How Attendance Affects the General Success of the Student

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Abstract

The aim of this research is to analyse the students' attendance at the Faculty of Business and Economics. The study is divided into two parts: the first part analyses why some students are not motivated to attend lectures and practical hours while the second part analyses the impact of students' attendance (motivation, bonus) in lectures and practical hours and their final success.

This paper provides results of a survey completed at the beginning of the summer semester and results of the final success in three courses for the academic year 2010/11 (Business Mathematics, Statistics and Managerial Economics) with first, second and third-year students at the Faculty of Business and Economics, at South East European University in Tetovo.

This paper uses logical regression to give an overview of the impact of students' attendance (motivation, bonus) at lectures and practical hours in their final success.

Results show that, besides other daily engagements during studies, students have other excuses for absence from lectures and practical hours such as conditions, management and methods of teaching in the Faculty. Final results of three subjects which are considered as more practical show that attendance of students have a big influence in students' final success.
The *software MedCalc* was used for the elaboration of data.

Keywords: Student attendance, Motivation, Mathematical model, Logistic regression

1. Introduction

In recent times, students' attendance at SEE University is a disturbing issue (Student Evaluation Report 2011, 45% students in the Faculty of Business and Economics were present in lectures and practical hours) and this influences the overall learning process and contributes to the poor academic performance of students. Students' attendance in lectures and practical hours depends on many factors such as: employment, lectures timetable, medical reasons, sports activities, methods of teaching, the instructor of the course, the subject and its importance and motivation. In this paper, a statistical and empiric descriptive analysis is made as to why some students are not motivated to attend lectures and practical hours and what encourages them to increase their presence. It also analyses some of the factors that influence absence from

lectures/practical hours. This question was raised by many scholars (Gump, 2006; Nicholl and Timmins, 2005; Hughes, 2005; Timmins and Kaliszer, 2002; Hunter and Tetley, 1999; Longhurst, 1999). Studies provided some reasonable excuses related to the daily circumstances of life. Some studies show that students' attendance is closely linked with good students' health thus resulting to higher academic achievements. (Donka Mirtcheva, 2009).

However, there are many excuses given by students which seem to be irrelevant. Joanne Cleary-Holdforth (2007) studies a phenomenon of student apathy or poor pedagogy. This is what made me analyze those factors that affect the students' absence from classes and which directly depend on students and University services.

In order to study the effect of students' attendance in lectures/practical hours on their final success, the students' attendance in three courses is analysed i.e. Business Mathematics - a course attended in the first-year; Statistics – a course attended in the second-year; and Managerial Economics – a course in the third-year.

Logistic regression is used in this research paper in order to promote a better perception of the education process through quantitative statistical analyses where the relationship between students' attendance (motivation, bonus) in lectures/practical hours and their final success/failure can be noted.

Logistic regression is part of a wide category of statistical models named '*General Linear Models*' where the result can often be seen as a two-value variable '*dichotomous*' such as for example, success/failure or presence/absence. This makes them easy to identify arithmetically through two values: the result is marked with value 1 with a probability of success p and value 0 with probability of failure 1-p. The model of logistic regression is a result of transformation of a probability linear model. During some one-value changes over the transformation of the probability linear model emerges odds ratios so that the result takes the value 1 towards the value 0 depending on the variables (characteristics) that have influence on it. The natural logarithm of these reports is named as Model of the logistic regression.

$$\log it(p) = \ln \frac{p}{1-p} = \alpha_i + \beta_1 X_{i1} + \ldots + \beta_k X_{ik} \qquad (1)$$

It is to be emphasised that *odds-ratios* have a very important role in the interpretation of situations. In the last section of the logistic regression, according to the program MedCalc, are given odds ratios $e^{\beta i}$ and their intervals 95% of confidence. Interpretation of variables occurring to the chance from the value change of variable X, explains the tendency that the chance for success depends on the value change of variable X, when other responsible variables remain constant.

Thus, if a variable increases with a unit and all other variables remain unchanged, and then the chance will change with a factor of type $e^{\beta i}$ which is called the odds-ratios O.R. This factor, for the variable X expresses the relative amount for which the chance of result increases (O.R.>1) or decreases (O.R. <1), when the value of this variable increases with a unit.

Numerical problems are simplified by the fact that today there are many computer programmes that offer the possibility of performing calculations. The application of *MedCalc* is shown in this article.

2. Research Methodology

The study was realized in two parts. The first part embraced the survey with 185 undergraduate students of the Faculty of Business and Economics, at SEE University. The questionnaire contained questions on reasons for students' absence from lectures/practical hours and actions undertaken after the lesson loss. It also aimed to find out what motivates the students who were regular in classes.

The survey was realized in the beginning of the summer semester 2011 and the basic aim was to find the reasons for students' absence from lectures/practical hours and make efforts to stop this phenomenon. During the semester, each student's attendance was followed in each course, and those who were absent more often were called by the Student Advisor in order to discuss their absence. Results from the survey were analysed and submitted via e-mail to the academic staff and the Faculty management who were asked to give their suggestions and remarks on the collected results.

The second part of the study was mainly focused on the progress and academic achievements of students of the Faculty of BE for their final success following their attendance in lectures/practical hours.

In order to illustrate the interpretation of data, conclusions and statistical decisions, three mathematical models are created, taking into account three most practical subjects which require higher attendance in classes. For first-year students, the results of the course *Business Mathematics* were analysed, for second-year students, the results of *Statistics*, and for third-year students, the results of *Managerial Economics* were analysed. On the creation of the mathematical model, the dependant "passing" variable is a two-value variable: 1 in the case when the student has taken a passing grade and 0 when the student has taken a failing grade or IN (Incomplete) in certain courses. The independent "attendance" variable is also a two-value variable: 1 in the case when the student has obtained less than 7.5 points of total 10 points of attendance (motivation, bonus) and 2 in the case when the student has obtained more than 7.5 points. Three models of logistic regression were created: the first one expresses the influence of students' attendance (motivation, bonus) in lectures/practical hours towards success/failure in the Faculty of Business and Economics, first-year students in the course *Business Mathematics*; the second model expresses the impact (motivation, bonus) towards the success/failure in the course *Statistics* and the third one the impact of attendance (motivation, bonus) towards the success/failure in the course *Managerial Economics*.

3.   Results

3.1.   Student attendance survey

The proportionality between the years of study was preserved in this paper. The processed data show that the gender distribution of respondents is 57.84% male and 42.16% female. The average age of respondents was 20 years, where 30.27% are first-year students, 30.81 % second-year students, and 38.92% third-year students. In terms of their place of residence, the majority of respondents 78.38% are students from Macedonia, 15.68% from Kosovo, and 5.95% students from Serbia (as can be seen in the *Figure 1*).

Figure 1: Year of study, gender and country of origin (%)
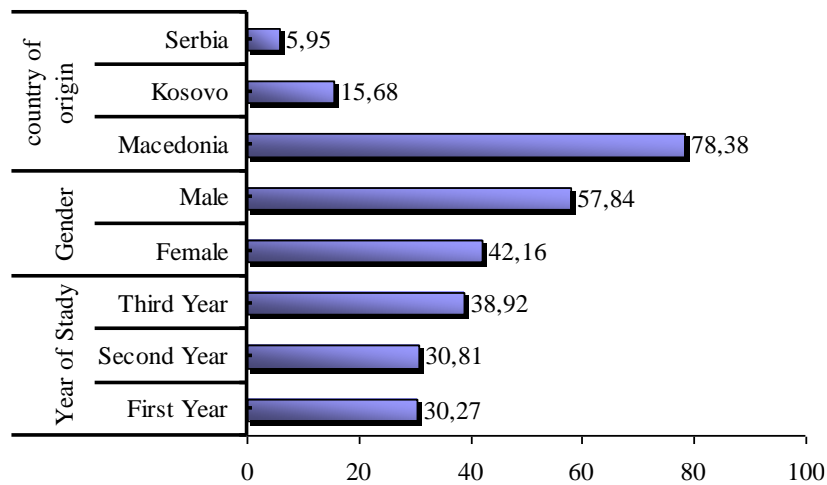
Although the respondents' age was young, 22.16% of them stated that they are employed part-time during the academic year. This means that these students have an additional stress while they need to work and attend classes. This is causing problems in their class attendance and gives them less free time for extracurricular activities. *Table 1*

Table 1: Working Relationship

	Absolute Frequencies	Percentage Frequencies
Yes	41	22.16
No	144	77.84
Total	**185**	**100.00**

Students were further asked to indicate the reasons for continuation of their studies. 44.32% of them responded that it was for their own personal fulfilment and interest in this area, and 40.00% to get a qualification that would improve long-term employment prospects. *Table 2*

Table 2: What was the reason you've decided to continue studies at the university?

	Absolute Frequencies	Percentage Frequencies
Natural progression after completing high school	18	9.73
To get a qualification that will improve long-term perspective of my work	74	40.00
For my own personal fulfilment and because I am interested in this area	82	44.32
The desire of my family members	5	2.70
Others (please specify)	6	3.24
Total	**185**	**100.00**

In terms of the travel distance to the University, the majority of respondents (36.76%) indicated that they needed less than 15 minutes while 33.51% of students needed 15-30 minutes to get to the University. *Table 3*

Table 3: How long does it take to get to the University?

	Absolute Frequencies	Percentage Frequencies
Less than 15 min	68	36.76
15-30 min	62	33.51
30-45 min	26	14.05
45-60 min	9	4.86
60-90 min	4	2.16
More than 90 min	16	8.65
Total	**185**	**100.00**

70.27% of students stated that they had missed lectures and practical hours and 29.73% have been present in classes. *Figure 2*

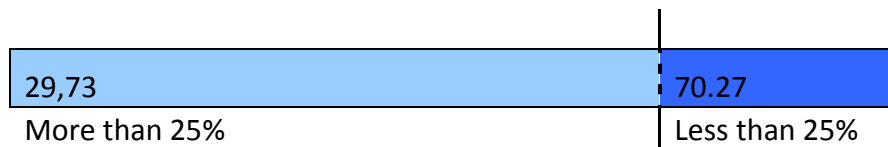**Figure 2: Percentage of lectures and practical hours attended**

29,73	70.27
More than 25%	Less than 25%

Table 4: What is the approximate percentage of your attendance in lectures and practical hours?

	Absolute Frequencies	Percentage Frequencies	GPA
Less than 25%	130	70.27	8,05
More than 25%	55	29.73	6,97
Total	**185**	**100.00**	

Students were further asked about the reasons for absence from lectures and practical hours (with 1 being the less common reason and 3 the most common reason). Results are given in Table 5.

Table 5: What are the most common reasons for absence from lectures and practical hours from the beginning of your studies up to now?

(with 3 being the most common reason and 1 the less common reason)	Percentage of Frequencies		
	1	2	3
Work - engagements out of studies	60.00	21.82	18.18
I had only one class per day	49.09	32.73	18.18
I had too many classes a day	30.91	36.36	32.73
The lecture/practical hours timetable was too early or too late during the day	36.36	34.55	29.09
I had problems with transport	58.18	25.45	16.36
The weather conditions were too bad	63.64	25.45	10.91
Medical reasons, I was ill	63.64	21.82	14.55
I had an appointment with a doctor or a dentist	67.27	20.00	12.73
I had family commitments	45.45	32.73	20.00
I was on holiday	65.45	20.00	9.09
I was tired	45.45	34.55	14.55
I was engaged in other social or recreational activities (sports, cultural, youth, educational activities, clubs, fairs, etc.)	45.45	29.09	20.00

I was suffering from the effects of alcohol	67.27	18.18	10.91
I had already studied the material elsewhere (transfer)	70.91	16.36	9.09
The material covered was too difficult	43.64	32.73	20.00
The subject matter was boring	32.73	29.09	34.55
Lack of motivation	40.00	32.73	21.82
I was not interested in the subject matter	52.73	29.09	12.73
I did not like the instructor of the course	52.73	27.27	14.55
I was completing some other works/assessments	49.09	23.64	18.18

In order to analyse the past, the present, and the future, as well as the importance of attendance, students were asked how their attendance in lectures and practical sessions had changed since they started their studies at the University as compared to their peers; their opinion was asked on attendance and absence from classes in the future and its impact on the academic work. About 42% stated that their attendance had improved since they started their studies; the same percentage of students (42.16%) indicated that their attendance was better than their peers, and 44.86% of them stated that their attendance would remain the same in the future. *Figure 3*

Figure 3:
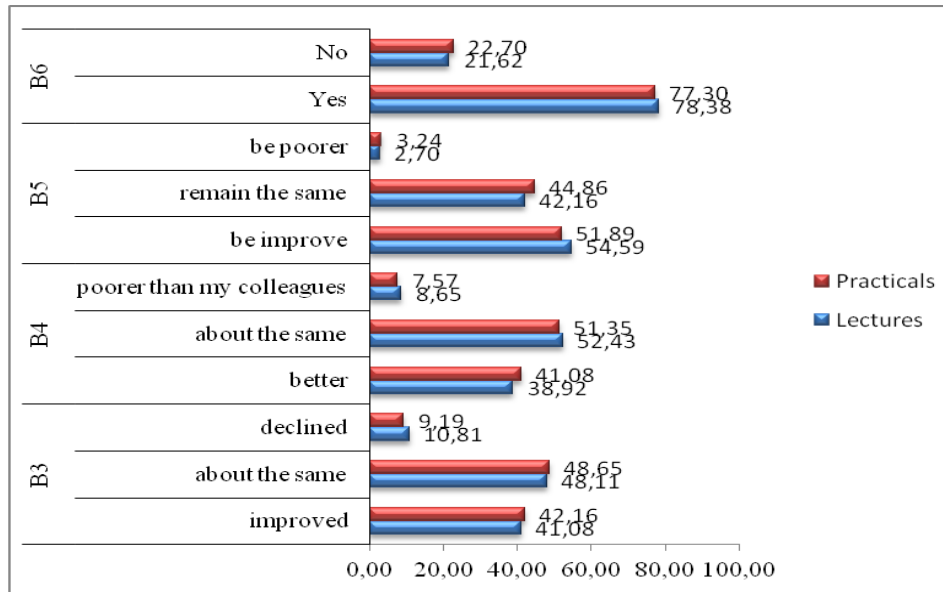
B3. Has your attendance changed since the beginning of your studies at the University?
B4. What do you think about your attendance compared to your peers?
B5. Shall we expect your attendee in the future to be better?
B6. Do you think that lack of attendance at lectures and practical hours affects your academic performance?

Meanwhile, 70.27% of students stated that they have missed less than 25% of their classes. Most common reasons that motivate these students to be regular on classes are: to increase their knowledge (66.92%), to learn new things (60%), interest for the faculty being chosen (59.23%), etc. *Table 6*

In the end, students were asked what actions have undertaken to replace the missed lectures/practical sessions. *Table 7*

Table 6: What are the most common reasons for you to attend lectures and practical hours from the beginning of your studies up to now? (Less than 25%)

(with 3 being the most common reason and 1 the less common reason)	Percentage of Frequencies			
	1	2	3	No Comment
To learn new things	23.08	10.00	60.00	6.92
To better understand the problems	16.92	17.69	58.46	6.92
To increase my knowledge	14.62	11.54	66.92	6.92
I'm interested in the faculty I have chosen	14.62	19.23	59.23	6.92
I like the courses	17.69	43.85	30.77	7.69
Work environment at the faculty (e.g. Internet access, library, etc.)	25.38	38.46	26.15	9.23
I like the way of teaching	20.77	41.54	28.46	9.23
I like lecturers	16.92	50.00	24.62	8.46
The fear of failing an exam	33.08	29.23	29.23	8.46
The need to pass an exam	31.54	23.08	35.38	10.00
I feel guilty if I don't attend classes	29.23	17.69	43.08	10.00
Insufficient course materials provided/available on "LIBRI"	40.77	32.31	17.69	9.23
To obtain better grades	14.62	20.00	56.15	9.23
The best way to learn is by listening	19.23	20.00	52.31	8.46
Because I'm paying money for the studies	20.00	23.85	46.92	9.23
If I miss one lecture, I'll lose a lot	16.92	26.92	47.69	8.46
Why not?	19.23	26.92	43.85	10.00

Table 7: What actions have you undertaken to replace missed classes?

(with 3 being the most common reason and 1 the less common reason)	Percentage of Frequencies			
	1	2	3	No comment
I've contacted the lecturer of the course by e-mail and found out what I've missed and read it in a textbook	43,24	24,86	20,00	11,89

I've consulted the lecturer and got an explanation about the lost class	46,49	24,86	15,14	13,51
I've asked colleagues what I've missed and read about it in a textbook	17,30	23,78	47,57	11,35
I've borrowed lecture notes from a colleague and copied them	28,11	23,24	36,76	11,89
I've looked information about the missed lecture on the 'LIBRI' portal	24,32	28,11	35,14	12,43
I've taken no action to replace missed classes	42,70	18,38	26,49	12,43

3.2. Results of final success

In order to analyse the students' final success in the Faculty of Business and Economics by considering their attendance in lectures and practical hours, three courses which are regarded as more practical and which require higher regularity of attendance are taken into account. *Figure 4* illustrates the overall success of first-year, second-year and third-year students for the subjects Business Mathematics, Statistics and Managerial Economics. *Figure 5* also illustrates the success (if the students passed or failed the course) for the same three subjects, based on 10% attendance (motivation, bonus) and students who have earned over 7.5 points versus those who have earned less than 7.5 points.

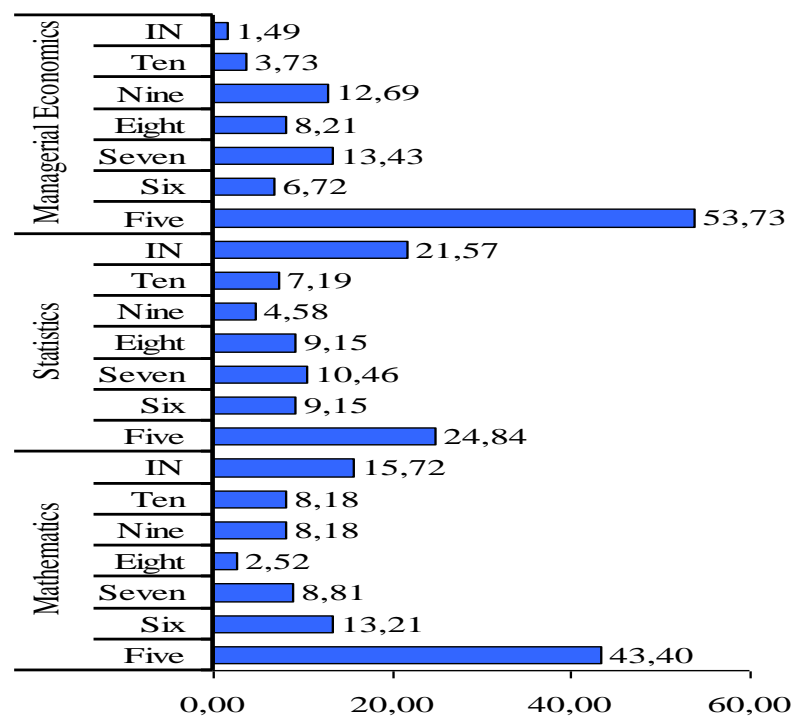**Figure 4: Scores in Business Mathematics, Statistics and Managerial Economics (%)**
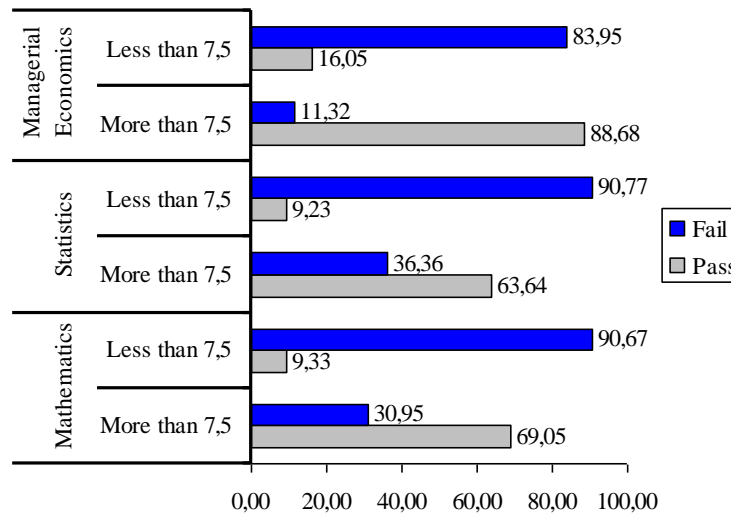
Figure 5: Overall success based on the attendance (plus other motivations) (%)

3.3.   Mathematical models

As we analysed the success of three subjects for first-year, second-year and third-year students, three models of the logistic regression are built which express the impact that the attendance (activity, bonus) has on student performance.

The First Logistic Regression: Results in Business Mathematics

Table 8 illustrates the results received by putting data of the final success for students (for the subject Business Mathematics) into the table of the program MedCalc for logistic regression.

Table 8: Logistic regression Model 1

Dependent Y	Grade
Method	Enter
Sample size	159
Cases with Y=0	94 (59.12%)
Cases with Y=1	65 (40.88%)

Coefficients and Standard Errors

Variable	Coefficient	Std. Error	P
Attendance	3.0759	0.4618	<0.0001
Constant	-5.3495		

Odds Ratios and 95% Confidence Intervals

Variable	Odds Ratio	95% CI
Attendance	21.6703	8.7653 to 53.5752

Classification table (cut-off value p=0.5)

Actual group	Predicted group		Percent correct
	0	1	
Y = 0	68	26	72.34 %
Y = 1	7	58	89.23 %
Percent of cases correctly classified			79.25 %

By using the data from table 8, we got the following *logit* model:

$$\text{logit}(p) = \ln\frac{p}{1-p} = -5,350 + 3,076X_1$$

The odds ratios for this variable is X_1=21.67>1 i.e. any student who has been regular on classes or has earned over 7.5 points in terms of attendance (motivation, bonus), has 21.67 times more chance to gain a passing grade in Business Mathematics compared to a student who has missed classes more often or has less than 7.5 points.

The Second Logistic Regression: Results in Statistics

By using the program MedCalc for the logistic regression with the method *Enter*, using attendance as an independent variable, and final success as a dependent variable, we got the results in table 9.

By using the data from table 9 and acting as in the first case, we got the following *logit* model:

$$\text{logit}(p) = \ln\frac{p}{1-p} = -5,131 + 2,845X_1$$

Table 9: Logistic regression Model 2

Dependent Y	Grade
Method	Enter
Sample size	153
Cases with Y=0	91 (59.48%)
Cases with Y=1	62 (40.52%)

Coefficients and Standard Errors

Variable	Coefficient	Std. Error	P
Attendance	2.8454	0.4824	<0.0001
Constant	-5.1312		

Odds Ratios and 95% Confidence Intervals

Variable	Odds Ratio	95% CI
Attendance	17.2083	6.6850 to 44.2973

Classification table (cut-off value p=0.5)

Actual group	Predicted group		Percent correct
	0	1	
Y = 0	59	32	64.84 %
Y = 1	6	56	90.32 %
Percent of cases correctly classified			75.16 %

Odds ratios for this variable is X_1=17.21>1, making the relative chance for a retention rate in *Statistics* to be increased for 17.21 times if the students' attendance is increased.

The Third Logistic Regression: Results in Managerial Economics

In this case calculations give the results in table 10, the *logit* model is obtained:

$$\log it(p) = \ln \frac{p}{1-p} = -5,368 + 3,713 X_1$$

Table 10: Logistic regression Model 3

Dependent Y	Grade
Method	Enter
Sample size	134
Cases with Y=0	74 (55.22%)
Cases with Y=1	60 (44.78%)

Coefficients and Standard Errors

Variable	Coefficient	Std. Error	P
Attendance	3.7129	0.5287	<0.0001
Constant	-5.3675		

Odds Ratios and 95% Confidence Intervals

Variable	Odds Ratio	95% CI
Attendance	40.9744	14.5357 to 115.5021

Classification table (cut-off value p=0.5)

Actual group	Predicted group		Percent correct
	0	1	
Y = 0	68	6	91.89 %
Y = 1	13	47	78.33 %
Percent of cases correctly classified			85.82 %

Results for odds ratios show that the variable attendance has a big impact i.e. 40.97 times increase in receiving a passing grade if students are regular in lectures and practical hours.

4.   Discussion Of Results

Results show that students who missed more than 25% of classes (29.73%) gave the most common reasons for absence from lectures/practical hours, besides family engagements and part-time engagements during their studies (22,16%), other reasons such as not suitable timetable of classes, boring courses, difficult subjects, lack of motivation, dislike of and finding the lecturer boring. Table 5

Students who have missed less than 25% of classes (70.27%) cited motivation for attending classes the desire to learn new things, understanding better and absorbing information easier, increasing their knowledge and reaching higher academic performance. Table 6

Results of actions undertaken in order to substitute lost classes show that students either borrow lecture notes from their colleagues, read the lesson by themselves, or take information from the University's Learner Management System 'LIBRI'. Table 7

Results of the final success for the first-year, second-year and third-year students in the subjects Business Mathematics, Statistics, and Managerial Economics show that the attendance (motivation, bonus) has a major impact on their final success, where odds ratios are very large.

If we make a comparison between students who are absent from classes more than 25% (with GPA 6.97), who got a failing grade or IN (Incomplete) and those who passed (Grade 6) in certain courses (Business Mathematics, Statistics, and Managerial Economics), it turns out that odds ratios for these students is approximately 8, meaning that these students who regularly attend classes have 8 times bigger chances to get a passing grade.

5. **Conclusions And Recommendations**

Based on the results of this research, it is apparent that during their studies, apart from personal commitments from everyday life and part-time employment, students also have other reasons for their absence from lectures and practical hours such as conditions, classroom management, professional skills and methods of teaching at the Faculty. Thus, the Faculty should analyse the results of the students' survey and undertake the necessary measures in order to improve and strongly encourage the attendance with both positive persuasion of the value of attendance and quality teaching. The Faculty should also review its academic programmes, course syllabi and curricula planning. Teachers should make greater commitment by using certain course practises in the classrooms such as interactive teaching, quizzes, projects, homework and other practical hours which will keep students interested in the subject matter and heighten the students' attention and presence in the classroom.

A large number of students (about 42%) report that their attendance at University was significantly better than at their high school, which is obviously a matter of concern for high school students in our country. Consequently, the Republic of Macedonia should work for improvement in this direction through various projects.

For the analysis of the educational processes, several mathematical models had been constructed by using the logistic regression, in order to follow the students' attendance. Chances are used in interpreting the results where, besides assessing the nature of the tendency that the sample has and depending on the value change of predictive features, the level of tendency is determined. In each three cases of study, mathematical models we built show that odds ratios are very large, which means that attendance has a big influence in the final success of students.

Despite the fact that students are aware of the consequences of absence from classes (78% of them state that this has an impact on their academic work), I believe that this research will serve as a proof to demonstrate how their presence influences their overall academic performance. This research could be expanded and carried out in other Faculties at SEEU.

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