JoLaCE
Journal of Language and Cultural Education (2013), 1.1
ISSN 1339-4045 (print)

On Selected Phenomena of the ICT-supported Foreign Language Teaching/Learning: Research Results

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Abstract
The paper deals with three phenomena relating to the ICT-supported process of foreign language teaching and learning: mind mapping, testing and communication. Latest changes in society and education and latest results of research activities held at the Faculty of Informatics and Management, University of Hradec Králové, Czech Republic, are introduced focusing on (1) Concept of e-learning reflected in learners´ mind maps; (2) open-answer versus multiple-choice tests and (3) communication in online courses under the virtual observation.

Keywords
ICT, foreign language, teaching, learning, ESP, research

1 Introduction

The 1990´s events in the Czech Republic evoked changes in all spheres of the society, including education. General development towards democracy and information and knowledge society transformed the existing structure of the educational system - new competences reflected in new learning content were defined; demands for new teaching methods, organizational forms, ways of evaluation were detected; new relations between elements participating in the educational process arose; different subjects and competences were emphasized, i.e. Humanities and foreign languages, Informatics, Environmentalistics; learner's responsibility for his/her own education, creativeness and motivation; economic aspects of education and competitiveness, and last but not least the call for lifelong education appeared. These features have been slowly but steadily included into the new educational system, which is hardly to be imagined without implementation of modern information and communication technologies (ICT).

The main objective of the ICT implementation is to optimize the educational process. But this new approach does not only mean adding new teaching aids, methods, forms to the existing ones. It requires revision of the whole system and active ICT implementation in the process. Having undergone the starting period

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of material and technical problems, the time came we dealt with didactic aspects of ICT implementation into the instructional process. And what are the results? Are teachers able to apply suitable means, create and use those which are offered by new technologies? Do students have higher level of knowledge if they attend lessons supported by ICT or those run traditionally by teachers? Are the new didactic means (methods, forms and aids supported by modern information and communication technologies) able to optimize the process of forming knowledge (Šimonová, & Poulová, 2012)?

2 Research activities

In this paper, we focus on researching selected phenomena relating to the ICT-supported process of instruction: (1) monitoring the concept of e-learning in learners´ mind maps; (2) considering features of open-answer tasks in tests in comparison to multiple-choice ones and (3) observing tutor – learner communication in online courses. All research activities relate to foreign language instruction focusing on English for Specific Purposes (ESP). They were held at the Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic and students of Applied Informatics and Information Management study programmes were included in the sample group.

2.1 Concept of e-learning reflected in learners´ mind maps

Searching for new approaches to education which would provide teachers with deeper reflection of students´ knowledge is evoked by crucial efforts towards improving the process. Receiving realistic and objective feedback is the key problem of each educational concept. There exist various approaches to taking it, and the mind mapping (mental mapping, semantic mapping, concept mapping) is one of them.

The term of mind mapping first appeared in 1970s in the concept introduced by psychologist Buzan (2001) who searched ways of remembering experience and concluded they were saved in individual's memory in the form of clusters showing mutual interrelations. In the field of education the mind mapping relates to developing meaningful learning, i.e. a new piece of knowledge becomes meaningful to learners if in-built in their existing knowledge structures which he understands to be are identical with mind maps.

The mind map as a research method was first applied by Novak (1998) in late 1970s. In his concept mind maps are understood as diagrams expressing significant relations between terms in the form of statements. These are represented by links between terms which describe their mutual relations. This concept was later adapted by Åhlberg (2004). Buzan (2010) says the mind maps thus can be understood as external expressions of knowledge integrated in individual´s mind. He emphasizes the mind map is neither "correct", nor

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"incorrect", but it must be always accepted in a certain context, while it could be rejected in another one.

The mind maps can be applied in different phases of instruction, e.g. for revising, practising and fixing the knowledge, and as a means of feedback. Novak (1998) distinguishes four ways how the mind maps can be used, i.e. learning strategies, teaching strategies, means to forming concept and content of single subjects and the instruction as the whole, and a means of collecting information about learner's understanding of the learning content. He also mentions other ways, e.g. strategies towards acquiring new learning content, evaluation etc. The information and communication technologies can be used for the same purpose, e.g. electronic applications for creating and analyzing the mind maps, which are available on web pages of iMind-Map (2011), brainstorm and mind map online (2011), Edraw Mindmap (2011) etc.

Research design and methodology

The main research objective was to monitor how students understand the term of e-learning. Despite the term is generally and widely used within the field of education (Bertrand, 1998), there still does not exist a generally accepted, common definition of e-learning. Until this is provided, two approaches can be applied. First, accept the definition presented in main European administration documents, e.g. (EC, European Commission growth, competitiveness and employement, 1993), (EC, 1995) saying that e-learning means using modern multimedia technologies and the Internet towards improving the quality of education thanks to easy approach to sources and services (EC, 2001). Second, e-learning can be considered from two different points of view Zlamalova (2001): (1) it is the *educational process supported by information and communication technologies*; (2) it is a set of *technological tools supporting education.* Above all, Zlamalova (2001) emphasizes that under no circumstances eLearning means the technical "*e-*" only, but the traditional didactic "-learning" must not be omitted. Or, as Khan says (2006): "E-learning may be considered a new approach to providing a quality, interactive learning environment, easy available to everybody, anytime, anywhere, using features and sources of various digital technologies, and also other learning materials which suit to open, flexible and distributed learning environment." And, last but not least, a completely different approach is introduced by Logan (2010) who defines that "The ***e*** doesn't stand for electronic. Better to think of the ***e*** as ***e***volving, or ***e***verywhere, or ***e***nhanced or ***e***xtended ... and don't forget ***e***ffective".

The research sample included 104 respondents, the 1st-year students (aged 18 - 20 years) of the Faculty of Informatics and Management who in 2011/12

ISSN 1339-4045 (print)

enrolled in the Applied Informatics and Information Management study programmes.

Respondents had not had any experience in being tested in this way, so the method of mind mapping was not used in the traditional form, i.e. the respondents did not create the mind map themselves, but they were provided the eight-dimensional schema of e-learning designed by Khan (2006). The eight-dimension schema replies to the question what is required for the open, flexible and distributed learning. It is presented in two versions which differ in graphic presentation (Figure 1). In the middle of schema 1 (left) the figure of a human being is presented but Khan does not explain how this symbol should be understood. Two basic approaches can be applied: e-learning as a learner-oriented process; or e-learning as a way of learning which enables/provides highly individualized approach to learning which is defined by each learner and is reflecting individual learning style preferences and other didactic-psychological characteristics (i.e. requirements-oriented learning). In schema 2 (right) the word e-learning is placed in the centre instead of the human figure.

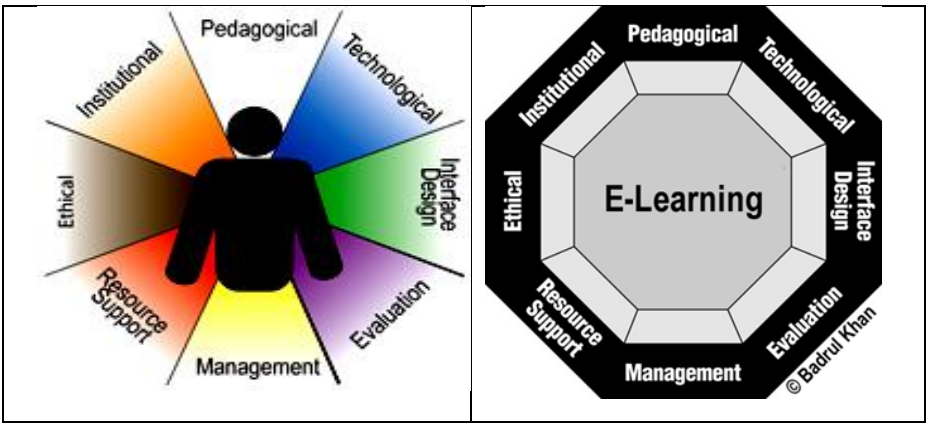


Figure 1: Concept of e-learning: two versions of schema (Khan, 2006)

Before the research started, the principle of mind mapping and Khan's schema were explained to the respondents. Then, students modified the Khan's schema and adjusted it to their individual mind concepts by matching 17 terms defining e-learning by Khan to the eight dimensions and describing each match by an appropriate verb. In case of disagreement respondents removed the term or dimension. Additionally, they were provided several other terms by the researcher which were not mentioned by Khan (learning, tutor, communication) and which focus on concrete subjects and foreign language learning (a subject,

foreign language/s, English (ESP). In case of total disagreement with the concept provided, respondents were encouraged to draw their own schema.

The Khan's structure of e-learning includes eight dimensions as follows: Pedagogical (P); Technological (T); Interface Design (D); Evaluation (in this research marked as feedback, F); Management (M); Resource Support (R); Ethical (E); Institutional (I). The 17 terms defined by Khan are listed below: analysis of objects, content and media used, analysis of participants (dimension P); organization, methods, strategies used in the environment (T); infrastructure design (hardware, software) (D); design of e-learning programme (design of pages, content, navigation, tools for testing) (F); management (evaluation of learner's work during the instruction using the assignments, evaluation of the learning environment (M); resource support (learning management, ways of providing and spreading information, online support, maintenance (R); social influence, cultural and geographical differences, differences in level of entrance knowledge, differences in accessibility to information, ethical and legal rules (E); institutional support in the field of e-learning services for students (I).

The collected data were processed by the method of frequency analysis.

Research results

The data were structured according to five criteria:

a) Dimensions used in the respondent's concept of e-learning.
b) Dimensions not included in the respondent's concept of e-learning.
c) Additional terms included in the individual concepts.
d) Levels included in the individual mind map.
e) Defining a new model of the mind map.

a) Dimensions used in the respondent's concept of e-learning

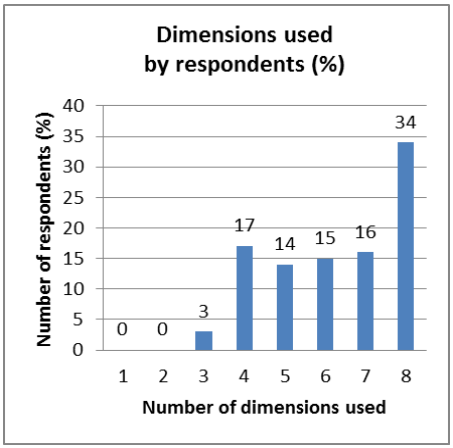
First, respondents matched 17 terms to the eight dimensions of the Khan's concept of e-learning. Results are displayed in figure 2 showing that one third of respondents (33.6%) did not make any changes in the concept, they used all eight dimensions and matched one term to each dimension at least; 16.3% respondents worked with seven dimensions; 15.3% used six dimensions; 14.4% of respondents matched terms to five dimensions and 17.3% to four ones; 3% of respondents used only three out of eight dimensions. Results are displayed in figure 3.

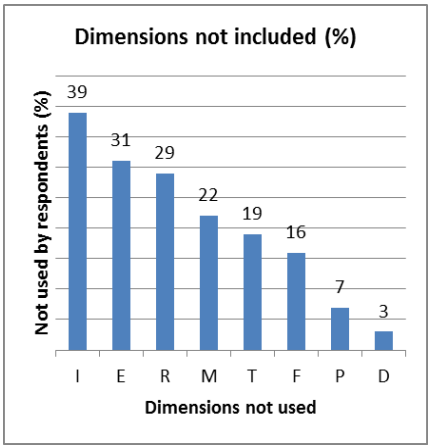
b) Dimensions not included in the respondent's concept of e-learning

As mentioned above, respondents could have matched terms to eight dimensions. Results showed that nearly 34% of them had done it while 66% of respondents had used from three to seven dimensions. Not a student worked with one or two dimensions only. As clearly seen the lowest scores describing the

frequency of matches were detected in the Design interface dimension (D; 3%), followed by Pedagogical dimension (P; 7%), design of e-learning programme, i.e. design of pages, content, navigation, tools for testing (F; 16%) and technological dimension (T; 19%). These scores closely relate to respondents´ study programmes (Applied Informatics, Information Management) and prove what reflect their professional interests. Results are displayed in figure 3.

Figure 2: Dimensions used in the respondent's concept of e-learning (left)
Figure 3: Dimensions not included in the respondent's concept of e-learning (right)





c) Additional terms in the concept

Except of the above mentioned terms, there exist other ones which were not mentioned by Khan but in our opinion strongly relate to the topic: *learning, tutor, communication*. The results show that only few students included any of them in their individual concepts: learning 7.7%; tutor 3.9%; communication 1.9%. Totally 3.2% of respondents used one of the terms in their mind maps, no respondent implemented two or three terms.

The reflection of a particular subject, foreign language/s and/or English (ESP) was also monitored. The results showed no respondent had included any of these terms in the individual mind map; English was mentioned by one respondent as the language of professional communication in the LMS Blackboard which was used for the ICT-supported instruction at FIM and language of IT professionals, not the subject taught/learned with the ICT-support. Our expectations were

different in this field – we expected at least EPS and/or a foreign language and an IT subject would be mentioned in mind maps, even under the circumstances, when the ESP teacher and Database Systems teacher were the main organisers and present within this research activity. In the given academic year the ESP teacher taught approximately 20% of respondents and all of them attended lectures of Database Systems.

d) Levels included in the individual mind map

If the presented Khan's schema is considered to be the first level of the mind map, then 92.3% of respondents added the second level and 6.7% of respondents designed the three-level model.

e) Defining a new concept of the mind map

Nine respondents (8.6%) drew their own, totally different concept (model) of the mind map. Eight of them first started with re-organizing the Khan's concept but finally they designed their own schema; one respondent rejected the Khan's concept at the very beginning and designed a completely new model. Similarly to Khan the human body was situated in the centre but it was not defined who s/he is, because the teacher and learner were displayed separately. Several from the above provided terms were included in the schema; others were added according to the respondent's choice (friendship, stressfulness). In the text below the mind map, other two items were mentioned (motivation, responsibility) being related to all dimensions. The centre of the circle was called the system. Within the following interview the respondent explained he had considered the whole schema to be a system, not only the body in the centre which was not linked to any other dimension or described by other characteristics.

Summary and discussions of results

The results of researching the term of e-learning by the method of mind mapping showed that one third of respondents (33.6%) had not made any changes in the provided Khan's schema; respondents had matched at least one term to each dimension; the others adjusted the schema and matched terms to 4 - 7 dimensions. The least frequently used dimension was the institutional one (more than one third respondents did not match any term to it), followed by the ethical, resource support, management and technological dimensions which were not used 20-30% of respondents. This result proves that 97% of respondents understand e-learning from the point of design interface, pedagogical dimension (93.3%) and evaluation (83.7%), followed by management, ethical and institutional dimensions and group of dimensions, e.g. IER, IEM, IEF, IET. This result reflects the structure of the sample group consisting of students of the Applied Informatics and Information Management study programmes who

ISSN 1339-4045 (print)

attend the institution where e-learning and ICT-supported instruction have a relatively long tradition and have become standard. The mind maps were structured in two levels by most respondents, 7% of them designed three-level mind maps. Respondents matched 17 terms to eight dimensions of the Khan's concept; in general, they used 6-17 terms. One third of respondents (33.6%) matched all 17 terms to the dimensions, using fewer dimensions step-by-step decreased from 12.5% up to 1%. Nine respondents designed their own mind map; eight of them worked with the provided Khan's schema first.

It is hardly possible to sum up all the collected data to a single and homogenous conclusion. Results mostly express agreement on the Khan's concept of e-learning, which can be appreciated because this concept is complex, considering e-learning from the whole width of this phenomenon. On the other side, it should be taken into account that the respondents were students of study programmes focusing on Informatics who focus on this field from the point of profession and interest and pay more attention to technological aspects. For the future, similar research should be held so that to monitor the e-learning concept of students of teachers´ training and other faculties and check whether their concepts are influenced by their future profession, i.e. whether e.g. pre-graduate teachers emphasize the pedagogical dimension of e-learning as the Informatics students do with dimensions closely relating to information technology and how the didactic approach is reflected in the e-learning concept.

2.2 Open-answer versus multiple-choice tests

Didactic tests belong to frequently applied research tools in educational sciences and relating fields. Czech authors, e.g. Byčkovský (1986), define the didactic test as a tool of systematic measurement of results of instruction. Didactic tests are generally classified according various criteria which have been analyzed by numerous authors, e.g. Byčkovský (1986), Chráska (2006), Pelikán (2011), Průcha et al. (2009) etc. In our research the quasi-standardized, cognitive, objectively scored, comparative, monothematic tests monitoring the entrance knowledge were applied. Further on it is highly required the test contained tasks of various types. The entire type is pre-defined by the educational content and the main objective of testing. If these rules are kept, the test reliability increases (Chráska, 2006). The tests applied in this research contained tasks of two types: open-answer tasks (i.e. translation from Czech into English, test 1, T1) and multiple-choice tasks (providing four distractors per task, test 2, T2).

Since the World War II when applied first, the *multiple choice tests* have become the tool which is frequently used in various fields of human activities and knowledge, including the field of higher education (Hymes, 2011). Currently, the

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multiple-choice tests are mostly used in the electronic form, i.e. they are set and assessed with the ICT support. Everybody concerned could agree it might seem to be less difficult for students to choose the correct answer from several provided ones randomly than to actively formulate it by themselves. If chosen randomly, the received results do not reflect student's real knowledge but they are influenced by other characteristics, i.e. good luck, intuition, "guessing" the answer etc. Thus the multiple choice tests might be understood the tool of lower reliability than open-answer tests (Hymes, 2011). To contribute to solving this problem and verify or reject this expectation is the main objective of the described research.

So as the random choice was minimized, the risk is lowered by increasing the number of provided answers (distractors). Four distractors seem to be optimal, as too many choices make the task not clearly arranged, and fewer choices make the "guessing" easier. If two or three distractors are applied, it is highly recommended to make the correction of the test result (Chráska, 2006). If the teacher is going to apply the test score correction, learners should know about it before the test starts to decide whether to apply the random choice if they are not sure their choice is correct, or not to answer at all. The main pre-condition is all distractors were plausible for the learner (Johnson, 1999).

Another approach is if both types of tests are applied. In our research, first, the open-answer test (i.e. translation from Czech to English) was used; second, the multiple-choice test was applied. This two-tier testing enables the teacher to analyze learner's cognitive structures and knowledge and defining misconcepts (Prokša, 2008). Calculating the test reliability, difficulty, sensitivity and discussing the validity are the obligatory preconditions.

Research design and methodology

The research objective was to verify whether students reach higher level of knowledge in the Czech-English translation or in the multiple choice test.

The research sample consisted of 101 students of the Faculty of Informatics and Management, University of Hradec Králové, who enrolled in the first year of the bachelor study programme Applied Informatics and master study programme Information Management in the 2010/11 academic year. The testing was held at the beginning of the second term. Students were randomly (by drawing lots) divided in the experimental and control groups.

The process of testing was structured into two phases, each of them applying a different tool: (1) the Czech-English translation was applied (Test 1, T1), i.e. the open-answer tasks were used, when respondents translated Czech sentences into English; (2) the multiple-choice test (Test 2, T2) was applied providing four distractors in each task.

Each test contained 11 tasks (sentences) based on the same lexical material so that the result, i.e. knowledge of English tenses, was not influenced. In each sentence *Mr Parker* did an activity, i.e. *to wash the car*. The verb *wash* and noun *car* belong to basic vocabulary acting under regular rules without any exceptions which might influence the result. This vocabulary is used in each sentence describing various situations by different tenses, e. g. *Mr Parker is washing his car., Have you washed your car, Mr Parker?*

The selection of grammar items resulted from the expert analysis of 16 academicians from the Applied Linguistics Department, Faculty of Informatics and Management and Faculty of Education, University of Hradec Kralove; Slovak University of Agriculture, Nitra; Department of Language and Intercultural studies, Faculty of Education, Constantine the Philosopher University, Nitra and University of Economics, Bratislava. The visual similarity of the sentences emphasized differences in the application and translation of single tenses, which could help in discovering learner's potential misconceptions in this field (Prokša, 2008). This intention was supported by the order of single grammar items, which has been used in most grammar books, i.e. from easier to more complicated ones, using the comparison of similar forms of various tenses (Present Simple/Continuous, Present Perfect Simple/Past Simple, Gerunds, Indirect Question, Sequence of Tenses, Conditionals etc.).

Each test was set independently, i.e. the following type of test was assigned only after finishing the previous one. Thus e.g. the T1 results could not be influenced by feedback provided in T2. Reflecting the testing procedure, the large amount of respondents (101 respondents) and low number of seats in IT laboratory (25 seats), the testing cycle would have to be repeated several times, which might have lowered the testing conditions, the tests were not provided in the electronic version, as it might be expected with students of Informatics, but in the printed form.

The following hypothesis was set to be verified:

H_1: Students will reach higher test scores in the multiple-choice test (T2) in comparison to the open-answer test (T1).

Research results

The collected data were summarized and analyzed in two steps.

First, the occurrence of correct answers in both tests was monitored and presented in table 1. The results clearly showed students reached higher test scores in test 2 (T2), i.e. in the multiple choice test, than in the open-answer test (test 1, T1), i.e. Czech-English translation. Comparing the data it is clearly seen that respondents provided 45.63% of correct answers in the Czech-English translation (T1), while in the multiple choice test (T2) it was 50.67% correct

Journal of Language and Cultural Education (2013), 1.1
ISSN 1339-4045 (print)

answers. This result verified the expectation that they reached higher test scores in multiple-choice test.

Table 1: Correct answers in T1 and T2

Responses	Correct in T1	Correct in T2
total score (n)	507	563
total score (%)	45.63	50.67

Second, the hypothesis was verified by the single-pair t-test on the 0.05 significance level. The collected data were processed by the NCSS2007 statistic software and results are displayed in Table 2.

Table 2: Comparison of statistic results in T1 a T2

Paired differences				
Tests	**Mean**	**SD**	**t-test**	**p-value**
T1 : T2	-5.04	2.560	-0.535	0.012

The results proved there the statistically significant difference was discovered in the amount of correct answers in T1 and T2 tests, i.e. between the Czech-English translation and multiple-choice test (Mean is -0.535; p-value (Sig.) is 0.012). The correlation coefficient between T1 and T2 tests is 0.25, which refers to the significant relation between the test scores in both tests. Thus the H_1 hypothesis was accepted.

Above all, the correlation coefficient between the amount of identical (both correct and incorrect) answers is 0.707 in T1/T2 which refers to the strong relation and the results cannot be considered the random choice ("guessing") but answers based on good knowledge.

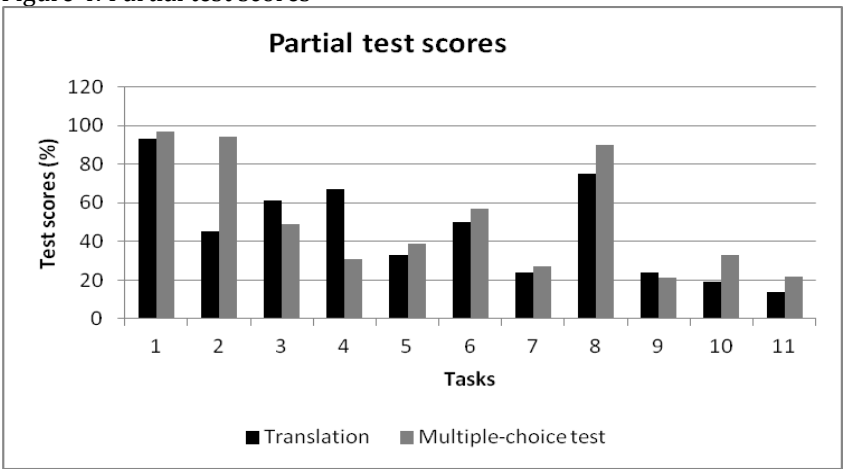
Partial results supporting the verification of hypothesis are displayed in Table 3 and Figure 4. Higher test scores in single tasks are highlighted light grey, the lowest test scores are highlighted dark grey and written in italics.

Table 3: Partial results in tasks: correct answers

Task N.	Grammar item	Test 1 (%)	Test 2 (%)
1	Present Continuous	93	97
2	Present Simple	45	94
3	Past Simple	61	49
4	Present Perfect Simple and Past Simple	67	31
5	Present Perfect Continuous	33	39
6	Gerund	50	57
7	Indirect Question	24	27

8	Future (going to)	75	90
9	Sequence of Tenses	24	21
10	Conditional Clause	*19*	33
11	Wish Clause	*14*	22
Total (%)		**46**	51

Figure 4: Partial test scores



As it can be clearly seen in figure 4, the highest test scores in both tests were reached in task 1 (present continuous tense) and task 8 (expressing the future - going to). Surprisingly, the high score appeared in task 4 (combining present perfect and past tenses, 67%). A reason might be this task follows the one where present perfect was applied. Generally, using this tense is often difficult for numerous students, which is the reason why special attention is paid to this tense and the test result might be influenced by this feature. The high test score in task 2 (present simple, 94%) in test T2 (i.e. the multiple choice test) shows that numerous students are able to select the correct answer but only fewer than half of them (45% in T1) apply the tense correctly in the Czech-English translation.

Lower test score appeared in task 5 (present perfect continuous tense, 39%) in the T2 test (i.e. multiple choice test with feedback), in the Czech-English translation (T1, 33%) and the multiple choice test). The lowest test score (fewer than one third of correct answers) appeared in task 11 (wish clause), task 9 (sequence of tenses) and task 7 (indirect question).

ISSN 1339-4045 (print)

Despite the tested hypothesis confirmed our expectation (students would reach higher test score in the multiple-choice test and the difference in comparison to the open-answer test scores would be statistically significant) this result will not lead us to completely stop using the multiple-choice tests. What we consider to be more important is the fact that the level of knowledge of the first-year IT students is low and does not meet the required B2 level of secondary school graduates. Differences in partial test scores and their seeming illogicality result from and reflect the higher secondary school situation. While the grammar school graduates meet all requirements, the secondary professional school graduates (mainly those who did not pass the school leaving exam in English) have crucial problems. Generally, it is not their fault, but the blame should be mainly laid on the education system, when teacher's competence may be of low level or the period of being taught by a teacher is short, e.g. two teachers per school year. The situation requires more from both the teachers and learners, including those who reach the adequate level. Working in classes of different knowledge is demanding and stressful for teachers who are looking for adequate didactic strategies and for learners, whose level of knowledge differs significantly.

Taking the credit system into account, the weak students have enough time (18 months) to study independently (individually) and reach the required level of knowledge. Providing motivation (both inner and outer) and didactic support lead to succeeding in this process. The organization of study, which reflects the situation, from the FIM side and providing additional courses organized by the Institute of Further Education at FIM on the other side support those students who are interested and make efforts to meet the demands.

2.3 Communication in online courses under the virtual observation

Observation belongs to traditional, natural and widely spread research methods of collecting data within the educational environment. Generally, it is understood as monitoring of sensitively perceived phenomena, mainly human behaviour, course of activities (Mareš, 1995). Some authors emphasize this activity to be objective, intentional, purposive, systematic, planned and directed but on the other hand having some limits (Travers, 1969). Relating to the wide variability there exist various typologies covering e.g. long/short-term, intro/extrospective, non-/structured, non-/mediated, in/formal observation etc. Modern technologies, e.g. ICQ, Skype e-mail, short message service (sms) running on the Internet, are understood as a special way of (electronic) communication.

Information and communication technologies have introduced a new approach to observation. Some authors call it the virtual observation, i.e. the

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observation in the virtual environment, or tracking (Kalwar, 2011). It is mostly defined as a record of exact facts which can be monitored either by single electronic tools (e.g. e-mail), or by the whole virtual learning management system (Mareš, 1995). The record includes all learner's activities since the logging in the LMS, i.e. frequency and length of studying, the tools used, evaluation of work and outcomes, participation in discussions, team work, assignments etc. If the observer is expected not to disturb the process of instruction during the real observation, i.e. to be hidden, this requirement is met to maximum extent with the virtual observation, as it is the LMS which plays the observer's role. From this point of view the virtual observation applies the ex-post-facto approach, as past activities cannot be changed but analyzed and serve for deducting conclusions. On the other hand, the quality of data is limited to pre-defined phenomena and no other (additional, unintentional) data can be received. Despite the limits the observation supported by ICT/LMS provides valuable data which enable to tailor the course of instruction to learner's needs and thus make it more efficient.

Within this research we focus on communication in online courses. Teachers and students are there in the educational communication, which is a special type of social communication, when information between educants and educators are exchanged so that educational objectives could be reached. The particularity of this relation between the teacher and student(s), and the environment which the communication runs in, belong to important factors of the process (Nelešovská, 2005).

Research design and methodology

The research focuses on the student – tutor communication in the situation when the students are submitting assignment for tutor's evaluation within the LMS. The main research objective was to monitor and analyze the situation so that such measures can be taken which will support the communication in the future as the communication is expected to improve the student – tutor relations and consequently contribute to the learning "climate" in the virtual class.

The observed process of instruction was organized in online courses designed in the LMS WebCT. Data were collected in two 3-year periods and processed by the NCSS 2007 statistic software. The frequency and content of communication were evaluated by two methods: first, the contingency table – the independence test was applied; second, the relative frequency was calculated. Hypotheses were tested on the 0.05 significance level and the normal distribution of data had been proved. The research was held in four subjects which are crucial for the study programmes - Database Systems (D), Management (M), IT English (ITE) and Business English for FM students (FME). The subjects were taught by three tutors

ISSN 1339-4045 (print)

(ITE and FME were taught by the same tutor) in eight online courses where 16 assignments were submitted, totally 2,954 assignments were analyzed (2,781 in AI and IM, 173 in FM). The communication, i.e. messages were structured according to the content into 14 types as follows:

1 Assignment sent without comments.
2 I am sending my assignment.
3 I am sending my assignment + greetings.
4 I am sending my assignment + greetings + some comments.
5 Apology but not for late submission.
6 Apology for late submission.
7 Apology for late submission + brief explanation (1 line).
8 Apology for late submission + medium-sized explanation (2-3 lines).
9 Apology for late submission + long explanation (4-more lines).
10 Apology for late submission + brief explanation (1 line) + provides some extra work for being late.
11 Apology for late submission + medium-sized explanation (2-3 lines) + provides some extra work for being late.
12 Apology for late submission + long explanation (4+ lines) + provides some extra work for being late.
13 Without apology for being late.
14 Other comments.

Because of low data occurrence under criteria 7-14, the data were restructured in six types and all data relating to groups 7-14 were included under the type 6). Thus two groups were set as follows: non-communicating respondents (type 1), communicating respondents (types 2-6).

Resulting from the research objectives the following hypotheses were set:

H_2: The frequency of communication differs in subjects IT English, Management and Database Systems.

H_3: Financial Management students communicate more frequently in comparison to those in Applied Informatics and Information Management.

H_4: The frequency of communication increases from the first the third year of study.

Research results

Collected data were processed and are presented below following single hypotheses, i.e. data relating to communication monitored in subjects, study programmes and years of study.

Verification of H_2

Differences in frequency of communication in *various subjects* are expected in H_2 hypothesis. It arises from the fact that each subject belongs to the different field of science, different methods and outcomes (knowledge and skills) are required from the students. The research sample included students of Applied Informatics and Information Management (years 1-3) who submitted 2,807 assignments in three subjects: IT English (E), Management (M) and Database Systems (D). Data of each subject were structured into six types of messages under the criteria 1-6 as mentioned above. The received data are displayed in Table 4.

Table 4: Communication in subjects : content (n)

ype of message	Message content	E	M	D
1	Assignment without comments.	1,162	458	299
2	I am sending my assignment.	137	122	74
3	I am sending my assignment + greetings.	200	174	19
4	I am sending my assignment + greetings+comments.	39	22	4
5	Apology (not for late submission).	21	7	0
6	Apology for late submission.	58	9	2
Total in subject		1,617	792	398
TOTAL				**2,807**

Data presented in table 4 were summarized from the point of non-communicating students in Table 5.

Table 5: Total communication in subjects: non-communicating students

Students / Subject	E	M	D
Non-communicating students: type 1 (n)	1,162	458	299
Communicating students: types 2-6 (n)	455	334	99
Total (n)	1,617	792	398
Non-communicating students (%)	**71.86**	**57.8**	**75.1**

First, the H_2 hypothesis was tested by the method of contingency table – independence test on the 0.05 significance level. Second, the data underwent the comparative analysis of relative frequency by the F-test and Z-test. The relative amounts of non-communicating students (type 1) were compared to those who

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communicate even though minimally (types 2-6). Differences in communication between subjects were discovered by both methods.

The partial results were as follows:

- **M < E:** There is the statistically significant difference in communication in Management and IT English. (Z-test: -6.820).
- **E < > D:** There are more non-communicating students in IT English and Database Systems in comparison to Management (the difference is 3.24 10%) but the difference is not statistically significant (Z-test: -1.155).
- **M < D:** There are fewer non-communicating students in Management in comparison to Database Systems (the difference is 17.3%), which is the statistically significant difference (Z-test: -5.803).

Conclusion

The H_2 hypothesis supposing the differences in communication between the subjects was accepted. The results discovered higher amount of communicating students in Management, followed by IT English and Database Systems. The statistically significant differences were proved between all groups except E versus D.

Verification of H_3

Differences in communication in various *study programmes* were expected in H_3. The hypothesis was based on teachers´ experience that Financial Management students communicate more frequently in comparison to those of Applied Informatics and Information Management study programme, they show better ability to express their minds logically, fluently, they speak and write in standard language, apply grammar rules, keep the social code and last but not least, they do not have problems with presenting their ideas to the public. These features do not relate to all students, individual differences appear.

The communication was monitored in two subjects - IT English and Management and totally 217 messages were included in the research. The collected data were structured into six types as mentioned above. The results are displayed in Table 6.

Table 6: Communication in study programmes and subjects: content (n)

	Message content	ITE	FME	ITM	FMM
1	Assignment without comments.	68	25	21	7
2	I am sending my assignment.	3	6	12	9
3	I am sending my assignment+greetings.	3	12	21	12
4	I am sending my assignment+greetings+comments.	1	4	0	0

5	Apology (not for late submission).	4	2	4	0
6	Apology for late submission.	2	1	0	0
Total in study programmes (n)		81	50	58	28
TOTAL (n)					**217**

Legend:
E: English; M: Management; IT: Informatics; FM: Financial Management; ITE: English for IT students, FME: English for FM students, ITM: Management for IT students, FMM: Management for FM students

Data presented in Table 6 are summarized from the point of non-communicating students in Table 7.

Table 7: Total communication in study programmes and subjects: non-communicating students (%)

Students / Subject	**ITE**	**FME**	**ITM**	**FMM**
Non-communicating students: type 1 (n)	68	25	21	7
Communicating students: types 2-6 (n)	13	25	37	21
Total (n)	81	50	58	28
Non-communicating students (%)	**84**	**50**	**36**	**25**

First, the H_3 hypothesis was tested by the method of contingency table – independence test on the 0.05 significance level and differences in the subjects were discovered. Second, the data underwent the comparative analysis of relative frequency by the F-test and Z-test. The relative amounts of non-communicating students (type 1) were compared to those who communicate, even though minimally (types 2-6). The results did not discover any statistically significant differences between students of Financial Management and IT study programmes (Applied Informatics, Information Management) (Z-test: 1.457).

Conclusion: The H_3 hypothesis supposing statistically significant differences in communication in various study programmes was rejected. Despite the results discovered fewer non-communication (i.e. more communicating) students in the Financial Management study programme in comparison to Applied Informatics and Information Management, the difference was not statistically significant.

Verification of H_4

Differences in communication in various *years of study* were expected in H_4, mainly the increase in frequency in the third year of study in comparison to the first year. The research was held in the subject of IT English in two three-year periods. Group 1 included students enrolled at the faculty in 2007/8-2009/10 academic years; group 2 consisted of those enrolled in 2008/9-2010/11. The research timing is displayed in Table 8.

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Table 8: The course of research

	2007/8	2008/9	2009/10	2010/11
Group 1	year 1	year 2	year 3	
Group 2		year 1	year 2	year 3

Data from 418 respondents (222 respondents in group 1, 196 respondents in group 2) were included in the research sample, which is 873 assignments (450 in group 1, 423 in group 2). The total amount of assignments is displayed in table 9.

Table 9: Assignments included in the research (n)

Subject	E, year 1		E, year 2		E, year 3	
Assign.	*1/1*	*½*	*2/1*	*2/2*	*3/1*	*3/2*
2007	**107**	**107**	55	52	41	-
2008	**81**	**81**	**53**	**53**	87	87
2009	127	116	**96**	**72**	**68**	**62**
2010	39	40	49	49	**50**	**43**

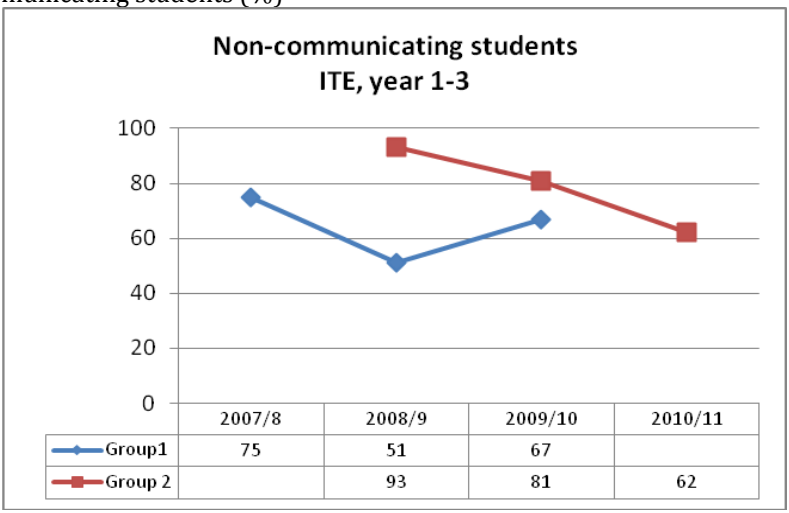
The data were summarized, structured in two groups (see table 8) and displayed in table 10.

The results prove the H_4 hypothesis showing the higher occurrence of non-communicating students in the first year in both groups. We understand the students were at the beginning of their study and the process of developing their relation to tutors was at the starting point. So there was the reason to build social contacts and communicate despite the technical or didactic support to submitting assignments were not needed. Partial data show students did not have late submissions of assignments at the beginning of study, nor any other problems. In years 2 the number of non-communicating students decreased rapidly (24% in group 1, 12% in group 2), which means communication became more frequent. In both groups the communication of type 2 and 3 increased, i.e. I am sending my assignment, I am sending my assignment and greetings; and type 6 in group 1 (Apology for late submissions). In the third year of study this tendency continued in group 2 only and reached 62% non-communicating students (from 80.5% in the second year), while in group 1 the number of non-communicating students reached 67% (from 50.5% in the second year). When comparing the data of the first to those of the third years, we can see the decrease in the number of non-communicating students in both groups (8% in group 1, 31% in group 2). The results are displayed in Figure 5.

Table 10: Three-year communication in IT English: non-communicating students (%)

Communicating per group/assignment (%)						
	year 1		year 2		year 3	
Assignments	E 1/1	E 1/2	E 2/1	E 2/2	E 3/1	E 3/2
Group 1:	Total communication (%)					
1	70	79	55	46	65	69
2-6	30	21	45	54	35	31
Average per year (%)						
1	**74.5**		**50.5**		**67**	
2-6	25.5		49.5		33.5	
Group 2	Total communication (%)					
1	100	85	80	81	54	70
2-6	0	15	20	19	46	30
Average per year (%)						
1	**92.5**		**80.5**		**62**	
2-6	7.5		19.5		38	

Figure 5: Three-year communication in two groups in IT English: non-communicating students (%)



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Conclusion: The H_4 hypothesis supposing the increase in amounts of communicating students in the third year in comparison to the first year of study was accepted. The highest amount of non-communicating students appeared in the first years. The reason might be students did not have any relation (positive or negative) to the tutor, as they were at the beginning of their study, so the need to communicate did not arise. Partial data show students submitted their assignments in time at the beginning of their study; they did not have any other (e.g. technical) problems. In second years the amount of non-communicating students sharply decreased (i.e. number of communicating increased) (24% in group 1, 12% in group 2). Amount of messages of type 2 (*I am sending my assignment*) and type 3 (*I am sending my assignment* and greetings) increased, as well as type 6 (*Apology of late submission*) in group 1. This trend continued in the third year in group 2, when amount of non-communicating students decreased to 62%. The relative amount of non-communicating students increased in group 1, but results in both groups are similar (67% in group 2). Totally the increase in number of communicating students was discovered in the third years in comparison to the first years (8% in group 1, 31% in group 2).

To sum up, communication is an essential part of the process of socialization and the ground of upbringing and education. This research aimed at a small part of educational communication only which appeared in the ICT-supported distance form of instruction in online courses in LMS. Despite this some recommendations can be deduced. Positive relations and trust between teachers and students are reflected in the way of mutual communication, and it contributes to higher quality of the educational process, i.e. it supports positively the course of instruction. The "non-invitational communication", i.e. such a type of communication from students to teachers which is not obligatory but desirable, is highly appreciated. Current fast development of information and communication technologies makes the distance e-communication easier. It still holds man is the sociable creature longing for communication in any form. Following long-time observations would be highly desirable as they could provide other data and result in conclusions applicable to teaching other subjects and to the field of e-learning in general (Šimonová, Poulová, & Bílek, 2010).

3 Conclusion

Much has been said and written on foreign language teaching and learning. Despite the importance of latest research activities reflecting the entire impact of current technologies, common sense, experience and intuition may contribute to this process making it more natural and “human being- friendly” as both the citations below clearly prove.

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"Only providing technologies do not change the situation much, but it can start new activities and approaches. Bringing computers to schools is less important than provide teachers with new ideas. Technologies do not aim at removing traditional educational methods and forms. The new technologies do not automatically bring positive changes into the process of instruction. But they may contribute to increasing its effectiveness, under some conditions" (Venezky, 2002).

"For more than 40 years, hundreds of thousands of students, managers and employees have filled in learning style inventories, their scores have been subjected to factor analyses of increasing complexity, numerous learning styles have been identified, and what are the conclusions that stem from such intensive labour? We are informed that the same teaching method does not work for all learners, that learners learn in different ways and that teachers should employ a variety of methods of teaching and assessment. Comenius knew that and more in seventeenth century Prague and he did not need a series of large research grants to help him find it out (Coffield, 2004).

Acknowledgements
The article is supported by the Excellence project N. 2208.

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