# ACADEMIC E-LEARNING MANAGEMENT WITH E-LEARNING SCORECARD

## Jelonek D., Dunay A., Illes B.C.*

**Abstract**: E-learning is becoming more and more popular form of students' education. Universities should perceive it as one of their directions of development. The aim of the paper is to present the concept of using e-learning scorecard (eLSC) in the managemet of e-learning activity of the university. The project of e-learnig scorecard uses the academic e-learning experience of the Faculty of Management of CUT (Poland) and the Faculty of Economics and Social Sciences of SzIU (Hungary). The method allows for the complex investigation into the effects of the conducted activity and can be applied as a tool of management of the e-learning–implementation, i.e. monitoring the achievement of goals. There are given the examples of aims of the conducted e-learning activity of the university in four perspectives applied in scorecard: financial, stakeholder's, internal process and learning & growth. Furthermore, there are indicated the means of their implementation.

**Key words:** e-learning scorecard, financial perspective, student perspective, internal process perspective, learning & growth perspective

## Introduction

E-learning is becoming more and more popular form of educating students, improving their qualifications and skills. The application of this method may significantly improve the management of e-learning increase the quality of teaching individual subjects as well as the whole process of education realized by the university, lower the costs of educating students, and also strengthen competitive advantage of the university on the education market. The achievement of the above goals is possible if the university perceives e-learning as one of the directions of its development. The management objectives of e-learning at university should assume both the development of information and communication platform, introduction of organizational solutions, improvement of skills of teaching staff to apply these solutions and motivating teachers and students to the most effective use of this form of teaching and learning. The aim of the paper is to present the concept of using e-learning scorecard (eLSC) in the management of e-learning activity of the university. The eLSC method allows for the complex examination of the effects of the run activity and may be applied as the tool of the

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assessment of the strategy implementation, i.e. monitoring of the achievement of strategic goals. There are given the examples of the goals of the run e-learning activity in four perspectives applied in balance scoreboard: financial, customer, internal processes and learning and growth and there are indicated the measures of their realization.

**Trends of E-Learning Development**

E-learning includes the whole of the processes connected with teaching and learning in the environment of and by means of modern information technologies, particularly the Internet. In the educational approach, e-learning is a way of teaching, education supported by digital technologies. This aspect is underlined also by the definition: "e-learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration" (Alonso et al., 2005). In many publications there are emphasized technical and technological conditions of e-learning. Such a view is presented by the definition: "e-learning is the use of electronic media for a variety of learning purposes that range from add-on functions in conventional classrooms to full substitution for the face-to-face meetings by online encounters" (Guri-Rosenblit, 2005). The development of e-learning is possible due to rapid adaptation of new information and communication tools to platforms. The examples are: mobile learning (Yao-Ting et al., 2016), game-learning (Domínguez et al., 2013), board-learning or blog-learning (Williams and Jacobs, 2004).The application of Web 2.0, namely, the phenomenon of "socializing" the Internet in e-learning allows everyone who has this knowledge to share it. There may appear changes in the construction of the existing system in the center of which there has been a teacher, and now the role of a teacher, in relation to other students, may be adopted by another student. The concept of e-learning 3.0 predict using structure semantic networks. The essential role is played by the systems of organization of knowledge such as ontologies. The task of ontology in e-learning is the formal description of meanings of the used vocabulary by the set of symbols. It enables better opportunities for composing and re-using both teaching materials and contexts combining them.  As a new trend in e-learning there may also be indicated the use of intelligent software agents (Jelonek and Chluski, 2010; Jelonek, 2015). Software agent may appear as a personalized element of intelligent interface, which adjusts teaching material, form of transfer, frequency of delivery of contents etc. to the preferences of a learner and, simultaneously, it supports them in the education process.

**The Characteristics of Balanced Scorecard**

The management concept defined as Balanced Scorecard came into being in the nineties of the 21st century as the result of the research into the measurement of the achievements of organizations of the future conducted by Robert Kaplan and David

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Norton (1996). They describe the innovation of the balanced scorecard as follows: "The balanced scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation."

Balanced Scorecard is defined as the system of measuring the effectiveness of the entity, enabling explanation and communication of the strategy, as well as the system of strategic management of the entity. The universality of balanced scorecard is proven by the examples of the acceptance of this tool in business in different areas of activity, e.g. in human resources management (Johanson et al., 1998) and also as tools of evaluation of the implementation of the IT strategy in the enterprise (Jelonek and Turek 2011). Balance scorecard is also adopted to public sector organizations (Dreveton, 2013) and education (Karathanos and Karathanos 2005; Brown, 2012). The project of e-learning scorecard based on Balance Scorecard is present in this paper. The Balanced Scorecard emphasizes that financial and nonfinancial measures are all part of a system that gives information to every part of the organization. They are part of a top down driven process, driven by the mission and strategy of organization. The measures are a balance between external measures for customers and internal measures of business processes, innovation and learning and growth. A balance must also be struck between measures of past performance and measures that drive future performance. Traditionally, organizations measured their performance on short-term financial measures; however the balanced scorecard approach extends this to including measures of performance relating to customer, internal processes and learning and growth needs of their people (Latshaw and Choi 2002).

**Materials and Method**

The e-learning scorecard project uses the academic e-learning experience of Faculty of Management of Czestochowa University of Technology and Faculty of Economics and Social Sciences of Szent István University. The project team included the authors of this article. Jelonek also used her experience from being the Chairperson of the Team for e-Learning at Czestochowa University of Technology. Moreover, the university teachers and students have taken part in the project as consultants. The project is implemented in three stages:

1. Developing the e-learning scorecard. Implementation period: January – September 20017.
2. Developing e-learning platform with applications providing data for e-learning scorecard. Implementation period: academic year 2017/2018.
3. Implementation of the e-learning scorecard on both faculties. Implementation period: academic year 2018/2019.

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The project team knows the principles of conducting e-learning in both faculties. The collected and developed data on e-learning activities were used to determine the indicators for the e-learning scorecard. Below are brief descriptions of academic e-learning in the Faculty of Management of Czestochowa University of Technology and in Faculty of Economics and Social Sciences of Szent István University.

**E-Learning in the Faculty of Management of Czestochowa University of Technology**

The development of e-learning in the Faculty of Management began in 2008 as a result of project entitled "The Development plan of the Czestochowa University of Technology" financed with the support from European Social Fund. There were prepared appropriate course patterns and innovative IT solutions including the Internet System supporting authors of e-learning courses within the range of course creations and preparation of the documentation which certainly contributed to the facilitation of activities connected with preparation and implementation of e-learning courses. Since that time there is a steady increase in the number of courses realized across the faculty: 1 (2009/2010), 6 (2011/2012), 28 (2013/2014), 80 (2015/2016) to 142 (2016/2017).

E-learning courses may only be conducted by academic teachers who have completed teacher training. There is a steady increase in the number of academic teachers who choose this form of teaching: 1 (2009/2010), 3 (2011/2012), 20 (2013/2014), 51 (2015/2016) to 51 (2016/2017).

There is also an increase in the number of e-learning courses offered to the extramural students. Traditional on-campus classes take place on weekends and the introduction of e-learning classes allows to reduce the number of weekend sessions.

The Faculty of Management offers 11 fields of study for students, and each of them include e-learning courses. Most of the online courses are implemented for students of Management, Management and Engineering of Production, and Logistics. E-learning is preliminary used in place of courses traditionally taught in the form of lectures and discussions. In 2016/2017 there were 90 lectures, 41 discussions, 7 projects and 4 practical lab courses conducted in the online form.

As a rule, all subjects declared as e-learning courses must also have scheduled traditional classes. Usually out of 15 classes scheduled for one course, 3 of them are conducted in a traditional form. During the first meeting students are presented with the e-learning platform, expectations and rules of communications, the second meeting during the semester is to explain any doubts that students may have, and the last one to summarize the course. Many years of teachers and students experience confirm that the use of blended learning brings very good effects.

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## E-Learning in Faculty of Economics and Social Sciences of Szent István University

The knowledge-based economy of our times requires employees who are flexible, team-workers, but who are able to use individual-centered education tools. By the financial support of Human Resource Operative Programme – as the part of the National Development Plan, the e-learning platforms were started to be built in Hungary and nowadays higher educational institutions have some kind of e-learning system, at least file servers to share documents. The results of recent Hungarian researches show that there are still many barriers of using these modern education tools, but these barriers are mostly connected to unwillingness to novelties, fears of change and insisting on good old tools and solutions (Czarnecka and Daróczi, 2017, Poór et al., 2017). The development of e-learning system in the Szent István University began in 2006-2007. The first steps were connected to build up infrastructure and to involve colleagues who could act as tutors and could help to spread this new educational method. The preparation stage started in April, 2008, which main objectives were to build an intelligent learning environment and to prepare the university's e-learning strategy, based on previous professional and practical experiences and the preliminary surveys among educators and students. The main tasks of the preparation stage were the elaboration of the strategic plan, the development of the organizational background (technology, place, human resource). The first stage of the service was started in September of 2008. In the first phase of implementation (2008-2009) 20-25% of students and teachers started to use the e-learning portal. In the 2nd phase, the main goal was to reach this proportion of users at every faculties. The goal of the strategy was to involve 50% of students and teachers, as active users, until 2011 and to provide a well-based and user-friendly service for them. The e-learning platform started with 500 users in 2008, which increased very fast, by the end of 2009 the number of users was more than 4000. The number of courses also increased very quickly, today various courses are available, and more than 60% of subjects have e-learning courses. The courses can be classified into different groups: as teaching courses (material sharing, e-exam tools, uploading assignments etc.), tutorial services for users, helpdesk services, platform for final exams etc. Nowadays, e-learning system is under reconstruction, which main objective is to improve user-friendliness, by which more teachers may be committed to use the e-learning portal in order to improve their educational methods to comply with the expectations of the new age methods of learning.

### The Concept of E-Learning Scorecard

The e-learning scorecard suggests that we view the didactic processes realized in e-learning from four perspectives, and to develop metrics, collect data and analyze it relative to each of these perspectives: financial, customer - student, internal process, learning and growth.

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Figure 1 shows the basic perspectives in the e-learning scorecard. Structure of the scorecard, which takes into consideration four basic perspectives: financial, customer, internal processes and learning and growth. It also presents the role of processes: analysis, design, evaluation and development and implementation.
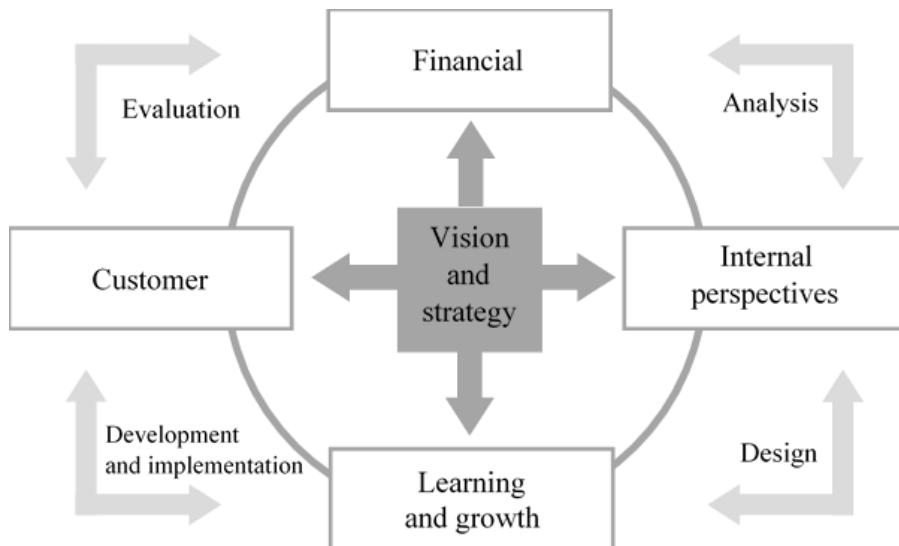


**Figure 1. The basic perspectives in the e-learning scorecard**

E-learning scorecard for the public university, particularly in the financial perspective, is significantly different from the goals of profit-oriented organizations. Public universities maintain the level of expenditure at the level of the obtained grants and generated budget, and the degree of its realization ought not to be the overriding objective of their functioning. Satisfying needs of the society in the field of education opportunities, i.e. the customer perspective is more importance. In the financial perspective of scorecard for the university, it is possible to take into consideration the maximization of values with the lowest costs, minimization of administrative expenses and the achievement of positive financial result. E-learning activities of the university, in the perspective of the financial assessment also undergo the above constraints. The primary objectives of the e-learning activity of the university in the financial perspective may include:
− increase and change in the structure of revenues,
− cost reduction / productivity growth,
− improvement of the efficiency of asset use.
As a financial indicator it is possible to measure the use of assets such as: the amount of hours performed in the computer labs, the number of days of meetings or the cost of one hour per student. In literature, it is also possible to find out the examples of the objectives: maximization of value with the lowest costs of the run activity and maximization of royalties in the structure of costs (Dabrowski, 2011).

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The assessment of the e-learning activities of the university in the customer (students) perspective is the most important area of scorecard. The basic objectives of the e-learning activity of the university in this perspective may include:

− increasing the use of e-learning in the academic education,
− increasing students' satisfaction with the mode of distance education,
− developing vocational (post-graduate) training using e-learning.

Among the measures of realization of the first objective in this perspective, it is possible to apply e.g. the indicator of share of e-learning teaching offer of the university on the education market. In the construction of the indicator, it is possible to take into consideration e.g. the number of subjects conducted in the e-learning form, the number of subjects in the form of blended learning, the number of subjects supported by e-learning solutions, level of studies (bachelor, M.A., Ph.D.) depending on the adopted priorities for the direction of e-learning development and the existing degree of e-learning at the levels of studies.

In the measurement of the level of satisfaction of students using e-learning solutions, the indicator of student's satisfaction calculated on the basis of the examination of students' opinions on the way of performance of classes may be helpful.

In the perspective of internal processes in the analysis of the e-learning activity of universities, it is possible to diagnose the objectives and the measures of their achievement in the following groups of processes: innovative, operational and after-sales service. For e-learning conducted at universities, it is possible to establish the following objectives:

− better organization of teaching processes and the selection of forms of education to the students' needs,
− implementation of new, innovative educational services,
− improvement of the quality of online teaching.

The measure of realization of the first objective may be the indicator of the level of acceptance of new applications and functions in e-learning products and the evaluation of the range of practical use of innovation by students, introduced on the e-learning platform and used by university teachers in the process of education. The measure of improvement of quality of online teaching should refer to the technological, organizational and methodological areas

For the e-learning activity of the university in the perspective of learning and growth, it is possible to formulate the following objectives:

− acquiring qualifications by the academic teachers in the field of e-learning,
− improving qualifications of the academic teachers and expanding their knowledge in the field of new trends and technologies in e-learning,
− maximizing the involvement of students in the process of conducting e-learning classes.

The courses at the elementary level whose completion brings about powers to the academic teacher to conduct e-learning courses for students may be helpful in overcoming this barrier. In the assessment of acquiring qualifications by academics

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in the field of e-learning, there may be applied the indicator specifying the number of qualified teachers and the indicator of an increase in the teachers' involvement, measured by the number of new courses activated in the mode of e-learning.

The objective of maximizing the involvement of students in the process of realization of e-learning classes, may be measured by e.g. the amount of the reported methodological and organizational innovation and the amount of the implemented innovation.

**Table 1. The project of e-learning scorecard**

| Perspective | Strategic objective | Measure | Target |
|---|---|---|---|
| Financial | Increasing and changing the structure of revenues, | 1. Dynamics of revenues from the part-time courses where 15% of classes is realized in the form of e-learning | 100-110% |
| Financial | Reducing the cost of studying | 2. Days of meetings for part-time students | 20 |
| Cusomer - student | Increasing the use of e-learning in the academic education | 1.Rate of the share of e-learning courses in the total number of classes | 10%[*] |
| Cusomer - student | Increasing the use of e-learning in the academic education | 2. Number of teachers who have the power to conduct e-learning | 25% |
| Cusomer - student | Increasing students' satisfaction with the mode of distance education | 1.Rate of students' satisfaction (on a scale from 1 – the lowest to 5 – the highest) | 5 |
| Cusomer - student | Increasing students' satisfaction with the mode of distance education | 2.Rate of hours of e-learning realized by each student | 10%[*] |
| Cusomer - student | Development of vocational (post-graduate) training using e-learning | 1.Number of vocational training (postgraduate studies) launched in e-learning in a year | 5 |
| Cusomer - student | Development of vocational (post-graduate) training using e-learning | 2.Number of participants of post-graduate studies | 150 |
| Internal processes | Better organization of teaching processes and the selection of forms of education to the students' needs | 1.Evaluation of e-learning courses in terms of methodology (electronic survey among students) | 5 |
| Internal processes | Better organization of teaching processes and the selection of forms of education to the students' needs | 2.Evaluation of e-learning courses in terms of organization (electronic survey among students) | 5 |
| Internal processes | Better organization of teaching processes and the selection of forms of education to the students' needs | 3. Evaluation of e-learning courses in technical terms (electronic survey among students) | 5 |

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|---|---|---|---|
| | Implementation of new, innovative educational services | The number of activated new applications and functions in e-learning products | 10 |
| | Improvement of the quality of online teaching | 1.Rate of effectiveness of online teaching (grade average received on a scale from 2 – the lowest to 5 – the highest grade) | 5 |
| | | 2.Number of technical problems reported by students monthly | 4 |
| | | 3. Rate of rapidity of removing problems from notification to solution | Max. 24 hours |
| **Learning and growth** | Acquiring qualifications by the academic teachers in the field of e-learning | 1.Number of university teachers who obtained the certificate enabling them to run e-learning classes | 100 people |
| | | 2.Number of university teachers who took part in the course improving their skills in running online classes | 50 |
| | Improving qualifications of the academic teachers and expanding their knowledge in the field of new trends and technologies in e-learning | 1.Number of specialized publications on e-learning | 10 |
| | | 2.Number of teachers participating in conferences on e-learning | 10 |
| | | 3. Number of conferences on e-learning organized by the university | 1 |
| | Maximizing the involvement of students in the process of conducting e-learning classes | 1. Number of methodological innovations reported by students | 10 |
| | | 2.Number of organizational innovations reported by students | 10 |
| [*]In accordance with the Law on Higher Education, 60% of the total number of hours in a given course may be conducted in the mode of e-learning | | | |

Table 1 presents the project of e-learning scorecard for universities. Target values are only a proposition and should be defined separately for each University. The proposition of target values was prepared by an international team of authors by analyzing the current value of indicators in both Faculties and by agreeing on the optimal but realistic to achieve in the next year's target value.

**Summary**

Creating e-learning scorecard is the process aiming at the establishment of goals and appropriate measures connected with them and all essential activities which need to be taken to realize individual goals. Summing up the presentation of e-learning scorecard as the tool of realization of the e-learning strategy at university, it is necessary to emphasize that it can be used to take a broader view on all the

aspects of the status of realization of e-learning. Modern strategies formulated either for business, a university or e-learning at university must be, above all, flexible. Therefore, it is very important to be aware of the fact that e-learning scorecard will have to be modified and improved for the whole time of its use. The necessity of adjustment of this tool to the current situation of functioning of the university in the future, does not underestimate the importance of the elaborated pattern of e-learning scorecard at university.

Thus, the eLSC method, as a combination of fundamental and modified BSC assumptions, helps in translating strategies into specific tasks that are needed to be carried out in order to meet the goals of e-learning management. In addition, it effectively supports the planning and control processes in the e-learning management framework at universities.

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## ZARZĄDZANIE AKADEMICKIM E-LEARNINGIEM Z ZASTOSOWANIEM KART OCEN E-LEARNINGU

**Streszczenie:** E-learning staje się coraz popularniejszą formą edukacji studentów. Uniwersytety powinny postrzegać ją jako jeden z kierunków rozwoju. Celem artykułu jest przedstawienie koncepcji wykorzystania e-learningowej karty wyników (eLSC) w zarządzaniu działalnością e-learningową uczelni. Projekt karty wyników e-learnigu wykorzystuje doświadczenie e-learningu akademickiego Wydziału Zarządzania PCz (Polska) oraz Wydziału Nauk Ekonomicznych i Społecznych SzIU (Węgry). Metoda pozwala na kompleksowe badanie efektów przeprowadzonej działalności i może być stosowana jako narzędzie zarządzania wdrożeniem e-learningu, tj. monitorowanie realizacji celów. Podano przykłady celów prowadzonej działalności e-learningowej uniwersytetu w czterech perspektywach stosowanych w karcie wyników: finansowej, interesariuszy, procesów wewnętrznych oraz uczenia się i rozwoju. Ponadto wskazano sposoby ich realizacji.

**Słowa kluczowe:** karty wyników e-learning, perspektywa finansowa, perspektywa studenta, perspektywa procesu wewnętrznego, perspektywa uczenia się i wzrostu

### 學術電子學習管理與電子學習計分卡

摘要:網絡教育正日益成為學生教育的熱門形式。大學應該把它看作是其發展方向之一。本文的目的是提出在大學電子學習活動管理中使用電子學習記分卡(eLSC)的概念e-learnig計分卡項目使用CUT(波蘭)管理學院和匈牙利SzUU經濟與社 會科學學院的學術電子學習經驗。該方法允許對所進行的活動的效果進行複雜的調查,並且可以將其用作電子學習實施的管理工具,即監視目標的實現。本文從四個角度對大學開展的電子學習活動進行了實例分析:金融,利益相關者,內部流程和學習與成長。此外,還指出了實施的手段

關鍵詞:電子學習記分卡,財務視角,學生視角,內部過程視角,學習與成長視角