Magdalena **ŚLUSARCZYK**
Marek Ł. **GRABANIA**

E-LEARNING AS A MODERN TEACHING TOOL

Abstract. This article presents one of the most important e-learning distance learning tools. Areas of application, its advantages and disadvantages and limitations are discussed. Definitions of the following are provided: Learning Management System and Learning Content Management System. In addition, e-learning standards are outlined, particularly the SCORM standard for military use. The summary highlights the need for improving one's self-learning skills useful in e-learning.

Keywords: distance learning; e-learning, i-learning, learning management, learning content management, e-learning standards.

1. INTRODUCTION

The flow of information is constantly present in human life and is constantly improving. It is driven by the progress of civilization and by available technical means. In the past, the basic form of teaching was education under the guidance of a teacher who was in physical contact with the learners. This form has survived centuries, and it is still present in educational institutions and is referred to as traditional education.

Teaching methods have been and still are influenced by available communication means that allow transmission of training materials. A big step forward in teaching methods was the invention of print. Training materials (books, albums, guides) could be provided to and from educational centres. The development of postal services has created the foundation for new forms of education - distance learning. Teaching methods are gradually improved, new techniques are constantly introduced to optimize the learning process. The optimizing parameters include: increasing the effectiveness of learning, reducing the time of teaching and reducing the cost of education. Education processes at all levels are constantly reformed, and further education reforms are discussed.

A huge progress, a civilization leap in teaching in recent decades has been brought by the techniques of electronic processing and transmission of information, especially computer techniques. The first educational systems of the CAL (Computer Assisted Learning) or CAT (Computer Assisted Teaching) type emerged in the 1970s. The educational programs developed at that time operated in the computer-learner mode and enabled testing learners' knowledge and skills. The computer asked questions and provided a set of answers, and the learner chose the ones he thought were right. Another, more advanced form of education was the use of simulation techniques. Educational materials based on simulation methods allowed the learner to learn the effect of set parameters on the functioning of the model. This mode of learning eliminated the teacher's contact with the learner. The teacher's role was reduced to developing a computer program. There was only the machine (computer) – learner relation.

Magdalena **ŚLUSARCZYK**, Marek Ł. **GRABANIA** – Ośrodek Badawczo-Rozwojowy Urządzeń Mechanicznych „OBRUM" sp. z o.o., Gliwice

The above teaching techniques are still used, but they cover narrow areas of routine knowledge, such as spelling learning programs, multiplication tables, foreign languages or specific fields of technical knowledge.

2. E-LEARNING

E-learning is one of the forms of distance learning, whereas distance learning covers a much wider area of functioning [1], [2], [3], [4], [5]. Distance learning is an organized form of education where the teacher (instructor) has no physical contact with the learner. The contact is effected by means of correspondence, text, graphics, audio and video tapes, CD-ROMs. audio and video conferences, or interactive television. E-learning includes such teaching techniques as WBT (Web-Based Training), CBL (Computer Based Learning) or virtual classroom.

E-learning allows us to learn what we need at the moment, in the place, at the time and pace that suits us best. On the one hand it helps enrich and diversify traditional activities and, on the other hand, it eliminates the factors that restrain the learning skills of the trainees (students).

2.1. Application areas of e-learning

Contemporary e-learning can take on numerous forms and can be addressed to many people. Modern IT tools, as well as e-learning product vendors, provide distance learning for virtually every potential computer user. Learning and training are now offered in many fields; secondary and higher studies based on e-learning are often offered to students from remote areas. Advantage can be taken of language courses, specialist courses that expand professional knowledge. E-learning is widely used in corporations, banks, financial institutions, businesses, in areas where there is rapid development and large number of employees need to be trained. Training in this field is primarily aimed at improving the competence and qualifications of staff or other people involved.

Fig. 1 shows a block diagram with the most important areas of application [2].
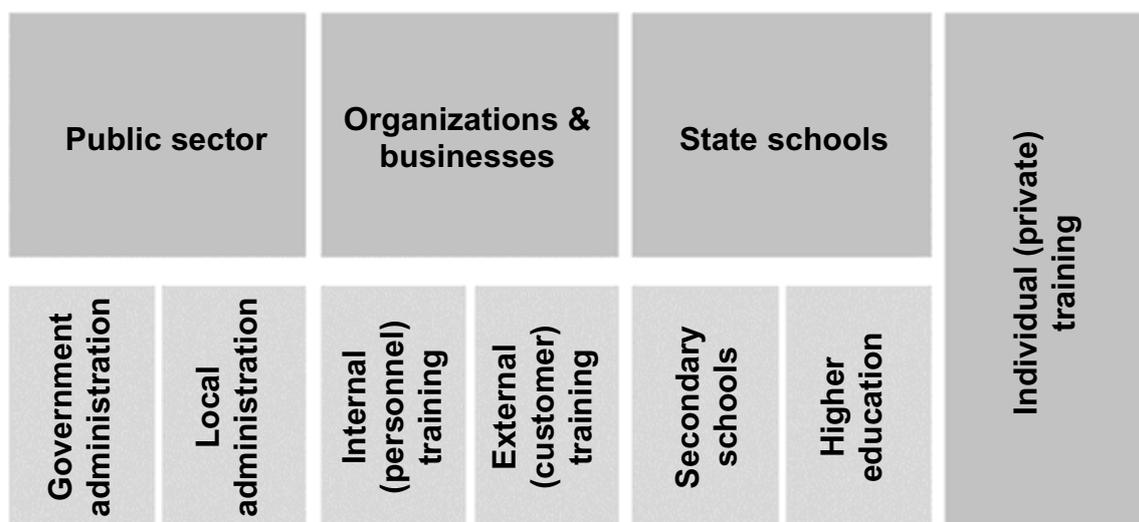
Public sector		Organizations & businesses		State schools		Individual (private) training
Government administration	Local administration	Internal (personnel) training	External (customer) training	Secondary schools	Higher education	

Fig. 1. Fields of e-learning application

Training/learning materials are supplied by specialized vendors [1], [2], [3], [5]. They can also be made up by the users themselves seeking help on specialized websites. Using materials requires access to specialized tools that support on-line learning. One of the characteristic categories of such tools are the so-called e-learning platforms. These are elaborate applications that facilitate the creation, running and administration of educational courses [1]. Platforms are also designed to support the activity of course participants during on-line training so that their activities are effectively implemented.

There is a dedicated platform for instructors that allows the use of ready-made or self-prepared teaching materials [6]. Another such platform is MOODLE [7]. Individuals or institutions interested in setting up e-learning systems on their own are offered training courses on the administration, use of educational platform tools, preparation and conducting on-line training. Assistance and support are provided in case of problems that may occur in a business or organization in connection with the use of e-learning platforms. A complete process of implementing e-learning tools can be set up; the educational platform is launched, learning content is supplied, operator training is provided.

2.2. Advantages/disadvantages of e-learning

Despite the undeniable positive features, learning and teaching methods that make use of e-learning techniques have a number of limitations and can pose difficulties. The most important include [5]:

- indirect, mostly in written form, contact between the participants of the educational process;

- difficulty in keeping the participants active;

- difficulty in maintaining motivation for learning;

- technical barriers resulting from the low self-esteem of course participants with regard to IT techniques;

- plagiarism phenomenon occurring among i-learning participants;

- high workload required for the development of educational materials;

- high interdisciplinary requirements for course and training designers.

Education that uses information technology (not to mention appropriate hardware requirements and Internet access) has both undeniable advantages and disadvantages. The most characteristic advantages and disadvantages are listed in Table 1 (based on [1]).

Table 1. Advantages and disadvantages of e-learning

Advantages	Disadvantages
- Reduced training cost - Centralized education process - Standardization of knowledge - Facilitated (contrary to appearances) contact with tutor, expert or trainer - Repeatable quality of training (if the training is well prepared, the quality is good)	- Additional expense, often high - A large percentage of people do not complete e-learning courses - Reluctance of trainees to work with the computer has a negative impact on the course of training - Lack of necessary computer skills often hinders effective training

• Ease of content modification and its immediate dissemination • Convenient conducting of training courses • Contextuality, multithreading, and individualized training • Interactive and engaging form of training • The ability to better utilize the organization's knowledge resources • The ability to better perceive and understand the human capital of the organization • Possibility of a good complement to other training methods • Sanction-free learning environment • Reduced fluctuation	• Repeatable quality of training (if the training is badly prepared, the quality is bad) • Atomization of knowledge may lead to the loss of context and to gaps in knowledge • Dependence on the provider of e-learning courses as far as the training program is concerned • Training is superficial because it focuses on solving the problem, rather than gaining deep knowledge of its essence • Low credibility in the process of remote communication, possibility of impersonating an expert • Need to involve large resources while running e-learning processes (implementation is no longer the sole responsibility of the training department) • Negative impact on organizational culture after replacing traditional training with e-learning courses • High cost of developing and maintaining training content • Need to adapt the corporate network to the requirements of e-learning courses

By analyzing the content of Table 1 showing both the pros and cons, one has to remember that the advantages and disadvantages mentioned do not need to appear in case of every training.

3. E-LEARNING MANAGEMENT

E-learning management covers two areas related to the learning process. Typically, these are two separate systems:

– Learning Management System (LMS);
– Learning Content Management System (LCMS);

3.1. Learning Management System

The LMS system provides individual learners with access to a variety of learning resources, administers training programs, and offers opportunities for human resources development [1], [2], [3]. The LMS may require the listener after completing the course to pass a test of acquired knowledge, and then LMS may produce a report of the training results and suggest the next training phase. It enables setting up online virtual classes and teacher/instructor-led courses.

3.2. Learning Content Management System

LCMS is an application program that allows the teacher and learners to manage the content of the training and its course [1], [2], [3]. It merges course management features, supported by LMS, with the creation and storage of learning content. It provides training authors and designers, who define the subject, with the means for effective creation of e-learning content.

4. E-LEARNING STANDARDS

The subject of e-learning standards are the methods by which knowledge content can communicate with the learning management system (LMS), and by which the LMS knows what collection of knowledge units it will deliver to the learners.

Many solutions are offered, and these are being constantly modified. Two standards stand out with their application areas. One of them, controlled by the AICC (Aviation Industry Computer-Based Training Committee), has adopted the name AICC and has been used as a standard for more than twenty years [2]. It is used by many vendors offering e-learning products that are certified by the AICC. The second standard is the SCORM (Sharable Content Object Reference Model), a project maintained by the ADL (Advanced Distributed Learning) initiative of the United States Department of Defence. It combines the resources of AICC, IEEE, IMP (Instruction Management Project) and IMS Global Learning Consortium [2], [3]. SCORM is strongly supported in the US by the academic, government, industrial and e-learning provider circles.

There are three types of content in SCORM [1], [2].

- Asset - a file that can be included in a web browser, e.g. a text, HTML or GIF file, various types of applications, etc.;

- SCO (Sharable Content Object) - a set of assets, at least one of which implements a predefined interface with LSM;

- Content aggregation - a structure like a content table designed to define the sequence and navigation in the course content.

SCORM specifications allow e-learning content, developed in accordance with its rules, to be placed in any LMS and to be linked to other content in order to design a course/training that meets specific requirements. SCORM is applied widely in e-learning systems, also in the US Army. The Polish e-learning platform implemented in the National Defence Sector also requires training materials implemented and used on that platform to comply with SCORM standards [8], [9].

5. SUMMARY

E-learning in its present form owes its development mainly to the Internet. Due to the rapid growth of the global network and the related technologies, online learning has become so widespread. The changes that have taken place in the last decade have made the modern information society develop a new model of knowledge transfer. Studies show that distance learning, where e-learning dominates, is at least as effective as traditional learning. However, it is important to remember that people who are to be trained by means of e-learning should be properly prepared. Despite the undeniable benefits of e-learning we cannot forget that its

effectiveness depends not only on the available content and forms of transmission, but also on the learner. E-learning requires the learner to have various skills. The learner is recommended to work on his/her own to improve his/her skills. Some of those skills, though mastered in previous experience, require adapting to the online environment. Table 2 lists the skills that each course participant should be able to assess on his/her own and systematically develop and improve [4].

Table 2. Skills useful in e-learning.

Item	Skill type	Short description
1.	Reading	Reading the content available on the Internet requires the ability to find important issues in that content.
2.	Writing	1. Keyboard - typing is one of the basic skills, because of the adopted method of communication (via computer). 2. Homework - essentially the same skills are needed as in traditional learning. 3. Note-taking - the ability to write notes is indispensable in many applied forms of learning. 4. Electronic mail and other types of communication by sending messages - ability to form concise, clear messages.
5.	Learning in collaboration	Ability to collaborate many times decides on the execution of tasks.
6.	Reflection	The ability to draw conclusions from own experiences is helpful in improving the learning process.
7.	Time management	Time management is critical in e-learning as it decisive of the learning efficiency.
8.	Responsibility	In e-learning, the learner is responsible for learning, so self-discipline plays a very important role.
9.	Planning	In an e-learning study needs to be planned in such a way as to avoid interference with other duties.
10.	Web searching	Internet is a rich source of knowledge, finding which requires many skills, such as use of various types of web search engines and search, analysis and selection techniques.
11.	Navigation	To navigate the structure of the Internet, it is necessary to know how hypertext links function and to know the navigational features of individual web browsers.
12.	Assessing quality of web resources	The ability to search through websites must be combined with the ability to evaluate the available information.

13.	Self-assessment	Self-assessment is useful for analyzing feedback and asking questions. Also important is the knowledge of the applicable standards.
14.	Evaluation by others	On some e-learning courses, learners are asked to evaluate their peers.
15.	Problem solving	1. Individually 2. In a group
16.	Coping with stress	All forms of learning are stressful, but those who learn on their own are particularly vulnerable to stress.
17.	Finding motivation	Motivation is the key to success in learning, the ability to arouse motivation is particularly important.

6. REFERENCES

[1]   Hyla M.: Przewodnik po e-learningu. Wolters Kluwer Polska Sp. z o.o. Kraków 2007.

[2]   Machol A.: E-learning, i-learning. Kompendium wiedzy o sieciach. NetWorld. No 5. March 2003.

[3]   Grygiel J.: E-learning - nowa forma edukacji. Katolicki Uniwersytet Lubelski.

[4]   Clarke A.: E-learning nauka na odległość. Wydawnictwa Komunikacji i Łączności. Warszawa 2007.

[5]   Przybyła W., Ratalewska M.: Poradnik dla projektujących kursy e-learningowe. Wydawnictwo Naukowe Instytutu Technologii Eksploatacji - Państwowego Instytutu.

[6]   www.nauczyciel.pl [Retrieved: 15.09.2017].

[7]   www.moodle.org.pl [Retrieved: 15.09.2017].

[8]   https://elearning.wp.mil.pl/ [Retrieved: 15.09.2017].

[9]   Dostawa specjalistycznego wyposażenia warsztatowego dla CSLog, Skład Drawno, 15 WOG, KPW Świnoujście. Specyfikacja Istotnych Warunków Zamówienia. 1 Regionalna Baza Logistyczna w Wałczu. Wałcz, 2016. (OBRUM documents – unpublished).