

STUDY OF CORRELATIONS BETWEEN EFFICIENT LEARNING HABITS AND THE STUDY ACHIEVEMENT INDICATOR

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INTRODUCTION

Successful universities keep on investigating and studying how they could develop their academic activities and make them more efficient to meet the demands of the current legal, economic and cultural environment. For this, however, one should get to know the students' formal, informal and nonformal learning habits with reference to the paradigm of lifelong learning and also the instruction conditions characteristic of the university.

Within the framework of a project of unique initiative, the Students' Representative Body of the University (Hungarian abbreviation: EHK) declared in November 2013 that it wished to investigate the students' learning styles and habits in detail with the help of a questionnaire survey. EHK considers it of primary importance that BME students should get as high level education as possible and is committed to student quality. This motivation gave rise to the idea that in order to raise the instruction level of the university, we should get a better knowledge of our students' learning conditions, habits and methods, which would enable us to put forward innovative ideas and provide the leadership of the university and the teaching staff with supportive ideas in their decisionmaking.

This paper presents the elaboration of this almost one-year-long project and summarises its results.

1. THE BACKGROUND OF RESEARCH

Therefore, it is convenient to examine BME's student body, its major characteristics and input and output factors, and make a comparison about what qualitative features and quantitative indicators BME students display on a national scale.

On the basis of the results of the application procedure, it can be stated that on the national level, as regards technological programmes, there is only application over college quota to BME's BSc programmes. In order to preserve quality, in recent years, BME has not used 100% of the quotas available to it.

The university has been investigating the labour market suitability of its graduates for 12 years. Taking into account the salaries made in first jobs, it can be concluded that

those having a BME degree earn an income higher than the gross average earnings of full-time white collar workers employed in the business sector even at the very start of their career.

1.1. Motivations for the learning survey

The idea that the students' learning conditions, habits and methods should be investigated more closely in order to make progress in raising educational standards using them grew out of the initiative of the Student Representative Body. This demand is based on the recognition of the above elaborated factors, namely, that students' behaviour, expectations and motivations should be revealed in context so that the university can make knowledge and innovation as the factors constituting the basis of the economy in an intelligent growth model key pillars through producing highly qualified and innovative experts having both professional and social skills. For this, a complex learning survey was compiled. The main topic of my paper is to present and evaluate it.

1.2. The questionnaire

The compilation of survey questions was started in November 2013. Our basic aim was to explore students' background, learning habits, styles and their relationship to the university and to themselves. This was the motivation behind the structure of the questionnaire and the composition of the questions. The questionnaire was compiled with the help of the Internal Study Committee of the Student Representative Body. In the compilation of the questionnaire, special attention was paid to making them unambiguous so that students should interpret questions preferably in the same way. It was also important to find the proper question form for each topic area.

The survey was done online as with the students, this is the only way to get a large number of responses, and keep the database simply manageable. The questions were compiled in a Google questionnaire. After the compilation of the questionnaire, completion was tested, and any recognised errors and inaccuracies were corrected. The time of completion was also measured (about 15 minutes).

Students were able to take part in the learning survey in the period from 15 January, 2014 to 12 February, 2014 (exam period). Every active full-time student received the invitation in a Neptun message. In addition, faculty Student Representative Bodies also advertised it through official news channels.

Nearly 6,000 (exactly 5,954) students took the opportunity to complete the questionnaire, which approximately means that almost every third full-time BME student took part in the survey. Following data filtering and cleansing, we were left with 5,439 questionnaires that could be evaluated. Every further analysis was made on these data.

The questionnaire consisted of 4 major thematic parts:

- **student background** – here, basic student data, the students' current direct conditions and background were asked about
- **learning habits** – this group of questions was concerned with attending contact classes, daily and semester learning routines and the scene of learning
- **learning styles** – in this chapter, the details of the learning process were investigated including the different aspects of the learning process, individual and group learning, the role of the different senses and the tools of learning

- **student attitudes** – finally, the general issues of being a student, the priorities among the different activities, the development of 'soft skills", the student's attitude to him/herself, the university and the world were investigated. At the end of the questionnaire, the completion habits concerning Student Course Assessment questionnaires were asked about.

It was mandatory to answer all the questions. Due to the large number of respondents, guiding and closed questions were also used with some exceptions where processing was done with the help of word clouds.

1.3. Methodology

As a supplement to the learning questionnaire, a Kolb test was offered. The Kolb test is widely used in international publications to investigate problem-solving thinking. The Kolb test was also available in a Google Questionnaire. It had a simple structure. Regarding completion priorities, in the Neptun message, students were directed to complete the learning questionnaire first and the Kolb test afterwards. As a motivation for completion, we offered that we would send the evaluation to everyone who gave their e-mail addresses in a few days. The Kolb test was completed by 2,750 students.

2. DETAILED ANALYSIS

Following the simple evaluation of the survey, the correlations between the individual questions and data series were focussed on. First, it had to be investigated what success indicators could be set up which later might be used to investigate the correlations between different forms of behaviour and success in university studies. There was a huge amount of data so in this study, only some correlations can be highlighted as there are innumerable opportunities to find correlations.

2.1 Correlation between preparation strategies and study achievement indicators

In the analysis of the preparation strategies, the question naturally arises if there is a correlation between preparation strategies and study achievement indicators or not.

As a result of the analysis, it can be concluded that those students have the highest study achievement indicator who study from week to week, and those have the lowest study achievement indicator who only study a few days before tests. There is no discernable difference in study achievement indicators between those who occasionally boost their knowledge level and those who only start studying 1 or 2 weeks before assessments.

Table 1. Multiple comparisons of the correlation between preparation strategies and study achievement indicators

Multiple Comparisons

Dependent Variable: Tan_mutato

Tukey HSD

(I) Jellemző_felkészülési_stratégia	(J) Jellemző_felkészülési_stratégia	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	,447 [*]	,072	,000	,26	,63
	3	,448 [*]	,070	,000	,27	,63
	4	,574 [*]	,070	,000	,39	,76
2	1	-,447 [*]	,072	,000	-,63	-,26
	3	,001	,049	1,000	-,12	,13
	4	,127 [*]	,049	,048	,00	,25
3	1	-,448 [*]	,070	,000	-,63	-,27
	2	-,001	,049	1,000	-,13	,12
	4	,126 [*]	,046	,030	,01	,24
4	1	-,574 [*]	,070	,000	-,76	-,39
	2	-,127 [*]	,049	,048	-,25	,00
	3	-,126 [*]	,046	,030	-,24	-,01

*. The mean difference is significant at the 0.05 level.

Magyar kifejezések megfelelői:

tan_mutato= study achievement indicator; jellemző felkészülési stratégia = typical preparation strategy

2.2. Correlation between the time spent on learning and the study achievement indicator

For the investigation of the time spent on learning, the responses given to the question with the identifier 'Napi_átlag_tanulás' were analysed in the way that the average learning times for the different weeks of termtime were formed and this way, the average learning time of an average week was generated.

Table 2a. Descriptive statistics of the correlation between the time spent on learning (without an extra week) and the study achievement indicator

Descriptive Statistics			
	Mean	Std. Deviation	N
Tan_mutato	3,30	1,378	5439
atlag_napi_tan_szorg	3,0083	1,27751	5439

Table 2b. Value of correlation factor and the strength of correlation

Value of correlation factor	Strength of correlation
1	perfect
0.8 - 0.9	very strong
0.5 - 0.8	strong
0.3 - 0.5	moderate
0.1 - 0.3	weak
> 0.1	very weak
0	zero

On the basis of the responses, it can be concluded that there is a very weak but detectable correlation between the time spent on studying per week and the study achievement indicator, namely, that the value of the study achievement indicator increases with the increase of the time spent on learning (and conversely).

Regarding the work done in termtime, this means a stronger correlation, that is, better students learn proportionately more during termtime.

As we are concerned with a questionnaire here, the admitted periods of time spent on learning may be affected by a lot of factors. It is very important that no cause-effect correlations could be detected so it is not certain that the study achievement indicator will be higher due to more learning invested but the study achievement indicator may affect the admitted number of hours through self-justification, as well, or it is also possible that both are dependent on a third factor.

2.3. Correlation between satisfaction with the time spent on learning and the study achievement indicator

If the correlation with the study achievement indicator is not compared with the time invested but with the student's satisfaction with the time spent on learning, such a measure is taken into account that also reflects the student's own study achievement. It is important because this self-assessment is mostly based on local factors just like the study achievement indicator (students compare themselves to their peers' achievement, and this plays a great role in the judgement of the time invested).

On the basis of the research, it can be concluded that there is a positive correlation of moderate strength between the study achievement indicator and the evaluation of the student's own amount of learning. The exact question was 'To what extent do you consider preparation time sufficient?'. It is naturally changeable what is 'sufficient' to different individuals: whether it is sufficient for them to pass every exam or to earn an excellent grade. The correlation is affected by the difference in individually set goals. Still, a correlation is clearly discernible. It is an extra interesting factor that no correlation can be detected between the amount of learning and the evaluation whether it is sufficient so from the fact that somebody learns a lot does not follow that he/she is satisfied and finds preparation time sufficient.

2.4. Correlation between making a daily schedule and the study achievement indicator

During university studies, everyone has periods when tasks pile up, when one has to do a lot of tasks at the same time, therefore it is very important to coordinate the different tasks and manage time efficiently. An important device in this is to think over one's daily tasks in advance and increase one's efficiency through their proper timing. The question with the identifier „Tan_stílus/Napirend” was designed to reveal this: Do you usually make a daily schedule and do you adhere to it? In this section, we investigated how the inclination to make and adhere to a daily schedule correlates with the study achievement indicator.

Table 3. Correlation between making a daily schedule and the study achievement indicator

		Correlations	
		Tan_mutato	Napirend Daily schedule
Tan_mutato	Pearson Correlation	1	,098**
	Sig. (2-tailed)		,000
	N	5439	5439
Napirend	Pearson Correlation	,098**	1
	Sig. (2-tailed)	,000	
	N	5439	5439

** . Correlation is significant at the 0.01 level (2-tailed).

There is weak positive correlation between making a daily schedule and the study achievement indicator so it is more characteristic of those having a higher study achievement indicator that they at least go through the daily tasks and plan them in this way.

2.5. Correlation between the rate of men and women at the faculty and happiness

This test is simply based on intuition. Among university populations, relationship with the other sex, and after all, friendship, meeting and contact with representatives of the other sex is a very important factor. For all this, a student has much better opportunities if he/she meets representatives of the other sex every day, even if only in classes. In this investigation, no smaller groups were formed but simply, faculty statistics were taken as starting point. For the rate of men and women, a percentage indicator was used showing how far the percentage representation of the two sexes was from an equal proportion ($Abs[50\% - \text{proportion of one sex}] * 100$).

It was possible to find a significant weak negative correlation here. To some extent, this confirms the idea that the more unequal the rate of the sexes is in a faculty, the unhappier students are. Here, the cause-effect relation can be evaluated more clearly. It is not likely that one would transfer to another faculty because he/she is unhappy as there are too few representatives of the other sex but it is likely that the correlation is the result of coincidence and is caused by a third factor.

2.6. Further possibilities

The database offers a large number of possibilities for further analysis. The above statistical tests are just examples.

3. KOLB TEST

3.1. Presentation of the Kolb test

The test to determine learning styles was elaborated by David A. Kolb, an American researcher on learning and social psychologist. Kolb distinguishes four learning styles. According to his theory, learning is a cyclically repeated process, in which the phases of experiencing, observation, thinking and application can be distinguished. The learning cycle relies on a dual basis: the way of taking up and acquiring information and its processing (Kolb, 1981). The Kolb test is a simple device to

assess quickly where there are strong and weak points in your learning. The scores earned for the four ways of learning indicate which is the way of learning in which you are relatively the strongest, which you apply most often and which you like most – independently from the learning situation. An efficient learner applies all the four ways of learning in most situations.

3.2. Evaluation

Although the Kolb test is basically characteristic of the individual as it investigates the problemsolving of the particular student, it is interesting to study what ways of learning are primarily characteristic of BME's students as students of engineering, IT, economics etc.

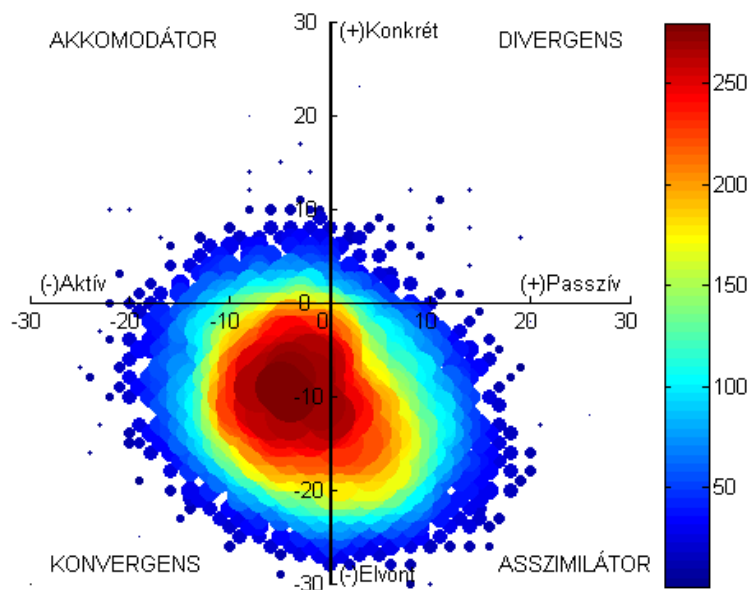


Fig. 2. The results of the Kolb test in the entire sample

akkomodátor = accommodator; divergens = divergent; konkrét = concrete ;elvont = abstract; aktív = active; passzív = passive; konvergens = convergent; asszimilátor = assimilator

It can be seen that regarding the entire sample, the convergent quarter is most typical, which combines abstract conceptualisation and active experimenting, that is, it strives to implement the practical utilisation of ideas and theories. These skills are important for a successful technological career.

4. SUMMARY

The learning survey conducted at BME was a basic research project. It investigated learning habits and efficiency. In the research, indicators were developed. The most important one, which is new, is the study achievement indicator, which provides a local success index on the basis of a system of criteria. Hypotheses were set up and then put to statistical tests.

A large scale Kolb test was done, in which any students interested could get the evaluated results of their own tests.

Through the evaluation of the questionnaire, a huge cleansed database was set up and then comprehensively analysed. The analysis provided essential information about the current students of the university, which may be interesting for every instructor because of the cooperation-based nature of education. The focus was on getting to know students' learning conditions, habits and methods better in order to further raise academic standards, and then, in the knowledge of these, to formulate innovative ideas and provide a tool for the leadership of the university and the teaching staff to support decisionmaking.

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