

Concepts and Experiences - Female and Male Students about Technology Higher Education Programmes

Valéria Szekeres, Ph.D.

Óbuda University, 1084 Budapest, Tavaszmező u. 17, Hungary

szekeres.valeria@kgk.uni-obuda.hu

Abstract: In spite of their higher number in tertiary education, women form a significant minority in engineering and IT academic programmes. This phenomenon has been defined as a problem in several countries. In Hungary so far there has been no research on the situation of female students in higher educational technology programmes. This paper presents the results of a quantitative study that was conducted among the university students of the faculties of electronic engineering, mechanical engineering and IT. The results show that significant gender differences exist in various aspects of the choice of career and university experiences. The paper gives suggestions as to the measures towards a more balanced gender representation in technology higher education programmes.

Keywords: higher education, training in technology and IT, gender equality

1 Introduction

In the tertiary education of Hungary certain fields are dominated by female students and others by male students. The largest gender gap can be found in IT and engineering: the rates of men are 6,6 and 4,3 times higher than those of women. Although they are low in proportion, female students are successful in obtaining a degree in these fields. Compared to the male students, a lower proportion of women drop out of universities and a higher proportion of them obtain a degree (NEFMI, 2006).

In the tertiary education, in general, women outnumber men. On the other side, they are barely represented in engineering and IT academic programmes; their share is much less than ten percentages. The small proportion of female students in these fields has been defined as a problem in several countries. The causes of the problem include gender stereotypes among teachers, students and members of society, and the shattered self-esteem of girls (OECD PISA, 2007; Spencer et al, 1999). Fighting against gender stereotypes and promoting equal gender

opportunities in education have been set as one of the goals of the European Union (European Parliament, 2006). Also, companies employing engineers and IT professionals need female employees in order to ensure a more successful marketization of their products in the markets dominated by female consumers.

To invoke more girls to study in technology related fields, Germany along with other countries started various initiatives such as Girls' Day, to provide opportunities for girls to visit companies with technical departments, laboratories, where they can get personal experience and talk to the employees. Some universities have started interdisciplinary academic programmes with the aim of getting more female students. In media-informatics, for instance, there is a greater proportion of female students than in more traditional technology programme fields such as mechanical engineering (Csekei, 2008).

In order to recommend measures appropriate to reduce the gender inequality in technical higher education, a survey on the conditions of students is necessary. In Hungary, there has not been conducted research on the situation of female students in higher educational technology programmes. This paper presents the results of a quantitative study that was conducted among the university students of the faculties of electronic engineering, mechanical engineering and IT. We are going to show the main aspects of the university studies from the viewpoints of both female and male students.

2 Methodology

We have conducted an online questionnaire survey among the full-time students of a university in April 2012.¹ They were asked in emails through the Neptun system to answer the questions. The research focussed on three topics: factors behind the motivations of students during the choice of career, their experiences at the university and ways of making technology programmes more popular. The ratio of those replying the questions was considerably high, 23,6%, which is due to the fact that several times warning emails were sent to the students to call them for filling in the questionnaires. All the answers were evaluated by gender. In the following sections we show the partial results of the survey, concentrating on the answers given by the students of the faculties of electronic engineering,

¹ The research was part of the gender sub-project of TÁMOP 4.2.2/B-10/1-2010-0020 Support of the scientific training and workshops and development of the talent management system at the Óbuda University. The Hungarian acronym TÁMOP refers to the Social mobility programme of the European Union. The collection and analysis of the data have been implemented by the Krolify Opinion and Organizational Research Institute.

mechanical engineering and IT. The number of participants belonging to these faculties was 1267.

3 Results of the research

3.1 Motivation, choice of career and plans

The motivation behind and the commitment towards the chosen career were examined together with the students' plans and aspirations about the future. There was not a significant gender difference in the scores attained in the entrance exams. On average, the students in the IT programmes achieved the highest level of scores, 324 points, while the others in the faculties of mechanical engineering and electronic engineering received scores 319 and 308 respectively.

Concerning the ratio of students who chose their fields as their first choice when marking their preferences for their tertiary education, the gap between the male and female students is between 6% and 29%. It is the men who more often chose their fields as their first choice, and their proportion is the largest in the faculty of electronic engineering and the smallest in the faculty of IT.

As to the motivations behind choosing the faculty, the participants could choose among various aspects: relative prestige of the faculty, score limits of previous years in the faculty, marketability of the diploma, possibilities of further studies in the faculty, relative performance of the faculty in the hierarchy of higher education, and the number of places supported by the state. Neither the female nor the male students were indeed attracted by further studies. Women considered the prestige of faculty and the marketability of diploma by far the most important factors when applied to the university, although this latter also played an important role for men in the faculty of mechanical engineering. The consideration of an easy admission to the university, including the score limits and the number of places supported, was more significant for the women.

In the questionnaire we asked the students about how informed they were concerning the content of their future studies and jobs. The women were more informed than men, excepting the faculty of electronic engineering, and the gender difference was considerably large in both directions. Concerning the students' assertiveness and confidence in the future, there is a significant gender difference only in the faculty of IT where the men are much more confident than women. As to the question, if the first workplace will be closely related to the present field of study, there is no significant gender difference.

3.2 Experiences at the university

The academic records by faculty and gender reflect more or less the subjective judgements of students: it is the women who have found the education more difficult than men, excepting the faculty of mechanical engineering. The scholastic average of men was better than that of women at the IT faculty, the contrary was true for the faculty of mechanical engineering, and no difference was shown between the genders in the faculty of electronic engineering.

We also examined various indicators of satisfaction: the judgement about the education compared to previous expectations, recommendation of the education to others, and reconsideration of decisions on the choice of career. Among the students the level of feeling satisfaction with the training is higher at the men. Women think more often of disrupting the training, because lack of information and intention to remain in the chosen career may lead to dropout resolution.

Men form a considerably close community in the faculties of electronic engineering and IT. We know that from the fact that they very rarely make friends with women. On the other hand female students prefer the company of men at each faculty. As to the gender difference in assistance in the faculties, female students, particularly in the faculty of electronic engineering thought significantly more often that men are more helpful than women.

The students were also questioned about their feelings whether they were discriminated against or not by their colleagues or professors on the basis of their sex. A considerably higher percentage of women than men felt that both advantages and disadvantages occurred to them because of their sex. In the faculty of mechanical engineering, female students did mostly experience a negative attitude towards their sex. This misbehaviour includes comments or quips, higher/lower expectations in university tasks, less/more attention on the part of professors, impoliteness and isolation.

There are significant gender differences in the evaluation of attributes related to studies. In each faculty, women deal with studies during a much longer period of time. Similarly, attention in classes by women is evaluated by higher scores at each faculty. In spite of these results, passing exam seems more difficult for women, with the exception of the students of the faculty of mechanical engineering. Women are thought better in terms of theoretical conceptions and men in terms of practical problem-solving, but in the IT faculty men are considered better in both fields. Regarding the self-confidence in capabilities, men were given much higher points at each faculty, but women can much easily communicate with professors.

Concerning the reconciliation of career and housework, men represent a more traditional, conservative attitude. This opinion was expressed by the men's strong approval of those statements such as most women's dream is to have home and

children or the life of a family is disturbed if the wife works full-time. Men did not think to as large extent as the women that the reconciliation of career and family can be solved in the case of women. Female students consider more feasible that career and family life can be reconciled with each other.

3.3 Ways of making technical programmes more popular

The students involved in the survey do not consider very important to increase the number of women in the fields of IT and engineering. However, female students, particularly in the faculty of mechanical engineering rather agreed with the statement that more women are needed in their career. The gender difference in the opinions was substantial in this faculty. On the other hand, regarding the question whether students would be glad to see more women in their faculties, men replied yes in an overwhelmingly large percentage. Women were asked about the measures necessary to propagate the faculties for secondary school students. They think that the most important steps include lectures given by companies employing female engineers or by women graduated from or studying in faculties of technical programmes. The organization of Open Days at university or Girls' Day was also regarded an important step towards the rise in the number of female students. Reorganization within the university, such as the introduction of mentoring programmes for female students, alumni groups or interdisciplinary training, was not popular among the participants in the questionnaire survey.

Conclusion

This paper has summarized the most important results of a quantitative survey conducted among full-time students who are participating in the training of bachelor and master programmes in the faculties of electronic, mechanical engineering and IT. They were questioned about their motivations and satisfaction with the training. The answers were analysed by gender. We also asked the students about their opinions on the gender-based discrimination, difference in performance and expectations. Related to these issues, we also received suggestions on the steps to be taken in order to boost the number of female students.

Results of the research indicate that the students would appreciate a more balanced gender representation during their studies. To attract more female students to apply to technology higher educational programmes, personal relationship and impressions at secondary schools are essential. Lectures by female engineers and IT specialists can provide a key step for girls interested in technical matters. Similarly important measure can be the improvement of the atmosphere at the university to avoid prejudice on the part of professors and male students.

