

COMPARISON OF FULL TIME AND COMBINED STUDIES WITH GENDER ASPECT

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Abstract

The Czech University of Life Sciences operates seven tutorial centres for combined education in several regions of the Czech Republic. The number of female students is over 50% in the tutorial centres as well as in the full-time study form in Prague. The share of women is remarkably growing in combined study. The article focuses on the students in tutorial centres. The data on their demographic structure, their subjective opinions and motivation are from a questionnaire survey which the authors proposed and realised in several centres outside Prague. The goal of the survey is also to discover differences in motivation and conditions for male and female students. The article contains results of the questionnaire survey and its statistical analysis. The analysis brings basic demographic structure of the respondents and other information from students with comparisons of answers of men and women. The analysis of quantitative signs, tests of relationships and odds ratio, are made to find relations and dependencies between chosen variables. The statistical analysis uses software SPSS, version 17. The differences between the genders are found only in two questions and none of them was strong. The data from questionnaires are eked out with official data given by the faculty study department. These data are used for comparison of full-time and combined studies. The article considers the numbers of students, their achievements

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and gender structure in full-time and combined form of study. The results appears more beneficial (and with raising trend) for women both in full-time and distance studies.

Key Words

Combined education, tutorial centres, questionnaire survey, statistical analysis, gender differences, fruitfulness of study

Introduction

In recent years there are more than 50% of female students in Czech universities. In 2010, there were 370 000 students in all Czech universities, 57% women. In 1991, there were only 41% of women. The number of female graduates is 42 000 (57.5% of the total number); male graduates make up 31 000 (Vavroň, 2010 and CSO, 2010).

A similar situation is also in the Czech University of Life Sciences in Prague (CULS), definitely with differences depending on a study branch. The fruitfulness of the study in the regular form is about the same for women and men. The fruitfulness we understand here as successful graduation with a bachelor's or master's degree (Houška and Beránková, 2007 and 2008).

A different situation is for women who due to some reasons interrupted their studies or did not continue to the university right after the secondary school. If the women had not finished their studies nevertheless they still had potential and abilities, they got into a threat of social exclusion. They can be long-time unemployed (more probably in rural regions) or they are permanently not satisfied with their work which is not qualified enough. They often change jobs and in fact never can get into a position which would be acceptable for them. The permanent dissatisfaction can lead to problems in many aspect of their everyday life.

Such women rarely go back to regular studies. Some of them are interested in improving their qualification in various long-time or short-time courses.

Often they try to get the university graduation in their mid-age when their children are grown up and the apprehension of losing a job is stronger than when they were younger. Usually the women are working in a certain position for many years and

suddenly they have to face the situation that they would not be allowed to stay in their position without higher (university) education. This situation is now typical for women employed with the state and local executive, with police and army, with financial and labour offices, as well as the teachers and nurses. These are probably the reasons of steadily higher numbers of female students in distance form of study with even a small increase which were monitored in the whole Czech Republic (IEE, 2010).

The article deals with studies of women in distance courses realized by the CULS, the Faculty of economics and management (FEM). It gathers the results of the survey which took place in the TC outside Prague.

The traditional presumption is that the men are better in maths and science and that there are many other differences in educational capability caused by the gender. This point of view is too simple. It was discovered that there are more factors that are causing the gender test score gaps (Bedar and Cho, 2010). In some investigation the scores of women were even better but the gender achievement gap favouring girls decreased during the middle school (Lai, 2010). This corresponds with our point of view – the gender differences are getting stronger with age.

Socially responsible educational development issues include examination of whether students in diverse situations have equal access to educational programs. Within a global society that supports equal opportunities for individuals, issues of access to educational content have merit at both individual and social levels (Stewart, 2004).

Very important part of the distance studies is the on-line communication and exploitation of the on-line materials, e.g. text books and tests. The way of using seems to be different for

men and women however this fact looks to be more beneficial for women.

Blum (1999) characterized the voice of male messages as tending to be confrontational, autonomous, certain, abstract, arrogant, or consisted of a controlling nature, while female messages tended to be empathetic, mentioning self, family, or spouse, or had a cooperative tone. Blum also noted that male communication patterns were different online where male domination seemed to be stronger than in face-to-face communications. Confrontational behaviour appears to be more common in virtual environments, which seem to reduce inhibition and constraints of etiquette.

Based on his investigation of gender differences in distance learning, Sullivan (2001) reported: "The data provide compelling evidence that online courses are of great value to non-traditional students, particularly female adult learners with children or family responsibilities". Females appeared to have more compelling needs for flexibility. Sullivan suggested that might be why adult female students are seem to take more and successfully complete more distance courses than male students.

Distance learning is a new trend of education. One of the attractions of the distance learning is its flexibility of instruction. Since students and instructors can be separated spatially and temporally from each other, students in a remote area and part-time students can all benefit from this spatial-temporal flexibility as well as a high degree of information sparing (Chang, 2002).

New communication technology, such as the internet, has been widely used in order to reach those who are unable to enrol at conventional universities. By way of such technology, students are supposed to be able to study wherever and whenever they

want, and thereby gain the flexibility necessary for conducting their studies (DePew and Lettner-Rust, 2009).

This flexibility in time and place can be one of the main reasons of higher percentage of female students in distance studies. Travelling for course to a certain place might be especially difficult for women with families.

There are questions on ability or disability of women in context of using technologies. Many researches have been made on this topic.

Technology itself (e.g., computer software programs, computer lab space) may also be a type of learning material that maintains or promotes gender bias in the classroom by including male lead characters in a majority of software programs or by having limited computer lab space, making it difficult for everyone to get a chance to use technology on a daily basis. While technology is becoming more of a necessity in the classroom because of its widespread use, concerns about the disadvantages technology may produce in education have been set aside. As technology in the classroom increased and was intended to make education easier for all students, it has actually served to increase gender-bias (Plumm, 2008).

A significant sex difference in attitudes towards computers was observed. Although both males and females alike were aware of the value and benefits of computers in daily life, females showed less interest in learning about and using computers. Male and female differences were mostly realized with respect to self-confidence in using computers (Shashaani, 1993).

The distance courses we investigated are also based on communication technologies, mainly on Internet. This article can be taken as another contribution to above mentioned discussion.

The objective of this work is to investigate the motivations and results of students in the TC. The study includes search for dependencies between demographic signs and reasons for study. The second objective is to compare motivation of men and women in the TC and the results of men and women in both TC and in regular studies. These investigations are made on real data coming from a questionnaire survey and from official database of the FAM. The data from survey we analyse by standard statistical methods. We use both single and multiple dimensional statistical methods to characterize the responders and to find and prove supposed dependencies.

This article reassumes the publication presented on conferences (Dömeová et al., 2010). (Vydrová and Dömeová, 2009) extended with deeper insight into survey data and comparisons with faculty and national statistics.

Material and Methods

Survey administration

The FEM operates TC in Litoměřice, Hradec Králové, Most, Cheb, Jičín, Šumperk, Klatovy and Tábor. The centres were established with a support and cooperation of local secondary school or other organization like agrarian chamber. The capacity of each TC is about 100 students in one class; three classes are on bachelor's level and two on master's level. There are about 1,500 students in all TC in all classes.

The study includes contact education – 16 lessons for one subject, five subjects per semester.

The questionnaire was developed by the authors and was pre-tested using 10 students of full-time study to assess its logical consistence and easy understanding.

The respondents of the survey were male and female students of various TC in both bachelor and master levels. The questionnaires were distributed by teachers and the students were asked to complete them during the breaks. 356 of complete and valid questionnaires were collected and analyzed. The study was realized as a pilot one with supposed amplification to other faculties and universities.

Statistical background

The 2x2 contingency table is called a four-field table (the scheme is in Table 1), It compares two dichotomous signs (Hindls et al. 1999).

The influence of each sign is possible to test by χ^2 test for the contingency table. The χ^2 is able to reject or not the null hypothesis on dependency or homogeneity of data on a given significance level α . There are also some modified coefficients or testing based on odds ratio. (Řezanková, 2005)

	Sign B	
Sign A	b_0	b_1
a_0	a	b
a_1	c	d

Table 1 Contingency table 2x2 (source Řezanková, 2005))

We suppose that each sign A and B can be classified by two variables (sign A a_0, a_1 ; sign B b_0, b_1). The **a** is then defined as number of elements (from selection with extent n) which belong to category a_0 by the sign A and to b_0 by B. The definition of **b**, **c**, **d**, is similar.

The influence of factors was expressed by odd ratio and relative risk for selected 2x2 tables. The odd ratio is equal to 1, $\Psi = 1$, if the variables B and A are independent. The values $0 < \Psi < 1$ indices the negative association, values

$1 < \Psi < +\infty$ positive association between A and B. It follows, the scale of values Ψ is asymmetrical around the value 1 (Řezanková, 2005).

The odd ratio is calculated as relation of relative risks RR_1 a RR_2 , where

$$RR_1 = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a(c+d)}{c(a+b)}, \quad 1.1$$

$$RR_2 = \frac{\frac{a+b}{d}}{\frac{c+d}{d}} = \frac{b(c+d)}{d(a+b)}, \quad 1.2$$

$$\Psi = \frac{PR_1}{PR_2}, \quad 1.3$$

Goodman –Kruskal's λ

The coefficient λ presents the measure of reduction of prediction error; in the case we know the value of the describing variable. This value can be zero even when the dependency between variables is proved.

$$\lambda_{Y/X} = \frac{\sum_j n_{mj} - n_m}{n - n_m}, \quad 1.4$$

n_{jm} ... maximum (modal) absolute frequency of j-th line

n_m ... maximum marginal frequency, i.e., summation line

By analogy can be derived: $\lambda_{X/Y}$.

The calculation of the coefficient λ is possible only when the nonzero frequencies occur in more than one column. The coefficient can take the value from $<0;1>$ interval. The value 0 is for the case when the categories of the line variable do not contribute to the prediction of the category of the column variable in any way. The value 1 appears when each line of the table contains at most one field with nonzero frequency.

Goodman – Kruskal's τ

Calculation of this coefficient is based on a analysis of dispersion. With growing scale of the contingency table the coefficient tends to reach relatively small values. Seeing that coefficient is a result of the variability decomposition the extraction is suggested. The values are then more similar to the contingency coefficient.

$$\tau_{Y/X} = \frac{n \sum_{i=1}^r \sum_{j=1}^s \frac{n_{ij}^2}{n_j} - \sum_{i=1}^r n_i^2}{n^2 - \sum_{j=1}^s n_j^2}, \quad 1.5$$

The statistical analysis was realized with the statistical software SPSS, version 17. The significance level for test was $\alpha = 0,05$ (Field, 2005 and Leech et al., 2008).

Materials

This analysis was based on a questionnaire survey realised in the TC of the CULS, FEM. The content of the inquiry form is in Table 2 and Table 3.

The statistical analysis was focused on all parts of the form with exception of the question 13-16. The goal was to describe the structure of the responders and to describe the motivation for study with gender aspect.

The motivation with gender aspects were searched in questions 10-12. The responders can chose more than one answer for each of these questions. The null hypothesis H_0 was: There is no difference between the answers of male and female students.

No.	Question	No.	Question
1.	Sex	7.	Previous educational attainment
2.	Age	8.	Uncompleted university studies
3.	Number of children	13.	Proposals for study system improvement
4.	Place of living, number of inhabitants	14.	Study branch
5.	Place of living	15.	Proposed changes in time schedule
6.	Working activity	16.	Other proposals

Table 2 Socio-demographic questions and students' proposals
(source: own work)

No.	Question
9.	Reason of incomplection of previous studies.
10.	Identify the main reasons for present studies.
11.	Why do you study in a combined form?
12.	What do you most appreciate on the distance form of study?

Table 3 Questions on motivation (source: own work)

Results and Discussion

Information on the respondents

The total number of women was higher than the number of men. The female forms 61% and male 39% in the questionnaire survey. This gender distribution is in line with the real share of men and women in TC of the CULS. It confirms higher demand for study among women.

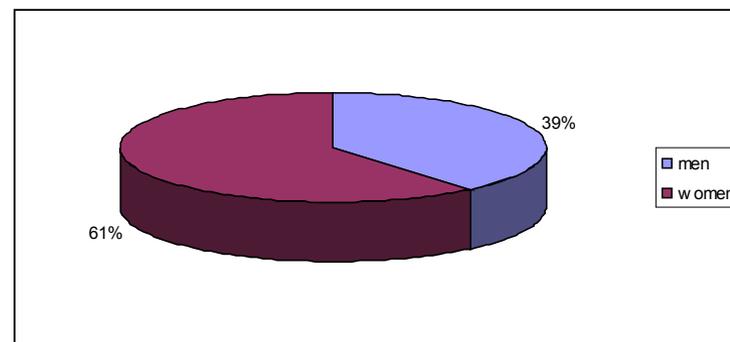


Figure 1 Distribution of men and women in the questionnaire survey (source: own work)

The responders were divided into 5 age groups. The most frequent was the age 26-30, the second 31-35; both for men and women. The most frequent were full time jobs. 8% of students were on the parental leave (all of them women).

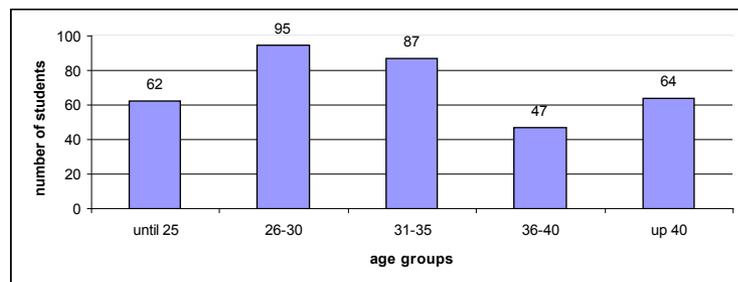


Figure 2 Distribution of age groups in the questionnaire survey
(source: own work)

All the respondents have finished some kind of secondary school; some of them have finished university (another branch not suitable for their today's employment) or have not finished their previous university studies. The graduate students are usually from pedagogical or lawyer's faculties. The demographic information on the respondents is in Table 4.

We use the contingency tables for the analysis of dependency of certain signs. The contingency tables are two dimensional tables of frequencies which contained always one couple of categories. This process is used for calculation of dependency measures. (Řezanková, 2005).

The chi-square test is able to confirm or to refuse the H_0 hypothesis that the signs are independent. The value p which was calculated in the test was compared with the value $\alpha = 0,05$. When p is lower than α than the dependency is significant (proved). If the dependency is proved, the intensity of dependency can be

measured by the measures of the dependency intensity (Hindls et al., 1999).

79% of women are in full time jobs (83% for the whole file), 14% is on maternity leave. The high number of full-time employed student is caused, by our opinion, by raising demand of university degree for state employees. They have to reach the university degree to maintain their position or to further progress in their carriers.

The calculated value of $p = 0.00027$ is lower than the value of chosen α . The null hypothesis that the signs are independent can be refused. The dependency between gender and working activity exists. According to the values of dependency measures the dependency is weak – all the calculated measures have the value of about 0.3.

Measure	Items	Percentage
Gender	Female	61.0
	Male	39.0
Age	Under 25	
	do 25	17.4
	26-30	26.7
	31-35	24.4
	36-40	13.2
	above 40	18.0
Number of children	0	42.1
	1	20.2
	2	32.3
	3	4.5
Job title	Full time employee	82.9
	Part time employee	1.4
	Entrepreneur	5.3
	Maternity leave	8.4
	Unemployed	0.9
Place of living	Town	75.0
	Countryside	23.3

Table 4 Demographic information of the respondents
(source: own work)

Motivation analysis

For the questions 10, 11 and 12 we construct relative frequencies

Question no.9: The reason for unfinished previous university studies

In the case of unfinished university studies, the students could have named the reason of the previous failure. Majority of students had no previous experience with university studies or they have successfully graduated. The most frequent reasons of not completing the studies were “dissatisfaction with chosen branch of the study” and “other reasons”. According to the results of the analysis we can say that the dependency between gender and reason for unsuccessful termination of university studies exists ($p = 0.0004$). The calculated intensity of dependency is medium.

Question no.10: The reasons for present studies

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent reason was “I want to have good feeling and to raise my self-confidence. “; in about 30% were answers:” I want to get higher position.” and “I want higher income.” (Table 5). The gender relation was proved only for the answer “I want to have good feeling and to raise my self-confidence” (see Table 6) which was remarkably more often selected by women (see Table 7).

Answer	Percentage
I want to keep my position at work.	23.0
I want to get higher position.	33.1
I want to change job (employer).	19.1
I want to change job (qualification).	10.7
I want higher income.	29.2
I want to have good feeling and to raise my self-confidence.	57.6
I want to raise my prestige in family.	6.5
I want to raise my prestige in employment.	23.3
I want to raise my prestige among friends.	5.1
Other reason(s).	4.2

Table 5 Reason for studies – relative frequencies (source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I want to keep my position at work.	No	p = 0.072	
I want to get higher position.	No	p = 0.171	
I want to change job (employer).	No	p = 0.209	
I want to change job (qualification).	No	p = 0.318	

I want higher income. No p = 0.488

I want to have good feeling and to raise my self-confidence. Yes **p = 0.004 0.152**

I want to raise my prestige in family. No p = 0.993

I want to raise my prestige in employment. No p = 0.199

I want to raise my prestige among friends. No p = 0.141

Table 6 Reason for studies – gender dependencies (source: own work)

		Yes	No	Total
Sex	Female	137	78	215
	Male	67	72	139
Total		204	150	354

Table 7 Number of answers: The reason for study is: "I want to have good feeling and to raise my self-confidence." From men and women (source: own work)

Question no.11: Why do you study in a combined form?

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent reason was "I do not want to leave my job." (Table 8). The gender relation was proved only for the answer "I have to keep the house and husbandry." and for "I do not want to leave my job." - see Table 9.

Answer	Percentage
I do not want to leave my job.	62.6
I cannot effort reduction of income.	40.0
I cannot commute.	18.8
The entrance examination is the main problem.	10.4
I think that the regular study is more demanding.	3.4
I have to take care of children.	25.6
I have to take care of handicapped or seniors in the family.	2.0
I have to keep the house and husbandry.	6.5
I have to run my firm.	3.7

Table 8 Reason for combined form of studies – relative frequencies (source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I do not want to leave my job.	Yes	p = 0.045	0.106
I cannot effort reduction of income.	No	p = 0.796	
I cannot commute.	No	p = 0.243	
The entrance examination is the main problem.	No	p = 0.113	
I think that the regular study is more demanding.	No	p = 0.850	
I have to take care of children.	No	p = 0.168	

I have to take care of handicapped or seniors in the family.	No	p = 0.566	
I have to keep the house and husbandry.	Yes	p = 0.008	0.140
I have to run my firm.	No	p = 0.265	

Table 9 Reason for studies – gender dependencies (source: own work)

Question no.12: What do you most appreciate on the distance form of study?

The sum of percent does not give 100% because the responders can chose more than one answer. The most frequent answer was "I can combine the study and the full time job." (Table 10). More frequent answers for women were two – see Table 11.

Answer	Percentage
I can study in a place close to my home.	52.2
I can combine the study and the full time job.	78.9
I can use my free time for my own development.	11.0
The self study based on provided materials is possible.	24.2
I can socialize, find new friends and contacts.	11.5
My fellow students are in a similar situation, I do not feel second-rate.	12.6
The teachers have better access to adult students.	9.3
Other benefit(s)	2.8

Table 10 Benefit of combined studies – relative frequencies (source: own work)

Answer	Dependency proved	p-value	Pearson's coefficient
I can study in a place close to my home.	No	p = 0.765	
I can combine the study and the full time job.	No	p = 0.159	
I can use my free time for my own development.	No	p = 0.438	
The self study based on provided materials is possible.	No	p = 0.354	
I can socialize, find new friends and contacts.	Yes	p = 0.041	0.108
My fellow students are in a similar situation, I do not feel second-rate.	No	p = 0.888	
The teachers have better access to adult students.	Yes	p = 0.002	0.121
Other benefit(s)	No	p = 0.471	

Table 11 Benefit of combined studies – gender dependencies (source: own work)

The odds ratio calculations for proved dependencies

The odds ratio 1.887 means a direct positive association between the gender and the reason for study (good feeling and higher self-confidence). For the women, there is 1.887 times higher chance that the reason of study is “good feeling a higher self-confidence” – see Table 12.

There is 0.632 lower chance that the reason of study is “I do not want to leave present position” and the reason “Take care for house and/or farmstead” is 0.316 lower for the women – see Table 12.

Odds Ratio	Value	95 % Confidence Interval	
		Lower	Upper
For gender x good feeling, higher self-confidence	1.887	1.223	2.912
For gender x I do not want to leave present position at work	0.632	0.403	0.991
For gender x care for house and/or farmstead	0.316	0.130	0.768

Table 12 The odds ratio for proved dependencies (source: own work)

In the questions where the dependency was proved the measures of predictability were calculated – see tab. 13.

Question	Goodman–Kruskal's λ	Goodman–Kruskal's τ
	For gender x good feeling, higher self-confidence	0.129
For gender x I do not want to leave present position at work	0.153	0.128
For gender x care for house and/or farmstead	0.217	0.169

Table 13 The measures of predictability for proved dependencies (source: own work)

Discussion

There are often questions of effectiveness and overall fruitfulness of the combined studies. Many people believe that the students of combined studies, especially students in the TC outside Prague, have worse results than full-time students in Prague. Other question is which form of study is more suitable for women and why.

This year the CULS, FEM, has 2 925 students in regular full-time form of study; 58% of them are women. The prevailing number of female students is also in the TC; even more remarkably. There are 1 607 students in the TC and 70% of them are women.

We investigated the period 2003-2010. The growth of total number of students was continual and the share of women was always above 50%.

We compare fruitfulness of students in full-time study and in the TC. The database of the FEM records only the numbers of students enrolled and graduate for each school year. That's why we were able to compare only these total numbers (see tables 14 and 15). To follow an individual course of studies for single students (e.g. number of repeated exams or classes) is impossible because it contains operations with private data of students.

Year	Number of enrolled students			Number of graduates		
	total	women	%	total	women	%
2003	423	232	54.8	50	31	62.0
2004	118	62	52.5	158	86	54.4
2005	212	151	71.2	163	90	55.2
2006	710	468	65.9	314	191	60.8
2007	1054	668	63.4	472	227	48.1
2008	1376	938	68.2	813	528	64.9
2009	1492	1008	67.6	905	612	67.6
2010	1607	1128	70.2	1140	789	69.2

Table 14 Number of enrolled students and graduates in tutorial centres of the FEM 2003-2010 (source official database FEM)

The share of women is higher both in the number of enrolled students and in the number of graduates. The percentage of women is higher in the TC. The number of graduates from the TC is raising and this trend can be forecasted for next two years (considering the number of enrolled).

The data from the study department enables us to calculate the percentage of students who have successfully passed the state exams in the third and fifth year. The percentage of satisfactory results is about 70%. Generally more successful are student of the fifth year who get the masters degree.

Year	Number of enrolled students			Number of graduates		
	total	women	%	total	women	%
2008	2568	1514	59	1363	890	65.3
2009	2741	1576	57.5	1632	1061	65.0
2010	2925	1698	58.1	1700	1146	67.4

Table 15 Number of enrolled students and graduates in full-time studies in the FEM 2008-2010 (source official database FEM)

The data from the FEM correspond generally with the national data (see Table 16). The national investigation also states that the percentage of women in distance studies is higher than in regular studies with slight increase in last three years (IEE, 2010).

Year	Percentage of women applied	Percentage of women enrolled	Percentage of women graduate (bachelor level)	Percentage of women graduate (master level)
2006	57.1	52.5	56.7	53.5
2007	56.9	52.7	56.4	55.4
2008	56.8	53.1	57.7	56.9

Table 16 Percentage of women in the Czech Universities (IEE, 2010)

The main difference between mentioned two forms of study we found in the number of women. The percentage of women is remarkably higher in the TC. These findings are in line with other authors. (Chang, 2002), (DePew and Lettner-Rust, 2009). The main advantage of the combined study is found in the higher flexibility. In our survey, the women appreciate that they can continue in a full time job and keep the position in their job. In the same time they can take care of the family and the household.

There are many traditional prejudices concerning women's capabilities and gender differences in education. Many of them are not proved; some of them are rather outdated. Quite often the women's test gaps are reported in connection with certain age group. The research concerned with females in regular studies from primary to tertiary level found worse results for

higher age groups (Lai, 2010). This study does not deal with adult students over 26 who form the majority of students in combined study.

Our results are not worse for women (the percentage of graduated is about the same as the percentage of enrolled – see Table 14) in the TC and better women in regular studies (Table 15).

Other studies (Plumm, 2008), (Shashaani, 1993) see a big problem in using modern communication technologies and computers by women. By our experience the computer skills of female students are on satisfactory level. The students in the TC are highly dependent on using these technologies because they have only limited number of contact lessons. They use various computer communication tools for discussions and asking questions. The results of studies are not worse for women and their interest in this form of study is even higher than the interest of men.

Conclusion

The share of graduates from the TC is comparable with the regular students. The number of women is higher than the number of men in both forms with higher percentage of women in the TC. The women in regular studies are slightly more successful (the percentage of women enrolled is lower than the percentage of women graduate).

The described form of combined study in the TC of the CULS, FEM, is in a long time horizon successful and welcomed by women (61%-70% enrolled). The majority of female students are fully employed persons, entrepreneurs or mothers on maternity leave. The high number of graduates refers to a strong

motivation of students and their intensive work even though they have less free time.

The proved differences between male and female students in the motivation factors were not very important and did not discover possible threats of educational handicaps of any gender.

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