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QUALITY ENHANCEMENT THROUGH DETERMINING THE GAP BETWEEN THE EXPECTATIONS AND PERCEPTIONS OF STUDENTS: eMPIRICA COLLEGE CASE STUDY

UNAPREĐENJE KVALITETA KROZ UTVRĐIVANJE JAZA IZMEĐU OČEKIVANJA I PERCEPCIJA STUDENATA NA PRIMJERU VISOKE ŠKOLE EMPIRICA

Summary: *Increased competition present in the higher education in BiH has conditioned the trend that institutions need to "fight" for each student through quality development at higher education institutions. This paper deals with means of enhancing quality at eMPIRICA College through continual investigation of students' satisfaction.*

For the purpose of this research, we used a questionnaire with 26 statements on quality at the higher education institution, which were grouped in four quality dimensions using factor analysis. In addition, satisfaction and loyalty of students were measured where we compared students' expectations and perceptions at the beginning and end of the academic year. Thus, a gap in the quality of education services at eMPIRICA was noted, as well as the gap in regards to satisfaction and loyalty.

Using MANOVA it has been ascertained that there is a significant statistical difference between expected and perceived quality on the part of the students throughout all quality dimensions as well as in terms of students' loyalty, and there is no significant statistical difference in satisfaction of students. Using ANOVA it has been deduced that with specific statements there are significant statistical differences in satisfaction and loyalty of students, while using t-test we observed a difference between arithmetic means of expected and perceived quality in all quality statements.

Keywords: *higher education, quality measure, factor analysis, MANOVA, t-test.*

JEL classification: *I21*

Rezime: *Povećana konkurencija koja vlada u visokom obrazovanju u Bosni i Hercegovini uslovila je borbu za svakog studenta kroz razvoj kvaliteta na visokoobrazovnim institucijama. Ovaj rad obrađuje način unapređenja kvaliteta na Visokoj školi eMPIRICA kroz kontinuirano ispitivanja zadovoljstva studenata.*

Za potrebe ovoga istraživanje korišten je anketni upitnik sa 26 tvrdnji o kvalitetu na visokoškolskoj ustanovi koje su faktorskom analizom grupisane u 4 dimenzije kvaliteta. Pored ovih tvrdnji mjereno je zadovoljstvo i lojalnosti kod studenata gdje su upoređivalo očekivanje sa percepcijama studenata na početku i na kraju akademske godine. Na ovaj način je utvrđen jaz u kvalitetu usluga obrazovanja na Visokoj školi eMPIRICA kao i jaz u pogledu zadovoljstva i lojalnosti.

Pomoću MANOVE je utvrđeno da postoji značajna statistička razlika između očekivanog i percepiranog kvaliteta od strane studenata kroz sve dimenzije kvaliteta kao i u pogledu lojalnosti studenata dok ne postoji značajna statistička analiza kod zadovoljstva studenata. ANOVOM je utvrđeno kod kojih pojedinih tvrdnji postoje značajne statističke razlike u okviru zadovoljstva i lojalnosti studenata, dok je t-testom utvrđena razlika između aritmetičkih sredina očekivanog i percipiranog kvaliteta kod svih tvrdnji kvaliteta.

Ključne riječi: *visoko obrazovanje, mjerenje kvaliteta, faktorska analiza, MANOVA, t-test.*

JEL klasifikacija: *I21*

1. INTRODUCTION

Traffic in higher education institutions has forced higher education institutions to react to changes and turn their attention to the quality enhancement of the overall process. The pressure of competition on higher education institutions is increasing constantly. With respect to that, Senthikumar and Arularaj (2011) claim that overall higher education quality lags behind the level of excellence in relation to the primary and secondary sectors.

Higher education institutions as leaders of society development need to offer users a specific quality in their work. Specificity of higher education, that is, education in general is that via its system knowledge, in the form of services, is transferred onto the user. In the higher education knowledge is transferred onto students who are the primary users of the educational system. Students acquire new knowledge and competencies in the higher education which they transfer onto all activities of the economy.

Students are the best instruments to measure the quality of higher education since they are the primary users of the educational system. In order to enhance quality system at a higher education institution, it is essential to investigate the satisfaction of the students with that institution. Comparing satisfaction of students in two time periods can give us an insight into what has improved/worsened in the system. The investigation is conducted by determining the gap between the expectations and perceptions of students.

The topic of the paper is to investigate methods of enhancing quality system at eMPIRICA College through determining the gap in the quality system. Determining in which statement there is a gap helps in providing guidelines for enhancing the overall quality level.

The main aim of this paper is enhancement of quality system via determining the gap between the expectations and perceptions of the students. Supporting aims of this paper are to:

- Group the statements on measuring quality into quality dimensions,
- Determine if there is statistically relevant discrepancy between expectations and perceptions in quality, and satisfaction and loyalty of the students,
- Investigate in which quality statements there is a gap between expectations and perceptions.
- Provide guidelines using the results of the research to enhance quality at eMPIRICA College.

Prior to investigating the gap, it is necessary to comment on the condition of higher education in Bosnia and Herzegovina and provide the overview of the previous research.

1.1. Condition of Higher Education in Bosnia and Herzegovina

Higher education in Bosnia and Herzegovina, as in Europe, is facing numerous challenges such as: the need for quality assurance and harmony between teaching and learning, and the wider social needs and market demands, adjustment to globalisation and increasing number of students and higher education institutions in the whole world, increase in spread of offering higher education using new technologies such as massive open online courses or blended learning (Nanić 2014, 923).

Quality system in education needs to be the basis of development of every country. Through implementation of Bologna Declaration in BiH educational system the quality keeps developing. In order to receive its license, the higher education institution needs to actively apply the quality system as it is the only way to receive all necessary licenses and accreditations (Puška et al. 2015, 16). According to the official records taken from the website of Centre for Information and Recognition of Qualifications in Higher Education in Bosnia and Herzegovina there are 10 public and 38 private higher education institutions which have a license. Out of these, 18 HEIs have received an institutional accreditation and 12 more are in the process of getting accredited, which puts the quality culture at a higher level in BiH.

At BiH universities there is still a wide spectrum of application and establishment of quality management system (Musa, Rotim 2015, 119). However, the tendency of all HEIs is that the quality is starting to be in the foreground.

2. CONCEPTUAL FRAMEWORK OF THE RESEARCH

2.1. Higher education quality

The main characteristic of the new education quality should be the transition from reproductive to productive education, from static to dynamic, from unchangeable to operative. An important characteristic of the new, modern education should be the quality and its developing function (Grandić, Stipić 2011, 413). Quality in HEIs is equivocal and encompasses teaching delivery (a high-quality curriculum adjusted to the market), high-quality work conditions (well-equipped schools), competent teaching staff (qualified to offer knowledge to students), competent HEI employees (Students' office clerks, expert associates, etc.), etc. (Puška et al. 2015a, 16). The system of quality assurance guarantees that the subject of higher education pays attention to the purpose of its existence, to the processes that contribute to creation of experts and to people who plan and conduct education processes and scientific research work (Mencer 2005, 241).

With the help of professional and scientific personnel higher education institutions strive to achieve the teaching, scientific and professional quality at a high level in accordance with the process of European integration of higher education envisaged by Bologna Declaration and ensure through the quality of offered services both trust and satisfaction of the students, economy and overall society (Puška et al. 2015b, 104). The main tendencies in the field of assuring and enhancing quality of higher education are conveyed through (Lazić 2007, 1):

- Ascertaining unique criteria of assuring and guaranteeing the quality of education within the frame of Bologna process,
- Developing, determining and balancing national systems of accrediting HEIs and study programs and
- Elaborating on and introducing the quality management system based on different QMS models.

Establishment of quality system in European countries is conditioned by Bologna Declaration on development of higher education. "A wide spectrum of evaluation and accreditation programs of individual countries in the EU and the world considerably hinders the establishment of unique quality standards in higher education, comparison of accredited programs, curricula or institutions as well as mobility of students and staff" (Petković, Jašarević 2005, 288). It is precisely curricula, teaching staff and students that are key parameters of development and enhancement of quality in higher education.

Guolla (1999) deems that positive perceptions of quality can lead to students' satisfaction and an increase in the number of students at the institution. Each HEI strives to achieve competitive advantage and attract new students and keep the existing ones by enhancing the quality system (Temizer and Turkyilmaz 2012, 3802).

In addition to the need for implementation of the quality system in order to get the license, that is, accreditation, HEIs need to place the student into the centre of their attention. Quality system is not merely introduced so as to meet the legislation. Quality should serve the purpose of creating satisfaction on the part of students who will be loyal as well.

2.2. Instruments for measuring quality in higher education

Measuring the quality of higher education is confronted with complexity of the service due to its intangibility, on one hand, and presence of different interested parties with different quality demands, on the other (Klarić, Kulašin 2011, 821). Different research applied different instruments to measure quality in higher education. Many researchers have readjusted SERVQUAL model for measuring quality for the purpose of investigating students' satisfaction with the quality. Original SERVQUAL, created by Parasuraman et al (1988) saw its 10 dimensions reduced to 5, those being: tangibles, reliability, responsiveness, assurance and empathy.

It is precisely by readjusting SERVQUAL model that Owlia and Aspinwall (1996) suggested six dimensions to measure quality in higher education, those being: tangibles (appropriate equipment and facilities), competence (vocational classes, practical and theoretical knowledge), attitude (understanding needs of students, friendliness, personal care, etc.), content (practical application of curriculum, knowledge flexibility, etc.), delivery (effective presentations, feedback from students,

etc.), reliability (trust, solving complaints and problems etc.). As it was mentioned above, HEI services are specific as they are used to transfer knowledge to students and for that reason it is not possible to apply the classical instrument for measuring service quality. Furthermore, Ho and Wearn (1996) incorporated SERVQUAL into HETQMEX model which is excellence model for higher education, while Klarić and Kulašin (2011) have developed SERVQUAL into HEDUQUAL model for measuring higher education quality.

In addition to SERQUAL model for measuring higher education quality the following models are also used:

- SERVPERF measures service quality based on the perceived service factors. It is in essence SERVQUAL model that differs in that it measures students' perceptions, not expectations.
- HEdPERF was developed by Firdaus (2006) and it serves as a measuring instrument of service quality exclusively for higher education which consists of the following dimensions: non-academic aspects, academic aspects, reputation, approach and understanding. It is precisely SERVPREF and HEdPREF that represent the best instruments for measuring higher education quality, but it is not possible to determine which one is better (Camgoz-Akdag, Zaim 2012, 875).
- EduQUAL is specifically suggested for education sector. It is used for measuring satisfaction level of different participants (Mahapatra, Khan 2007, 289). This measuring instrument consists of the following dimensions: learning outcomes, responsibility, physical facilities, personality development and academic aspects.
- EDUSERVE was developed based on SERVQUAL measuring instrument which served for measuring the expectations and perceptions of quality in Mauritius high schools (Ramseook-Munhurrun et al. 2010). It consists of the following dimensions: empathy, school facilities, reliability, responsiveness and assurance of students' discipline.

2.3. Satisfaction and loyalty of students

Satisfaction is defined as a rate of the total service and service experience in the preceding period (Lin et al. 2010). Loyalty is a term connected to dedication of clients to a specific brand, shop or supplier based on the positive attitude and is reflected in the repeated purchase (Ningsih and Segoro, 2014, 1017). When applied to higher education system satisfaction is experience with higher education service while loyalty is students' dedication to higher education institution they attend as well as their desire to continue their education there. The most important indicator in HEI quality research is precisely loyalty and satisfaction of students. A loyal and satisfied student helps in development of that higher education institution. Keeping the levels of loyalty and satisfaction of students is impossible without the implementation of quality system at that HEI (Puška et al., 2015, 17). Connection of these two concepts with quality was dealt with in numerous studies. Puška et al. (2015a and 2015b) in their two studies connected quality perception with satisfaction and loyalty of students using multiple regression and canonical-correlation analysis and proved that a satisfied student is a loyal student. Negricea et al. (2014) investigated the connection of quality perception with satisfaction of students. Dib and Alnazer (2013) investigated how quality system is connected to satisfaction and loyalty of students. Dado et al. (2012) connected quality system with students' behaviour. Temizer i Turkyilmaz (2012) investigated how quality perception affects students' satisfaction index and its connection to loyalty.

Investigating loyalty and satisfaction is very important for each HEI. "Students transfer their satisfaction with work and quality of a HEI to others, and in that manner s/he represents that institution in the best possible way. On the other hand, a dissatisfied student will not represent the institution in the best way and in that manner the reputation and image of the institution suffers, which can result in a fewer number of enrolled students and migration of students to another institution (Puška et al. 2015b, 103)."

If the university meets the expectations, the student will be satisfied and will be the best promoter of the university. The aim of education service flow is the satisfaction of the student, which leads to loyalty and projects itself to the continuation of the studies (Masters, doctoral studies, etc.) or initiates positive references to potential students and partners (general public) (Gajić 2011, 73). Due to everything abovementioned it is very important for each HEI to monitor its quality system as well as the satisfaction and loyalty of its students.

2.4. Hypotheses of research

Higher education institution influences students through the established quality system. Yahnong Li and Kaye (1999) conducted a research on the sample of 228 students and proved that students' expectations are relatively stable in a period of time, while their perception of service quality changes during their studies and the perceived level of quality decreases as the studies progress. This research showed that all students have high expectations from HEIs, but the perceived quality decreases. For that reason it is necessary to enhance the quality system in HEIs so as the expected and perceived quality levels are approximately the same so that the students are satisfied with the HEI. Based on this and similar research the first hypothesis is formulated as follows:

- There is a significant statistical difference between quality dimensions based on expected and perceived quality level with students.

Satisfaction is the key factor of business success and implementation of quality system (Lin, Tsin 2008). Due to that, it is very important to investigate satisfaction of students and determine if it changes over a period of time and if students' satisfaction increases or decreases during their studies. If students' satisfaction decreases during their studies, they will not be interested in continuing the following cycles at that HEI, and it is debatable if they will complete the current cycle at that HEI. Based on the abovementioned the second hypothesis is formulated as follows:

- There is a significant statistical difference in students' satisfaction at the start and end of the academic year.

Since the quality system is connected to satisfaction and satisfaction in turn is connected to loyalty of students it is necessary to investigate if and how the loyalty of students changes. The mentioned studies have shown that these three research variables are mutually related. Loyal students continue other cycles at that HEI and recommend it to others (Temizer, Turkyilmaz, 2012). Based on that, it is necessary to investigate if and how the loyalty of students changes so as to enhance the quality at the HEI. For that purpose, the third hypothesis is formulated as follows:

- There is a significant statistical difference in students' loyalty at the start and end of the academic year.

To prove the proposed hypotheses the research will use multivariate analysis of variance (MANOVA). Based on that, the following variables are proposed: independent variable – conducted research in two time periods and dependent variables – quality dimension, satisfaction and loyalty of students.

3. RESEARCH METHODOLOGY

For the purpose of this paper empirical research was conducted at eMPIRICA College on two occasions. The first research and collection of primary data was conducted at the start of academic year 2014/2015, while the second research was conducted at the end of the same academic year. The research was conducted on two occasions so as to determine the gap between expected level of quality, satisfaction and loyalty (the research at the start of the academic year) and perceived level of quality, satisfaction and loyalty (the research conducted at the end of the academic year). The point of this research is to monitor and enhance quality at the HEI.
Both pieces of research used the same questionnaire taken from our co-founder *Ljubljana School of Business* which consisted of 4 parts:

- 26 statements related to quality which encompassed different segments of a higher education institution: teaching and administrative staff, availability of information, facilities and equipment as well as reaction of the institution to the needs and desires of students. Due to variety of statements factor analysis will be used to determine quality dimensions.
- 5 statements to measure students' satisfaction
- 5 statements to measure students' loyalty
- Participants' characteristics (gender, year of study, study program, mode of studying).

First three groups of questionnaire used five-level Likert scale, where students were required to provide their level of concurrence with the proposed statements (1 – strongly disagree, 5 – strongly agree). The fourth group of questions is related to the characteristics of the students: their gender, year of study, program study and mode of study. In both cases a web –based questionnaire was used which was uploaded to the scientific portal - *1ka.si* and the students received the link to the questionnaire. In the first research, the questionnaire was filled out by 85 students, which is 75 percent of the total number as there are 112 students in all three years of study. Due to the low total number the research used purposive sampling, that is, the link was sent to all students via a personal message through e-learning platform – *eCampus.*

Overall statistical data analysis was carried out in software packages SPSS 20.0. which used several statistical methods. The reliability of the acquired data was measured using statistical analysis called *Crombach' alpha*. Factor analysis investigated reliability of data based on *Kaiser-Meyer-Olkin* (KMO) test and Bartlett's test.

Apart from the need to investigate the proposed hypotheses it is necessary to determine what statements within quality dimensions show the gap between the expected and perceived quality level and to what extent, so as to provide guidelines for enhancement of quality at eMPIRICA College. This approach will also determine the gap between satisfaction and loyalty of students so as to enhance loyalty and satisfaction of students at eMPIRICA College. In the course of proving this hypothesis and aims the following methodology will be used:

- Step 1: Grouping statements into quality dimensions using factor analysis,
- Step 2: Investigating reliability of the collected data using *Crombach alpha*,
- Step 3: Investigating the proposed research hypotheses using MANOVA and
- Step 4: Investigating the gap between the expected and perceived quality using t-test.

4. RESULTS OF THE RESEARCH

The questionnaire was filled out by 84 students the first time and second time it was filled out by 85 students and the following table shows the general characteristics of the subjects.

Table 1 *General characteristics of the subjects*

Factor	Category	Percentage in the 1st research (%)	Percentage in the 2nd research (%)
Study program	Engineering Informatics	46,4 %	50,6 %
	Business Informatics	53,6 %	49,4 %
Mode of studies	Full-time studies	26,2 %	27,1%
	Distance-learning studies	73,8 %	72,9 %
Gender	Male	89,3 %	84,7 %
	Female	10,7 %	15,3 %
Year of study	First	23,8 %	28.2 %
	Second	37,0 %	38.8 %
	Third	39,2 %	32.9 %
Total number of students		**84**	**85**

Source: Research results

Since the questionnaire was anonymous it was not possible to compare the answers of the specific students and determine the discrepancy between them. However, since the general answers will be observed in two pieces of research and it will not be dealt with subtle differences in the observed categories of the subjects, these characteristics are considered acceptable for the further investigation.

To examine the reliability of the factor analysis results, we used Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett test of sphericity. KMO indicator ranges from 0 to 1.If the value of that measure is below 0.6 the correlation matrix will not be appropriate for the factor analysis. With Bartlett's test it is desirable that the significance value is below 0.05 ($p < 0.05$).

In the course of running factor analysis the analysis of main components was used, as well as varimax factor rotation with Kaiser normalization. In the choice of number of factors we used unit root method, that is, Kaiser criterion.

Before the factor analysis results are interpreted it is necessary to determine values of Bartlett's test and values of KMO test. Measure of sampling adequacy is represented through KMO test and using Bartlett's test of sphericity it is aimed to determine the meaning of correlations within correlation matrix. Results obtained through factor analysis show that the data are adequate for factor analysis since value of KMO test is 0.939, which is almost 1. Specificity test is of significant importance since it implies that the correlation matrix is not unit, which the test has proven.

Table 2 *Results of factor analysis on quality dimensions*

Factor	Quality-related statements	Factor value	Satement code
1	Employees in the school pay attention to the specific needs and wishes of the students	.761	VAR00021
	Students' complaints are solved quickly	.740	VAR00023
	Reaction to students' needs is the main task of all employees	.739	VAR00022
	Employees help students in solving problems encountered in the course of the studies	.715	VAR00025
	Employees always think about students' interests	.692	VAR00026
	The school keeps promises it has made to the students	.689	VAR00024
	Employees provide support to the students	.687	VAR00020
	The school looks after students' wellbeing	.647	VAR00018
	Overall, the education quality at the College is excellent	.499	VAR00001
Explained variance 52%, *Crombach's alpha* 0.937			
2	Administrative staff at the College is pleasant	.734	VAR00006
	College employees are always at students' disposal	.733	VAR00007
	Employees are always willing to help students	.712	VAR00008
	Information that students require for studies are easily accessible	.607	VAR00002
	Employees' behavior increases trust of students	.567	VAR00009
	Information that students require for studies are always prompt	.523	VAR00003
Explained variance 4.8%, *Crombach's alpha* 0.890			
3	Lecturers use modern scientific methods in transferring knowledge	.725	VAR00013
	Lecturers connect theory and practice	.723	VAR00012
	Lecturers are available via electronic media	.645	VAR00014
	Lecturers are professional	.644	VAR00010
	Lecturers treat students in a transparent way	.629	VAR00011
Explained variance 4.1%, *Crombach's alpha* 0.874			
4	The College has solid equipment	.803	VAR00017
	College facilities are comfortable	.757	VAR00016
	The College keeps its promises	.498	VAR00004
Explained variance 5.9%, *Crombach's alpha* 0.766			
KMO = 0.939; Bartlett's test p < 0.000; Total variants explained 66.799%			

Source: Research results

Factor analysis results have shown that in accordance with 26 statements that were used to measure quality at the higher education institution 4 dimensions stand out, which are shown as factor 1-4.

Factor 1. - Students' needs and help provided. This first quality dimension describes students' needs and help provided for their wellbeing using 9 statements. The first factor explained 52% of the variance of the main group so the reliability of the collected data is very high. The value of Crombach's alpha is 0.937 as the values for Crombach's alpha range from theoretical 0 (zero) to 1. If the values of this indicator are close to zero then such data is said to be unreliable. If those values are close to one it can be said that the data is reliable.

Factor 2. – Satisfaction with the employees and information. This second quality dimension is described using 6 statements which are related to student's satisfaction with administrative staff and information they received from the College. The second dimension explained 4.8 % of the variance and it also has a high reliability of the collected data. Crombach's alpha value is 0.890.

Factor 3. – Satisfaction with the teaching staff. This third dimension was described using 5 statements which are related to satisfaction with the teaching staff at eMPIRICA College. Using this factor 4.1 % of the main group is described and there is a high reliability of the collected data. The value of Crombach's alpha is 0.874.

Factor 4. – Physical objects and promises. The fourth quality dimension consists of merely 3 statements related to satisfaction with College equipment and facilities as well as College's keeping promises. This factor explains 5.9 % of the main group variance and the value of Combach's alpha is 0.766. It does not represent a high reliability but it can be taken into consideration. It is necessary to point out that "if all values of this indicator are below and equal to 0.75 one should reconsider if that data should be taken into consideration" (Leontitsis, Pagge, 2007, 336). Since the value of Crombach's alpha is over 0.75 the data will be taken into consideration. Factor analysis could not determine where three statements belonged, those being: *Teaching staff is available after working hours, Students receive personal approach, The College reacts to needs and desires of students*. Since the values of quality dimensions are almost the same for two quality dimensions it is not possible to determine where those statements belong. Since quality dimensions have now been determined, now we will carry out factor analysis for the remaining two variables, those being satisfaction and loyalty of students.

Table 3 *Results of factor analysis on students' satisfaction*

Factor	Quality-related statement	Factor value	Statement code
1	I think I have done the right thing by selecting education at this College	.901	VAR00028
	I do not regret enrolling in this College	.893	VAR00030
	I am satisfied with my College choice	.868	VAR00027
	My experience of this College is very pleasant	.853	VAR00029
	Generally speaking, I am satisfied with this College	.806	VAR00031
Explained variance 74.9%, *Crombach's alpha* 0.915			
KMO = 0.837; Bartlett's test p < 0.000;			

Source: Research results

Results of the factor analysis have shown that all the conditions for conducting this analysis have been fulfilled, which is corroborated by KMO and Bartlett's test results. All five statements used to investigate satisfaction have been grouped in one factor and it explained 74.9 % of the main group variance. There is a high reliability present in these data as the value of Crombach's alpha is 0.915. Based on factor analysis and Crombach's analysis it has been shown that the statements used for satisfaction of students are related and reliable.

Upon conducting factor analysis on satisfaction of students, factor analysis for statements on loyalty of students will be conducted as well. Results of KMO and Bartlett's test show that the used matrix is not a unit matrix and that there is a relation between the used statements which fulfilled the propositions for the use of factor analysis.

Conducted factor analysis has shown that there is only one factor related to students' loyalty and that factor explains 75.3 % of the main group variance. Crombach's alpha test shows that the data are reliable since its value is 0.919.

Table 4 *Factor analysis results on student's loyalty*

Factor	Quality related statement	Factor value	Statement code
1	I would recommend the College I attend to others	.909	VAR00033
	If I had to choose again I would choose the same school	.890	VAR00034
	I am proud to be a student of this College	.855	VAR00032
	I only say good things about this College	.854	VAR00035
	If given an opportunity to continue my education, I would do it at this College	.841	VAR00036
Explained variance 75.3%, *Crombach's alpha* 0.919			
KMO = 0.876 ; Bartlett's test p < 0.000;			

Source: Research results

Upon investigating the reliability of the used data we move on to testing the proposed research hypotheses. Testing hypotheses will be carried out using MANOVA analysis and using Wilks' Lambda indicator. MANOVA is the extension of variance analysis which is used when there are more than one (two or more) dependent variables. "MANOVA compares groups and shows if it is probable that the mean differences in group influences that combination of dependent variables are correct and if it shows the possibilities those groups manifest." (Memet 2011, 76). Examination of the hypotheses will be carried out with 99 % reliability of accepting the correct hypothesis, that is, p-value should be below 0.01. In the course of conducting this analysis the most important things are the indicator of significance and F-test value. For the level of significance, the lower p-value, the better, while the higher F-test value, the better, since it is precisely that which proves that there is greater statistical difference between two or more observed groups. With MANOVA analysis the results from two pieces of research are taken as an independent variable – one for the start of the academic year and the other one for the end of the academic year. As dependent variable with the first hypothesis we took quality dimensions, with the second hypothesis we took students' satisfaction variable and with the third hypothesis we took students' loyalty variable.

Table 5 *MANOVA analysis results using Wilks' Lambda indicator*

Dependent variables	**Value**	**F**	**Sig.**	**Square deviation**
Quality dimensions	.898	4.632	0.001	.102
Students' satisfaction	.929	2.497	0.033	.071
Students' loyalty	.846	5.952	0.000	.154

Source: Research results

MANOVA results show that in proving the third hypothesis there is a significant statistical difference in students' loyalty-related answers. F-test result is the greatest and is 5.952. The lowest one is the significance level. P-value is 0.000, which makes the third hypothesis acceptable, with 0.0 % risk level that the true hypothesis will be rejected. Furthermore, this analysis has the lowest value of Wilks' Lambda indicator and is $\lambda = 0.846$, while the highest value of square deviation in answers is 0.154.

Furthermore, MANOVA results show that the first hypothesis is accepted, that is, that there is a significant statistical difference between quality dimensions based on expected and perceived quality level with students. With proving this hypothesis the value of F-test is 4.632 while the level of significance is 0.001, which makes this hypothesis acceptable with 0.1 risk level that the true hypothesis will be rejected. The value of Wilks' Lambda indicator with this analysis is $\lambda = 0.898$ while the value of square deviation is 0.102. However, the second hypothesis proposed cannot be accepted since there is no significant statistical difference with students' satisfaction at the start and end of the academic year, which is also supported by the level of significance. P-value is 0.033 while the value of F-test in this analysis is 2.497. In this analysis the value of Wilks' Lambda indicator is $\lambda = 0.929$ while the square deviation is 0.071. However, examination of the second hypothesis shows that there is 3.3 % probability that the true hypothesis is rejected. For the second hypothesis we cannot say that there is not a significant statistical difference between the observed pieces of research but there is one, only it is not highly significant.

By conducting MANOVA the following hypotheses are accepted:

1. H_0 –There is a significant statistical difference between quality dimensions based on expected and perceived level of quality with students.
2. H_1 – There is no significant difference with the students' satisfaction at the start and end of academic year.
3. H_0 – There is a significant statistical analysis with students' loyalty at the start and end of the academic year.

To determine with which quality dimension there is a significant statistical difference, that is, which satisfaction and loyalty-related statement has a significant difference ANOVA analysis will be applied.

Table 6 *ANOVA analysis results for quality dimensions*

Quality dimensions	F-test	Sig.	Square deviation
Students' needs and help provided	9.267	.003	.053
Satisfaction with the administrative staff and information	8.198	.005	.047
Satisfaction with the teaching staff	8.973	.003	.051
Facilities and promises	18.468	.000	.100

Source: Research results

Unlike MANOVA, ANOVA compares only one dependent variable while the interpretation of results is the same as it is in MANOVA. ANOVA analysis results show that there is a significant statistical difference in all quality dimensions in regards to expectations and perceptions of students at eMPIRICA College. Results of F-test show that the largest statistical difference is with the fourth quality dimension – Facilities and promises – where the value of this test is 18.468. The level of significance (p=0.000) is the lowest in this dimension and the square deviation is the highest in relation to other dimensions and is 0.1. This is followed by the first quality dimension – Students' needs and help provided – where the value of F-test is 9.267 and the level of significance is p= 0.003 while the square deviation is 0.053. The same level of significance has the third quality dimension – Satisfaction with the teaching staff – but with this dimension the value of F-test is 8.973 while the square deviation is 0.051. The lowest value of F-test is in the second quality dimension, that is, Satisfaction with the administrative staff and information and it is 8.198 and at the same time it has the highest level of significance – p= 0.005, and the lowest rate of square deviation – 0.047. All levels of significance show that there are significant statistical differences for all quality dimensions, that is, that the answers related to expected and perceived quality differ. These two analyses have shown that there are significant statistical differences, but not the gap between the answers. For that purpose, we will use t-test for specific statements within quality dimensions so as to get the overall impression.

Table 7 *ANOVA analysis results for students' satisfaction*

Statement code	Perception Mean	Expectation Mean	F-test	Sig.	Square deviation	Mean difference
VAR00027	4.1882	4.5357	9.074	.003	.052	-.34748
VAR00028	4.1765	4.4524	5.892	.016	.034	-.27591
VAR00029	4.0353	4.4048	9.716	.002	.055	-.36947
VAR00030	4.1882	4.4643	4.806	.030	.028	-.27605
VAR00031	4.0706	4.4167	7.825	.006	.045	-.34608

Source: Research results

ANOVA analysis results regarding students' satisfaction show that there are significant statistical differences in students' answers in three statements while there are differences in the remaining two statements but not significant ones as the p-value is greater than 0.01, which is the limit for accepting hypothesis. The largest discrepancy in answers was with the statement *Experience of the College is very pleasant* which has the largest F-test value and it is 9.716, and the largest difference between arithmetic means in students' answers while the level of significance is p= 0.002. Then there is the statement *I am satisfied with my College choice*, where the value of F-test is 9.074 while the level of significance is p= 0.003. In one more statement the level of significance is below 0.01 that being *Generally speaking I am satisfied with this College* where the value of F-test is 7.825. This analysis shows that the smallest difference between the answers is related to the statement *I do not regret enrolling in this College*, where the value of F-test is 4.806. It is precisely in this statement and the statement *I think I have done the right thing by selecting education at this College* that there is the lowest difference between arithmetic means generated through answers at the beginning and end of the academic year. The results of square deviation are proportionate to F-test. The larger the value of this test the larger the result of square deviation. This analysis shows that there is a difference in students' answers regarding the measurement of their satisfaction at the start and at the end of the academic year. In that respect the students expected more than their level of satisfaction at the start in relation to the end of the year, which is shown by arithmetic means as well as the difference between the

arithmetic means. So as to enhance students' satisfaction it is necessary to include all activities so that satisfaction does not get decreased as the academic year progresses.

Table 8 *Results of ANOVA analysis of students' loyalty*

Statement Code	Perception Mean	Expectation Mean	F-test	Sig.	Square deviation	Mean difference
VAR00032	3.9647	4.3214	8.073	.005	.046	-.35672
VAR00033	4.0000	4.5476	17.514	.000	.095	-.54762
VAR00034	3.9176	4.2381	4.777	.030	.028	-.32045
VAR00035	4.0941	4.4881	8.815	.003	.050	-.39398
VAR00036	3.8941	4.4524	16.551	.000	.090	-.55826

Source: Research results

ANOVA results with loyalty statements show that four statements contain a significant statistical difference between students' answers and one statement - *If given an opportunity to continue my education, I would do it at this College* – does not contain it and the level of significance is 0.030 while the value of F-test for this statement is 4.777. Furthermore, the square deviation is the lowest for this statement and it is 0.028 and the same applies to mean difference. The statement that has the largest difference between students' answers at the start and the end of the academic year is *I would recommend the College I attend to others*. The value of F-test in this statement is 17.514 while the level of significance is 0.000, and the value of square deviation is 0.095. The same level of significance has the statement *If given an opportunity to continue my education, I would do it at this College.* This statement has a lower value of F-test (16.551) and square deviation (0.090). This statement has the greatest mean difference between students' answers at the start and end of the academic year. The following one is the statement *I only say good things about this College* where the value of F-test is 8.815, level of significance is p=0.003 and the square deviation is 0.050. The fourth statement where there is a significant statistical analysis is *I am proud to be a student in this College* where the value of F-test is 8.073, level of significance is 0.005 and the square deviation is 0.046.

Compared to the previous analysis, that is, students' satisfaction analysis it can be noted that there is a greater gap in answers in loyalty of students than it is the case with students' satisfaction. This imposes the conclusion that the students at the end of the academic year are less loyal than they are satisfied with eMPIRICA College. This College should work on increasing and maintaining the level of loyalty until the end of the academic year because a decrease in loyalty can lead to dropout, that is to transfer of students to other higher education institutions.

After the hypotheses have been examined and guidelines given for improvement of students' satisfaction and loyalty, now a two-direction t-test will be carried out so as to ascertain the difference between expected and perceived quality with all statements within each quality dimension. T-test is one of the most recognized statistical procedures based on the Student or t distribution. It is related to statistical difference between two means.

Table 9 *Difference between expectations and perceptions of students regarding quality*

Statement Code	Perception mean	Expectation mean	t-test	Freedom degree	Sig.	Mean difference
Quality dimension – Needs and help to students						
VAR00001	3.9059	4.3214	-3.818	167	.000	-.41555
VAR00018	3.8588	4.2857	-3.397	167	.001	-.42689
VAR00020	4.2000	4.4286	-2.118	167	.036	-.22857
VAR00021	3.8824	4.2381	-2.848	167	.005	-.35574
VAR00022	3.8706	4.2381	-2.786	167	.006	-.36751
VAR00023	3.7176	4.2024	-3.316	167	.001	-.48473
VAR00024	3.7059	4.1190	-2.908	167	.004	-.41317
VAR00025	4.1412	4.3929	-2.200	167	.029	-.25168
VAR00026	3.9647	4.1667	-1.473	167	.143	-.20196

Statement Code	Perception mean	Expectation mean	t-test	Freedom degree	Sig.	Mean difference
Quality dimensions –Satisfaction with the administrative staff and information						
VAR00002	3.9647	4.2976	-2.710	167	.007	-.33291
VAR00003	3.6471	4.2143	-4.154	167	.000	-.56723
VAR00006	4.3882	4.3214	.590	167	.556	.06681
VAR00007	4.2235	4.4524	-1.853	167	.066	-.22885
VAR00008	4.2824	4.5119	-2.077	167	.039	-.22955
VAR00009	4.0706	4.4524	-3.169	167	.002	-.38179
Quality dimension – Satisfaction with the teaching staff						
VAR00010	4.2588	4.4286	-1.566	167	.119	-.16975
VAR00011	4.3294	4.5595	-2.196	167	.029	-.23011
VAR00012	4.1412	4.3810	-2.122	167	.035	-.23978
VAR00013	4.0941	4.4762	-3.307	167	.001	-.38207
VAR00014	4.2588	4.5833	-2.862	167	.005	-.32451
Quality dimension – Facilities and promises						
VAR00004	3.5765	3.9881	-2.686	167	.008	-.41162
VAR00016	3.8235	4.3452	-3.795	167	.000	-.52171
VAR00017	3.5765	4.2024	-4.029	167	.000	-.62591

Source: Research results

Examining the given results of t-test we can see that only one statement has a positive value of this test because expectations for that statement were lower that the perception at the end of the academic year and that statement is *Administrative staff at the College is very pleasant*. Examining and comparing quality dimensions we can say that the smallest difference is with Teaching staff dimension while the largest difference are with Facilities and promises. The greatest value of t-test is with the statement *Information that students require for studies are always prompt* and is -4.154, while the largest mean difference is with the statement The College has solid equipment, which is -.62591.

Based on t-test results it can be concluded that eMPIRICA College needs to work on providing information to students and improve equipment and facility quality. Furthermore, it is necessary to improve promise-keeping and support provided to students as there is the greatest gap with these statements. Even though there is a gap, it is not particularly large with quality dimensions that refer to teaching staff and the satisfaction with administrative staff though in this quality dimension the relationship between staff and students needs to be improved. In all dimensions there is a negative difference, that is, students' expectations were higher than the perceptions at the end of the academic year. This College's management should analyse in more detail these results and make decisions so as to enhance the quality system at this institution and thus reduce the gap between expectations and perceptions of that quality.

It is necessary that each higher education institution continually monitors students' satisfaction and compares it according to time frames so as to identify bottleneck in the quality system.

5. CONCLUSION

The research in this paper has been conducted on two occasions: at the start and end of the academic year with the aim of examining the gap between expectations and perceptions of the students. The results have shown that with all research variables there is a negative difference, that is, the expectations exceed the perceptions of students and average deviation is from 4 to 12 percent. Only with the statement *Administrative staff at College is very pleasant* there is a positive difference, that is, a positive gap. Based on the calculated gap and results of ANOVA and t-test the conclusions can be made as to what statements need more work so as to enhance the quality system at higher education institutions.

In the course of examining quality at eMPIRICA College, we used 26 statements which were grouped into 4 quality dimensions using factor analysis. Since the questionnaire was taken from eMPIRICA College co-founders it had some disadvantages as it did not include some other statements and dimensions used in e.g. SERVPREF and HEdPREF models for measuring quality. This research has shown that it is necessary to separate teaching staff from administrative staff and technical staff in

the course of measuring quality of the staff and treat them as separate quality dimensions as higher education institutions primarily transfer knowledge onto students via teaching staff and using equipment and facilities. It is also necessary to include more statements on equipment and facility quality and reduce statements related to the needs and help to students. The recommendations for the future research are that in the course of creating a new model for measuring quality at higher education institutions it is necessary to include more different statements and determine which dimensions are of primary significance for the quality. Furthermore, it is necessary to apply this questionnaire to different HEIs so as to gain more complete information from students rather than merely conduct this type of research on only one HEI. Only in that way can we get a valid model for measuring quality at higher education institutions.

REFERENCES

Camgoz-Akdag Hatice and Selim Zaim. 2012. Education: a comparative structural equation modeling study. *Procedia - Social and Behavioral Sciences*, 47, 874-880.

Lazić Miodrag. 2007. Sistem kvaliteta - QMS u visokom obrazovanju, *Nacionalna konferencija o kvalitetu (XXXIV)*, Agencija za kvalitet i standardizaciju Srbije, Selekcija A-1., 1-6.

Leontitsis Alexandros and Jenny Pagge. 2007. A simulation approach on Cronbach's alpha statistical significance, *Mathematics and Computers in Simulation*, 73, 336–340.

Lin, Cheieh Peng and Yuan Hui Tsai. 2008. Modeling educational quality and student loyalty: a quantitative approach based on the theory of information cascades, *Quality and Quantity*, 42(3), 397-415.

Lin, Ru Jen, Rong-Huei Chen and Kevin Kuan‐Shun Chiu. 2010. Customer relationship management and innovation capability: An empirical study. *Industrial Management & Data Systems*, 101(1), 111-133.

Mahapatra S.S., and Mohammed Sadique Khan. 2007. A neural network approach for assessing quality in technical education: an empirical study. *International Journal of Productivity and Quality Management Decision*, 2(3), 287-306.

Memet, Aleksandar. 2011. Analiza preduzeća u Srbiji u uslovima svetske ekonomske krize. *Singidunum Revija*, 8(2)72-78.

Mencer Ivan. 2005. Osiguranje kvalitete i visokoškolske ustanove u Republici Hrvatskoj. *Ekonomski pregled*, 56(3-4), 239-258.

Musa Dalibor i Krešimir Rotim. 2015. Implementacija upravljanja kvalitetom na sveučilištima u Bosni i Hercegovini. *Poslovna izvrsnost*, 9(1), 109-123.

Nanić Husein. 2014. Visoko obrazovanje: Izazovi i perspektive u moderno doba. *Zbornik radova II međunarodna konferencija Bosna i Hercegovina i Euroatlantske integracije, Trenutni izazovi i perspektive*, Pravni fakultet Univerziteta u Bihaću, Centar za društvena istraživanja Internacionalnog Burč univerziteta, 919-928.

Negricea, Costel Iliuță, Tudor Edu and Emanuela Maria Avram. 2014. Establishing Influence of Specific Academic Quality on Student Satisfaction, *Procedia - Social and Behavioral Sciences*, 116, 4430-4435.

Dado Jaroslav, Janka Taborecka Petrovicova, Sreten Cuzovic and Tamara Rajic. 2012. An Empirical Examination of the Relationships Between Service Quality, Satisfaction and Behavioral Intentions in Higher Education Setting. *Serbian Journal of Management*, 7(2), 203-218.

Ningsih Sri Minarti and Weseoso Segoro. 2014. The influence of customer satisfaction, switching cost and trusts in a brand on customer loyalty - the survey on student as im3 users in Depok, Indonesia, *Procedia - Social and Behavioral Sciences*, 143, 1015-1019.

Owlia, Mohammad Saleh and Elaine M. Aspinwall, E. 1996. A Framework for the Dimensions of Quality in Higher Education. *Quality Assurance in Education*, 4, 12-20.

Parasuraman A. ''Parsu'', Valarie A. Zeithaml and Leoanard L. Berry. 1988. SERVQUAL: A multiple-item scale for measuring customer perceptions of service quality. *Journal of Retailing*, 6(41), 12-40.

Petković Darko i Sabahudin Jašarević. 2005. Razvoj sistema upravljanja kvalitetom na Univerzitetu u Zenici kroz prizmu bolonjskog procesa. *4. Naučno-stručni skup sa sa međunarodnim učešćem "KVALITET 2005*", 287-294.

Puška Adis, Aleksandar Maksimović i Samira Fazlić. 2015.. Utjecaj sustava kvaliteta na zadovoljstvo i odanost studenata VŠ eMPIRICA. *Praktični menadžment*, 6(1), 15-21.

Puška et al. 2015b. Uticaj kvaliteta na zadovoljstvo i lojalnosti studenata, *Poslovna izvrsnost*, 9(2), 101-119.

Ramseook-Munhurrun, Prabha, Perunjodi Naidoo and Pushpa Nundlall. 2010. A proposed model for measuring service quality in secondary education. *International Journal of Quality and Service Sciences*, 2(3), 335-351.

Senthilkumar, Nakkeeran and Arockiasamy Arulraj. 2011. SQM-HEI- determination of service quality measurement of higher education in India. *Journal of Modelling in Management*, 6(1), 60–78.

Temizer Leyla and Ali Turkyilmaz. 2012. Implementation of student satisfaction index model in higher education institutions. *Procedia - Social and Behavioral Sciences*, 46, 3802 – 3806.

Yanhong Li, Rose and Mike Kaye. 1999. Measuring Service Quality in the Context of Teaching: A study on the longitudinal nature of Students' Expectations and Perceptions. *Innovations in Education and Training International*, 36(2), 145-154.

Dib Hayan and Mokhles Alnazer. 2013. The Impact of Service Quality on Student Satisfaction and Behavioral Consequences in Higher Education Services. *International Journal of Economy, Management and Social Sciences*, 2(6), 285-290.

Firdaus Abdullah. 2006. The development of HEdPERF: a new measuring instrument of service quality for the higher education sector. *International Journal of Consumer Studies*, 30(6), 569-581.

Gajić Jelena. 2011. Merenje satisfakcije studenata u visokom obrazovanju, *Marketing*, 42(1), 71-80.

Grandić Radovan i Milena Stipić. 2011. Novi kvalitet obrazovanja: šansa za bolju budućnost. *Pedagoška stvarnost*, 56(5–6), 410-425.

Guolla, Michael. 1999. Assessing the teaching quality to student satisfaction relationship: applied customer satisfaction research in the classroom. *Journal of Marketing Theory and Practice*, 7(3), 87–97.

Ho Sammuel .K. and Wearn Katarina. 1996. A higher education TQM excellence model: HETQMEX. *Quality Assurance in Education*, 4, 35-42.

Klarić Samil i Dženan Kulašin. 2011. Konstrukcija heduqual instrumenta za mjerenje glavnih faktora usluge visokog obrazovanja u BiH. *7. Naučno-stručni skup sa međunarodnim učešćem "KVALITET 2011"*, 821-828.