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RESEARCH REGARDING THE CORRELATIONS AMONG FACTORS INFLUENCING THE SATISFACTION OF STUDENTS IN AN UNIVERSITY

***Abstract.** The decision of potential students towards a university depends on a great number of factors which are related both to the academic and also to several non-academic items. Of course the ideal case is the one in which knowledge and the obtained competences should be the main purpose for choosing a university. Despite of these, several discussions with students revealed also other aspects related to the financial, material or social issues, which play an important role in their decision. The aim of this paper is to present the results of a research about the satisfaction of students with several items in a university and to determine the correlations and the importance of these factors. The analysis of the results took place in two phases. In the first phase there were determined the interdependences among items with the help of the factor analysis in the SPSS program leading to 6 factors. Based on the 6 determined factors, a regression analysis was done in order to determine the coefficients of each of the factors and therefore their importance in the overall satisfaction of students.*

***Keywords:** student, satisfaction, university, factor analysis, correlations, regression, coefficients*

JEL Classification: M10, M20

1. Introduction

The perspective of universities towards their students has changed in recent years because of globalization, decreasing demographics and increased competition on international education markets. Therefore the discussion regarding the idea of seeing students more and more like customers has gained the attention of experts in the field. Of course this new perspective raised discussion about the academic performance of students having arguments for and against this view.

Authors like Randal (1998, pg. 63-69) or Finney and Finney (2010, pg. 276-291) are against this view sustaining that students who are treated like customers are not necessarily oriented towards academic performance. Other authors like Brown (2015) or Cuthbert (2010) favor the idea sustaining that for the long term success of the university there should be a good relation between the university, its professors and its students. Despite of this, most authors sustain that even by having students as customer, education is a special type of “product” and besides buying educational services it has also the role of shaping the personality of students (Parson, 2014; Seymour, 1993).

This paper presents the results of a research about the satisfaction and perception of students towards their university. Based on the results of this research, the aim of the paper was to determine the correlations among the different aspects which influence the satisfaction of students and their impact on the overall satisfaction. Only by knowing the factors which affect the satisfaction of students, can the university create the optimal conditions for an efficient learning organization and knowledge oriented university

2. Research Methodology

The objective of this research was to determine the satisfaction and perception of students with a university and its impact on the strategy and performance of the university. The research took place in the Bucharest University of Economic Studies, Romania on a sample of 351 students from the bachelor programs from all faculties of the university. The research contains a homogenous number of respondents regarding the faculties, as there is approximately the same number of respondents from each faculty. The questionnaire contained questions about the satisfaction of the students both with the academic and administrative issues such as the courses and the seminars, the competences and the attitude of the teachers and other facilities offered by the university such as canteen, dorms, library, scholarships and so on. The questions were selected based on a brainstorming done among the students from the university. The research took place in the period April-May 2013 at all faculties of the Bucharest University of Economic Studies. The survey contains Likert-scale, multiple choice and open questions. The questions regarding the satisfaction with several items in the university were scaled from 1 to 7, where 7 equals to a total satisfaction, while 1 represents a total dissatisfaction. Besides the satisfaction of the students, there were also asked questions about demographic data, such as age, faculty, etc.

The analysis of the results of the research took place in two distinct phases. In a first step a factor analysis was applied with the purpose of determining the correlations between the items. In a second phase a regression analysis was applied in order to determine the relation between the overall perception of students and the perception for several items, including the previously determined factors. Both multivariate analysis methods were applied with the help of the SPSS program.

The methodology of both phases is presented in the following, while the results and their interpretation are discussed in the following chapters.

In order to determine the correlation between the items in the survey, a factor analysis was applied with the help of the SPSS program. The Kaiser-Meyer-Olkin Test had a value of 0.936, indicating a marvellousad equation of data for the multivariate analysis method. Also the values in the anti-image matrix showed a high adequacy of all variables for a factor analysis. The first issue to be determined in a factor analysis is the distinct number of independent factors and their loadings. For this, first, there was applied a principal axis factoring with eigenvalues higher than 1. This criterion indicated an ideal number of 16 factors which is too much because of the difficulty of interpretation and applicability for other multivariate analysis methods. On the other hand, the elbow criterion in the scree plot indicated an adequate number of 2 factors, which is very restrictive regarding the analysis of the potential data. At a closer look at the scree plot there can be observed a smaller elbow at the number 6, consequently there were chosen 6 factors for the further analysis. Therefore, the factor analysis in SPSS was run for the second time for a fixed number of 6 factors. Based on the loadings resulted from this factor analysis, there were described the factors in chapter 3.

The second phase consisted out of several regression analysis models having the overall satisfaction as dependent variable and several combination of the factors resulted from the factor analysis as independent variable. There was tested a regression model having as independent variables all six factors resulted from the factor analysis as well as regression relations based on different items related to the teaching quality as independent variables. For each of the applied models there were calculated the R-square as an indicator which shows the amount of the explained relation, the F-test as a measurement of the adequacy of data for this type of analysis and the t-test for the measurement of the significance of each coefficient in the model. The resulted coefficients were also used to determine the factors with a higher degree of influence on the dependent variable.

2. Results of the factor analysis and determination of correlation among the items

The possible items which characterize the satisfaction of students with the services offered by the university can be divided into six categories depending on the correlations between them. Based on the factor loadings determined with the help of the SPSS program they are grouped as described in the following. Taking in consideration the fact that, the analysis was done for the second best number of factors as explained in the methodology, the loadings are not too high. Despite of these, the obtained loading values can show the grouping of the items for the six factors. Depending on their characteristics for each of the groups there was given a generic name.

Factor 1: General conditions

The first factor includes most of the items and was generically named “general conditions” as it contains different topics. It is the only factor where different aspects of the academic life are presented in opposition to the other five factors where the items belong to the same topic. Probably all the items which were not correlated to the other factors are included here. Besides, this is the factor with the highest loadings for the contained factors. Probably in another factor analysis model with fewer factor, many items would be grouped here.

This factor includes aspects regarding the social life at university and different logistic issues. The first included aspect refer to the social activities. On one hand students have the same satisfaction with the social atmosphere at the university (0.482) and the relation and communication to the colleagues (0.488). Also included in the social life is the representation of the students in the decision structures of the university such as the student’s senate (0.571) or student’s organization (0.600). Another aspect related to the social life are the sports activities (0.568), included also in this factor.

Besides the social conditions at the university, this item also contains aspects regarding different logistics issues such as the length of the examination period (0.476), the structure of the time table (0.387), the distance between the buildings of the university (0.437), medical services offered at the university (0.595) and parking spaces (0.472). There are included also communication means between the university and the students such as the internet page of the university (0.677) and the one of the faculty (0.645) as well as the personal page of students as an information share point for students (0.567). It is interesting to observe that this factor contains the satisfaction of the students with the level of study fees (0.367). All the other items which were not included in other factor can be also found here. In this sense, we have the loan service and the behavior of the personnel at the library (0.599), the activity of the cashier (0.583), the waiting times at the canteen (0.414) and the safety of the dorms (0.483). From within the academic items, visual support for the courses (0.624), the applications and examples at the seminar (0.592), the utility of projects and the relevance of the bibliography (0.584) are included in this item.

Factor 2: Teaching quality

The second factor includes items related to the teaching quality and relation between the professors and the students. The first evaluated aspects are related to the content of the courses and seminars. There is analyzed the satisfaction with the course and seminar in general, the knowledge achieved during classes (0.421), the relevance and actuality of the achieved information (0.368), the interactivity during classes (0.313) as well as the utility of the content for the future professional development (0.364) in the perception of the students.

Another element contained in this factor is the communication between the professor and the students. There is evaluated the satisfaction of students with items

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like the competences of the professor seen through the eyes of the student (0.410), his teaching style and the pedagogical competences (0.473), the communication and the attitude of the professor towards the students (0.405) as well as the implication in the student's activity (0.414).

Not less important in this item is the perception of the evaluation system (0.340). It is interesting to observe that in this factor are also included the evaluation criteria for dorms (0.416). This inclusion is probably related to the fact that the selection for the dorms is made based on the grades. Probably for both items there is evaluated the way of awarding the grades. There can be observed that all these items are evaluated in the same way showing that there is a correlation between the content of a certain subject and the communication and the competences of the professor.

Factor 3: Research and information possibilities

The third factor includes items related to the research and information possibilities of students and it is also named in this way. The first category of items refers to the possibility of students to do research and contain items related to library of the university. There is evaluated the satisfaction with the number and the relevance of the books in the library (0.324), the access to the books (0.307) as well as the timetable of the library (0.303).

A second component for this factor is the means of information of the university. There are evaluated the means of information in general as well as the information from the secretary's office (0.243) and the real time updates of the internet site of the university (0.264) and of the faculty (0.231). The availability of professor (0.330) also as a way of achieving information is correlated to the items of this factor.

Factor 4: Equipment and conditions at the university

The fourth factor refers to the equipment and contains items related to the conditions in the classrooms and break time and other facilities such as the canteen. The first set of items in this factor contain the satisfaction of the students with the conditions, facilities and equipment in the classrooms and in the laboratories (0.422) as well as the computers on which the students work (0.437). Another aspect included in this factor is the access to wireless networks (0.341). The availability and conditions for the break-time or team-work (0.353) are also important and are included in this factor.

To the conditions offered by the university are also included aspects related to the canteen or restrooms. There are analyzed aspects about the quality and diversity of food at the canteen (0.228), the hygiene and the behavior of the personnel (0.277) as well as the prices for food (0.396). It is interesting to remark that the satisfaction with the facilities and equipment of the university is correlated with the aspects related to the canteen.

Factor 5: Administrative organization

The fifth factor named administrative organizations includes the relation with the secretary's office and the facilities of the dorms. There are evaluated the timetable, the activity and the behavior of the personnel at the secretary's office (0.399). The values of the satisfaction with this factor are the lowest from the whole study, showing that several measures must be taken in this field. The second aspect included in this factor is the items related to the dorms. There is included the satisfaction of the students with the comfort in the dorms (0.377), the behavior of the employees responsible with the dorms, the number of places and the cost (0.261).

Although all the items included in the fourth and the fifth factor are related to the social and organizational aspects, the items included in the fourth factor are rather motivators according to Herzberg's theory of motivation, while the factors in the fifth factor are rather hygiene factors. The difference between the two categories is the fact that the items in the fourth factor are more easily replaceable in opposition to the factors in the fifth factor. Different facilities or food can be also found elsewhere, but any student is more or less dependent on the secretary's office and also on a place where to live.

Factor 6: Personal development and international relations

The last factor was named personal development and international relations as it contains items about the international exchange programs such as Erasmus and the involvement of the university in finding internships or personal development.

The first set of items with a similar satisfaction, are the ones related to the exchange programs as they have a high impact on the personal development of a student. There is measured the satisfaction with the process of achieving an Erasmus scholarship (0.333) for an exchange program, the number (0.286) and value (0.284) of the scholarships. Not less important is the coordination of this process (0.425) and the equalization of the grades after returning back from the program (0.403).

Another issue included in this factor is the level of knowledge after graduation as well as the involvement of the university in finding an internship or opportunities for the personal development of the students. It is interesting to observe that there is the same satisfaction perception both for the participation in international exchange programs and the interest for the future opportunities.

4. Determination of the impact of knowledge on the overall perception of students

In order to determine the impact of the knowledge and learning process several regression analysis models were applied having the overall satisfaction of students as dependent variable and several combination of items as independent variables.

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For the regression analysis with overall perception as dependent variable and the factors as independent variables, there can be determined the following relation:

$$\begin{aligned}
 S_s = & 0.677 * S[\text{Teaching Quality}] \\
 & + 0.187 * S[\text{General conditions}] \\
 & + 0.030 * S[\text{Personal development\&international relations}] \\
 & - 0.075 * S[\text{Equipment}] \\
 & - 0.070 * S[\text{Research and Information}] \\
 & - 0.006 * S[\text{Administrative}] \\
 & + 1.761
 \end{aligned}$$

Where S_s = the overall satisfaction
 $S[X]$ = Satisfaction with factor/ item X

As it can be observed in the previous formula the factor regarding the teaching quality has the highest influence on the overall perception as its coefficient has the highest absolute value. This influence is confirmed by the BETA value as the factor teaching quality has the highest one. The R-Square value for this relation indicates an average influence of 33.6% of the independent variables on the dependent one, showing that there are also other factors which might influence the overall perception. The F-value of 28.852 indicates a high adequacy of the data for this type of analysis for a probability of error of 0.01%.

Table 1: Results of the Regression Analysis for overall perception as dependent factor and the 6 factors as independent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.761	.313		5.620	.000
	factor_1	.187	.172	.133	1.091	.276
	factor_2	.677	.086	.544	7.856	.000
	factor_3	-.070	.093	-.064	-.758	.449
	factor_4	-.075	.089	-.062	-.844	.399
	factor_5	-.006	.075	-.005	-.073	.942
	factor_6	.030	.083	.025	.369	.713

a Dependent Variable: total_satisfaction_ase

The t-test is adequate for the analysis of the influence of each independent variable on the dependent variable. Therefore the t-test values for the factor 2 – teaching quality (t=7.856) indicates an influence on the dependent variable with a probability of error of 0.01% at 344 degrees of freedom. For factor 1 – general conditions (t=1.091) the t-test value indicates an influence on the dependent variable of 27.6%. For all the other factors the probability of error is higher than 40% showing that the model cannot be fully trusted. Moreover factor 5 – administrative organization has a probability of error of 94.2% showing that there is no dependence between the two variables. Analyzing the previous results of the factor analysis, even there, there was observed that the items included in this factor act more like hygiene factors according to Herzberg’s theory.

Taking into consideration the relatively small influence of the model with overall satisfaction as dependent variable and the six factors resulted from the factor analysis as independent variables, we experienced a new model with overall satisfaction as dependent variable and factor 2 as independent variable. There was determined the following relation:

$$S_s = 0.719 * S[\text{Teaching Quality}] + 1.761$$

Where S_s = the overall satisfaction
 $S[X]$ = Satisfaction with factor/ item X

The R-square value of 0.332 indicates an average influence of the independent variable on the dependent one. It is also interesting to observe that the R-square value of the relation with one independent variable is similar to the one with six independent variables confirming the fact that factor 2 – the teaching quality has the highest influence on the overall satisfaction of students among the factors. The F-test (F=173.3) for the relation shows an even higher adequacy of the relation with one independent variable in comparison to the relation with six independent variables (F=28.852) at a probability of error of 0.001. The t-test for the variable (t=13.1) confirms also the high significance of the relation for a probability of error of 0.001.

Table 2: Results of the Regression Analysis for overall perception as dependent factor and factor 2 as independent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.900	.269		7.070	.000
	factor_2	.719	.055	.576	13.166	.000

a. Dependent Variable: total_satisfaction_ase

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In order to determine if there are other items within factor 2 which have a higher influence on the overall perception of students, the model was also tested for the relation between the overall satisfaction as dependent variable and the items of factor 2 as independent variables, obtaining the following results.

Table 3: Results of the Regression Analysis for overall perception as dependent factor and the items in factor 2 as independent variable

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
1 (Constant)	1.884	.272		6.922	.000
Courses_7	.189	.071	.208	2.677	.008
Seminars_8	-.022	.068	-.023	-.317	.752
Knowledge_9	.075	.064	.078	1.180	.239
Relevance_of_info_10	.191	.066	.189	2.898	.004
Recency_info_11	-.021	.057	-.023	-.376	.707
interactivity_15	-.070	.052	-.078	-1.346	.179
utility_subjects_16	.125	.053	.137	2.354	.019
competences_prof_18	.102	.062	.112	1.647	.101
teaching_style_19	.032	.065	.037	.494	.621
pedagogical_competences	.005	.063	.006	.084	.933
implication_prof_21	-.053	.067	-.060	-.797	.426
evaluation_system_25	.033	.047	.040	.705	.481
atitute_prof_22	-.012	.067	-.014	-.182	.856
communication_prof_23	.138	.060	.163	2.300	.022

a Dependent Variable: total_satisfaction_ase

The R-square for this model has a value of 0.386 showing that the separate items have a higher influence than their average. The F-test ($F=15.068$) shows a high adequacy of the data with a probability of error of 0.001, but it has a smaller value than in the previous relations. This smaller value shows a higher adequacy for the previous models. Despite of this, the significance of the influence of the items differs. Therefore we have significant influences for the items relevance of information ($t=2.898$), courses ($t=2.677$), utility of subjects ($t=2.354$) and communication with professors ($t=2.300$). This shows the importance of the knowledge and information transmitted in the courses. Among the less relevant items are the pedagogical competences ($t=0.084$) and the attitude of professors ($t=-0.182$). These are items which are not necessarily perceived by the students.

5. Conclusions

The results of the research show that only 33% of the satisfaction and perception of the students can be determined with the items considered in this research. Therefore it would be interesting to analyze which are the other potential factors which influence the perception of students towards the university. The question which arises is if there are other factors related to the university which determine the perception. Another type of influencing factors might be characteristics related to each individual, his expectations and aspirations for the future. The importance of determining the type of items is because university related items can be more easily changed, while personal aspirations and expectation are more difficult to be influenced.

However, within the percentage of elements which are determined by the university the knowledge gathered within the university plays the most important role. Another question which arises here is to determine the influence of the other 5 factors. According to the results of the research they don't influence significantly the overall satisfaction, but they can be hygiene factors according to Herzberg's theory. Therefore the students assume that they are fulfilled, without having a positive influence on the satisfaction. These aspects should be researched in further research as they are important in the way a university develops its offer to potential candidates.

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