E-LEARNING TRENDS AND GUIDELINES

Marko Mikša
Polytechnic Hrvatsko zagorje, Krapina, Croatia
marko.miksa@gmail.com
Irena Popović
Polytechnic Hrvatsko zagorje, Krapina, Croatia
Mira Hércigonja-Szekeres
Polytechnic Hrvatsko zagorje, Krapina, Croatia

ABSTRACT

E-learning is becoming a more and more important segment used by everyone who wants a better quality of learning. Trends in e-learning are directed by the most commonly used tools in the field of m-learning, cloud computing, social learning, whose potential is increasingly exploited. In modern times, there is a rapid growth of new possibilities and thus the guidance of e-learning often changes.

KEYWORDS

e-learning, m-learning, cloud computing, social learning, LMS, Moodle, HTML5, Adobe Flash, BYOD

1. WHAT IS E-LEARNING

Electronic learning or e-learning encompasses many different forms of information and communication technology (ICT) which is a support to all
levels of the educational system, to improve the quality of learning. The basic definition of e-learning is formed as a process of education (teaching and learning) with the use of ICT, which contributes to improving the quality of the process and the quality of educational outcomes. Internet is necessary to be able to access remote resources, services and multimedia.

When it comes to e-learning in the university education, the LMS (Learning Management System) open-source tools (Moodle, Claroline ...) always come first to mind because they have the best use of this level of education and therefore are the most commonly used tools of e-learning. Teachers make the job of studying easier and simpler for students (especially the part-time students). Using LMS tools the students know where to look for the latest information and materials for a course, and teachers can post homework assignments, time-limited tests, group exercises, and much more [1, 2].

2. THE CLASSIFICATION OF E-LEARNING

Using computers and other related devices in learning is becoming increasingly available in all levels of education. Already preschool children are very happy to learn with the help of a computer, and to the students at the present time it is necessary. According to today's trend, to line up with the technologies available for the individual learning (lifelong learning) in the progress of employment, this is usually done with the help of computers, because regardless of the profession, having a college education should be a regular professional training. Thus, the main classification of e-learning is into school e-learning (primary school e-learning, secondary school e-learning and university e-learning) and lifelong e-learning (e.g. business e-learning) [2], [3].
3. TRENDS AND GUIDELINES ON E-LEARNING

In the past few years many conferences in Croatia and abroad have dealt with the subject of future technologies and tools in education and e-education. Technology is advancing very quickly so it is considered that one should not neglect the world of e-learning, and everything designed for the business world should be applied in the world of e-learning.

Much of the existing technology has already been used for e-learning, but many innovations are still expected for a wider application in the areas of m-learning (mobile learning), r-learning (the robot in the classroom), h-learning (hologram replaces teachers), social learning (use of social networks in the learning process), cloud computing (working with programs that are installed on the remote computer) and 3D virtual worlds (virtual classroom). The focus of this paper is on m-learning technologies, Cloud computing, social learning and Massive Open On-line Course – MOOC [4].

3.1. M-learning

There have been many definitions of mobile learning in the last decade, especially due to the increasing emergence of the Internet on mobile devices. The simplest definition says that m-learning is actually e-learning in which mobile devices are used. M-learning has been present for many years, but we were not aware that this is a new way of learning. Today it is quite normal to study using a tablet or a laptop, and smart phones were often used to see only some information or a summary of the lessons learned [5].
3.1.1. Responsive design and e-learning

The developers are aware that for a long time now Windows OS has been the only platform for the use of the Internet and web-based programs; the trend is moving towards increasing use of mobile devices with iOS and Android for that purpose. Therefore, when developing such a web application one must take account of responsive web design so that a website can be visited and used by any user, regardless of the device that is used. Responsiveness is affected by many factors, but the most common are the resolution, screen size and web browser support.

To students a high quality responsive system for e-learning is a prerequisite that allows BYOD (Bring your own device). BYOD implies that students carry their own devices to class, because it ensures that all these devices can display content that the teacher uses in their courses and teaching with such materials and can undisturbedly monitor what is being done [6, 7].

3.1.2. M-learning with HTML5

HTML5 is the latest edition of the HTML programming language, and has many advantages over the previous releases. The course built on HTML5 burdens less the CPU than the one built on Adobe Flash, which increases the battery life of the device. Short battery life is a major problem of today’s portable devices. In HTML5 there are still some problems, such as in the support for older devices - older Internet browsers do not support HTML5 (e.g. Internet Explorer 8). In using the technology based on the Adobe Flash and HTML5 one should pay attention to the fact that Adobe Flash directly supports video and audio, while in HTML5 those are installed through links. Some of the better known tools for developing the course in the HTML5 are: Adapt Learning, Adobe Captivate, Adobe Edge Animate, Articulate Storyline, Brainshark, Camtasia Studio 8 and Composica Enterprise 6. Many of these tools still support Flash, despite its known bad influence on the performance of the device that is displayed and that there are no Flash supported tablets and smartphones. All the above mentioned tools are promising, but the most important for users (teachers and students) is to use a tool that quickly and easily prepares a course for e-learning and that everything that is prepared works fluidly on all the devices there are [9].

3.2. Cloud computing

Many companies decide to hire the CPU power from a supplier (e.g. for ERP or CRM systems). In e-learning it is very similar, because there are usually great resources that many educational institutions cannot buy, but it is slowly becoming a trend that they can also be rented. Cloud computing consists of 3 layers [9, 10]
Infrastructure as a service (IaaS): the infrastructure of hosting and server are located in the cloud; Platform as a service (PaaS): development environment or platform is available remotely for developing applications and services; Software as a service (SaaS): software application is accessed remotely.

In this technology the terminals, PDAs, cell phones, laptops and other computers turn into clients who primarily executed the applications running on servers somewhere on the Web. At cloud computing, "cloud" implies a remote web space on a server which can be accessed by all those who are assigned roles and privileges. The cloud can take on different functions, depending on the interface that provides access. It may be a relatively common web disk that has a function primarily to store and share files (Google Disk, Microsoft SkyDrive and Dropbox) or can be advanced which includes applications for creating documents, presentations or training courses. Best known cloud e-learning tools are: Prezi, EasyGenerator, Lectora Online, Elucidat, ZebraZapps, Quicklessons, Amvonet Publish and SmartBuilder. Common benefits of these tools are that for users with an average knowledge of computer use and with average computers allow the creation of high quality materials for students. Such tools can achieve better performance than the ones using the tool installed on the PC. Sufficient is just a fast connection to the Internet, and the rest is taken care of by the Cloud services provider. Also, it would mean data security, operational reliability and privacy [11].

Advantages of cloud computing [12, 13]:
- Simplified control of software versions and upgrades;
- Minimal risk of the virus;
- The original data and the results are stored and protected behind a firewall from the server;
- Clients do not need a powerful computer;
- Defective client computer is not a big problem as far as software and data goes, because the data is not lost and everything is still installed;
- Many computers can access the online materials at the same time from different places;
- There are free apps in the cloud that are available on the Internet, which teachers can use to organize their lessons (e.g. Moodle);
- Group work will enrich the students education, as in a normal world socializing does;
- Educational institutions can reduce costs if they use an open source software in the clouds, and there is no cost of installing and maintaining the software;
- Users can easily create new content, using only a web browser.
The disadvantages of cloud computing [12, 13]:

- The clouds have limitations, for example, they allow only basic video streaming, interactive flash animations, a basic text editor, and maybe not working in AutoCAD or other demanding programs;
- There is still the question of security, the user has no control over the security and needs to believe that everything is well secured;
- There is the issue of copyright protection, in order to protect the contents of plagiarism;
- Since there is almost no real user control of servers where the data is located, when the user account is deleted, there is no guarantee that the content associated with that account is also deleted.

3.3. Social learning

The term social learning in online education was first mentioned in the last few years, when Facebook, Twitter and Google+ regarding social network, then, YouTube and Podcasting for multimedia and Wikipedia as an online encyclopedia have achieved the greatest popularity. During their development there has not even been hinted that some of the social networks could be so popular, versatile and very useful for e-learning. Nowadays, it is believed that nearly every young person in secondary school and college has created an account at least on one of these social networks. It is assumed that the methods of learning using these tools bring students a lot of enjoyment, motivation, collaboration and creativity. Social learning tools allow students to connect based on common interests (the same university or the same course at university) and communicate and facilitate studying. This is especially advantageous for part-time students who are employed and are not able to be regular in classes and thus come into contact with other students, create new friendships, share experiences, ideas, materials and information.

Social learning requires an integrated platform that provides a safe pace of each individual to be connected, store and share their personal resources for learning and work (presentations, images, video or audio materials, scripts, etc.), must provide a safe space for mutual learning and the work of a group and must provide a safe space for formal social and collaborative learning which will take place. If it complies with this, a tool for social learning has great potential for success in e-learning [14].

3.3.1. Facebook

In the future, the most famous social network, Facebook, may represent an excellent platform for e-learning. Teachers can publish all their material forms, can prepare quizzes, start discussions, create groups, inform students, etc. Besides, Facebook provides the ability to create their own
applications so that they can create a variety of applications that will enhance the capabilities of the primary Facebook [15].

3.3.2. Twitter

Twitter is not so popular as Facebook, because a lot of people do not know how brilliant features it offers, especially in the world of education. It offers a great space for the realization of ideas, where students and teachers can ask questions and receive answers which can be achieved in real-time two-way communication. Creating hash tags (# hash) one easily finds help or give an answer to a topic. By creating a list of students, a teacher can follow their tweets in a group and communicate to address the current problems. The teacher can also forward (Re-Tweet) everything considered interesting about their courses [16].

3.3.3. YouTube

YouTube was primarily designed for fun in a way that users publish their videos which are then made available to all other users in recent years, the contents are no longer exclusively YouTube videos that show music videos, but there are many educational contents. Through this tool, students can view a video as many times as they want until everything is clear. YouTube has its own educational tool where exclusively educational video contents in the field of business, health and medicine, history, mathematics, and various other areas appear. In Croatia, this tool is still not very popular, but in the future it is expected to be, because it would be very helpful to the students to look at some of the sessions again to understand everything or if in case of illness they did not attend the lectures. The first shift in the use of YouTube as an e-learning tool in Croatia was made by Professor Toni Milun with various clips of solving typical tasks in mathematics and statistics [17].

3.3.4. Blogs

Blogs are considered to be a collaborative and interactive tool and if they start to be frequently used for e-learning, they could allow teachers and students to exchange views and develop discussions about the topic published. For now there are not many blogs that are used for training, but in the future they could be seen all over. Regular blogging encourages the development of writing and research skills, and also enables students to learn how to critically assess and evaluate a variety of online resources. American universities Harvard and Stanford already allow their students and teachers to open blogs within their own blogs system [18].

3.3.5. Wiki system

This system is designed for a group work to create and edit content. The system works in such a way that a user publishes their article, another user adds more content and the third user completes it. Wiki systems in their closed form can be useful in teaching to create their own teaching manuals.
(presentations, seminars, multimedia, etc.) or sharing useful resources that are relevant to the case. The most famous Wiki systems for education are Wetpaint and PBwiki [19, 20].

3.3.6 Delicious

Delicious is a service that allows its users to save or bookmark a web page that is important and helpful for them, and the users store interesting links online instead on their PC. In e-learning this service can be used to connect with other disciplines, and could serve teachers and students to create a list of useful sources related to a particular topic [21].

3.3.7 Google services

Google has a great use in e-learning, with lots of services. One of the most important service is Google Scholar, a database which contains scientific articles and books. In addition to this new service, Google Docs can be used to create a poll or a quiz. Teachers can examine them online and the results are immediately processed, stored and can be looked at any time [22, 23].

3.4 Massive Open On-line Course – MOOC

Massive Open On-line Course (MOOC) is online education course open to an unlimited number of students, with no formal entry requirement, no participation limit, free of charge and do not earn credits. They are developed not only to provide more learning opportunities, but also to improve the learning experience. MOOC providers are non-profit (e.g. EdX) or for-profit (e.g. Coursera, Udacity, Udemy...) private companies, partnering with universities or individual scholars. The usual division of tasks is that the universities are responsible for the content and the quality of the courses, whereas the company (provider) is in charge of the production and its technical facilitation [24].

4. POLYTECHNIC HRVATSKO ZAGORJE AND E-LEARNING

Nowadays, students are looking for more than a classic study. They're looking for an easier access to information, material and additional content that make it better and faster to understand and learn. Through newer technologies the Polytechnic should follow the new trends and offer some kind of e-learning, because in this way the quality can be recognized. The Polytechnic Hrvatsko Zagorje may introduce some kind of LMS like Moodle, known as a robust open-source learning platform. There are many advantages of teaching with the support of the LMS that save time and money. It provides high-quality mutual communication between students and teachers, monitoring and getting a quick and complete feedback. Students
(especially part-time) are very interested in this kind of teaching, because they have all the information about the course in one place, they can communicate better with the teachers, solve some of their obligations at home, online practice for the exam and much more.

BYOD (Bring Your Own Devices) can be an upgrade of this type of e-learning, and it involves users bringing their own laptops and tablets to class which are able to connect with the LMS (e.g. Moodle). Responsive design allows Moodle to be used at all today’s mobile devices that have the ability to display a web page (MS Windows, Linux, IOS, Android...). Instead of BYOD the IT classroom can always be used, but in this case there is a problem because of low number of IT classrooms. The requirement to use this e-learning technology is a wireless network and computers (in the case without BYOD). This kind of e-learning is well applicable in dynamic and often changing areas, like Traffic Logistics.

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