MONTENEGRIN JOURNAL OF ECONOMICS, Vol. 10, No. 1 (July 2014), 25-42

COMPETITIVENESS IN HIGHER EDUCATION IN TERMS OF THE LEVEL OF STUDENTS' SATISFACTION WITH E-LEARNING IN BLENDED ENVIRONMENT

SANJA BAUK[1], and
JASMIN JUSUFRANIC[2]

ABSTRACT

The intellectual competitiveness is a motto of the new information era. Higher education within contemporary conditions appearances as the leading area for the provision of competitive capabilities and competitive advantages of the company since it directly affects the creation of intellectual and organizational capital, including greater competence of personnel, i.e. greater number of employees with intellectual vacations.

The paper explains the growing role of e-learning in the provision of competitive properties of higher education at the example of the International University of Travnik. It is started from the hypothesis that e-learning, as an alternative form of learning in higher education, expands the array of educational choices by strengthening the competitive position of the observed University. Also, the competitive position of the analyzed University becomes stronger with increasing degree of students' satisfaction with e-learning component in blended environment which is a mix of traditional (or, face-to-face, classroom based, traditional education) and learning supported by modern information and communication technologies and tools (or, e/online/web based/internet mediated/m-learning).

In validating these hypothesis, in addition to the theoretical considerations, on the basis of the results of the surveys conducted among students of the International University of Travnik, two-dimensional Kano model is applied, with the aim of determining the degree to which certain dimensions of e-learning in blended model affect the level of students' satisfaction with conditions and outcomes of such form of learning. The results are interpreted by the appropriate numerical, graphical and statistical analysis.

***KEY WORDS**: concurrency, higher education, e-learning, blended environment, level of students' satisfaction, Kano model*

JEL Classification: D83; I23;
Received: February 05, 2014 / Accepted: June 30, 2014

1. INTRODUCTION

Nowadays competitive advantage goes to the side of those who are "armed" with knowledge through which they can resolve the most real world complex problems. The transition to the innovation way of development and so called "knowledge economy" imperatively highlights the relevance of specialized competencies that are acquired in the field of higher education, and are aimed at increasing the value of intangible assets (human and intellectual capital), and thus the competitive ability of specific companies and ultimately the state. According to this, it is present continuous development of new forms of knowledge transfer based on extensive using of modern information and communication technologies and tools. One of these forms of knowledge transfer finds support in blended learning model.

Blended learning is one way in which institutions can prepare themselves for the next era in education (Garrison, and Kanuka, 2004; Owston, 2013). It offers new opportunities for combining face-to-face and online teaching and learning. This includes different learning or instructional methods (lecture, discussion, guided practice, reading, games, case study, simulation), different

[1] University of Montenegro, Department of Maritime Studies, Kotor, Associate Professor, bsanjaster@gmail.com
[2] International University Travnik, Assistant , j.jusufranic@gmail.com

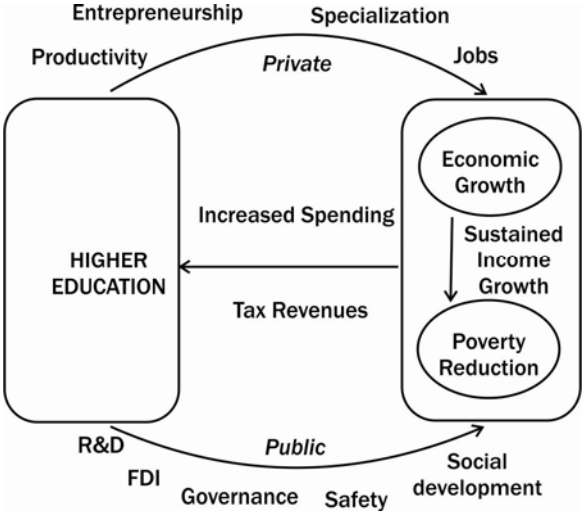
delivery methods (live classroom or computer mediated one), different scheduling (synchronous or asynchronous), and different levels of guidance (individual, instructor or expert led, or group/social learning). There are many definitions of blended learning and yet no single accepted one. In the scope of this study we shall consider students' level of satisfaction within blended learning model as a formal education program in which a student learns at least in part through online learning, with some elements of student control over time, place, path, and/or pace (Clayton Christensen Institute for Disruptive Innovation, 2012-2013).

Bearing in mind that the work of the blended environment influences the increase of competitiveness of higher education, this paper will discuss the theoretical and practical dimension related to the provision of an appropriate blended learning models and the acceptable level of student satisfaction with new technology based models of knowledge transfer.

2. INCREASING COMPETITIVENESS THROUGH HIGHER EDUCATION

Knowledge is being treated as the key factor of economic growth, and ability to create new technological and sustainable development. In the opinion of Maringe and Gibbs (2009, p. 47) dynamic environment of the higher education points to the need of developing some new opportunities in the future, such as: greater complexity of the „educational product", complex social role of education institutions, and importance of their financial performances and competition. As Figure 1 shows, higher education can lead to economic growth through both private and public channels.

Figure 1: Conceptual framework of the role of higher education

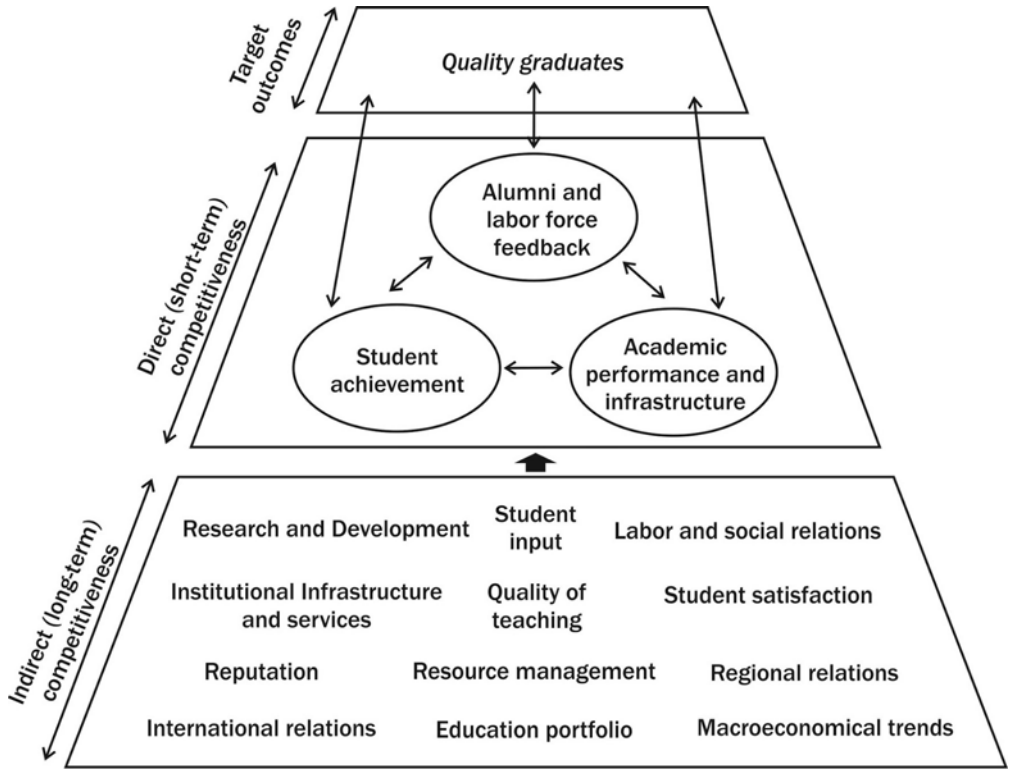


Source: Bloom, Canning, and Chan 2006, p. 16.

Higher education (HE) is of particular importance for the economic competitiveness of any society, since higher education institutions generate knowledge and develop expertise and skills which enable individuals to achieve their personal goals as well as become valuable members of society. HE is an infrastructure for future state-level social cohesiveness. HE is becoming increasingly competitive in terms of students, staff and resources. In the area of economic development, higher education increases productivity and competitiveness, particularly through the growth of the human capital and the creation of a better educated, more qualified and more skilled work force. HE contributes to state competitiveness (Green, Mostafa and Preston, 2010) via human capital development that provides future returns to the economy through increases in labor productivity.

Creating innovative higher educational institutions, where technology permeates every part of the curriculum, where creativity and innovation are included into each discipline, is of particular importance. From that depends encouraging the growth of creative people who have capital. Creative economy will have a key advantage in the growing competition. Because of this, many authors have attempted to model a way of gaining competitiveness of education. One of these models is shown in Figure 2.

Figure 2: Pyramid model of competitiveness in higher education

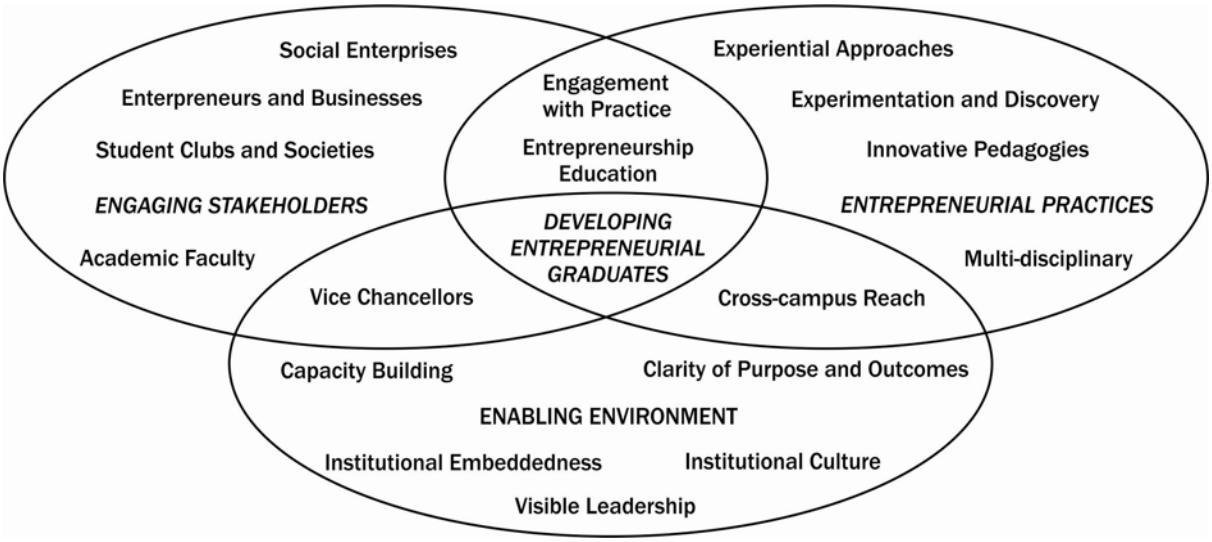


Source: adapted from Tamándl and Nagy 2013, p. 1127.

Contemporary higher education is now situated in an open information environment. It is a complex combination of the impacts of global flows and networks of words, ideas, knowledge, finance and institutional relationships, along with their respective national system design and original creation (Figure 3). Therefore, it is considered (Marginson 2006, p. 2) that it is imperfect and variable integrated system, which is characterized by uneven and variability patterns of engagement and communication, autonomy and separation zones, and both stable and unstable hierarchy. Relationships are dual structured based on cooperation and concurrency. The concurrency positioning in higher education, within each national system, exists as ratings hierarchy (Table 1).

World Economic Forum (2006-7) is underlined that education and training have emerged as key drivers of competitiveness, ensuring that the labor force has access to new knowledge and it is trained in new processes and the latest technologies. A country's ability to absorb new technologies, to produce goods and services that can reach standards of quality and performance acceptable in international markets, to engage with the rest of the world in ways that are value creating, is intimately linked to the quality of its schools, to the priority given to training and education in mathematics and science, and to the existence and accessibility of specialized research and training centers.

Figure 3: An implementation framework for higher education



Source: Herrmann 2008.

Development of the knowledge society in the 21st century is characterized by broadening the boundaries of knowledge, shortening of the knowledge life cycle, and the emergence of new knowledge at a very fast pace. Learning is increasingly becoming a life-long process. There is a growing competition between higher education service providers since the market is increasingly privatized (OECD 2010, p. 299). In such circumstances, higher education service quality becomes a key for the service providers.

The higher level of development puts more strict rules and expectations on education service quality. Besides, economic and cultural globalization, along with market increasingly liberalization, have created new challenges for the higher education system since it requires global openness and knowledge exchange.

Table 1: Typical segmentation of competition in national higher education systems

Segment 1	Elite research universities self-reproducing, combining historical reputation, research performance, and student quality/degree status. Driven by status attraction/accumulation not revenues *per se*. Non expansionary in size. Limitless ambitions for social status and power. Wealthy. Relatively closed.
Segment 2	Aspirant research universities struggling to live as Segment 1, but unable to break in. Tendency to brain drain of best students and researchers to Segment 1. May engage in selected commercial activities to generate revenues, but not so efficient in commercial terms. Resource scarcity. Semi-open.
Segment 3	Teaching-focused (university or other) student volume and revenue driven. Some are private for profit institutions, or public sector operations with a large commercial component, tending to expand. High resource scarcity. Tendency to hyper-marketing and reducing costs/quality under market pressure. Open.

Source: Marginson 2006, p. 8.

High quality is the main competitiveness indicator of HE. The term 'quality of education' implies the following guidelines: (a) quality of teaching (learning process design, teaching methodology); (b) quality of academic staff; (c) quality of study programmers; (d) quality of equipment, maintenance and support rendered; (e) quality characteristics of the learning environment; (f) characteristics of students; (g) quality of university management, and (h) quality of research. Thus, the quality of HE is multidimensional, and its empowerment depends on numerous impacts, particularly on new forms of knowledge transfer supported by contemporary ICT tools.

3. E-LEARNING AS AN ALTERNATIVE AND POSSIBLE COMPETITIVE ADVANTAGE IN ER EDUCATION

New educational technologies have paved the way to a new learning techniques unconstrained by time and space. E-learning in blended environment (most commonly) becomes a significant quality strategy to increase the reputation of the higher education institutions through service differentiation. In this effort to innovate universities, the introduction and utilization of e-learning component will be a key advantage. New types of for-profit and non-profit organizations are beginning to provide competition in targeted segments of higher education (Armstrong 2000, p. 2). Evolution of this competition will be speeded by internet mediated learning which will enable these new competitors to access easily many of the traditional constituencies of higher education.

Irrespective of many doubts regarding the quality of e-learning in comparison to traditional education, and undoubtedly less competition diplomas obtained through this type of learning, if one considers the issue from the aspect of the new competitive arena and profitability of higher education institutions, the most important is the level of satisfaction of clients (here students) from which derives the corresponding demand for new form(s) of higher education. In addition, it is not negligible the shift of the boundaries of knowledge and education over much broader layers of the population. Of course, e-learning creates strong concurrency pressure on traditional higher education. E-learning (usually within blended models) seeks its place in the market of higher education, and users who prefer its requirements, capabilities, quality and virtuality. Most probably, its best chance is reflected in: a) rapid development of new information and communication technologies; b) flexibility, diversity, and interactivity education process; c) much lower cost; d) greater convenience, and individualized acquisition of basic skills, and e) many other benefits, one of which is perhaps the most important limitlessness of entry.

Armstrong (2000, p. 21) claims that e-learning becomes a new and powerful educational technique which combines communication power of internet with computing power of desktop and mobile computers (laptops), or even smart phones nowadays. Access to internet based courses is no longer restricted to a location, as are traditional university classes, or to a time, as are traditional classes or televised distance learning courses. Instead, it becomes global and asynchronous to provide maximum flexibility and opportunity for students. Traditional classroom lectures follow a linear learning approach in which the student follows the pace and path of the professor through the subject matter. The new e-learning allows nonlinear learning approaches based on cognitive learning theories, permitting the student to move at his/her tempo with an organizational structure that responds to his/her comprehension of the material. The flexibility to respond to different learning styles is increased dramatically compared to the traditional, classroom based lecturing and/or learning.

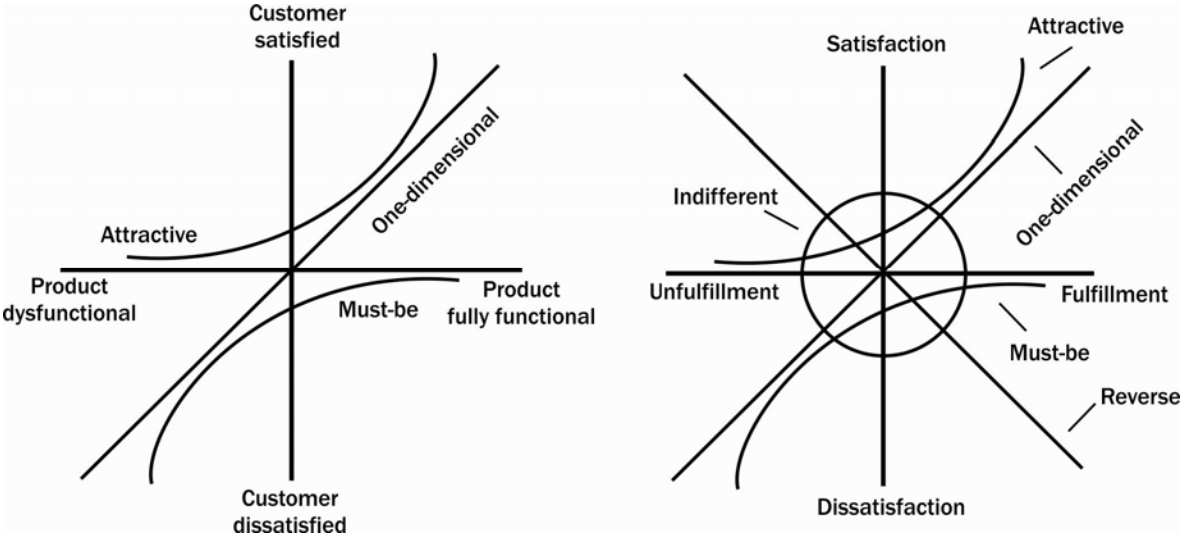
In this context of the growing role of e-learning in blended environment, it is important to find a reliable methodology and technique(s) for assessing the level of students' satisfaction with this relatively novel mode of learning. Therefore, the following paragraphs of the paper contain detail analysis of the level of students' satisfaction with e-learning component of blended learning model at International university of Travnik. For this purpose, Kano two-dimensional model of assessing customers' requirements and consequently satisfaction is used. Firstly, the main idea of Kano model is presented, and then the analysis of the surveys conducted among the students of this university is performed.

4. ASSESING E-LEARNERS' SATISFACTION BY KANO MODEL

In the past, customer satisfaction has been perceived in one-dimensional terms: the gre-ater the fulfillment of desired quality attributes, the higher would be customer satisfaction. However, there are some quality attributes that fulfill individual customer expectations to a great extent without necessarily implying a higher level of customers' satisfaction (Matzler and Hinterhuter, 1998). Several studies have therefore attempted to link the physical and psychological aspects of quality to see how specific attributes of a product or service actually relate to customer satisfaction or dissatisfaction, where the physical aspect is concerned with the physical state or extent of the specific attributes, and the psychological aspect is related to the customer's subjective response in terms of personal satisfaction (Schvaneveldt et al., 1991). Similarly, Kano (1984) considered two aspects of any given quality attribute: an objective aspect involving the fulfillment of quality, and a subjective aspect involving the customers' perception of satisfaction. Using this model, quality attributes are classified into six categories (first four of them are shown in Figure 4):

- *Attractive* quality attribute (A): an attribute that gives satisfaction if present, but that produces no dissatisfaction if absent;
- *One-dimensional* quality attribute (O): an attribute that is positively and linearly related to customer satisfaction – that is, the greater the degree of fulfillment of the attribute, the greater the degree of customer satisfaction;
- *Must-be* quality attribute (M): the presence of these product/service attributes will not increase customers' satisfaction level significantly, while their absence will cause extreme dissatisfaction;
- *Indifferent* quality attribute (I): an attribute whose presence or absence does not cause any satisfaction or dissatisfaction to customers;
- *Reverse* quality attribute (R): an attribute whose presence causes customer dissatisfaction, and whose absence results in customer satisfaction; and
- *Questionable* quality attribute (Q): it means that is not clear weather customers expect these attributes since they gave unusable responds due to misunderstanding the questions on the survey, or making an error when filling out the questionnaire.

Figure 4: Kano two-dimensional model for accessing customers' (here students') level of satisfaction with a product or a service (here e-learning in blended environment)



Source: adapted from Walden 1993, p. 4

In addition, Kano considered both functional and dysfunctional dimensions of analyzed customers' requirements and consequently their satisfaction with a product or a service. Within in the paper examined context, it is critical to identify must-be quality attributes, in order to meet demand for these elements at a minimum threshold level at least. Universities must also do their best on the one-dimensional attributes, which are typically articulated by customers as functionality they desire, while the attractive quality attributes can be selected as competitive „weapons" to draw the attention of students, especially new ones (Bayus et al., 1997).

4.1 Applied methodology

Within here conducted study the questionnaire based on Kano two-dimensional model is used to determine students' at International university of Travnik satisfaction with the web based learning system in blended model. In order to define quality attributes for Kano model, five quality components of DeLone and Mclean (D&M) model (DeLone and Mclean, 2003) are used (Table 2). Then, the questions, or students' requirements, for each quality attribute of the considered web based learning system: systems quality, service quality, information quality, use, and net benefits, are created.

Table 2: Kano model quality attributes questionnaire defined by D&M model

Quality attribute	Kano model questionnaire
System quality	– Technical stability/reliability of the system – User-friendly interface
Service quality	– Available access to the system at any time
Information quality	– Quality/quantity of e-instructional materials
Use	– Presence of audio/video recordings (besides textual ones) – Mandatory e-test and assignments – Student self assessment possibilities – Collaborative activities – Presence/existing of e-tutor(s)
Net benefits	– Enhanced learning with combination of web based and traditional learning (blended learning model)

Source: adapted from Bauk et al. 2014, p. 4.

The responders (students) are asked about their mindset due to functional and dysfunctional dimension of the web based e-learning system quality attribute, e.g. the offered answers in both cases, in accordance to Kano model, are: I like it; It must be that way; I am neutral; I can tolerate it; or, I dislike it. The respondents have to choose one of the offered options (answers) for both functional and dysfunctional dimension of the question. Due to the chosen pairs the reviewer may get an overview of the students' satisfaction with the examined web based learning system quality attributes.

The population sampled was of 70 students at the International university of Travnik. The results obtained through questionnaires delivered among students are presented and discussed within the following section.

5. RESEARCH RESULTS AND ANALYSIS

Here are presented the results of the students' responds to the questionnaires inspired by Kano model. The results are obtained through following methods of analyzing the responds:

- frequencies of certain Kano categories appearance in the set of responds;
- customers', here students', (dis)satisfaction indexes;
- two-dimensional (linear) graphical scheme; and
- some basic statistical parameters.

It should be said that it is often the case that there are usually some differences in the results of the survey analysis, depending on the method/technique that was applied. These differences at first might appear as confusing. However, they point to the non-uniqueness of the model and the opportunities that are „open" for the decision-makers in higher education, as well as for the designers of contemporary internet mediated learning components in blended models. In the analyses that follow, we will be confronted with some scattered results, but we will try to give a reasonable explanation of these inconsistencies.

5.1 Frequency of Kano attributes appearance

The first applied methodology of analyzing students' responds is based on the frequency of appearing certain Kano attributes in the set of responds (Table 3).

Table 3: Spreadsheet of most frequent responses to students' requirements

No.	Students' requirements (SR)	Most frequent response	Second most frequent response	Third most frequent response
1.	Technical stability (reliability) of the system	I	M	O
2.	User-friendly interface	I	O	M
3.	Quality/quantity of instructional materials	I	O	M
4.	Presence of audio/ video recordings	I	M	A
5.	Collaborative activities	I	Q	M
6.	Self-evaluation possibilities	I	O	M
7.	Mandatory exercises, tests, essays, etc.	I	Q	O
8.	Combination of web based and traditional learning	I	O	M
8.	Presence of e-tutor(s)	I	O	M
10.	Available access to the system at any time	O	M	A

Source: adapted from Walden, 1993, p. 11

By analyzing the results of the survey conducted among the students who have used web based learning system in blended model at the International university of Travnik (see Table 3), the following is to be noticed:

- The indifferent (I) category of applied Kano model has the greatest frequency of appearance among all the categories in even nine of offered ten questions! Simplified and looked though the eyes of Kano model, it means that customers, here students as e-learners, do not care about these features either way. How this could be explained? It could be realized that most of students among the responders are not interested in e-learning system, or, it was difficult for them to be "consistent" in giving answers on both functional and dysfunctional features/dimensions of the e-learning system at the same time, so the easiest for them was to be "indifferent". Or, they just want to fulfill the "form" by answering the questions, but they did not think deeply about the questions and scope of doing the interview. Anyhow, in our further analysis we have ignored the "indifferent" answers in the case of questions where they are present in the greatest number, and we focused on the second and/or third most frequent answers as rather indicative ones. As a kind of exception can be treated answers in cases SR5, SR6, Q7, and SR9 (collaborative activities; self-evaluation possibilities; mandatory exercises, tests, essays, etc., and availability of e-tutor). Namely, it has sense that students are indifferent about collaborative activities within e-learning platform, since they have a lot of another possibilities to collaborate through different social networks (Facebook, Twitter, e.g.). Additionally, students are not usually aware about the importance of self-evaluation possibilities in making them learning easier and more interesting, though it can be reasonable that they do not care about this feature. But, the teachers should explain them the benefits of self-evaluation process and "convince" them in a way to treat this category as more important one. Further, students usually do not like obligations like mandatory exercises, tests, essays, etc. Therefore, this can be accepted as well as a category they estimated as irrelevant for them. And, finally, when we take into consideration the question of availability of e-tutor, then it is to be emphasized that most of the students are familiar with contemporary information and communication technologies (ICT), and though they do not have special requirements for e-tutor (Bauk et al., 2014).
- A certain number of "questionable" answers was present in two cases (SR5 and SR7). This can be again treated as a result of the lack of some students' understanding of basic principle of the questionnaire. Hence, we have to be focused on, let's say, those answers which can be treated as more valid and relevant ones, and ignore these which do not have importance for planning an attractive e-learning systems in blended model due to learners' (reasonable) wishes/expectations. Sometimes, students are not aware what is indeed useful for them, and the obligation of e-learning systems designers, teachers and e-tutors is to find the optimal solution(s). However, the judgments and feeling of the students should not be neglected.

Then, one can notice that most frequent answers are: M, O or A. In accordance to the previous extensive analysis of Kano model we should relay on the following order of attributes importance: M>O>A (Dominici and Palumbo, 2013; Walden, 1993) and the universities should find the optimal balance between these attributes and corresponding e-learning features in blended model for sacking the compositeness of the universities in the new ICT era.

5.2 Analysis of better and worse coefficients

Since the results of the analysis in the previous case are fuzzy, we do here an effort to "sharp" them slightly, throughout the further analysis being based upon Berger, et al. (1993) model (see Dominici and Palumbo, 2013, p. 92; Walden, 1993, p. 17). Namely, instead of concerning must-be (M), one-dimensional (O), and attractive (A) features, the responds of the customers are reduced here to two numbers: a positive number that is the relative value of meeting this customer requirement (versus the competition), and a negative number that is the relative cost of not

meeting the customer requirement. These numbers are labeled as "better" and "worse" indexes and calculated in the following way, i.e. by equations (1) and (2):

$$Better = \frac{A + O}{A + O + M + I} \quad \ldots \quad (1)$$

$$\text{Worse} = -\frac{\text{O} + \text{M}}{\text{A} + \text{O} + \text{M} + \text{I}} \quad \ldots \quad (2)$$

Better or satisfaction index indicates how much customer satisfaction is increased by providing certain feature of a system which is intended to be developed, while worse or dissatisfaction indicates how much customer satisfaction is decreased by not providing the feature. More precisely, the positive better numbers are indicative of the situation where, on average, customer satisfaction will be increased by providing attractive and one-dimensional elements. The negative worse numbers are indicative of the situation where customer satisfaction will be decreased if one-dimensional and must-be elements are not included into *ex-ante* blended/e-learning system which designers, teachers, e-tutors, etc., are intended to develop by meeting students' expectations.

Now, let's consider in the light of these two coefficients the results of the survey being conducted among the students at International university of Travnik, and try to create more specified picture of the students' expectations. The indexes better and worse are calculated and presented in Table 4.

Table 4: Satisfaction (better) and dissatisfaction (worse) indexes

SR no.	Better	SR no.	Worse
10.	0.607	10.	- 0.705
8.	0.431	6.	- 0.559
6.	0.407	4.	- 0.545
3.	0.383	3.	- 0.517
9.	0.377	8.	- 0.517
2.	0.358	1.	- 0.508
4.	0.345	9.	- 0.508
7.	0.306	5.	- 0423
1.	0.271	2.	- 0.415
5.	0.250	7.	- 0.367

Source: adapted from Dominici and Palumbo, 2013, p. 92

Table 4 shows ranking of better and worse coefficients on the basis of which can be seen how presence or absence of some of the students' requirements affect the competitiveness of the analyzed e-learning system. It is obvious that presence of SR10 (available access to the system at any time) will bi-directionally affect the quality of analyzed system, i.e. this feature presence will increase students' satisfaction in the greatest extent, while its absence will decrease in the proportional extent their dissatisfaction. In this spirit one could continue further analysis of these coefficients. Thus, coefficients better and worse can be used for more refined analysis when (re)designing of the learning system is in matter. Further analysis will be realized through the appropriate Kano numerical calculus over students' responds including graphical presentation of the obtained results.

5.3 Graphical analysis of the obtained results

The basic of graphical analysis implies that there are Q pairs of questions, $j = \overline{1,Q}$ (Q=10 in this case, number of considered students' requirements) and N respondents (N=70 in this case, number of interviewed students), $i = \overline{1,N}$. In accordance to Kano model, there may be two basic scores for each potential customer requirement being investigated: functional and dysfunctional ones. These two scores can be coded as follows (Walden, 1993):

- Functional (Y_{ij}): -2 (dislike), -1 (live with), 0 (neutral), 2 (must-be), 4 (like), and
- Dysfunctional (X_{ij}): -2 (like), -1 (must-be), 0 (neutral), 2 (live with), 4 (dislike).

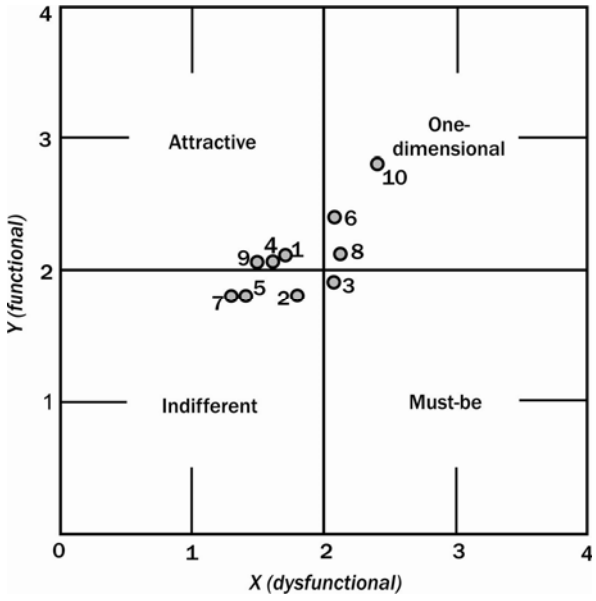
Since each answer of the respondents (here students) has been assigned by the appropriate numerical value it is possible to calculate average values for functional Y and dysfunctional X dimensions of the answers in a following manner, i.e. by equations (3) and (4):

$$Y_j = \frac{\sum_i Y_{ij}}{N} \quad \ldots (3)$$

$$X_j = \frac{\sum_i X_{ij}}{N} \quad \ldots (4)$$

These pairs of average values can be plotted on two-dimensional coordinate system with four quadrants representing key categories of Kano model: attractive, one-dimensional, indifferent, and must-be. For the purpose of this research, based on the collected students' answers, we take into consideration only must-be and like functional dimensions, and live with and dislike dysfunctional dimensions. Since neutral category implies pondering responds with zero value, it has in fact no impact on the total score and considered average values. Questionable and reversal answers were excluded from this analysis, as well. Besides, all average values are in positive quadrants (between 0 and 4 per X and Y axis) and given as points in Figure 5.

Figure 5: Plots of average functional and dysfunctional points for students' requirements SR 1-10



Source: adapted from Walden, 1993, p. 23, and Bauk et al., 2014, p. 8

On the basis of the plots in Figure 5, it can be observed that the requirement SR3 is in must be quadrant of Kano 2D graph. It means that quality/quantity of e-instructional materials are of up-most importance to the students. Then, requirements SR6, 8, and 10 are within one-dimensional quadrant. This means that self-evaluation possibilities, blended learning and available access to the system at any time are also of considerable importance to the users, here students of the International university of Travnik. The requirements SR1, 4, and 9 are in attractive quadrant. This means that developing technical stability (reliability) of the system, greater presence of audio/video instructional materials, as well as, presence of e-tutor(s) will increase competitiveness of the considered HE institution. The requirements SR2, 5, and 7 are in indifferent quadrant. It is to be noted that SR2 (user-friendly interface) should be translated to the attractive dimension, rather that to be in indifferent one. In addition to this plots analysis of Kano model, in the next sub-section will be given some statistical analysis of the students' requirements.

5.4 Some statistical analysis

In further analysis over the data set consisting of (X_j, Y_j) pairs, where X_j and Y_j are calculated by expressions (3) and (4) for $j = \overline{1,10}$, following statistical values have been calculated: mean value, standard deviation or variance, covariance, and correlation coefficient (Bertsekas and Tsitsiklis, 2008; Weltner et al., 2009). The numerical values of these statistical measures are given in Table 5. Here used notation is simplified and the analyzed data sets (pairs) are shown as X, Y and (X,Y).

Table 5: Values of some statistical indicators

Statistical measures	Values
Mean (X)	1.822
Mean (Y)	2.113
Var (X)	0.359
Var (Y)	0.307
Cov (X,Y)	0.077
Correl (X,Y)	0.777

Source: adapted from Bauk et al., 2014, p. 9.

Upon the calculated values of the statistical measures (see Table 5) the following can be observed:

- If we consider the mean value for the parent population, then it is the hypothetical "true" value of the variable. This means that Mean (X) and Mean (Y) might be treated as a pair which represents "true" value of general answer to all ten considered questions (or students' requirements) covered by the questionnaire. Consequently, the general answer is equivalent to *attractive* category of Kano model;
- Variations Var (X) and Var (Y), as well as covariance Cov (X,Y) are used as pre-calculus for determining correlation coefficient Correl (X,Y). In fact, the higher the absolute value of the correlation coefficient, the stronger the correlation.
- Relatively high value of correlation coefficient $[\mathrm{Correl}(X,Y)] = 0.777$, or the coefficient of determination $[\mathrm{Correl}(X,Y)]^2 = 0.608$ means that there is a strong correlation between X and Y variables. This is understandable if we concern the linguistic descriptors and corresponding numerical values for pairs of opposite (functional and dysfunctional) categories of Kano model. What makes this correlation stronger is that neutral (indifferent), questionable, and reversal responds have been excluded from the graphical analysis. In another words,

$[\mathrm{Correl}(X, Y)]^2 = 0.608$ means that more than 60% of the total variation in X can be explained by variations in Y. Or, another explanation might be that the ellipse representing correlation in this case should enclose more than 60% of the N considered points, i.e. (X_j, Y_j), $j = \overline{1,10}$ pairs on which it is based (Tailor, 1990).

Above given short analysis over the numerical values of some relevant statistical measures provides a certain refinement of the observations made upon graphical interpretation of Kano model based on plotting pairs of the students' quantified answers on both functional and dysfunctional aspects of the questions. These refinements will be better, i.e. more reliable, by introducing greater number of respondents and/or by having a greater number of questions forming the questionnaire, or more generally speaking, by uprising the parent population in statistical terms (Bauk et al., 2014), what should be a subject of further more extensive research work in this domain.

6. CONCLUSIONS

Application of modern information and communication technology (ICT) tools has changed the traditional type of classroom-based education to "user-defined informal spaces", which is based on student preferences (Farhan, 2014). This new methodology strives to develop an innovative, flexible and open system of education (Kondapalli, 2014). Learners became active participants and co-producers of knowledge. Or in other words, "learners' choice is the order of the day". Kondapalli (2014) claims that the process of globalization is bringing in many new dimensions, one of which is the maintenance of high standards in educational materials and service, which are expected to be comparable and competitive at national and international levels. In such constellation of facts, the academic leaders must be "agents of change".

This study aims to identify critical elements of e-learning system within blended environment by using Kano (dys)functional model (Walden, 1993) and DeLone and McLean (2003) generic model for the information systems success, providing though the recommendations for creating better new teaching/learning system.

The population sampled was composed of students at International university of Travnik. In total, 70 valid questionnaires were collected. Firstly, frequencies of each Kano model categories appearances have been measured and some approximations have been done in order to make the responds more meaningful. Also some analysis based on determination of *better* and *worse* indexes have been made with and aim to reduce the fuzziness in observations. Additionally, some two-dimensional graphical analyses in Kano 2D plane have been realized.

It is to be noted that there is a scattering among the obtained results, and that this is to be reduced throughout: repeating the questionnaire among another, considerably larger target group(s) of students, modifying the questions, and/or including some additional questions into the model.

In any case, it is to be recommended to the designers of e-learning systems in blended environment - using the combination of methods employed in this research work along with some other available analytical and/or stochastic methods for assessing degree of customers' satisfaction and their expectations of such learning systems. A holistic approach based on students' satisfaction level and the appropriate measurement analysis should give support to the designers in improving existing and designing new more attractive web based learning models in the contemporary educational blended schemes.

And finally, speaking more generally, as a powerful communications and commerce medium, the Internet is a phenomenon that lends itself to a measurement framework (e.g. Kano and D&M models). Within the e-commerce context, the primary system users are customers or suppliers rather than internal users. Customers (students/learners) and suppliers (teachers/instructors) use the e-system for learning, but as well for buying or selling learning courses and kind of execute business transactions. These will undoubtedly impact in greater extend the

whole process of learning including individual learners, universities, industries, and even national economies in the future. It can be argued that using ICT has become "must" for HE institutions (Farhan, 2014). The need to reach potential students, regardless of their geographic location, and the need to cut operational costs have made the use of technology a strategic option in providing the viability and sustainability of academic institutions.

LITERATURE

Armstrong, L. (2000), „A New Game in Town: Competitive Higher Education",
http://www.usc.edu/dept/chepa/papers_papers.html (downloads 11.04.2014)

Bauk S., Scepanovic S., and Kopp M. (2014), „Estimating Students' Satisfaction with Web Based Learning System in Blended Environment", *Education Research International*, Volume 2014, Article ID 731720, April 2014, pages 11,
http://www.hindawi.com/journals/edri/2014/731720/ (downloads 29.04.2014)

Bayus, B. L., Jain, S., and Rao, A. G. (1997), „Too Little, Too Early: Introduction Timing and New Product Performance in the Personal Digital Assistant Industry", *Journal of Marketing Research*, 34, 50-63.

Bertsekas, D., and Tsitsiklis, J. (2008), Introduction to Probability, 2nd Edition. Athena: Scientific, Nashua, USA.

Bloom, D., Canning, D. and Chan, K. (2006), Higher Education and Economic Development in Africa, Harvard University.

Clayton Christensen Institute for Disruptive Innovation, (2012-2013), „Blended Learning Model Definitions", http://www.christenseninstitute.org/blended-learning-model-definitions (downloads 21.10.2013)

DeLone, W.H., and Mclean, E.R. (2003), „The DeLone and McLean Model of Information Systems Success: A Ten-Year Update", *Journal of Management Information Systems*, 19(4), 9-30.

Dominici, G., and Palumbo, F. (2013), „How to build an e-learning product: Factors for student/customer satisfaction", *Business Horizons*, Kelley School of Business, Indiana University, 56, 87-96.

Farhan, B.Y. (2014), „Information and Communication Technology in Higher Education and its Effects on the Competitiveness of Academic Institutions",
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2396661 (downloads 05.07.2014.)

Garrison, R.D., and Kanuka, H. (2004), „Blended learning: Uncovering its transformative potential in higher education", *The Internet and Higher Education*, 7, 95-105.

Green, A., Mostafa, T. and Preston, J. (2010), The Chimera of Competitiveness: Varieties of Capitalism and the Economic Crisis. Centre for Learning and Life Chances in Knowledge Economies and Societies, http://www.llakes.org.uk (downloads 22.04.2014)

Herrmann, K. (2008), „Higher Education, Business and Future Competitiveness", CIHE, London
http://aces.shu.ac.uk/employability/resources/CIHE%20-%200812KHCompostela-WACE.pdf (downloads 23.04.2014)

Hirsch, F. (1976), *Social Limits to Growth*, Harvard University Press, Cambridge.

Kano, N. (1984), „Attractive quality and must be quality", *Hinshitsu (Quality)*, 14(2), 147-156.

Kondapalli, P. R. (2014), „Role of open and distance institutions in scaling up quality education for all", www.col.org/pcf6/fp/zIN1221.doc (downloads 05.07.2014.)

Marginson, S. (2006), „Dynamics of national and global competition in higher education", *Higher Education*, No. 52, 1-39

Maringe, F. and Gibbs, P. (2009), *Marketing Higher Efucation*, *Theory and Practice*, McGraw Hill, London.

Matzler, K., and Hinterhuter, H.H. (1998), „How to make product development project more successful by integrating Kano's model of customer satisfaction into quality function deployment", *Technovation*, 18(1), 25-38.

OECD (2010), *Education at a glance*, OECD Publishing.

Owston, R., York, D., and Murtha, S. (2013), „Student perceptions and achievement in a university blended learning strategic initiative", *The International and Higher Education*, 18, 38-46.

Schvaneveldt, S. J., Enkawa, T., and Miyakawa, M. (1991), „Consumer evaluation perspectives of service quality: evaluation factors and two-way model of quality", *Total Qualaity Management*, 2(2), 149-161.

Tailor, R. (1990), „Interpretation of Correlation Coefficient: A Basic Review", *Journal of Diagnostical Medical Sonography*, 6(1), 35-39.

Tamándl, L. and Nagy, D. (2013), „Competitiveness Factors of Higher Education Institutions, with Particular Respect to Hungarian Cities", in *Proceedings REAL CORP 2013 Tagungsband*, 20-23 May, Rome, Italy, 1125-1129.

Walden, D. (1993), „A Special Issue On: Kano's Methods for Understanding Customer Defined Quality", *Center for Quality of Management Journal*, 2(4), 1-37.

Weltner, K. et al. (2009), Mathematics for Physicists and Engineers (Fundamentals and Interactive Study Guide). Berlin: Springer.

World Economic Forum (2006), *2006-7 Global Competitiveness Report*, 26th September.

Appendix 1

In Table 6 below is given an example of processing the students' responds on the first question in the questionnaire concerning technical stability (reliability) of the considered e-learning system (SR1, i.e. students' requirement no. 1) at International university of Travnik within blended environment. Both functional and dysfunctional dimensions of Kano model are taken into the consideration.

Table 6: An example of processing students' requirements when e-learning system in blended model is in matter, in accordance to Kano two-dimensional model

SR1: Technical stability (reliability) of the system											
No.	Functional					Dysfunctional					SR
	4	2	0	-1	-2	4	2	0	-1	-2	
1.		1.00				1.00					M
2.		1.00						1.00			I
3.		1.00							1.00		I
4.			1.00			1.00					M
5.					1.00	1.00					Q
6.	1.00									1.00	Q
7.		1.00				1.00					M
8.	1.00							1.00			A
9.				1.00				1.00			I
10.				1.00				1.00			I
11.	1.00									1.00	Q
12.				1.00					1.00		I
13.		1.00				1.00					M
14.	1.00					1.00					O
15.		1.00						1.00			I
16.		1.00				1.00					M
17.				1.00				1.00			I
18.	1.00					1.00					O
19.	1.00					1.00					O
20.		1.00				1.00					M
21.			1.00			1.00					M
22.	1.00					1.00					O
23.				1.00					1.00		I
24.			1.00					1.00			I
25.	1.00								1.00		A
26.	1.00					1.00					O
27.	1.00					1.00					O
28.		1.00				1.00					M
29.		1.00				1.00					M

30.			1.00					1.00			I
31.		1.00				1.00					M
32.	1.00					1.00					O
33.			1.00					1.00			I
34.	1.00							1.00			A
35.		1.00					1.00				I
36.		1.00				1.00					M
37.				1.00			1.00				Q
38.		1.00						1.00			I
39.		1.00						1.00			I
40.	1.00						1.00				A
41.		1.00				1.00					M
42.				1.00				1.00			I
43.				1.00		1.00					M
44.				1.00				1.00			I
45.					1.00		1.00				R
46.	1.00					1.00					O
47.		1.00				1.00					M
48.				1.00				1.00			I
49.				1.00		1.00					M
50.				1.00			1.00				Q
51.		1.00						1.00			I
52.		1.00					1.00				I
53.				1.00						1.00	I
54.					1.00	1.00					R
55.		1.00					1.00				I
56.				1.00				1.00			I
57.		1.00				1.00					M
58.	1.00							1.00			A
59.		1.00				1.00					M
60.				1.00		1.00					M
61.				1.00		1.00					M
62.				1.00						1.00	R
63.		1.00				1.00					M
64.		1.00						1.00			I
65.					1.00	1.00					Q
66.					1.00			1.00			R
67.	1.00					1.00					O
68.					1.00	1.00					Q
69.	1.00					1.00					O
70.	1.00							1.00			A

Source: authors' creation

Legend:

(a) Dimensions:

- Functional: -2 (dislike), -1 (live with), 0 (neutral), 2 (must-be), 4 (like)
- Dysfunctional: -2 (like), -1 (must-be), 0 (neutral), 2 (live with), 4 (dislike)

(b) Kano model attributes:

- M: Must-be
- O: One-dimensional
- A: Attractive
- I: Indifferent
- Q: Questionable
- R: Reverse

Notes: In an analogous manner are processed SR2-10 questions within conducted survey among the students at the International university of Travnik (Bosnia and Herzegovina). The survey is realized in June 2014.

Appendix 2

Within this appendix is given the questionnaire (created by authors, due to the basic principles of Kano model) which has been recently delivered among 70 students at International university of Travnik (Bosnia and Herzegovina), and upon which the above presented analysis have been realized (Table 7).

Table 7: The questionnaire by which Kano analysis are realized

1.a) System of e-learning <u>is</u> stabile in technical terms.	1. I like it. (4)	2.a) System of e-learning <u>is</u> "user friendly".	1. I like it. (4)
	2. It must be that way. (2)		2. It must be that way. (2)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (-1)		4. I can live with it. (-1)
	5. I do not like it. (-2)		5. I do not like it. (-2)
1.b) System of e-learning <u>is not</u> stabile in technical terms.	1. I like it. (-2)	2.b) System of e-learning <u>is not</u> "user friendly".	1. I like it. (-2)
	2. It must be that way. (-1)		2. It must be that way. (-1)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (2)		4. I can live with it. (2)
	5. I do not like it. (4)		5. I do not like it. (4)
How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:		How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:	
1 2 3 4 5 6 7 8 9		1 2 3 4 5 6 7 8 9	
3.a) On-line available educational materials <u>are</u> of satisfactory quality in content and scope?	1. I like it. (4)	4.a) In addition to text and graphic files, the system <u>has</u> enough audio and video material.	1. I like it. (4)
	2. It must be that way. (2)		2. It must be that way. (2)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (-1)		4. I can live with it. (-1)
	5. I do not like it. (-2)		5. I do not like it. (-2)
3.b) On-line available educational materials <u>are not</u> of satisfactory quality in content and scope?	1. I like it. (-2)	4.b) In addition to text and graphic files, the system <u>has not</u> enough audio and video material.	1. I like it. (-2)
	2. It must be that way. (-1)		2. It must be that way. (-1)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (2)		4. I can live with it. (2)
	5. I do not like it. (4)		5. I do not like it. (4)
How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:		How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:	
1 2 3 4 5 6 7 8 9		1 2 3 4 5 6 7 8 9	
5.a) Collaborative activities are com-	1. I like it. (4)	6. a) There <u>are</u> ample opportunities for self-	1. I like it. (4)
	2. It must be that way. (2)		2. It must be that way. (2)

mon (forums, wiki, chat, etc).	3. I am neutral. (0)	checking of gained knowledge (on-line tests, educational games, etc).	3. I am neutral. (0)
	4. I can live with it. (-1)		4. I can live with it. (-1)
	5. I do not like it. (-2)		5. I do not like it. (-2)
5.b) Collaborative activities <u>are not</u> common (forums, wiki, chat, etc).	1. I like it. (-2)	6. b) There <u>are not</u> ample opportunities for self-checking of gained knowledge (on-line tests, educational games, etc).	1. I like it. (-2)
	2. It must be that way. (-1)		2. It must be that way. (-1)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (2)		4. I can live with it. (2)
	5. I do not like it. (4)		5. I do not like it. (4)
How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:		How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:	
1 2 3 4 5 6 7 8 9		1 2 3 4 5 6 7 8 9	
7.a) E-learning system <u>includes</u> mandatory online homeworks / tests / essays.	1. I like it. (4)	8.a) E-learning <u>is</u> combined with classroom based courses.	1. I like it. (4)
	2. It must be that way. (2)		2. It must be that way. (2)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (-1)		4. I can live with it. (-1)
	5. I do not like it. (-2)		5. I do not like it. (-2)
7.b) E-learning system <u>does not include</u> mandatory online homeworks / tests / essays.	1. I like it. (-2)	8.b) E-learning <u>is not</u> combined with classroom based courses.	1. I like it. (-2)
	2. It must be that way. (-1)		2. It must be that way. (-1)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (2)		4. I can live with it. (2)
	5. I do not like it. (4)		5. I do not like it. (4)
How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:		How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:	
1 2 3 4 5 6 7 8 9		1 2 3 4 5 6 7 8 9	
9.a) There <u>is</u> an e-tutor.	1. I like it. (4)	10.a) System of e-learning <u>can</u> be accessed at any time.	1. I like it. (4)
	2. It must be that way. (2)		2. It must be that way. (2)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (-1)		4. I can live with it. (-1)
	5. I do not like it. (-2)		5. I do not like it. (-2)
9.b) There <u>is not</u> an e-tutor.	1. I like it. (-2)	10.b) System of e-learning <u>can not</u> be accessed at any time.	1. I like it. (-2)
	2. It must be that way. (-1)		2. It must be that way. (-1)
	3. I am neutral. (0)		3. I am neutral. (0)
	4. I can live with it. (2)		4. I can live with it. (2)
	5. I do not like it. (4)		5. I do not like it. (4)
How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:		How much is this issue important to you? (1-almost irrelevant ... 9-extremely important) - Circle one number on the bottom scale:	
1 2 3 4 5 6 7 8 9		1 2 3 4 5 6 7 8 9	

Source: authors' creation

Task for the students who were interviewed: Circle only <u>one statement</u> for **X.a)** and **X.b)** ($X = \overline{1,10}$), which are closest to your attitude towards certain assumption related to an e-learning system in blended model. The survey is realized in June 2014, among the students of International university of Travnik, as it is noted previously.