The need for business competencies and knowledge for engineering students - an example of the University of Miskolc

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ABSTRACT: The University of Miskolc was established as a heavy industry university in the late 1940s. The whole culture and atmosphere of this institution was based on the fact that only engineering and technology education was in the training programme. After a few decades, the University has grown considerably and now has a wide range of research, education and training activities. An engineering student (whether mechanical, mining or electrical) can no longer obtain a degree without passing several courses related to economics and management. Nevertheless, most of the students do not even think that they will ever attempt to study the subjects of those courses. This study endeavours to show the attitudes and opinions of the students about their training programmes regarding the supportive courses in the field of business and management. The approach is to compare the needs of the labour market, the structure of training, the educational cultural facts and the results of a research questionnaire distributed to engineering students.

INTRODUCTION

Intolerance Towards Business Studies or Inappropriate Curriculum

The aim of this study was to ascertain a clear view on students' perceptions about the courses taught to them by the Faculty of Economics (referred to in this paper as business studies; economics students, business students, students of the Faculty of Economics are used here as synonyms). The results could be used to improve the curricula, especially the courses designed for engineering students.

The Institute of Management was called the Department of Industrial Economics, a part of the Faculty of Mechanical Engineering from 1957 until 1987. This Department was the essential basis for the foundation of the Faculty of Economics, and now, it is part of this Faculty in the organisational structure of the University of Miskolc.

Most of the courses have a strong engineering approach; nevertheless they are not favoured by engineering students. This dislike by the students was only noticeable at the seminars and never examined before. From another point of view, feedback can be given to the respondents about the utility of the questioned skills and competencies.

None of the respondents was aware that the questioned competencies were not selected randomly but they were the ones that employers described as being the most important ones for their future employees [1][2].

The Institute of Management Sciences is committed to the quality improvement of the University's activities and the Faculty of Mechanical Engineering and Informatics is a great partner in that common goal.

The Questionnaire

The survey questionnaire was distributed to 262 students from the Faculty of Mechanical Engineering and Informatics. To collect data for comparison, a survey among the students of the Faculty of Economics was also conducted. There were 81 respondents.

Both Faculties sent requests through the e-mail address lists of the Student Council to Bachelor and Master students, and Bachelors were asked to state the current year of their studies. None of the questions were compulsory. For that reason, the sum of the results does not necessarily total 100%. The structure of the respondents at the Faculty of Mechanical Engineering and Informatics and at the Faculty of Economics is shown in Figure 1.

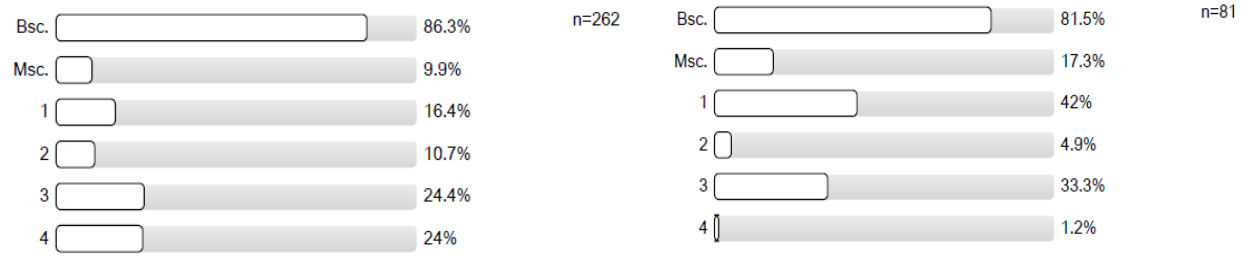

Figure 1: Respondents at the Faculty of Mechanical Engineering and Informatics and at the Faculty of Economics.

In both sets results, it can be seen that more Bachelor students responded to the questionnaire. Among the engineering students, a representative group of students from different school years responded, but more students in their third or fourth study year responded (This was more useful because these students have more experience about the courses). The results obtained from the students of the Faculty of Economics are slightly distorted because they include an over-representation of students in their first year (actually in their first semester before any examinations have been attempted), and students in their third year responded mainly to the questionnaire.

General Questions

A five-point scale was used. In the first part of the questionnaire (general questions), 1 indicated: *absolutely not true* and 5 indicated: *absolutely true*. The general questions were as follows: *The courses taught by (NEn, Ec, NEc) are*:

- *Important to me;*
- *In my focus;*
- *Difficult;*
- *Interesting from a professional point of view;*
- *Useful in my future career;*
- *Useful to get a higher salary in the future;*
- *Giving me a more complex view on the future field of my activity.*

NEn, Ec and NEc refer to the following faculties: non-engineering faculties (NEn), Faculty of Economics (Ec) and the non-economics faculties (NEc). Engineering students were asked about the NEn and Ec courses, and business students were asked about the Ec and NEc courses. Results from the two different samples were not compared for the general questions. Only differences between the answers about Nen-Ec and the answers about Ec-NEc courses were examined in their own context. The results showed that engineering students do evaluate the business studies below average among the other courses taught by NEn faculties. The average values were:

Table 1: Results of the general evaluation among the engineering students.

The courses taught by non-engineering (NEn) faculties are:						
Important to me	In my focus	Difficult	Interesting	Useful in career	Useful for salary	Giving Complex view
2.7	2.4	2.9	2.7	2.7	2.5	2.7
The courses taught by the Faculty of Economics (Ec) are:						
Important to me	In my focus	Difficult	Interesting	Useful in career	Useful for salary	Giving Complex view
2.4	2.3	2.7	2.4	2.6	2.4	2.6

Table 2: Results of the general evaluation among the economics students.

The courses taught by non-economist (NEc) faculties are:						
Important to me	In my focus	Difficult	Interesting	Useful in career	Useful for salary	Giving Complex view
2.9	25	2.8	3.2	3.1	2.6	2.7
The courses taught by the Faculty of Economics (Ec) are:						
Important to me	In my focus	Difficult	Interesting	Useful in career	Useful for salary	Giving Complex view
4.4	4.3	3.9	4	4	3.9	3.8

The engineering and business students rated the subjects outside their own field of expertise similarly. The business students appreciated the courses of NEc as being interesting and useful in their future career more than the engineering students. Of course, the trivial fact that the business students focus more on their own subjects than engineers can be seen.

Expected Competencies

A survey designed by the Institute of Management Science identified the need for several competencies of the employees of the companies that responded to this survey [1][2]. These competencies are:

1. Logical thinking;
2. Sense of reality;
3. Profoundness;
4. Reliability;
5. Professional skills;
6. Ability for understanding the others;
7. Self-development capabilities;
8. Cooperational skills;
9. Honesty;
10. Ability to learn from mistakes;
11. Decision-making skills;
12. Oral communication skills.

(These numbers will be used for identification of the competencies at the figures below).

The companies searching for engineers and economists highlighted these competencies. The demanded general skills and capabilities did not differ significantly between the two professions (except professional skills) so both samples were used. The aim was to examine the ideas and opinions of the students about the selected competencies from two points of view. One was the utility of these competencies in the eyes of the students. The other part was about the contribution of the courses taught by the Faculty of Economics to improving the students' skills in the aforementioned competencies.

All the questions were based on a 5-point scale. The questions were stated as:

How important could these competencies be in your future? 1 meant *not important* at all; and 5 meant *very important*.

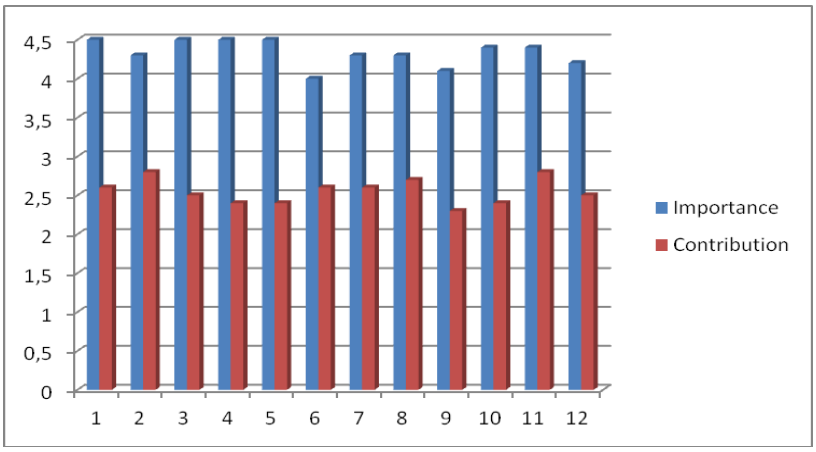

Figure 2: Importance of the competencies and the contribution of the business studies rated by the engineering students.

As can be seen, the engineering students are fully aware of the importance of the demanded competencies (4.5 was the maximum and 4.0 the minimum). The contribution of the Faculty of Economics to acquire them is poor. The best contributions are in the fields of decision making and sense of reality (both averaged 2.8) and the lowest was honesty (2.3). The backround to the results should be examined.

Perhaps the curriculum should be redesigned in order to make it more interesting and more useful. In addition, the utility of the business subjects must be emphasised by the lecturers. Knowledge transfer must occur by explaning the business point of view of the studies but through the eyes of the engineer. The next figure shows the results among the students of the Faculty of Economics. These results provide an opportunity for a more precise approach.

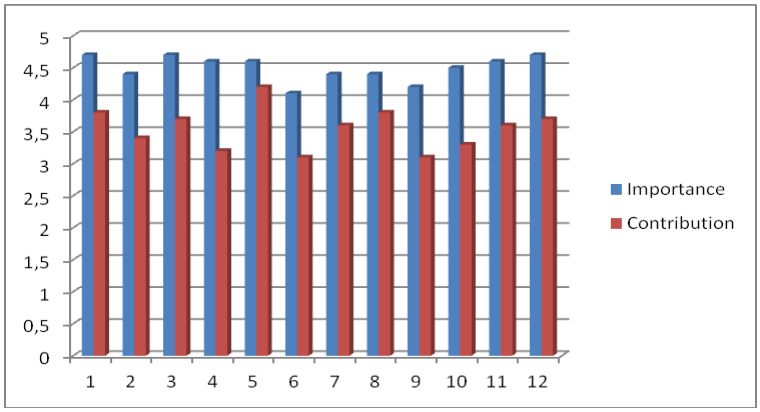

Figure 3: Importance of the competencies and the contribution of the business studies rated by the business students.

The business students also think that the competencies are important to them (4.7 was the maximum and 4.1 the minimum). The contribution here shows a better state. The poorest contribution was by honesty (just as in the engineering students' sample) and the best contributions (not mentioning professional skills with 4.2, which must be the most important of all) were in the field of logical thinking and co-operational skills (both rated 3.8). The biggest difference between the opinions of the two samples about the importance of the competencies was in the field of oral communication. The engineering students do not think that their communicational skills would be so important for the future; nevertheless, there is a n eed for engineers to have excellent communicational skills, especially in foreign languages such as English or German, based on the experience from employment in the North-Hungarian region (Bosch is one of the biggest employers in Miskolc for engineering graduates).

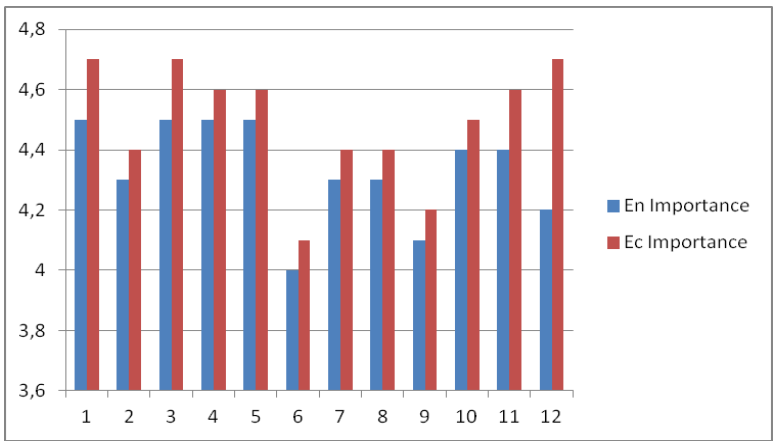

Figure 4: Comparing the results by the importance of the competencies (En: engineering students, Ec: Economics/business students).

The contribution shows entirely different results. This field was relativly poor at both samples (especially by engineering students) but there is a huge gap between them. Perhaps the curriculum should be tailor-made for the engineering students and use different tools, literature and even different methods to help them to get acquainted with the competencies required, throughout the business studies seminars.

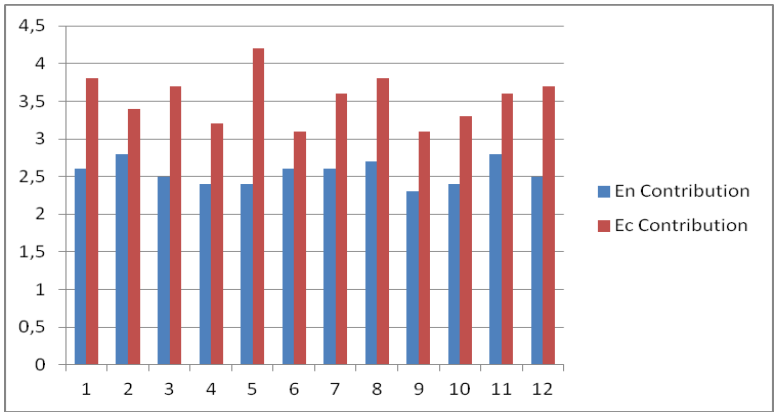

Figure 5: Comparing the results by the contribuiton to the competencies (En: engineering students, Ec: Economics/business students).

CONCLUSIONS

This questionnaire was just the first step to discover the difficulties faced by the academic staff, but it is obvious that there is much to do in curriculum development. Specialisation is needed to satisfy employers' requirements and to encourage the students. Further studies about the special needs of the engineering students from the field of business and economics must be undertaken. Perhaps, this approach is not appropriate for all the students from different faculties, but the tendency is that *...the professions are converging; engineering, medicine, law, and business are moving toward similar project- and problem-based pedagogic frameworks* [3].

Perhaps, the whole structure and implicit idea of the curriculum should be transformed now to provide theoretical and sometimes alternative information that differs from the interest field of mechanical engineers in order to show them the entrepreneurial side of the business studies and encourage them to establish their own businesses. This matter was studied by many researchers, such as Standish-Kuon and Rice [4].

As a competence-based approach, the teaching just started by the University of Miskolc and the Faculty of Economics had its first *Competence Days* where skills, capabilities and knowledge were evaluated by the students. A future goal should be to have continuous competence measurements by incoming students, by those who are still in their studies and by those who have graduated. This system would provide a great opportunity to both the students and academics to improve their personal career and to contribute to improved competencies in a better way. This study is a part of the quality management processes done by the University of Miskolc.

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