E-LEARNING – AN ALTERNATIVE TO TRADITIONAL LEARNING?

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Abstract: The article discusses the issue of e-learning courses as an alternative to traditional face-to-face courses or the support of the face-face courses. The main aim of the article is not to decide which alternative is more effective, but to find out whether there are students with particular learning style who are pre-disposed to e-learning. There were eight hypothesis postulated and tested in the research. However, we bring only four of them in this article. Hypothesis were verified by means the statistical analysis of a pedagogical experiment and results gained in the standardized questionnaires. The data were elaborated by the statistical software SPSS. The final conclusions are formulated based on the results of the research achieved by the author of the article.

Zusammenfassung: Der Beitrag handelt über das Problem der E-Lernen-Kurse als einer möglichen Alternative zu der traditionellen Präsentionausbildung. Das Hauptziel besteht nicht darin, die Entscheidung zu treffen, welche Alternative effektiver ist, sondern zu beurteilen, ob so eine Gruppe der Studenten mit einem bestimmten Lernenstyl existiert, die bestimmt für die Ausbildung durch E-Learning wäre. Zuerst wurden 8 Hypothesen gestellt,von denen wir in diesem Beitrag 4 analysieren. Das Prüfen der Hypothese wurde von einem pädagogischen Experten und statistischer Bearbeitung der Ergebnisse von standardisierten Testen realisiert.

Key words: e-learning, Moodle, experiment, e-course, face-to-face

1. Introduction

Educational technology is a term widely used in the field of education (and other areas), but it is often used with different meanings. Some people use it to define the devices that deliver the information, while others refer to it as a systematic process of solving problems by scientific means. Optimization of teaching should be one of those factors that are considered with every lesson. One way to optimize is selecting the most appropriate teaching aid.

„The Lisbon European Council (23- 24 March 2000) concluded that a European framework should define the new basic skills to be provided through lifelong learning as a key measure in Europe's response to globalization and the shift to knowledge-based economies, and emphasized that people are Europe's main asset. Since then, those conclusions have been regularly restated including by the Brussels European Councils (20- 21 March 2003 and 22- 23 March 2005), and in the re-launched Lisbon Strategy which was approved in 2005." (European parliament, 2006)

Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning introduces eight key competences:

1) Communication in the mother tongue;
2) Communication in foreign languages;
3) Mathematical competence and basic competences in science and technology;
4) Digital competence;
5) Learning to learn;
6) Social and civic competences;
7) Sense of initiative and entrepreneurship; and
8) Cultural awareness and expression.

Competencies can be reached by regular repetition, drill and exercise. Thus none of us can expect that a student, who has never heard about using any skill, will master and use those skills actively. Drivers

become masters by driving, language user by using a language. Concerning digital competencies analogically the users can master them not just by understanding its principles and positive effects but also, and mostly by using them.

If we want teachers to use technologies in their classroom they should become familiar with them as soon as possible so that they could personally assess and evaluate, based on their own experience the positive and negative aspects, advantages and disadvantages in using them in a classroom.

The learner-centered teaching is much discussed nowadays as well as a necessity to consider different learning styles (Burgerová, 2001) in our teaching and different learning strategies (Oxford, 1990). Similarly, a big attention is paid to autonomous learners (Straková, 2003).

These were also the motives for conducting research on possible impact of form of teaching on the result and the attempt to find out whether there are students who are pre-disposed to be effective in one or another form (face-to-face or e-learning course).

2. Learner Styles

The term learning style has been frequently discussed in the professional psychological and pedagogical literature. The problem is that the term is not explained and defined uniquely. Turek (2003 p. 13) defines learning style as a set of procedures a student uses in a particular period of his/her life in their learning. It is developed from the innate basis, but in a course of life it is changed and improved. Learning style helps to reach good results in learning of a particular material in a particular pedagogical situation, but it can also complicate and discourage reaching good results in different pedagogical situation where different learning style could help. Learning styles can be diagnosed and changed. However, changing them is not easy and they can be changed by the person himself/herself or with a help from the social environment (teachers, classmates, parents, etc.).

Messick (In: Mareš, 1998) describes five styles: expressive, responsive, cognitive, learning and defensive. Ruisel (2004 p. 274) claims that the difference between the cognitive and learning styles is not marked. He states that cognitive styles are characterized by the ways, modes of reaching information... and they deal with personality more than other styles" (ibid, p. 260).

We do not intend to discuss learning styles here, we just wanted to indicate there is a controversy in understanding learning styles and this is why there are various categorizations.

Coffield et al. (In Graf, 2007, p. 5) classified learning style models into 5 families "which are based on some overarching ideas behind the models, attempting to reflect the views of the main theorists of learning styles. The first family relies on the idea that learning styles and preferences are largely constitutionally based including the four modalities: visual, auditory, kinaesthetic, and tactile. The second family deals with the idea that learning styles reflect deep-seated features of the cognitive structure, including patterns of abilities. A third category refers to learning styles as one component of a relatively stable personality type. In the fourth family, learning styles are seen as flexibly stable learning preferences. The last category moves on from learning styles to learning approaches, strategies, orientations and conceptions of learning".

In the research presented we decided to use the standardised tests that are from different families, base on different approaches. In the research the following tests were used: Gardner's multiple intelligence test (that is based n the theory that intelligence is the ability to create an effective product or offer a service that is valued in a culture (Educational Broadcasting Corporation, 2004), Kolb's test that is based on experiential learning theory "which incorporates the important role of experience" in the process of learning (Graf, 2007) and The Grasha-Riechmann learning style model that focuses on students' social interaction with their teachers and fellow students in the classroom environment.

Howard Gardner published the book Frames of Mind in 1983 where he defined seven intelligence types. He claims that "Nowadays an increasing number of researchers believe precisely the opposite; that there exists a multitude of intelligences, quite independent of each other; that each intelligence has its own strengths and constraints; that the mind is far from unencumbered at birth; and that it is unexpectedly difficult to teach things that go against early 'naive' theories of that challenge the natural

lines of force within an intelligence and its matching domains" (Gardner, 1993, p. xxiii). Originally he defined seven intelligence types – linguistic, logical/mathematical, musical, bodily-kinesthetic, spatial, interpersonal, intrapersonal intelligences. Additional intelligence types are naturalist, spiritual, existential and moral.

Kolb's learning style inventory divides learners into four categories. *Convergers* whose "dominant abilities are abstract conceptualization and active experimentation... *Divergers* excel in concrete experimentation and reflective observation... *Assimilators* excel in abstract conceptualisation and reflective observation. Their greatest strength lies in creating theoretical models. They are good in inductive reasoning and in assimilating disparate observations into an integrated explanation. *Accommodators* have the opposite strengths to Assimilators. Their dominant abilities are concrete experience and active experimentation. Their strengths lie in doing things actively, carrying out plans and experiments, and becoming involved in new experiences" (Graf, 2007, p.12).

"The Grasha-Riechmann Student Learning Style Scales (GRSLSS), an instrument developed in the early 1970s, has been used to identify the preferences learners have for interacting with peers and the instructor in the classroom setting . … The six social learning styles identified by this model are the Independent, Dependent, Competitive, Collaborative, Avoidant, and Participant. The *Independent* learner prefers independent study, self-paced instruction and would prefer to work alone on course projects than with other students. *Dependent* learners look to the teacher and to peers as a source of structure and guidance and prefer an authority figure to tell them what to do. *Competitive* learners learn in order to perform better than their peers and to receive recognition for their academic accomplishments. *Collaborative* learners learn by sharing and by cooperation with teacher and peers. They prefer lectures with small group discussions and group projects. *Avoidant* learners are not enthused about attending class or learning class content. They are typically uninterested and are often overwhelmed by class activities. The *Participants* enjoy class and make good class citizens. They are interested in class activities and discussion and eager to do class work." (GRSLSS: Additional Information, 2000)

3. Research

The e-courses are widely used in the world. In Slovakia, they are slowly building their position, mostly in the sphere of further education of particular companies. At schools they are still no used very frequently, what can be caused by the fact that our teachers, tutors, lecturers do not have experience with this kind of environment and what more they do not have technical skills to build e-courses and the methodological support is missing too. Thus, we rely on intuition many times and self-study. Not just teachers but students as well do not have experience with this platform and thus we tried to find out whether there is a group of students that would be predisposed to cope with e-learning.

The course *Teaching English as a foreign language (TEFL)* had been taught at the Department of English Language as a four-semester course. The fourth semester was focused on the discussions leading as this is one of the most important skills that a language teacher should have. In the academic year 2007/08 the students (N=79) were given a free choice – face-to-face TEFL course or TEFL lessons in the virtual learning environment. The distance platform was chosen by 25 students. The course was run in the form of synchronous communication chat. The students were also provided with the materials necessary for individual study.

The following hypotheses were formulated and verified:

1. Students who choose the distance form are more introvert compared to students in the face-to-face education.

2. Students with the learner style assimilator or divergent (Kolb test) prefer the distant form of education. *We assume that these students prefer observation and that they are introverts preferring individual study.*

3. Students whose learner style is dependent (Grasha-Riechmann test) prefer the face-to-face platform; students whose learner style is independent (Grasha-Riechmann test) prefer the face-to-face platform as well.

4. The form of education does not influence the quality of education (it will not be reflected in various assessment forms).

To get the data we used the standardized tests – Multiple intelligences survey, Grasha-Riechmann Test and Kolb test.

The e-course was built by the tutor (in the LMS Moodle) after her previous positive experience with the courses Developing Reading Skills and Diploma thesis seminar. The face/to/face course was read by the same teacher.

By giving students the opportunity to choose a face-to-face course or an e-learning alternative we assumed that the e-learning version would be chosen mostly by introvert students as they could see this environment more convenient for their effective work (no need to directly communicate with others, individualized learning and teaching etc). To identify learner styles we used the multiple intelligence inventory (Gardner). To test the hypothesis we used the non-parametric Mann-Whitney test and as the results were interesting we decided to introduce the results in all categories. Based on these results we reject the zero hypothesis and confirm the statistically significant relationship between method and students with three prevailing types of intelligence – bodily-kinesthetic, intrapersonal, and interpersonal intelligence. The first three are significant at a level of 0.01 and the last one at the 0.05 level.

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
linguistic	619,500	2050,500	-,467	,640
logical - mathematic	627,500	2058,500	-,379	,705
spatial	378,500	703,500	-3,087	,002
bodily-kinesthetic	328,500	653,500	-3,600	,000
musical	504,000	829,000	-1,732	,083
interpersonal	466,500	1897,500	-2,125	,034
intrapersonal	187,500	512,500	-5,132	,000
natural	582,500	2013,500	-,866	,386

Grouping variable: form

Table 1. *Non- parametric tests – multiple intelligence test results*

To graphically visualize the above mentioned results we decided to use box and whiskers plots. This type of box plot will place a line at the midpoint (i.e., mean or median) which represents a selected range (and the whiskers outside the box also represent a selected range). A box plot presents min and max values and the 25th and 75th percentiles (StatSoft Statistica, 2008).
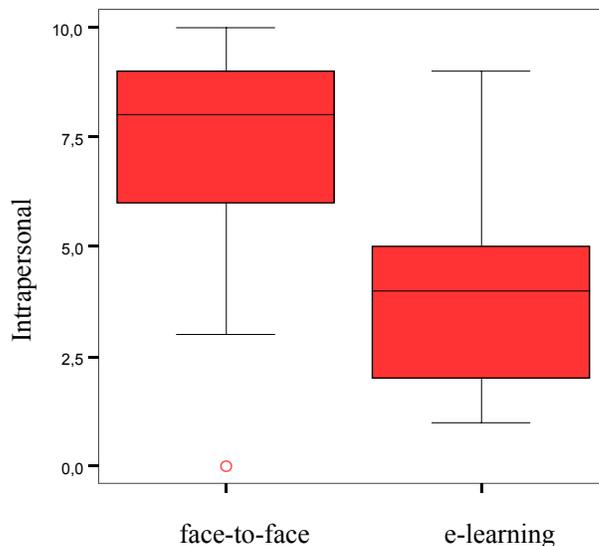
Figure 1. *Box and whiskers plot – intrapersonal intelligence*

The results and graph show that there is a statistically significant relation between the two variables; however, our hypothesis was not confirmed as we had assumed that introverts would choose the e-learning course and the exact opposite proved to be true – introverts chose the face-to face course. Here we would like to mention that the Council of Europe defined five sets of key competencies with which schools should "equip" young Europeans and among them he also highlights cooperation that is understood as the ability to work in a team, ability to build relationships, to negotiate, to solve conflicts and differences of opinions, ability to listen and take others' points of view into account etc.

In some sense, e-learning is very demanding as to establishing relationships; it also needs a skilled tutor to create a working and active society, and thus from our point of view it was a positive aspect that there was a prevailing group of interpersonal students in an e-learning course and thus we could presume they would be intrinsically motivated to establishing contacts with their course mates.
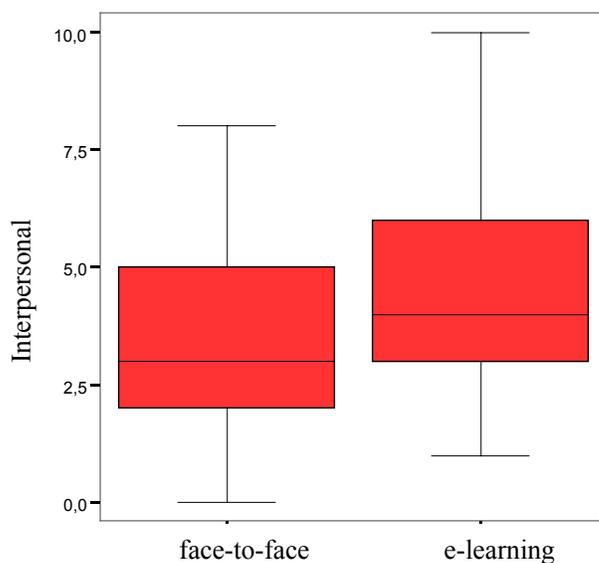

Figure 2. *Box and whiskers plot – interpersonal intelligence*

Out of four statistically significant relations (the least marked) was the relation between interpersonal intelligence and method (p=0,034). Again, we can state that our presumption was opposite, namely, students with prevailing interpersonal intelligence decided to take part in an e-learning course. However, we have to be careful when drawing conclusions as this result might be influenced by homogeneity of the group in a sense of their study programs – all students studied teacher training with the specialization in English. Thus we could have expected that students in our sample (linguistically and by the nature of their future profession communication oriented) would be cooperative and communicative. As a matter of interest we also include the box plot presenting the distribution of the students with linguistic intelligence between the two groups – face-to-face and e-learning. We would like to mention that there is no statistically significant difference; this is transparent from the graph below (Figure 3).
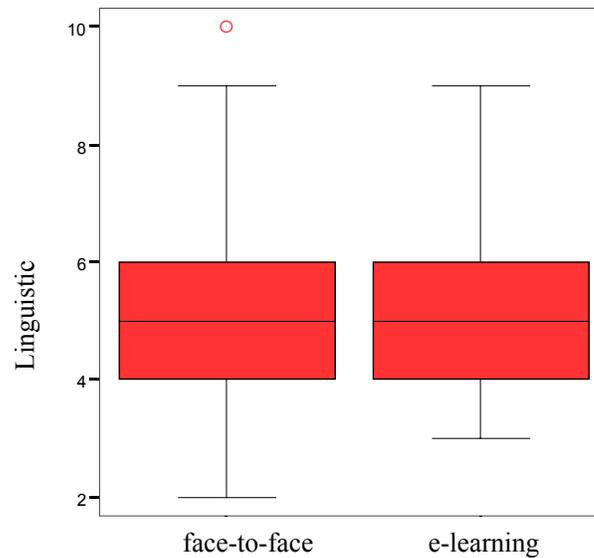

Figure 3. *Box and whiskers plot – linguistic intelligence*

The graph shows surprisingly almost equal distribution between groups of face-to-face and e-learning groups. The maximum score is the same in both groups and the box plots and median are also identical. The difference occurs only in the minimum value which is lower in a face-to-face group.

The second hypothesis assumed was that students with the learner style assimilator or divergent (Kolb test) prefer the distant form of education. *We assume that these students prefer observation and that they are introverts preferring individual study.*

Form	Learning style	frequency	percent	valid percent	cumulative percents
e-learning	accommodator	8	32,0	32,0	32,0
	diverger	13	52,0	52,0	84,0
	converger	1	4,0	4,0	88,0
	assimilator	3	12,0	12,0	100,0
	total	25	100,0	100,0	
face-to-face	accommodator	15	27,8	27,8	27,8
	diverger	35	64,8	64,8	92,6
	converger	1	1,9	1,9	94,4
	assimilator	3	5,6	5,6	100,0
	total	54	100,0	100,0	

Table 2. *Descriptive statistics - learning styles according to Kolb's learning style inventory*

We assumed that convergers and accommodators would prefer the face-to-face course and on contrary, assimilators and divergers would prefer Moodle course. To verify the hypothesis we used Pearson chi-square and the similar results were gained in a Likelihood-ratio test.

	cases					
	valid		missing		total	
	N	Percent	N	Percent	N	Percent
form * learning style	79	100,0%	0	,0%	79	100,0%

Table 3. *Case processing summary (form and learning style - according Kolb)*

			learning style				Total
			accomodator	diverger	converger	assimilator	
form	e-learning	count	8	13	1	3	25
		expected count	7,3	15,2	,6	1,9	25,0
		% within form	32,0%	52,0%	4,0%	12,0%	100,0%
		% within learning style	34,8%	27,1%	50,0%	50,0%	31,6%
		std. residuals	,3	-,6	,5	,8	
	face-to-face	count	15	35	1	3	54
		expected count	15,7	32,8	1,4	4,1	54,0
		% within form	27,8%	64,8%	1,9%	5,6%	100,0%
		% within learning style	65,2%	72,9%	50,0%	50,0%	68,4%
		std. residuals	-,2	,4	-,3	-,5	
Total		count	23	48	2	6	79
		expected count	23,0	48,0	2,0	6,0	79,0
		% within form	29,1%	60,8%	2,5%	7,6%	100,0%
		% within learning style	100,0%	100,0%	100,0%	100,0%	100,0%

Table 4. *Crosstabulation (form and learning style - according Kolb)*

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1,812(a)	3	,612
Likelihood Ratio	1,736	3	,629
No of valid cases	79		

Table 5. *Chi square test results (form and learning style - according Kolb)*

Again we cannot apply Pearson chi-square as the requirement of minimal expected count, thus we apply the Likelihood ratio test. The results show that there is no statistically significant difference in the searched data. The graph also shows the similarity of distribution between the groups.
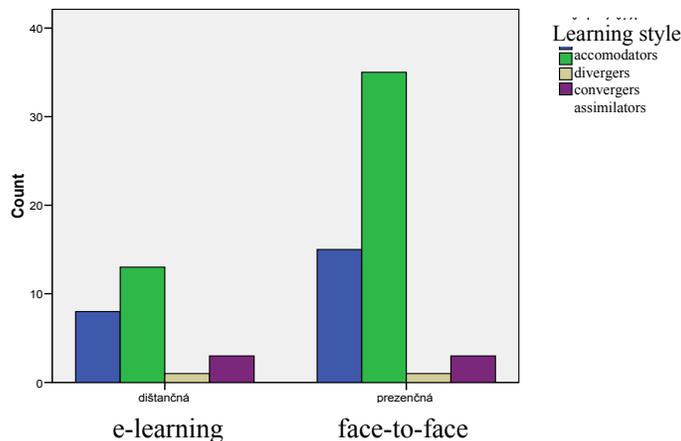
Figure 4. *Count in the categories form and learning style - according Kolb*

The likelihood-ratio test confirms the null hypothesis, which says that there is no difference in distribution of students with particular learning style (according to Kolb theory) between the groups of face-to-face and e-learning course. However, the results might be influenced by a small number of convergers and assimilators in the sample generally.

The third hypothesis which we would like to describe in this article is the one dealing with the results of the Grasha-Riechmann test. We believed that students whose learner style is dependant or cooperative prefer the face-to-face platform; however, students whose learner style is independent or competitive prefer the face-to-face platform.

In our research we presumed that students with the dependent learning style would choose the face-to face course and that, on the contrary independent learners would incline to e-learning. The statistically significant difference was measured in the groups of resistant students, dependent students and competitive students. All these groups of students preferred face-to-face course. Diaz and Cartnal (1999) came to the similar conclusion that "[students] enrolled in an online class are likely to have different learning styles than equivalent on-campus students. Online students were more independent and on-campus students more dependent, in their styles as learners. The on-campus students seemed to match the profile of traditional students who are willing to work in class provided they can obtain rewards for working with others, and for meeting teacher expectations. Online students appeared to be driven more by intrinsic motives and clearly not by the reward structure of the class".

			form		
			face-to-face	e-learning	total
dependent	low	count	1	8	9
		expected count	6,2	2,8	9,0
		% within dependent	11,1%	88,9%	100,0%
		% within form	1,9%	32,0%	11,4%
		std. residual	-2,1	3,1	
	moderate	count	39	15	54
		expected count	36,9	17,1	54,0
		% within dependent	72,2%	27,8%	100,0%
		% within form	72,2%	60,0%	68,4%
		std. residual l	,3	-,5	
	high	count	14	2	16
		expected count	10,9	5,1	16,0

		% within dependent	87,5%	12,5%	100,0%
		% within form	25,9%	8,0%	20,3%
		std. residual	,9	-1,4	
Total		count	54	25	79
		expected count	54,0	25,0	79,0
		% within dependent	68,4%	31,6%	100,0%
		% within form	100,0%	100,0%	100,0%

Table 6. *Crosstabulation (form and learning style according to Grascha-Riechmann)*

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16,718(a)	2	,000
Likelihood Ratio	16,472	2	,000
Linear-by-Linear Association	12,636	1	,000
N of Valid Cases	79		

Table 7. *Chi-square test results (form and learning style according to Grascha-Riechmann)*

The next graph shows that the biggest group of students belong to moderately dependent groups (72,2% of face-to-face students and 60% of e-learners. The differences can be found in the other two categories – low and high. As we can see as many as 87,5% out of all highly dependent learners are from the face-to-face group and almost 89% of the students in the category "low independent" chose the e-course.
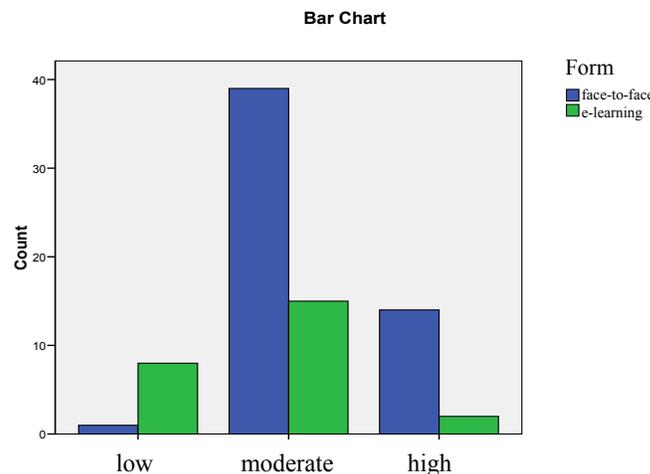

Figure 5. *Count in the categories of learning styles according to Grasha Riechmann*

The students could voluntarily choose the face-to-face course or e-course and their progress was assessed at the end of the course. We were interested if there would be an influence of the chosen form on their final result – the progress they make in whatever was the aim of the course. At this stage we were not searching what additional values (positive or negative) it had. The results are summarized in the following tables and graph.

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
form * evaluation	79	100,0%	0	,0%	79	100,0%

Table 8. *Case processing summary (form and evaluation)*

			evaluation			
			excellent	very good	good	total
form	e-learning	Count	13	8	4	25
		Expected Count	12,3	8,5	4,1	25,0
		% within form	52,0%	32,0%	16,0%	100,0%
		Std. Residual	,2	-,2	-,1	
	face-to-face	Count	26	19	9	54
		Expected Count	26,7	18,5	8,9	54,0
		% within form	48,1%	35,2%	16,7%	100,0%
		Std. Residual	-,1	,1	,0	
Total		Count	39	27	13	79
		Expected Count	39,0	27,0	13,0	79,0
		% within form	49,4%	34,2%	16,5%	100,0%

1 (16,67%) cell has expected count less than 5. The minimum expected count is 4,11.

Table 9. *Crosstabulation (form and evaluation)*

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	,107(a)	2	,948
Likelihood Ratio	,107	2	,948
N of Valid Cases	79		

Table 10. *Chi-square test results (form and evaluation)*

As it is clear from the table Pearson chi-square cannot be applied as no basic condition or presumption ismet, namely the expected count higher than 5 in each cell. Thus we use the value gained in the row Likelihood ratio. As one can see even from the graph there is no significant dependence between the chosen method and the result reached in the final evaluation. An important finding confirming the first hypothesis that choice of the form (distant or face to face has no influence on the progress the students make. We consider here the main aim of the course and not the by-side effects of the different courses or forms.
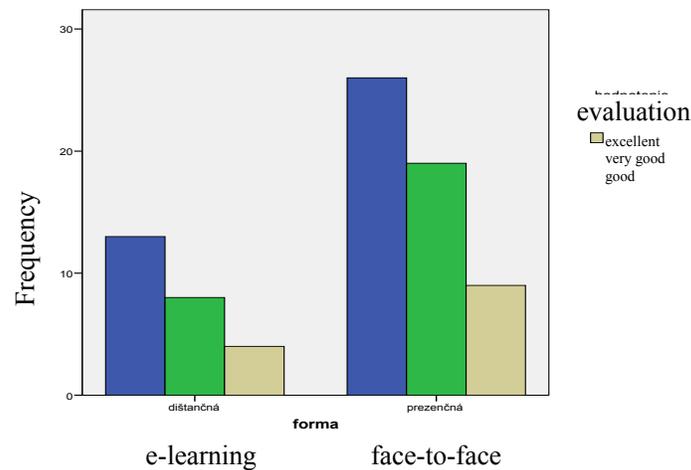
Figure 6. *Chi-square test results (form and evaluation)*

3. Conclusion

To implement a distance learning platform and to realize distance education is a demanding task not just for the course designer and tutor. Our aim was not to find out that one of the methods – face-to-face or the distant one is better or worse, more or less effective but rather we strived to prove that students studying in any of the forms can reach comparable results which do not depend on their leaner style.

The hypothesis tested in our research proved to be partly true. Concerning introverts (hypothesis one) the results surprisingly showed that our presumption was not right and that the introverts did not prefer e-learning course, but they chose a face-to face course. The statistically significant result was also reached in the group of students with prevailing interpersonal intelligence who preferred e-learning courses. Concerning the divergers (the second hypothesis) the likelihood-ratio test confirmed the null hypothesis, i.e. there is no difference in distribution of students with particular learning style (according to Kolb theory) between the groups of face-to-face and e-learning course.

In our research we presumed that students with learning style dependent would choose face-to face course and on contrary independent learners would incline to e-learning (Hypothesis 3). The statistically significant difference was measured in the groups of resistant students, dependent students and competitive students. All those groups of students preferred face-to-face course.

The last hypothesis assumed that the form of education does not influence the quality of education (will not be reflected in different assessment) and this proved to be true.

Independent learners with interpersonal motivation prefer e-learning course and they reach comparable results in the traditional face-to-face and e-learning courses.

Nowadays, there are two groups of people living next to each other, that are labeled by Marc Prensky (e.g. 2001) "digital immigrants" and "digital natives". It would be naive to expect that all teachers will use LMS to support their teaching as an alternative to face-to-face courses. Currently, most schools are equipped with computers and internet connection; the same can be said about households. Thanks to different grants many household could afford internet connection. In case we consider the finances and we state that distant education is not a low-cost issue we have to realize how much the face-to-face courses cost – travel costs, accommodation, food, etc.).

New things, new technologies, new approaches evoke concerns and fear in current life. The same is valid at school. Every teaching aid and device – overhead projector, television, video or computer had to build its position in our classrooms. Every day we try to find out the right approaches, we try to

optimize the teaching and learning process. Distant education has to undergo the same process. The verified methods cannot be substituted immediately. We hope that the face-to-face education as well as the distant education will have their position in our life and that both methods can be applied in e.g. further education of in-service teachers.

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