in 'MOOCs' and 11% increase in 'Gamified Learning' (CIPD, 2015).

A new educational phenomenon emerged in the last decade enabled by the e-learning technology and initiatives known as MOOCs. MOOCs (Massive Open Online Courses) aim at free, massive, online education system comprising open-access and self-learning method courses. Online e-learning website like "Udemy" offers massive amount of instruction oriented courses online. In 2011, Udemy courses enrolled over 100,000 students online (Joseph, Nath, 2013). According to Shah (2015) in 2015, 35 million of students signed up for at least one course, there were 4200 MOOCs offered and more than 500 universities offered these types of courses

#### *3.2 E-Learning Tools*

The learning content in the e-learning environment is presented/distributed to the learner through e-learning tools or learning objects enabled by the LMS. These tools can be roughly divided in two groups as tools for synchronous and tools for asynchronous learning. Tools for asynchronous learning can be used for self-paced learning and include, reading materials, audio and video, forums, wikis etc. The synchronous tools where both the instructor and learner are present at same time include: virtual classrooms, webinars, video conferencing and similar methods. Some of the above mention tools can be also considered as social learning tools. Social learning is the social tool that leaves 'digital audit trail' that documents the learning journey and paving the path for others to follow. It helps people updated, gain broader perspective and to become more educated by collaborating with others (Bingham, 2011).

Learning Objects (LOs) can be defined as the scholastic resources that can be employed in digital learning. Through meta-data instructions they can become integrated components that can be organized to form learning materials. LO can be built with text elements, 2D/3D models, websites, graphic images, videos, applets or any other source used in learning. Computer animations are self-explanatory and they can be embedded within complex multimedia learning environments. Computer generated graphics emphasizes information better than a picture (Huk, 2003, 1188). Webinar is a single online seminar devoted to achieve a specific goal in an

economical and effective way. It also contains question and answer session and in-meeting activities (Horton, 2006). Quizzes and tests are asynchronous interaction that aids the instructors and learners to evaluate the progress and track the effectiveness (Driscoll, 2002). Instructor presence and their active engagement is one of the key elements to the success of e-learning. In a questionnaire survey conducted, the presence of instructor was found to be most vital, in dealing with the students, in making course necessities clear and being approachable to the requirements (Sheridan, Kelly, 2010). Choosing the right pedagogy is vital; it must be neutral to all learners, considering not all learners are same. The pedagogy is designed in a way to adapt various potential uses according to the need of the course (Dron, 2007). FOSS (Free and Open Source Software) emphasizes unconventional pedagogies like constructive and connective learning methods. Some of the widely used FOSS applications are YouTube, blogs, wiki programs, Flickr etc., (Czerkawski, 2011).

Indiana University-Purdue University Indianapolis conducted an investigative study on 'Faculty Perceptions and LMS'. The key findings in the study about 'communications tools' are that, 92% use messages, 34% use Email archives, 90% use announcements, 24% use chats, 38% use forums and 16% use calendars (Little-Wiles, Hundley, Worley, & Bauer, 2012).

Several studies examine the usability and effectiveness the e-learning elements and environment including the e-learning methods and tools. Salas et al. (2005) suggest several recommendations for the design and delivery of distance learning programs of which some focus on the users and some on the methodological aspects of e-learning. Ardito et al (2004) evaluate the usability of the e-learning platform and the e-learning module (content). This research focuses more on the technical rather than pedagogical issues of the e-learning tools. Clark and Mayer (2008) propose 7 principals for enhancing e-learning's effectiveness. These principal are broad in scope and based on extensive empirical research. For example "The contiguity principle" states that when text is used to explain a graphic or vice versa, the text and graphics should be placed next each other on the same screen. In higher education, 65% of the students consider that 'compatibility' of e-learning platforms is the most important positive consequence of using E-Learning. The various features of E-Learning platforms provide the opportunity of being comfortable with new technologies, which is the main objective of E-Learning itself (Pelet, 2013). Anyway, in our research we didn't encounter studies focusing on the effectiveness of specific e-learning tools in general and compared to each other. The studies concerning this issue mainly compare the effectiveness of e-learning vs classic learning. (Kulik & Kulik, 1991; Machtmes, Asher, 2000; Sitzmann, et al 2006). Most of these studies suggest that e-learning methods/tools are at least as effective as classical learning methods

#### **4. E-learning Trends**

E-Learning is present in the society and business for several decades and is here to stay. It might seem as simple process of delivering learning materials and examining the proficiency and/or knowledge by electronic means but the development and flexibility of the Information Technology enables many different approaches and implementation of new methods regarding the process of learning helped by the technology and we can consider that it is still evolving. As the technology develops and some best practices are confirmed certain aspects and tools are adopted and widely used by many institutions and business. Some of the established and emerging trends include but are not limited to:

##### ***Blended learning***

Blended learning can be defined as the process of combining two or more teaching methods such as web-based technologies, pedagogical approaches, instructional technologies and job tasks (Friesen, 2012). Blended learning has been used to imply to "training that combines traditional classroom sessions with e-learning and self-study" (Kovaleski, 2004). Blended learning technique uses different teaching medium to create a training course for learners. Traditional teaching method and digital teaching method complements each other according to the course needs. The objective of blended learning is to make training media into a combined unit to create great impact (Bersin, 2004).

In 2010, Arizona State University is ranked first in math and in reading performance at the same time as the result of blended learning (knewton.com, 2011). In military, blended learning methods have been used to focus on skill training that provides personnel with job requirement abilities and to upgrade to new or higher levels of expertise (Wisher et al., 2006). According to the U.S. Department of Labour statistic report, 70% to 90% of workplace learning occurs informally and socially through reading books, discussion with fellow employees, water cooler discussions and experimental methods. About 10 to 30% of employee learning takes place through formal activities such as classes, conferences or organized courses (Woodall, 2012).

##### ***Gamification***

Gamification is the process of augmenting e-learning facilities by incorporating gaming elements, which engages people independently and communally in commerce and education sectors (Hamari et al., 2014). The more



challenging part in gamification process is designing the player experience. Learner/player experience design process can be divided into building a gaming application, and organizing its tasks in logical order. Gamification method mainly focuses on the design part to accomplish learner objectives in lesser time (Burke, 2014). Game-based learning may be particularly useful for skill building as it can provide necessary practice opportunities and feedback at the same time that it is fun, engaging, and motivating to learners (Prensky, 2001).

Gamification is on stable rise, according to a study its market value is predicted to be \$2.8 billion by 2016 and \$5.5 billion by 2018. The gamification players scored 14% higher in skill-oriented tests, 11% higher in factual information and 9% higher in remembering rates, 79% of business personnel and scholars said gamification method of learning would make them more productive (elearninginfographics.com, 2015).

### ***Micro learning***

When the learning time is relatively short and measurable, the content is small and simple, the curriculum is in parts of modules and episodes, the process is concomitant and iterative, the medium is e-medium or traditional, the learning method is for classroom or corporate, the procedure is defined as micro learning (Hug, 2005). Micro learning units provide learning material in chunks called 'nuggets'. 'Subscription learning' is also a part of micro learning, in which the learners subscribe to nuggets when needed; the interaction mostly lasts less than ten minutes. A certain learning sequence is created and only when the learner completes the sequence, the learner is given access to technical, electronic access to further information. This method is defined as Integrated Micro Learning (Gassler, Hug, Glahn, 2004).

### ***Personalized learning***

Rather than relying completely on service providers and expecting to improve the service; personalized learning offers an opportunity for students to partake completely and becoming co-producers in choosing the content and structuring the learning instructions (Leadbeater, 2005). New pedagogical prototypes, tools and methods which support collaborative learning are developed consequently to the growing necessity and for creating new outlooks. Personalized learning involves authentic and performance modes of assessment, so it can build authenticity and interest (OECD, 2006, 31-42).

Knowledge space theory is practiced in this method to describe the learner's knowledge condition in certain domain and the domain is characterized by a set of evaluation problems. The knowledge state of the learner is known with the set of problems the learner is capable of solving. Then the learning modules are tailored according to the learners need (Heller et al., 2006). In an online study, it is found that 33% of people are familiar with personalized learning and 22% are unfamiliar with personalized learning. When asked about the future, 69% said that personalized learning will become more relevant in the (ElearningInfographics.com, 2015).

### ***Continuous learning***

Continuous learning or 'Lifelong learning' can be identified as the continuous pursuit for knowledge and expertise for own or vocational purpose. This trend can be defined as the extension of educational facilities beyond the orthodox school ages and to aid education as a tool to improve the eminence of life (Sharma, 2004). It is a profound learning method that is possible only after continuous involvement in a confined learning milieu (Field, 2006). The three principles of continuous learning are: the centrality of learner, equality of opportunity, high quality and relevance. Two types of continuous learning are: Work-based learning which instructs and trains for employment and short-term necessity, Life-based learning coaches for employment and for fulfilled life in the long term (Longworth, 2005).

Lifelong learning can be seen as writings, worlds definite, enclosed and established through descriptive processes. It can be written or narrated or read and understood with single or several implications and it can be rewritten and represented with different meanings (Edwards, 1997). There are 2,625 MOOC's in 2014, which is 327% more than 2013. Approximately, there is 5-15% increase in productivity and 10% increase in income if there is an increase in one year of schooling (ElearningInfographics.com, 2015).

## **5. Conclusion**

Since the first pioneer systems till present days e-learning significantly evolved in parallel with the development of the Information and Communication Technologies. The real growth and development of the e-learning technologies and methodology started after the introduction of the Web and still is developing coping with the new challenges. At the beginning, the main concerns for the e-learning process were focused on the reliability of the technology that supports it. Nowadays, the focus is on the usability of the platforms and tools and their pedagogical considerations.

Given that the e-learning has many benefits for both sides in the learning process (trainers and learners) it is widely adopted by the educational institutions (80%), the companies (77%) and the military. On the other side, the learners/students also turn to e-learning where 32% of regular students take at least one online course

and in 2015 and 35 million students signed up for at least one MOOC.

The e-learning market is widely diversified with more than 500 Learning Management Systems available where none of them holds more than 10% of the market share. Since the market is still growing this suggests that there is still space for new entrants. Regarding the e-learning tools used there is variety of them that support both synchronous and asynchronous learning like video conferencing, virtual classrooms, webinars, presentations, videos, audios, graphics, texts, wikis, blogs, chat rooms etc.

Our research revealed that the trends that dominate and will further shape the e-learning landscape include but are not limited to: blended learning, gamification, micro learning, MOOCs, Software as Service (e-learning in the cloud), personalized learning, continuous learning and more. Given that our research didn't find any reliable and extensive studies examining the effectiveness and pedagogical aspects of the different e-learning tools and learning objects (in particular and in comparison to each other) we suggest that further research in the field of e-learning (distant learning or virtual learning) should target these issues.

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