

The Personal Computer and its Position in Lifelong Learning and Leisure of University Students in the Czech Republic, Slovakia and Poland*

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ABSTRACT This paper describes the results of a research study focusing on the attitudes of university students towards the personal computer. The objective is to find out whether they use it more as a learning instrument or a leisure instrument. The research methods were a questionnaire and ATER two-factor semantic differential. The research study involved students from Palacký University in Olomouc (PU), Constantine the Philosopher University in Nitra (CPU) and University of Rzeszow (RU), and was conducted in autumn of 2014. The performed research study indicated that at all universities, the concept of the personal computer was perceived in a similar way as the concept of my relationships with people. At PU and RU the concept of the PC is perceived in a similar way as the concept of colleagues-students. This confirmed the researchers' assumption that the PC is perceived among the population as an irreplaceable means of work, lifelong learning, communication and leisure.

INTRODUCTION

Today, the personal computer and all digital technologies have become a common part of everybody's life overlapping in the area of lifelong learning and leisure activities. University students use the PC for their academic preparation on a regular basis, as a part of the educational process is directly performed in the LMS environment (Klement et al. 2015; Stoffa 2014). However, the PC is also a specific means of leisure for students and a frequent means of communication in conjunction with the Internet.

It is generally acknowledged that the computer, the Internet and all digital technologies are used very frequently by students (Kalaš et al. 2013; Vargová et al. 2014; Zounek and Sudický 2012), and as a result of that, they may pose a risk of addiction, and cause limitation to physical and leisure activities.

The objective of the international research study described in this paper was to determine whether the concepts of the personal computer and dependence on technologies (including other selected concepts listed in Table 2) are perceived by the students in the Czech Republic, Poland and Slovakia in a similar way.

Another objective of the research study was to compare the frequency of the use of the PC, including time spent using the PC by these students for the purposes of education and enter-

tainment. However, the entire focus of the research study (Chráska and Chrásková 2016) was broader and also related to the concepts that characterize the students' approaches to the educational reality, social environment and a healthy lifestyle. The objective of the research was a detailed description of intercultural differences in the attitudes of university students in the mentioned countries.

METHODOLOGY

The research method was a simplified version of the ATER two-factor semantic differential (Chráska sr. 2007).

The semantic differential is a research technique developed in 1950s in USA by Professor Osgood (1964) for measuring individual psychological meanings of words or attitudes towards something. It focuses on simple evaluations and thus it is especially suitable for measuring emotional and behavioral aspects of the attitudes. Its great advantage is easy administration and relatively fast evaluation (Kerlinger 1972; Výrost and Slameník 2008).

Initially, this method was developed for measuring the connotative meaning of concepts, where each concept can be expressed as a point in a semantic space. The basic dimensions of the semantic space were determined by means of a factor analysis and the three most important fac-

tors were determined accordingly. Thus, each concept is usually evaluated in respect to those three factors that is, evaluation factor, potency (power) factor and activity factor (Heise 1970; Osgood 1964).

However, when a crosscheck factor analysis (Chráska sr. 2007) was performed in the Czech sociocultural conditions it was found that only two factors significantly contribute to the dispersion of the values. Extraction of three factors leads to a relatively unreliable measurement when one scale measures different factors in different concepts. The first factor was marked as the evaluation factor in compliance with C. Osgood (1964). The second factor is a combination of the initial potency and activity factors and is called the energy factor.

The scales, which are saturated by the energy factor, express how much the respondents perceive the selected concepts as “something”, which is connected with exertion, difficulties, changes or activity. Based on the analyses performed, the ATER (Attitudes Toward Education Reality) measuring instrument was developed. This instrument (Chráska sr. 2007) contains 10 scales, out of which 5 measure the evaluation factor (ev) and 5 measure the energy factor (en), and * marks reverse scales (See Fig. 1).

In addition, the following data was retrieved from the students at both universities by means of a questionnaire:

- ♦ How many times per month do you use a computer for educational purposes? How long does your work usually take? (Time in minutes)

- ♦ How many times per month do you use a computer for entertainment? How long do you usually use it for this purpose? (Time in minutes)
- ♦ How many times per month do you pursue a physical activity? How long does a single activity take? (Time in minutes)
- ♦ How many times per month do you pursue a leisure activity? How long does a single activity take? (Time in minutes)
- ♦ Gender

Prior to the application of the ATER semantic differential for a comparison of the attitudes of university students in the countries, the researchers carried out a control factor analysis of its scales (Chráska jr. 2014; Chráska jr. and Chrásková 2016).

The factor analysis suggests that in all countries involved in the research the evaluation of the concepts is optimally determined always from the same scales 3 and 7. On the contrary, in the Czech Republic, the energy of the concepts is optimally determined from scales 2 and 8, while in Polish and Slovak students the best scales for the measurement of the energy factor were 6 and 8. It is therefore obvious that the use of individual SD scales without verification of their factor structure would bring inaccurate results in an international comparison.

As a result, the comparative research used only optimized scales of the ATER questionnaire to compare the attitudes in order to ensure reliability.

PERSONAL COMPUTER				
1	good	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	bad	ev
2	understanding	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	demanding	en*
3	pleasant	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	unpleasant	ev*
4	trouble	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	trouble-free	en
5	fair	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	dark	ev
6	light	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	heavy	en*
7	ugly	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	beautiful	ev
8	easy	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	difficult	en*
9	sweet	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	sour	ev
10	strict	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	lenient	en

Fig. 1. Data sheet of two-factor semantic differential – ATER for the concept “Personal Computer”

Description of the Research Sample

The random research sample of Czech, Polish and Slovak students comprised a total of 260 students from faculties of education. To eliminate a possible cultural effect of individuals from the Czech-Polish border area, the researchers chose the students of the University of Rzeszow. For the same reason, the researchers selected a group of Slovak students from the University in Nitra. The research was carried out in all countries in autumn of 2014. The structure of the respondents is specified in Table 1.

Table 1: The research sample structure

<i>University</i>	<i>Gender (male)</i>	<i>Gender (female)</i>	<i>Total</i>
Univerzity of Rzeszow – RU (Poland)	29	44	73
Palacky University Olomouc – PU (Czech Republic)	9	56	65
Constantine the Philosopher University Nitra – CPU (Slovak Republic)	25	97	122
Total	63	197	260

RESULTS

In order to compare intercultural differences in the students' attitudes, for each of the investigated concepts the researchers calculated the average evaluation and energy for all groups of respondents (See Table 2). In addition, the researchers used an analysis of variance (chi-square test in case of frequency) to test the significance of the values. Statistically significant differences are marked in Table 2 in italics and in bold. It is obvious that in the perception of the core concept of the personal computer there are no significant differences between the groups of students. On the contrary, the concept of dependence on technologies is perceived by the students of PU (as opposed to students of RU and CPU) as the most complex and associated with a high degree of energy expenditure.

For a better comparison of semantic similarity of the investigated concepts, the students at all universities were provided with the so-called semantic spaces of the concepts, (see Figs. 2, 3 and 4), indicating which concepts are perceived by the students in a similar way.

Table 2: Evaluation and energy of investigated concepts in university students from various universities

<i>Concept</i>	<i>University</i>			<i>Significance p</i>
	<i>RU</i>	<i>PU</i>	<i>CPU</i>	
Colleagues – students (ev)	5.49	5.10	5.21	0.185
Colleagues – students (en)	3.30	3.55	3.27	0.251
University I study at (ev)	4.63	4.44	4.63	0.634
<i>University that I study at (en)</i>	4.08	4.83	4.21	0.008
Personal computer (ev)	5.44	5.33	5.32	0.837
Personal computer (en)	2.73	3.04	2.68	0.223
Future (ev)	5.04	4.90	5.39	0.061
<i>Future (en)</i>	4.22	4.95	3.91	<0.001
Money (ev)	5.31	5.04	5.10	0.553
<i>Money (en)</i>	4.39	5.23	3.98	<0.001
Education (ev)	4.56	4.98	4.72	0.237
<i>Education (en)</i>	4.13	5.48	4.40	<0.001
<i>I (ev)</i>	5.06	4.95	5.75	<0.001
<i>I (en)</i>	3.58	4.75	3.20	<0.001
My relationships with people (ev)	5.56	5.27	5.52	0.388
<i>My relationships with people (en)</i>	2.56	3.73	2.79	<0.001
Interpersonal communication (ev)	5.08	4.91	5.17	0.501
<i>Interpersonal communication (en)</i>	3.41	4.27	3.21	<0.001
<i>My future success at work (ev)</i>	5.43	4.68	5.25	0.007
<i>My future success at work (en)</i>	4.11	4.60	3.63	0.001
Physical activity (ev)	5.96	5.49	5.56	0.129
<i>Physical activity (en)</i>	3.40	4.32	2.86	0.000
Dependence on technologies (PC, mobile phone, internet) (ev)	3.69	3.40	3.48	0.614
<i>Dependence on technologies (PC, mobile phone, internet) (en)</i>	4.09	4.21	3.46	0.019
<i>My professional preparation (ev)</i>	4.97	4.22	4.57	0.018
<i>My professional preparation (en)</i>	3.98	4.91	3.96	<0.001

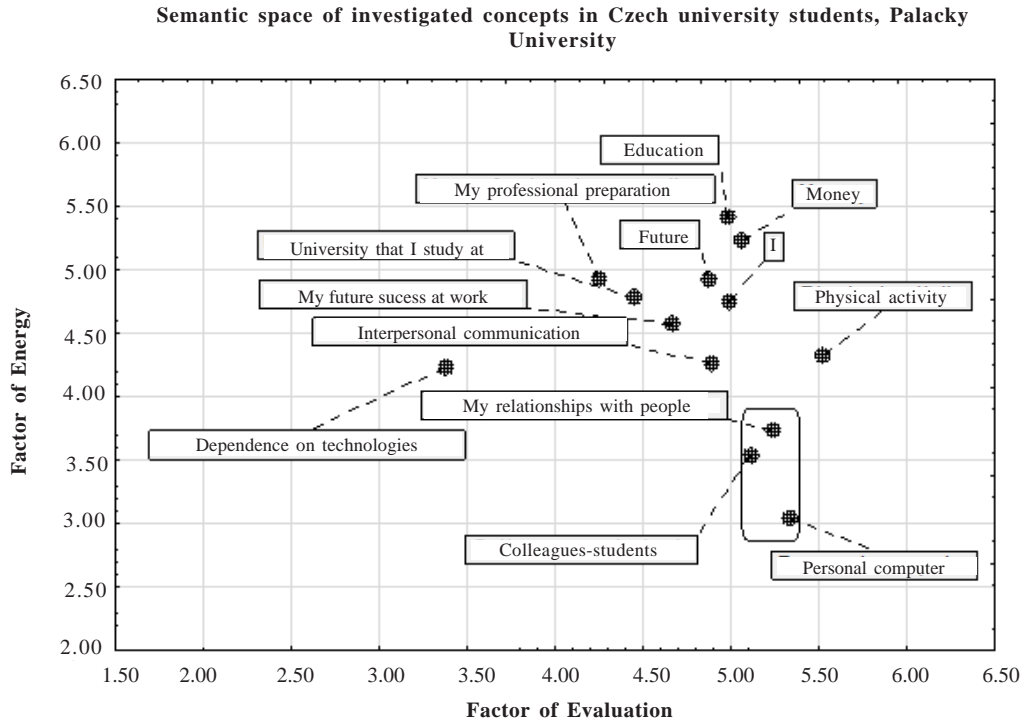


Fig. 2. Semantic space of investigated concepts in Czech university students, PU

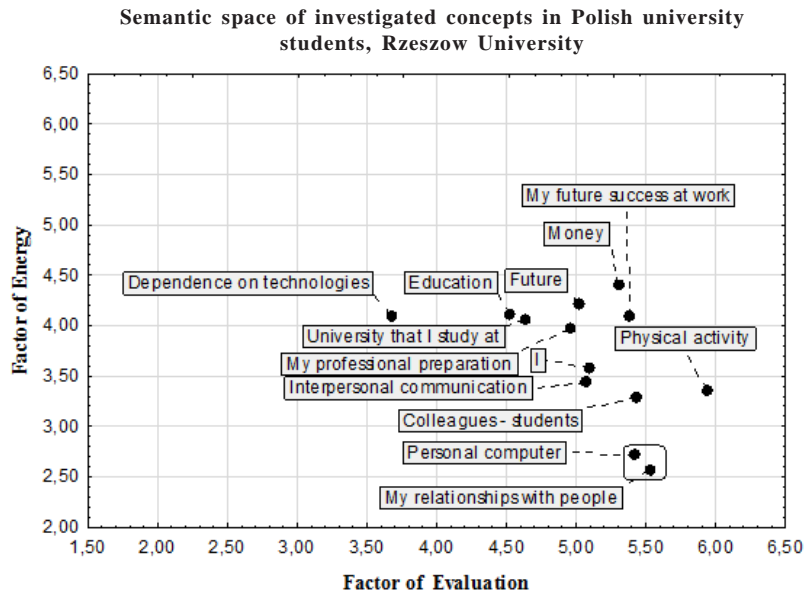


Fig. 3. Semantic space of investigated concepts in Polish university students, RU

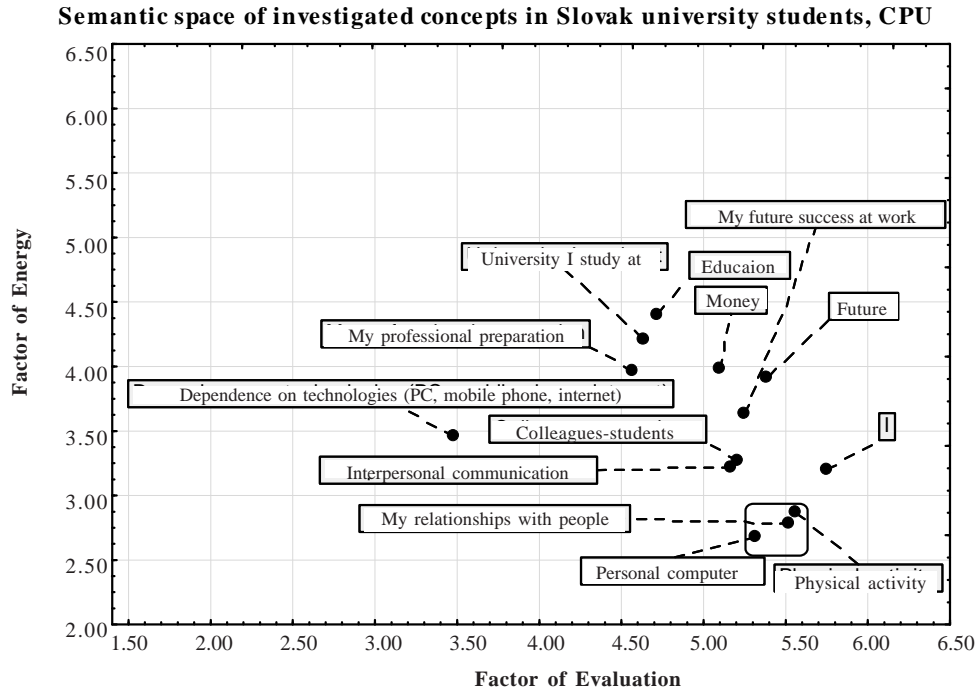


Fig. 4. Semantic space of investigated concepts in Slovak university students, Constantine the Philosopher University (CPU)

At all universities, the concept of the personal computer is perceived in a similar way as the concept of my relationships with people. At PU and RU the concept of the PC is perceived in a similar way as the concept of colleagues-students. On the contrary, at CPU the concept of the PC is perceived similarly to the concepts of mental and physical health and physical activity. The association with the concept of colleagues-students is somewhat looser at CPU.

The researchers were also interested in how university students use the PC at various universities. A comparison of time spent using a PC and physical and leisure activity for each group of respondents is indicated in Table 3.

Table 3 indicates significant differences between university students in the frequency of use of the PC for educational purposes, where PU students used the computer on average 21 times per month whereas RU and CPU students

Table 3: Comparison of time spent using a PC and physical and leisure activity in university students in Poland (RU), in the Czech Republic (PU) and Slovak Republic (CPU)

Variable	Mean (RU)	Mean (PU)	Mean (CPU)	p
How many times per month do you use a computer for educational purposes?	16.79	21.46	17.13	0.041*
How long does your work usually take? (time in min.)	106.88	161.25	158.91	<0.001*
How many times per month do you use a computer for entertainment?	23.90	22.06	19.17	0.084*
How long do you usually use it for this purpose? (time in min.)	109.15	130.87	130.66	0.527
How many times per month do you pursue physical activity?	18.76	12.52	11.07	<0.001*
How long does a single activity take? (time in min.)	82.87	77.66	85.53	0.542
How many times per month do you pursue leisure activity?	11.69	11.15	11.97	0.780*
How long does a single activity take? (time in min.)	137.41	115.83	115.82	0.570

*The differences in the frequencies were determined using the chi-square test

only 17 times per month. Similarly, the time spent using a PC for educational purposes was significantly higher in the Czech students (161 minutes at PU and 159 minutes at CPU as opposed to 107 minutes at RU).

On the contrary, there were no significant differences in the frequency of use of the PC for entertainment between the students from all universities (24 at RU, 22 at PU, 19 at CPU). However, there was a partial difference in the length of these activities. PU and CPU students spent on average 131 minutes per session and RU students “only” 109 minutes.

As far as physical activity is concerned, RU students pursued this type of activity on average 19 times per month, PU students 13 times per month and CPU students “only” 11 times per month. Although this difference is statistically significant, the length of a single sports activity was roughly identical in all groups of students (83 minutes at RU, 78 minutes at PU and 86 minutes at PU).

Leisure activities were pursued by all groups of respondents at a similar frequency (about 11 times per month), and the time spent doing this activity was also similar (137 minutes at RU and 116 minutes at PU and CPU).

Another analysis focused on the anticipated impact of gender on the results of the research study (see Tables 4 and 5). It turned out that this effect was not identical at the universities. The key concepts of the personal computer and dependence on technologies (PC, mobile phone, internet) were perceived in a similar way by both male and female students at all universities.

As far as computer use for educational purposes is concerned, female students at PU used the PC significantly more often (22) than female students at RU (16) and CPU (19). In the case of male students, no differences were observed. Similarly, the time spent using a PC for educational purposes was significantly higher in female students at PU (156) and CPU (158) as opposed to RU (104).

Table 4: Comparison of time spent using a PC and physical and leisure activity in university students in Poland (RU), in the Czech Republic (PU) and Slovak Republic (CPU) for male students

Variable	Mean (RU)	Mean (PU)	Mean (CPU)	p
How many times per month do you use a computer for educational purposes?	17.05	15.43	10.38	0.169*
How long does your work usually take? (time in min.)	100.91	192.86	152.46	0.123
How many times per month do you use a computer for entertainment?	24.36	24.29	26.62	0.924*
How long do you usually use it for this purpose? (time in min.)	126.14	192.86	212.77	0.069
How many times per month do you pursue physical activity?	15.46	11.71	15.46	0.653*
How long does a single activity take? (time in min.)	85.46	132.86	102.69	0.027
How many times per month do you pursue leisure activity?	9.05	15.71	15.69	0.068*
How long does a single activity take? (time in min.)	130.23	162.86	143.92	0.754

*The differences in the frequencies were determined using the chi-square test

Table 5: Comparison of time spent using a PC and physical and leisure activity in university students in Poland (RU), in the Czech Republic (PU) and Slovak Republic (CPU) for female students

Variable	Mean (RU)	Mean (PU)	Mean (CPU)	p
How many times per month do you use a computer for educational purposes?	16.44	22.37	18.60	0.007*
How long does your work usually take? (time in min.)	103.59	156.33	157.79	0.004
How many times per month do you use a computer for entertainment?	23.85	21.98	17.22	0.020*
How long do you usually use it for this purpose? (time in min.)	103.97	119.90	115.04	0.576
How many times per month do you pursue physical activity?	21.02	12.00	10.10	0.000*
How long does a single activity take? (time in min.)	82.69	69.39	79.96	0.241
How many times per month do you pursue leisure activity?	13.92	9.33	10.79	0.046*
How long does a single activity take? (time in min.)	135.00	108.16	100.51	0.381

*The differences in the frequencies were determined using the chi-square test

On the contrary, PC for entertainment was used more often by female students at RU (24) and PU (22) compared with female students at CPU (17).

Polish female students pursued physical activities significantly more often (21) compared with female students at PU (12) and CPU (10). Also, Polish female students at RU pursued leisure activities significantly more often (14) than female students at PU (9) and CPU (11).

In the case of male students, significant differences were observed only in the time spent exercising, the students at RU pursued this activity for 85 minutes on average. On the contrary, Czech male students spent 133 minutes on this activity and Slovak male students 130 minutes, that is, a significantly longer period of time.

The researchers were also interested in whether the perception of the key concepts of PC and dependence on technologies is associated with the frequency of the students' physical activity. For comparison, the researchers again used the analysis of variance (see Fig. 5).

It turned out that the concepts of PC and dependence on technologies were perceived by the students irrespective of the frequency of their physical activity. In practice, this means that the simplified view of the public that an individual prefers either physical activity or passive time using a PC does not apply.

DISCUSSION

Regarding the fact that the survey was conducted using a less traditional research method, that is semantic differential, the results cannot be directly compared with the results of other studies. Nevertheless, the results imply that according to theoretical assumptions (Kalaš et al. 2013), the position of the personal computer in lifelong learning is similar in all countries investigated. This is in line with the view of the new role of the personal computer (and digital technologies in general) in education, which often takes the form of virtual education (Vargová et al. 2014). This trend, however, is not identical in

ANOVA: LS Means
 Wills lambda=.92537, F(28, 830.7)=.64516, p=.922.33
 Effective hypothesis decomposition
 Vertical bars denote 0.95 confidence intervals

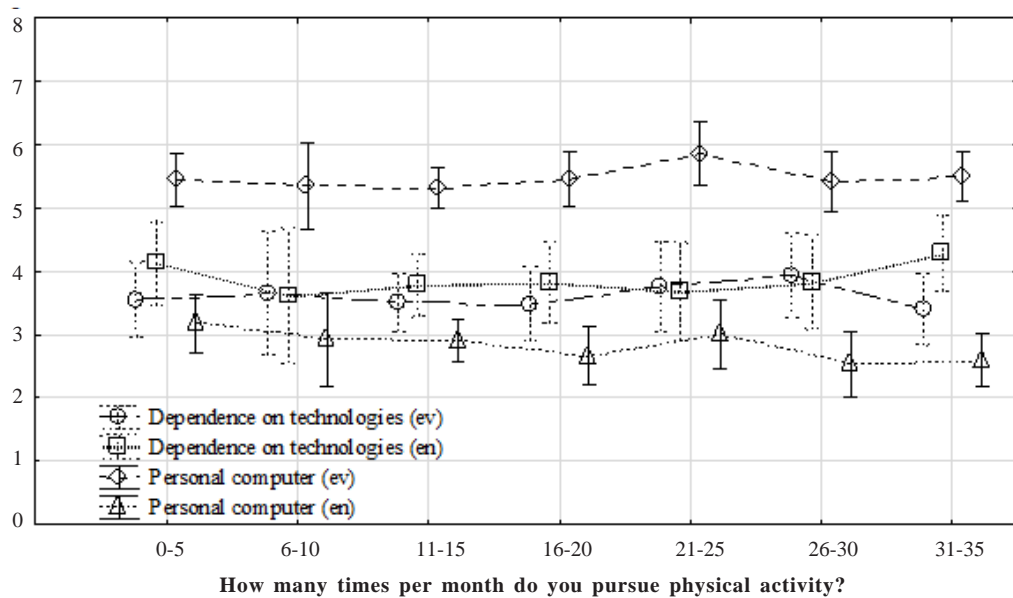


Fig. 5. Evaluation and energy of the key concepts with respect to the frequency of physical activity

all countries and universities investigated in this paper, which is evidenced for example by the differences in the frequency of use of the PC for educational purposes. This fact is probably related to a more extensive use of the LMS system and computer-aided teaching at Palacky University in Olomouc.

The results of the research can also be considered in a broader context with theoretically defined lifestyles of individuals (Kolesárová 2014). From this perspective, the characteristics of university students investigated in this paper most correspond with the emerging cyber-lifestyle, which is typical for the younger generation.

CONCLUSION

The performed research study indicated that at all universities, the concept of the personal computer was perceived in a similar way as the concept of my relationships with people. At PU and RU the concept of the PC was perceived in a similar way as the concept of colleagues-students. This confirmed the researchers' assumption that the PC was perceived among the population as an irreplaceable means of work, lifelong learning, communication and leisure time. In addition, at PU the PC was used more for educational purposes than at RU and CPU, which might be attributed to the focus of PU on electronic study materials. These play a crucial role in terms of study availability in the context of lifelong learning. As a result, there are more possibilities for study applicants who were, for various reasons (availability, time and financial demands), limited in their further educational activities. A satisfactory finding was that the positive evaluation of the PC did not depend on the frequency of physical activity.

RECOMMENDATIONS

The research suggests that simple acceptance of an existing semantic differential might bring inaccurate results in case of an intercultural comparison of attitudes. The use of individual SD scales without verification of their factor structure would bring inaccurate results in an international comparison.

NOTE

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