

ICT IN THE PRESENT AND DISTANCE WAY OF INSTRUCTION: COMPARISON OF STUDY RESULTS CZECH-LATVIAN RESEARCH

Ivana Šimonová

University of Hradec Kralove, Czech Republic
E-mail: ivana.simonova@uhk.cz

Abstract

The article presents results of research which was run during the ERASMUS Programme in 2008/9 academic year. The research deals with comparison of study results in present and distance form of education. Students of author's home institution, Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic, and the partner institution, Riga International School of Economics and Business Administration, Riga, Latvia, participated in the research. Its main objective was to learn whether there exist any significant differences in study results at the institutions and in the present and distance form of instruction there. The research field was English for specific purposes, namely topics Geography&Tourism, Social communication, Education, English grammar etc. The method of experiment was applied to collect the necessary data to verify the hypothesis. First, students' entrance knowledge was tested by pre-tests, and then the process of instruction followed. It was organized either in the traditional present, i.e. face-to-face way, or in the distance way supported and managed by modern technologies. At the end of the experiment, students' knowledge was evaluated by post-tests. The received data were processed by NCSS 2004 statistic software and compared in both institutions. At the end of the article the received results are discussed.

Key words: distance education, face-to-face instruction, ICT, pedagogical experiment.

Introduction

The 1990's events in the Czech Republic evoked changes in all spheres of the society. General development towards democracy and information and knowledge society transformed the existing structure of the educational system. New competences were defined which reflected topical learning content; new teaching methods, organizational forms, ways of evaluation were introduced; new relations between elements participating in the educational process were set; subjects as Humanities, foreign languages, Informatics, Environmentalistics were emphasized; learner's responsibility for his / her own education, creativeness and motivation were required; economic aspects of education and competitiveness had to be taken into account; and last but not least the call for lifelong education appeared. (Šimonová I., 2009) These features are slowly but steadily being included into a new educational system and curricula, which are hardly to be imagined without ICT implementation. The main objective is to optimize the educational process, i.e. increase students' interest and relax, not stress them at the same time, take on appropriate teacher's activities, and all these changes result in having more time for other, core activities.

But this new approach does not only mean adding new aids, methods, forms to existing ones. It requires revision of the whole system and active ICT implementation in the process. Having undergone the starting period of material and technical problems, the time came to deal with didactic aspects of ICT implementation into the instructional process (Šimonová I., 2008). It is obvious that new teaching / learning approaches require adequate competences from both participants of the educational process. According to the National Programme of Educational Development in the Czech Republic (Národní program rozvoje vzdělávání v České republice, 2001) the following new key competences were defined: *learn to study*, i. e. to master methods of gaining information, transforming it into knowledge, applying and evaluating, to think critically, use new ICT, be motivated towards further education, outline own educational strategies; *learn to live in society*, i. e. to have a human and social competences, work in teams, communicate in at least one foreign language, solve conflicts, accept different opinions; *learn to be*, i. e. to get informed about various new situations, react to them adequately, decide in accord with ethics, accept personal responsibility, create and respect a high moral code. The newly defined competences resulted from the world-wide process of globalization which brings not only great changes and provides chances but also requires more competences from people participating in it. Only an educated individual, creative in thinking and doing, flexible enough to solve still unknown problems is able to succeed in such a society. The increased requirements can be met by improving the quality of the educational process (Poulová & Černá, 2008). A new structure and relations in the field of upbringing, education and social activities have appeared being based on the human competence to predict the social development, accept running changes, developments and trends, and adjust the educational concept to the new situation. The main objective in the current society, including field of education, is to remove the traditional encyclopaedic content and point of view, and introduce another one which emphasizes student's activity and responsibility for his/her development and education. Globalization also means unifying and integrating the civilization to support its general increase, bringing nations together, studying other nation's cultures, and shorten non-geographical distances between them. (Šimonová I., 2007) Competences in foreign languages highly contribute not only to all these aspects, they are also part of forming both business and private international relations, and must belong to key competences of each current graduate to make him / her successful in the competition on today's labour market (European Qualification Framework).

Research Question

The University of Hradec Kralove (UHK), Czech Republic, has substantially contributed to the process of implementation new technologies into education in the Czech Republic. The university is structured into three faculties – Faculty of Education, Faculty of Arts and Faculty of Informatics and Management, and just this faculty started the process of ICT implementation ten years ago. (Poulová, Černá & Svobodová, 2009) Sufficient number of seats in computer classrooms having been equipped with hardware and software, the process of forming computer literacy started with both university teachers (including technical and administrative staff) and students. This key competence was later applied into the field of education (Veselá, 2009). And what are the results? Are teachers able to apply suitable means, create and use tools which are offered by new technologies? Are the new didactic means (methods, forms and aids supported by digital technologies) able to optimize the process of creating knowledge? These are the essential questions to be researched (Šimonová I., 2009).

Research objective

Resulting from the theory of short-term results and long-term effects of education (Průcha, 1997) we decided to pay attention to the problem whether ***students learn more when they are taught in the distance way, or if they are taught in the present way.***

The distance education is understood as such a way of instruction where students are

separated from the educational institution and the process is managed by ICT, mainly by LMS. The present way of instruction is organized traditionally, it runs face-to-face with real teachers in classrooms, supported by ICT, in adequate extent.

Methodology of Research

The research was organized under the Erasmus Programme of teaching staff mobility in October 2008.

Research sample

The participating institutions were Riga International School of Economics and Business Administration, Riga, Latvia (RISEBA) and Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic (FIM). Total number of participants was 300. They were randomly divided into four groups as it is presented in the table below (Table 1). Students in experimental groups were taught and studied in the distance way, students in control groups attended traditional present, face-to-face lessons run by teachers.

Table 1. Number of participants.

Groups	RISEBA	FIM
Experimental group (distance)	38	129
Control group (present)	40	93
Total numbers in groups	78	222

Defining the hypothesis

The hypothesis to be verified was stated as follows:

H₁: Students taught in the distance way reach better results in tests than students taught in the present form.

The term “better results” means that the difference in test scores of students taught in the distance way will be statistically significant in comparison to those taught in the present way.

The null hypothesis was stated as follows:

H₀: There is no significant difference in test results of students who were taught and studied in the distance way and in the present way of instruction.

In both ways of instruction students received materials on CD-ROMs which were tailored for this purpose (Poulová & Černá, 2008). Students in control groups used them after being taught in the present way, mainly as study materials and sources of information which made the process of learning easier for them. Students in experimental groups received not only study materials but also instructions (manual) on how to study effectively in the distance way, how to communicate with the teacher (tutor), how to test their knowledge, submit assignments etc. The present students received the same information in face-to-face lessons. The research focused on ESP (English for specific purposes). Learning content was divided into four fields called Questions I, II, III and IV (QI - IV) as follows:

Question I (QI) dealt with basic geographical data (capital, which country is larger and has more population, what the TLD country-code is, whether / when the country entered the EU etc.

Question II (QII) monitored important historical events, sights, traditional and typical

phenomena, sport and cultural personalities and fields, the university city and educational system, always in relation to the other country.

Question III (QIII) aimed at communication, mainly introduction, small talks, starting and finishing dialogues, greetings, table manners and talks, name of the educational institution and field of study in English, etc.

Question IV (QIV) pursued selected grammar topics which are considered difficult for Czech students (e.g. present perfect and past tense, countable and uncountable nouns singular and plural forms, gerunds, acronyms etc.). The importance and popularity of acronyms has been increasing recently, just in relation to spreading ICT, so it was a pleasure for students to study and use them and they contributed to this topic substantially by their own experience.

The topic was taught in five lessons (which are provided to each teacher in the Erasmus Programme).

Research methods and tools

The hypothesis was verified by the pedagogical experiment. The experiment started with testing students' entrance knowledge (pre-test) and running the introductory tutorial for distance students. After that the process of instruction followed, being organized either in the present, or distance way. Then students sat for the final test (post-test) which monitored their level of knowledge after the instruction.

The collected data were processed by National Cruncher Statistic Software NCSS 2004. Resulting from the situation non-parametric tests were applied, i.e. Aspin-Welch Unequal Variance Test, Mann-Whitney U/Wilcoxon Rank-Sum Test for Difference in Medians. They are generally recommended to be used simultaneously, as they are able to prove the results in two different ways, i. e. by testing and analyzing unequal variance and difference in medians. The increase (i. e. difference) in knowledge between pre-tests and post-tests in the experimental (i. e. distance) and control (i. e. present) groups was evaluated and considered from the point of statistic significance.

Results of Research

Table 2 displays the summary of test results and accepted/rejected hypotheses. In column three data are not distinguished according to the Aspin-Welch or Mann-Whitney tests because the solution on acceptance or rejection the hypothesis was always identical in both tests. The table is structured in seven columns (1: groups, 2: number of respondents, 3: results in Aspin-Welch and Mann-Whitney test, t-value received in the tests, 4: mean-value in pre-tests, 5: mean-value in post-tests, 6: increase, i. e. difference between results in post-tests and pre-tests, 7: t-value of the increase). RISEBA data are in blue fields, FIM data are in white fields. The results are presented according to the four questions described above.

Table 2. Statistic results of tests.

1	2	3	4	5	6	7
Group	N	Hypothesis: A/R t-value	Mean-pre %	Mean-post %	Increase %	difference in increase: t-value
Ri Di QI	38	Pre: A, Post: A	86.8	99.5	12.7	
Ri P QI	40	0.3761; 0.0362	85.3	99.5	14.2	0.3788
FIM Di QI	129	Pre: R, Post: A	73.5	98.5	25.0*	
FIM P QI	93	4.6096; 0.5888	91.2	99.0	7.8	4.4882*
Ri Di QII	38	Pre: A, Post: A	21.2	57.2	36.0*	
Ri P QII	40	0.4737; 0.7997	23.4	53.2	29.8	1.3589
FIM Di QII	129	Pre: R., Post: R	5.9	55.2	49.3	
FIM P QII	93	2.8034; 5.3775	9.8	71.7	61.9	4.0389*
Ri Di QIII	38	Pre: A, Post: A	38.8	68.3	29.5	
Ri P QIII	40	0.0675; 1.3047	38.5	71.3	32.8	1.0402
FIM Di QIII	129	Pre: R, Post: R	48.2	77.9	29.7*	
FIM P QIII	93	8.0518; 5.7516	75.1	91.6	16.5	3.8239*
Ri Di QIV	38	Pre: A, Post: A	36.0	74.2	31.8	
Ri P QIV	40	0.1970; 0.3653	36.7	76.7	40.0	0.3653
FIM Di QIV	129	Pre: R, Post: R	30.4	79.3	48.9*	
FIM P QIV	93	6.3019; 2.3520	51.9	86.2	34.3	4.1562*

$t\text{-value}_{crit}: 1,980$

Captions:

Ri: RISEBA; FIM: Faculty of Informatics and Management; Di: distance way of instruction; P: present way of instruction; N: number of participants; Mean-pre: Mean value in pretest in %, Mean-post: Mean value in posttests in %; A: hypothesis accepted; R: hypothesis rejected; Increase: difference between results in posttests and pretests in %.

Verifying the hypothesis

In the RISEBA groups the null hypothesis was accepted in all (i.e. four) pre-tests and post-tests; while in the FIM groups the null hypothesis was accepted in one test only (QI post-test, column 3). T-values of RISEBA tests were between 0, 0362–1, 3047; t-values of FIM tests were from -2, 8034 to 8, 0518; the critical value ($t\text{-value}_{crit}$) is 1,980. The results above the critical value are marked by asterisk (*) in column 7. All of them are in FIM groups.

The results also show that **four of eight experimental groups** (taught in the distance way) **reached higher increase in knowledge than control groups** (taught in the present way), (column 6, marked by asterisk (*)). Three of them were in the FIM groups (QI, III, IV), one was in the Riga group (QII).

Summary of the results

RISEBA students proved no difference in test results in the groups taught in the distance or present way, neither in pre-tests, nor in post-tests. FIM students proved statistically significant difference in the group taught in the distance way, in QI, pre-test.

Partial and total test results are presented in graphs below. Results collected at RISEBA are displayed in Figure 1. Results collected at FIM are displayed in Figure 2.

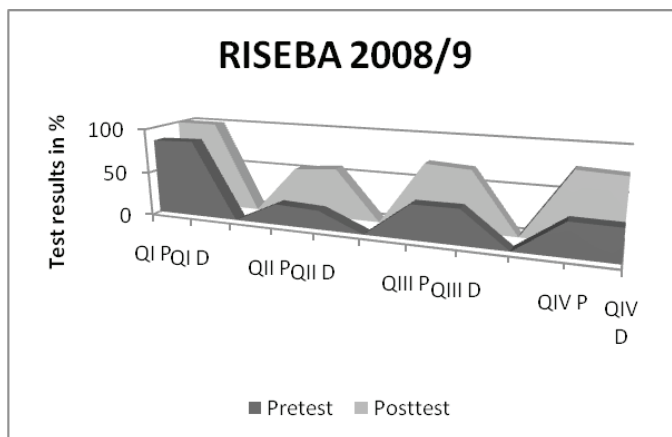


Figure 1. Test results in single questions at RISEBA.

The RISEBA students proved high entrance knowledge in question I (about 85%), dealing with geography, politics etc., and after the instruction they reached nearly 100%, both in experimental and control groups. A reason could be a wide-spread interest of young generation in topics like these ones. In question II, which deals with history, culture, sports etc., the entrance knowledge in both groups was only slightly above 20%, and more than doubled after instruction. The increase was nearly 30% in the control group and 36% in the experimental group. Half of the respondents mentioned they had visited the Czech Republic before and received their own experience. In question III, the increase was about 30% in both groups, starting from 38%, and reaching about 70% after the instruction. In question IV, the entrance knowledge was similar in both groups (about 36%), and so was after instruction (about 75%).

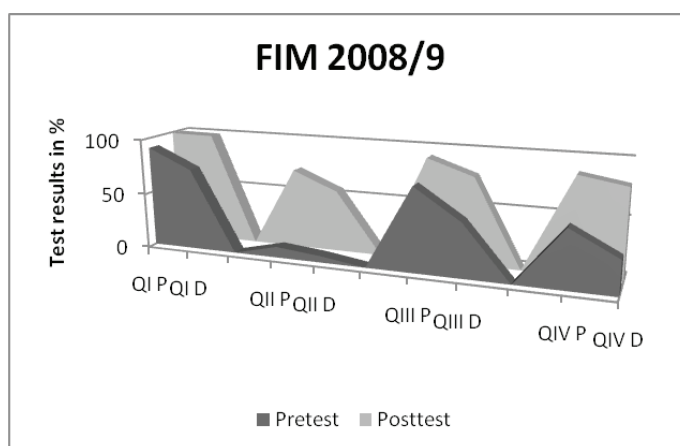


Figure 2. Test results in single questions at FIM.

The FIM students also proved quite high, but slightly lower, entrance knowledge in question I, about 70% in the experimental group and 90% in the control group, and after the instruction they both also reached nearly 100%. A reason could be the same as with RISEBA students, but hardly

anybody visited Latvia before. In question II, the entrance knowledge was lower than 10%, but increased to 55% in the experimental group and even above 70 % in the control group. This is the highest increase in all groups and questions. In question III, the increase was about 30% in the experimental group, starting from nearly 50%, and reaching 78%. In the control group the increase was about 16%, starting from 75%, and reaching 92%. In question IV, the entrance knowledge was quite low, about 30% in the experimental group, but reaching 80% after the instruction, while results in the control group moved from 52% before the instruction to 86%.

To summarize the partial results, high entrance knowledge was found in Question I, the distance students reached the highest score in pre-test and post-test, probably because the tasks in this field were easy, the only problem was the question concerning EU. On the other hand, the lowest entrance scores appeared in Question II dealing with history, culture, tourism etc. Although the entrance level of knowledge was low, the field is attractive, so students of both groups devoted time and efforts to these topics. And even more, the information was presented in relation to interesting and important context so that it could be easily remembered. In Question III, all students proved middle or higher entrance level of knowledge. After lessons, which enabled them to build communication skills, they reached very good results. Scores in Question IV, which contained several grammar items, were very low in pre-tests in both groups. After the instruction the situation changed substantially, students knowledge improved and reached very good level in both groups. A likely reason could be in non-attractive ways of teaching grammar which students consider boring and do not pay much attention to these activities. Sometimes their knowledge of mother tongue is low as well. All students admitted they had studied the mentioned grammar items sometimes before. The only exception were Gerunds, approximately half of students had heard about this item before the experiment, starting from those who knew the name only, to those who were able to apply it correctly.

Total results collected at both institutions are displayed in the graph below (Figure 3).

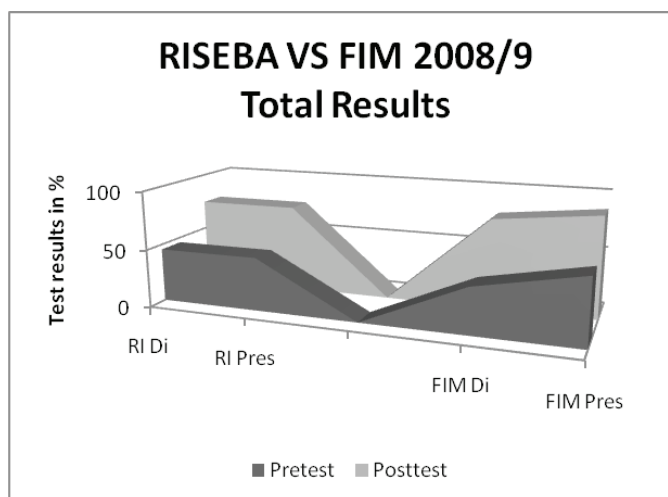


Figure 3. Total test results.

Conclusions

The results proved the study results in the distance and present way of instruction were quite similar. Currently the distance form is highly required as it helps remove various constraints in education; all people are busy, and at the same time new competences must be formed. The distance education opens gates, offers individual place, time and pace for studying according to possibilities of students, including handicapped ones. This way of education can be applied in nearly all fields, subjects and topics, in some extent. It depends on us, teachers, whether we have didactic skills and are media literate enough, to provide students such methods which can really help them in their learning, it does not matter whether of university or lifelong type.

Acknowledgements

This article was supported by the GAČR (Czech Science Foundation) Project No. 406/09/0669.

References

- European Qualification Framework*. (n.d.). Retrieved 11 11, 2008, from European Qualification Framework: [http://europa.eu.int/comm/education/policies/2010/doc\(basic2004.pdf](http://europa.eu.int/comm/education/policies/2010/doc(basic2004.pdf)
- Národní program rozvoje vzdělávání v České republice*. (2001). Praha: Ústav pro informace ve vzdělávání.
- Poulová, P., & Černá, M. (2008). Evaluation of e-learning courses – internal methodology. In *Proceedings of the 19th EAEEIE annual conference*. Tallinn: EAEEIE .
- Poulová, P., Černá, M., & Svobodová, L. (2009). University Network ? Efficiency of Virtual Mobility. In *Proceedings of the 5th WSEAS/IASME International Conference on EDUCATIONAL TECHNOLOGIES (EDUTE09)* (pp. 87-92). La Laguna: WSEAS Press.
- Průcha, J. (1997). *Moderní pedagogika*. Praha: Portál.
- Šimonová, I. (2008). On the process of e-learning implementation at FIM, UHK. In *Perspectives in education process at universities with technical orientation in Visegrad countries* (pp. 224–228). Nitra: Slovak University of Agriculture.
- Šimonová, I. (2009). The role of ICT in the process of professional English instruction at University of Hradec Kralove. In *Strategies for optimizing the quality standard in higher education ESP* (pp. 125–132). Targu Mures: Dimitrie Cantemir University.
- Šimonová, I. (2009). Three steps towards the process of ICT implementation at the University of Hradec Kralove. In *XXI. Didmattech 2008, 2nd part* (pp. 95–98). Eger – Komarno: Esterhazy Karoly College, Eger – J. Selye University, Komarno.
- Šimonová, I. (2007). *Využívání ICT v distanční formě výuky odborné angličtiny na FIM UHK. Disertační práce*. Nitra: Univerzita Konštantýna Filozofa.
- Veselá, K. (2009). *Učebné pomocky pre počítačom podporované vyučovanie*. Nitra: UKF.

Advised by Martin Bílek, University of Hradec Králové, Czech Republic

Ivana Šimonová	PhDr., Ph.D., Senior Lecturer, University of Hradec Kralove, Rokitanskeho 62, Hradec Kralove, Czech Republic. Phone: +420 49 333 2313. E-mail: ivana.simonova@uhk.cz Website: http://www.uhk.cz/eng/uhk/
-----------------------	---