BLENDED LEARNING AS A TEACHING SUPPORTING SOLUTION
IMPROVING THE QUALITY AND EFFECTIVENESS OF THE
EDUCATION PROCESS

Jacek Binda¹, Katarina Repkova Stofkova²

¹ Bielsko-Biała School of Finance and Law, Department of Finance and Information Technology (POLAND)
² University of Zilina (SLOVAKIA)

Abstract

Educational process is constantly changing, striving to improve the efficiency and effectiveness of teaching methods. There are several reasons for this state of affairs, e.g. market demands for specific competencies and the speed of their achievement, increasing range of material to learn, more and more frequent need to combine learning/studying and work, ensure the participation in classes to people with granted individual modes of study, women bringing up children and cost reduction concerning educational process. Information and communication technologies and techniques have great and continuous impact on almost every sphere of human’s life, including teaching process. The key challenge of modern educational process is to remain in line with the market trends and with the requirements of the Ministry of Science and Higher Education which are: improvement of quality of the education process, promotion of best practices, exchange of academic experiences, transfer of knowledge and innovative solutions between market and higher education institutions, supporting mobility of academic sector workers, preparation for international cooperation (in accordance with Europe 2020 strategy). New technologies implemented in e-learning and blended learning solutions, brings significant support in this area. They allow to gain expected results easier and in a more effective way. This way of teaching is becoming increasingly popular, as evidenced by the numbers of students studying in the so-called “virtual universities” e.g. The Open University in the UK. In the quest to obtain the best results of the learning process, supported by information and communication technologies, the number of teaching platforms and models has been created and developed. However, the diversity of available platforms and teaching models makes this process more and more complicated in search of the best and most effective solutions. The paper is going to present benefits of blended learning teaching and LMS used in higher education based on completed international project with Icelandic partner and solutions implemented at an academic institution. The pilot survey was carried out mainly on academic staff involved in project at this institution. The researches was carried out in Poland and Slovakia.

Keywords: e-learning, blended learning, higher education, ICT.

1 INTRODUCTION

Online learning’s popularity as a modern and pervading model of teaching is growing incessantly. His growing position and its growing participation in the process of teaching, is caused by among others: market expectation changes in relation to the efficiency of the process of competences acquiring and lowering costs of teaching, labor market openness, presence of European student and academic staff exchange programs, model of education from stationary to remote one. It has also succeeded in attracting attention of those who live far away from academic centres (geographical and demographic reasons or educational offer availability) - borderless education. Thanks to ICT technologies and especially the Internet availability it could be possible to transform the needs of the society and define and update students’ expectations. This transformation is especially visible both in higher education institutions that are in line with the guidelines of the Ministry of Science and Education and with European Union philosophy of lifelong learning [1] or big companies interested in increasing the efficiency of the use of their employees. At present and in the future too will endeavour to fulfil the principles of balanced socio-economic-environmental development, i.e. sustainable development. [2] This includes also the use of ICT in education process. The use ICT technology implemented in online learning process (e.g. e-learning and blended learning) has built itself a position as a model of teaching, allowing to confront existing teaching assumptions with teaching effectiveness and society expectations. The ICT efficiency and significant support to the teaching process has led to emergence of many varieties of online learning platforms and teaching models, making teaching process more
and more complicated in response to the best and most effective solutions. The paper is going to
discuss present trend in higher education to blend various models of teaching, based on a wide range
of ICT technologies, striving both to increase its efficiency and reducing cost of teaching. Although
literature points to the existence of a wide circle of supporters and opponents of the on-line learning
model, its blended version seems at least partly to combine the views of both parties in supporting
teaching process. So, in this paper, it would be posited, that “blended learning” maybe is not the best
solution, but still dynamically developing and changing tool, supporting learning process, reflecting
general manner, in which the modern society communicates and thinks. A multitude of LMS systems
(both are available as a box solutions or tailored to the end user needs) seems to confirm this
assumption.

2 BLENDED LEARNING - DEFINITION AND CURRENT TRENDS

In recent years, there has been a lot written about blended learning model of education and blended
learning ICT solutions supporting education process. The multitude of publications in this area and
indicated benefits tend to point that the traditional classroom - “bricks and mortar” - is starting to lose
its monopoly as the only place in which teaching process can be conducted. New ICT technologies
and public access to the World Wide Web have opened new teaching possibilities, better tailored to
the needs of the labor market, higher education institutions requirements, Ministry of Science and
Education guidelines (e.g. credit equivalency at the postsecondary level, and the possibility of
providing a world class education), European Union philosophy of lifelong learning and big companies’
expectations interested in increasing employees' efficiency usage together with lowering cost of
acquiring their competences [3].

What has significantly received most of attention for online education is growing earning gap between
university graduates and high school's graduates and the need to supplement and acquire multiple
competencies during graduates’ professional work. The rising cost of postsecondary education is one
of the key factors of online learning growing interest [4]. This is especially important because tangible
evidence of the value and importance of post-secondary education has been visible for years. They
are also in line with the European Union's guidelines for continuous improvement of competence and
their compliance with labor market requirements. It has also found that not only earnings premium for
a college degree is obtained (substantially higher employment rates) but median high school graduate
pays about $5,000 per year less in taxes than median college graduate. It should also be noticed that
both a bachelor's degree and two-year degrees appears to off substantial payoffs in compare to those
who never enroll at all [5].

Many online learning supporters believe that online learning can be an effective tool allowing to reduce
the cost of the learning process by spreading it to larger number of students [6]. Other significant
benefits for student learning outcomes in compare to face-to-face solution can be e.g. improved
learning, improved students’ outcomes verification, improved perception of learning, improved
systematic of learning, stronger sense of community among students. Benefits are also seen by
students themselves, pointing e.g. on better knowledge systematization, ease of access to essential
literature, fixation exercises. Particularly helpful in this regard is a process of new technologies
dissemination in recent years and their omnipresence in almost every area of human life, starting from
teaching process, e-banking, e-commerce to global economy. Above mentioned benefits, especially,
in education, caused that many researchers and educators have become interested in ICT usage to
online learning process, enhancing and improving student learning outcomes [7].

Wide researchers’ and educators’ interests in online learning is confirmed by among others a growing
number of e-learning solutions, e-models, LMS platforms and related definitions. The paper is going to
focus on mixed model of online learning – blended learning solution. In general, the term blended
learning means that academic staff uses both traditional activities in the classroom and combines it
with ICT technology-based programs. This mixed model of teaching remains unclear as it doesn’t
explicitly indicate of how much face-to-face learning solutions are inherent into blended learning. The
effective integration of combined models is based on finding a golden mean with no predominance of
one embodiment. Having in mind new challenges associated with this way of transmitting knowledge
and learning (e.g. discipline, wide access to virtual materials, basic ICT skills of LMS users, different
group of end users), no two blended learning models and even LMS configurations are identical. This
way, a very challenging ICT environment needs to be created to make teaching process more flexible,
more efficient, more engaging students and academic staff and much cheaper than the traditional
model of teaching. The above depicted e-learning model of teaching is represented in Fig. 1.
Definitions of blended learning mainly concentrate on combining instructional modalities [8], [9], instructional methods [10] and online and face-to-face instructions [11]. Some definitions point that blended learning should be understood as:

- integration of traditional learning with web-based online approaches,
- joint use of the media and tools employed in an e-learning environment, and
- a spectrum of pedagogic approaches, implemented irrespectively in learning process through
- appropriate ICT technology solutions.

Another definition, suggested by the Innosight Institute, highlights the meaning of the blended learning as a program in which students learn in part through online content and instructions delivery and in part at a supervised brick-and-mortar location (e.g. university) [12]. This first part of the definition depicts that content and instructions must be delivered to students online with some element of students’ control of time, place, path, and/or pace [13]. This distinguishes “blended learning” model from technology-rich instruction. While the second part of the definition highlights that learning process must be under supervision and take place away from home. Blended learning taxonomy is presented as in Fig. 2.
With development and growth of e-learning popularity, the ambiguity about how blended learning should be understood is arising [14]. The reason may be a variety of similar hybrid solutions and commonly used names referring to teaching methods (e.g. e-learning, blended learning, e-teaching, technology-mediated instruction, web-enhanced instruction, mixed-mode instruction) emerged on relatively cheap technological innovations, whose common goal is concentrated on making education process more efficient and cheap.

Synchronous education means that educational process of communication takes place in real time. In asynchronous education students study alone, so we are talking about separate study, where students organize their work based on the curriculum of educational program [15].

At present blended learning program has significantly evolved to encompass a wider set of learning strategies, combining frequently one or more dimensions: Blending Offline and Online Learning, Blending Self-Paced and Live, Collaborative Learning, Blending Structured and Unstructured Learning, Blending Custom Content with Off-the-Shelf Content, Blending Learning, Practice, and Performance Support, Fig 2.

Regardless of the accuracy of the above-mentioned definitions, the term “blended-learning” may be treated as an educational solution for shortening distance and facilitating interactions between students and their teachers. Benefits are concentrated on e.g. reducing overall cost of teaching process, pedagogical richness, social interactions, ease of revision, facilitated access to knowledge, increased systematic work and cost effectiveness Fig. 3.

![Fig. 3 Blended learning taxonomy.](source: Staker, Horn [13].)

It was stressed by many institutions (e.g. Pennsylvania State University) that blended learning constitutes a great option and unrecognized trend in higher education nowadays [16]. The American Society for Training and Development named it one of the top ten trends to emerge in the knowledge delivery [17]. The Journal of Asynchronous Learning Networks pointed that the number of hybrid courses in higher education may reach soon the level of 80-90% of all given courses [16]. Although face-to-face teaching techniques substitution has not been reached yet, the development of ICT models of teaching is still being observed. Its results mainly from its effectiveness and its ability to facilitate a community of inquiry, with multiple forms of communication to meet specific learning requirements.

These obvious strengths of blended learning could, however, be compared with the weaknesses of such model of education e.g.:

- the technology challenge focused on infrastructure set up and maintenance costs – the
- technology and process of preparing courses content are costly,
teachers’ problems in sync up streams with ongoing offline activity and in picking up the right syllabus and the right ratio between face-to-face and online learning,
problems with improperly tailored course program to individual students’ needs,
ineffective use of learning technology tools – resulting from ignorance concerning the learning,
technology use - this can have a significant impact on wasting chance to improve ROI,
plagiarism and credibility risks due to the ease of access to online content [18].

3 SELECTED LMS

Learning Management System (LMS) is a software that allows education institutions to conduct or support teaching process through electronic means. These systems allow for example for reduction of distance between academic staff and students, better flexibility and attractiveness of educational process; they also push students to more systematic work and keep track of their progress. LMS is focused on delivery of online courses’ contents and keeping track of students’ progress throughout all types of training activities. Such approach is reflected in definitions presented in the literature, where LMS is mainly defined as a software application addressed for course administration, documentation, delivery of electronic educational technology that covers nearly all aspects of the teaching process [19], [20].

LMS emerging popularity, as a web-based solution, is in line with general trend bound up with virtualization process in many fields of human live, including education. The course content as well as money are a great example of progressive virtualization. There is a great variety of LMS systems functioning at higher education institutions. Some of them are either available commercially or opened-sourced or as so called freemium. Freemium systems are scaled down versions of commercial systems used free of charge by education institutions with the possibility of their further extension to a fully paid commercial version guaranteeing access to advanced features.

The freemium systems popularity is dynamically emerging nowadays, because of high commercial LMS system costs. The variety of systems mentioned above results from different system stakeholders’ and users’ objectives, reflected in system functionalities. Regardless of these differences, there are LMS shared traits e.g. simplicity of use, versatile reporting, scalability, high level of content security, open API for custom integrations and in-place integrations for mainstream education and business applications.

Among the variety of LMS systems some of them will be discussed, due to their relative popularity in Poland and Slovakia: Moodle, Blackboard Learn LMS and Sakai, Fig. 4. At present many LMS/LCMS systems exist, in the area of electronic education. Commercial systems (BlackBoard, WebCT, TotalCMS, iTutorLCMS, Eden) require notable financial costs for procurement and subsequent renewal of licenses. The second group represents Open Source products, which are developed by a certain community of enthusiasts or professionals (Moodle, ILIAS). [21]

![Fig. 4 LMS systems. Source: Own study based on [22].](image-url)
The analyses show that the e-learning system usage is already a common part of the education and the top rated universities prefer commercial e-learning systems and are willing to pay fees for the provision of the licenses. Probably the reason of the higher frequency of commercial e-learning system usage is in meeting all the needs for proper security. [23] One of the primary challenges faced in the context of informatization is to ensure the protection of information and the entire information infrastructure against various threats. Necessary level of protection cannot be achieved without adequate security awareness of users and maintaining the proper knowledge of system administrators. [24]

The first – Moodle (modular object-oriented dynamic learning environment) – is one of the most popular LMS systems in Poland and Slovakia and is primarily aimed at the education market. [25], [26]. Moodle’s popularity is still growing, what is confirmed by the number of more than 2 million users out of 126 countries. Its popularity mainly results from it is an open-source system and without any upfront fees. It offers most of it is expected from LMS functioning in higher education: student dashboard, progress tracking and support for multimedia classes as well mobile devices support [27], [28].

Equally popular LMS system in Poland and Slovakia is Sakai, developed by the Aperio foundation. Sakai LMS system differs from Moodle as it is built using the Java programming language while Moodle uses PHP. Despite the fact, that the system is an open source, only certain key stakeholders are permitted to contribute to the source code and the development process [29]. Its features include among others grade-book, course management, syllabus tool, course authoring tool, analytics, IMS and SCORM. As Moodle, Sakai LMS supports mobile devices [30]. This system has also some features that strongly differentiate it from other LMS, such as Google Drive integration. Sakai functionality and stability is on par with the best commercial out-of-the-box systems, having a wide range of features required from modern LMS.

The third system – Blackboard – provides users with a platform for supporting communication, educational instruction, sharing course contents and assessment. It is mainly used by more than 70 percent of the U.S. colleges and universities, but its popularity in Poland is growing. As early as in June 2006, the Blackboard users exceeded 12 million in over 60 countries. Its functionality does not differ much from the above-mentioned systems - system users may benefit from e.g. course management systems, tracking and skill building.

The comparison of the above mentioned LMS in their major functional areas presents Fig. 5 (the figure presents only selected functionalities across a wide spectrum of available functionalities). It should also be noted, that a higher stacked bar doesn't necessarily mean a better software.

Despite differences between LMS systems and differences from traditional learning, the general pedagogical objectives remain the same. Students must be engaged in the learning process, their progress must be under control, they must solve given tasks and make exercises, they must have...
direct contact with lecturer and finally they have to fulfill requirements to have their course or term completed. To achieve the above-mentioned objectives, access to e.g. learning materials and syllabuses must be provided. When conducting e-learning systems, LMS must perform above mentioned materials delivery electronically. It is even more important case than in traditional way of teaching using face-to-face contact because of lack of direct contact with the lecturer. Thus, LMS functionality must counteract student discouragement that may lead to lower academic performance and cause resignation from participation in classes.

The solution to this situation can be building a strong course community and pointing to direct benefits of this method. Helpful in this regard will be LMS that can offer some or all the following activities: live broadcasted or recorded lectures during which students have access to audio and video; materials; live conferencing during which students can observe lecture live and ask questions; mediation of learning material; e.g. syllabus, reading material, handouts; chatting, allowing for the implementation of remote consultation; publishing assignments and returning grades and feedback; examining students - conducting of tests and examinations.

One of the significant features of LMS is creation of e-learning community as this system is friendly for students, teachers and other staff. This user-friendliness feature will be measured subjectively for each system and its main determinant is a growing culture of system users (including mobile phone and tablet users). Another important feature - out of students’ interest, is live broadcasted lectures or recorded lectures. This is mainly due to the lack of possibilities for active participation in classes, e.g. disease, child care, attending classes as a free listener or even bad weather conditions. This last reason often arises as especially important in countries of difficult and changing weather conditions – Iceland might be treated as an example. The above-mentioned features determine the suitability of the LMS system for e-learning.

The pilot study on a group of 22 academics related to benefits of blended learning and LMS used in higher education was undertaken under auspices of the Finance and Banking Department of Bielsko-Biała School of Finance and Law and University of Zilina. The outcomes of the survey confirmed that more than 50% of surveyed were using LMS actively in their teaching process. For the 25% of surveyed LMS is treated as a tool through which learning materials are transferred to students. Larger teaching effectiveness, simplicity of tracking students’ progress emphasized approximately 20% of the surveyed. Although this is only a pilot study it confirms the benefits of using ICT solutions that support the learning process.

4 CONCLUSIONS

Application of blended learning in teaching process in higher education plays an increasingly important role. On one hand, universities aspire to spice up and improve teaching process, bringing lectures to students, who for various reasons cannot participate personally in classes (women with small children, people with health conditions, weather conditions). On the other hand, the rising costs of teaching process, growing social demand for acquiring and confirming new competences, demographic reasons resulting in the need for addressing the university offer to students living far away from university are among the many reasons that blended learning is becoming more and more popular. It would be impossible, however, to achieve the projected outcomes of the learning process if not for LMS systems.

It is thanks to ICT solutions that extended simply face-to-face contact adding new and effective channels of communication. In this way, it has been possible to, not only shorten the student-teacher distance but also to improve relations between the parties and increase the efficiency of the teaching process. Nevertheless, it is hard to favour one of the reviewed LMS systems. All three systems are popular and their functionalities seem to fulfil universities’ expectations. Each system has its own strong and weak points. The decision related to the choice of a LMS is based on the individual universities’ adjustments and expectations.

Regardless of the LMS choice, these systems and blended learning method of teaching is the inevitable direction in which universities should follow in pursuit of the quality of the classes, recruitment of new students and cost-cutting in education. The findings indicated, that the main barriers for the blended learning development at universities include lecturers’ insufficient basic IT skills to operate LMS and fear of having not enough time to prepare courses. Thus, the weakest link here seems to be the human factor. However, universities trying to maintain their market position and
to attract students should use blended learning approaches in their strategies. Thus, blended learning seems to be an interesting solution to support the process of teaching in higher education.

ACKNOWLEDGEMENTS

This contribution was undertaken, as a part of the research project VEGA 1/0733/15 and VEGA 1/0696/16.

REFERENCES


3603


