Information and Communication Technologies in the Process of Instruction: Students´Communication in On-line Courses

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Abstract: - The paper describes the process of implementation and building appropriate competences towards reaching the teaching and learning competence in the process of instruction supported by modern technologies. The research is provided focusing on communication between a student and tutor of on-line distance courses in relation to submitting assignments (individual homework). The communication is monitored from the point of frequency, extent, content and academic year. The data were collected from students of the 1st, 2nd and 3rd year in three different subjects, English for IT Students, Management and Database Systems at the Faculty of Informatics and Management, University of Hradec Králové, Czech Republic. Proposed recommendations and conclusions are expected to contribute to building closer and warmer relations in the course of study, and thus contribute to higher effectiveness of the learning process in general.

Key-Words: - e-learning, ICT, English for specific purposes, ESP, Management, communication

1 Introduction

It is generally accepted that not only information itself but mainly its application in an appropriate situation and communication are very contributive for learning. According to the situation this is applied in, we communicate verbally, i.e. using words, either in oral or written form; non-verbally using facial expressions, gestures, body positions, touches, general outward appearance etc. Electronic communication used to be called telecommunication, and it is ran by telephone, telegraph, telex etc. [1]. Modern digital technologies, e.g. ICQ, Skype e-mail, short message service (sms) etc. running on the Internet, are understood as a special way of electronic communication. From another view two people speaking to each other are in interpersonal communication, more people speak in groups, and mass communication (i.e. TV, radio, press, Internet) enables to provide information to large amounts of people in a short-time period. There also exist organized groups, e.g. Association of mobile technology opponents (Sdružení Nepřátel Mobilní Komunikace), who fight against spreading mobile communication technologies, mainly from health reasons, loss of privacy, trust in veracity of information, tendency towards increasing personal laziness, easy localization of individuals, wiretapping, tracking etc. [2].

Teachers and students are in *educational* communication, which is described e.g. by Palán as a special type of social communication focused on the process of upbringing and education when information between educants and educators are exchanged so that educational objectives could be reached [3]. It is intentional, motivational, restrictional. Rules and social roles of participants are strictly defined. The particularity of this psychological relation between the teacher and student(s), and the environment which the communication runs in, belong to important factors of the process. This field, mainly on the level of primary education, has been widely researched by e.g. Mareš and Křivohlavý [4]. Gavora defines educational communication as mutual exchange of information between participants of the educational process which heads towards educational objectives [5]. Information is provided by language and non-language means, and it is structured into content, process and relations. Nelešovská deals with educational communication just because of its importance in this process [1]. It must belong to elementary professional skills of each teacher. That is why communication skills should be a research subject of the teacher skill model. Nelešovská defines educational communication from the point of its functions, participants, rules, forms, school climate and atmosphere. She emphasizes different students´ approaches to the communication and deals with various disorders, e.g. jitters, speech impediments etc. These days, the communication supported by information and communication technologies (ICT) is being spread,

which is one of the reasons why its process should be researched.

1.1 ICT in education

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; defined new competences reflected in the learning content; called for new teaching methods, organizational forms, ways of evaluation and new relations between elements participating in the educational process; emphasized Humanities and foreign languages, Informatics, Environmentalistics; as well as learner´s responsibility for his/her own education, creativeness and motivation; introduced economic aspects of education, competitiveness; and last but not least the necessity of lifelong education appeared. These features are slowly but steadily being included into the new educational system, which is hardly to be imagined without ICT implementation.

Efforts towards increasing the number of educated people should be prioritised in every society. As mentioned above, recently the university education has changed substantially but numerous problems still exist. Making the university education accessible to everyone and developing the system of further, lifelong education are the most important ones. Combined (part-time) and distance form of education are often the only ways to increasing qualifications and thus meeting the growing requirements of the labour market. High level of motivation and mature personality of students enable teachers to apply self-study methods supported by information and communication technologies implemented into the instructional process. This way is mostly used in the field of lifelong education but it is steadily spreading into educational institutions of all levels. 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. And what are the results? Are teachers able to apply suitable methods and forms of instruction, create and use appropriate didactic means which are offered by new technologies? Do students have higher level of knowledge if they attend lessons managed by ICT or run traditionally by teachers? Are the new didactic means (methods and forms supported by digital technologies) able to optimize the cognitive process of creating knowledge? These are the crucial questions. The most important changes in the society are defined by the following theses:
- *Fast development of ICT and their influence on the educational process.*
- *Globalization and new key competences.*
- *Availability of education, its influence on changes in the lifestyle* [6].

Either we belong to the supporters, or the opponents of the ICT implementation into the educational process, we should admit that each member of the society is more and more influenced by the results of fast technical and technological development, both in private and professional life. According to the traditional division of functions, educational institutions are expected to be the first to provide students with new knowledge, i.e. to teach them how to use technologies both in education and common life. But in this case the situation differs. It is mostly student´s family who provides material equipment and thus supports his/her motivation for creating new competence. It is essential to forward students´intrest into the field of education. Universities which have implemented new ICT in the instructional process consider computer literacy to be a necessary precondition of student´s success. These intitutions usually enable them to develop the competence up to the required level. Thus the ICT implementation can improve the process, not set it back. Opponents declare computers and ICT to be trendy, abundant, and recommend to keep traditional time-tested methods, forms and approaches. That is why they neither require this competence from students, nor form conditions to gaining it.

Globalization means integrating civilisations and cultures, connecting people in the geographic meaning. The society which is the new concept prepared for is called the "knowledge or information" society. Education, its content and objectives, must be adjusted to new requirements and to the role which it holds in the society. However, current changes do not aim at increasing effectiveness of the contemporary system. The future, significant ones, lying in curricular reconstruction, defining a new proportion between studying facts and data, and developing analytical skills and creative thinking, are to be introduced. The world-wide process of globalization brings not only great changes and 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. Increased requirements may be met by improving the quality of the educational process. New structure and relations among upbringing, education and social activities appear and are based on the competence to predict the social development, accept running changes, developments and trends, and adjust the educational concept (content and methods, forms etc.) according to the new situation. The main objective in the current society, including the 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 nations´cultures, and shorten real geographical distances. Foreign language competences highly contribute not only to all these aspects and tourism development, they are also essential part of forming both business and private international relations, and must be a key competence in the education of each current graduate to make him/her successful in the competition on today´s labour market.

According to the National Programme of Educational Development in the Czech Republic the following new key competences are distinguished:
- ability **to learn**, and be motivated towards further learning, i.e. learn with others and from others, work in team, co-operate, propose lifelong educational strategies, develop critical thinking;
- ability **to live** and act in society, i.e. communicate, solve conflicts, have respect for different opinions, understand mutual relations;
- ability **to be**, i.e. be oriented in different situations, react appropriately, decide according to own judgement and conclusions, but in relation to ethic rules, accept responsibility, form own hierarchy of values, have human and social competence to live in society [7].

The existence and possibilities of education supported by ICT form conditions to provide right to education, and diminish discrimination in availability of education, e.g. geographical distance to educational institutions or health handicaps [8]. The former trend of centralization (of educational and cultural institutions, employment opportunities etc.) to cities is growing weak. The new lifestyle is being developed and is formed by conditions given by ICT influence in all spheres of life. The number of people living out of big centres is increasing, as well as the number of people working from home, the electronic access to libraries and offices is offered, etc. This situation results in financial and time savings, then changes in daily routine follow. The time left can be spent with family, devoted to interests or education, which may change the lifestyle and even hierarchy of values.

There is another factor which is very powerful – *student´s motivation.* It is easier and more effective to study if s/he can see that the content is tailored to his/her needs, graduates of the studied field are required on the labour market and the didactic means are adequately used - one of a few things which can be said is that using ICT is really natural for today´s students. Social changes, technical and technological development, new didactic means – these are the extrinsic factors influencing man´s personality and the

process of instruction. Motivation is a set of intrinsic incentives even if they may be modified by external influences. Motives do not work separately. In the educational process the motivation plays the essential role – it must run through all activities. Teacher´s knowledge of student´s extent and level of motivation is a basic precondition for effective planning and running the educational process. The appropriate use of electronic communication tools as factors of e-learning humanization aims at both getting feedback in the professional field and making social contacts during the whole study. It must be supported by integrating motivational elements towards a single student, groups, a single topic, subject, especially in case of any problems.

Marshall McLuhan said *"Medium Is a Message"* [9]. His opinion elicites fears whether the knowledge is really more important that the medium which carries it on. The technical point of innovations in the educational process is often overestimated. But it is not the only means to guarantee the effectiveness of the process. The main task of ICT implementation is to optimize the educational process, i.e. relax the students, increase their interest, take on appropriate teacher´s activities. It results in having more time for other, more core activities. But it does not mean adding new means, methods, forms to the existing ones. It requires revision of the whole system and active ICT implementation in the process.

1.2 On the process of ICT implementation at the Faculty of Informatics and Management

The University of Hradec Kralove (UHK) consists of three faculties: Faculty of Education (FE), Faculty of Informatics and Management (FIM) and Faculty of Arts (FA). According the specialization the FIM is the leader in the process of ICT implementation. Being established in 1993, all its activities have been related to ICT implementation, both in the educational process and administration. Looking back, the process was structured into three basic steps:
- Getting new hardware, software and other class equippment i.e. to buy desks and chairs, computers, programmes, dataprojectors, etc.
- Gaining media competence, i.e. to study and become computer literate, which covers both faculty staff, academic, administrative and technical, and students. Current understanding of what the expression media competence really means is explained from the point of view of basic computer literacy, it means to be able to use the computer and its technologies: Knowledge management, i.e. the strategy on how to work with information, gain and process it, apply in professional work, is closely related to it.

- Implementing the general computer literacy into education, in the instructional process, which is understood as the didactic training aimed at both teachers and students to know how to teach and study being supported or managed by ICT.

At the very beginning, *Step Zero* was introduced which included e.g. presenting study materials in shared directories, using e-mail for communication between teachers and students, designing a system administering study results and enrolling for exams, creating Web pages of the faculty, editing an electronic magazine etc. None of the mentioned tools belonged to common services at that time. Over few years quite static shared directories did not meet new requirements and were replaced by web pages supporting instruction of single subjects. The process of piloting the Learning Space management system started, but finally the virtual learning environment WebCT was bought in 2000. Being designed for educational purposes it offers a wide range of tools and thus enables designing and running electronic courses (e-courses) which either support present lessons or can be used in the distance education.

Starting from *Step Zero and Step One* all the above mentioned activities required immense financial investments so that the provided hardware and software could be exploited effectively, by both teachers and students. Several computer classrooms have been equipped, open 15 hours a day, six days a week. Organizational rules and regulations for safe user´s access have been set. The financial requirements were partially covered by project sources. The first successful project was called OLIVA, which is an abbreviation from its name On-LIne VýukA (on-line instruction). This word became a synonym of WebCT and e-learning at the FIM. The project provided financial means for teachers´didactic training for several years. The other important project was REKAP (Rozvoj e-learningových kompetencí akademických pracovníků, Academic Staff E-learning Competence Development), which provided financial means for the whole university staff. Before being implemented, each WebCT e-course must undergo successful opponent procedure. In June 2009 the number of e-courses was about 180, their structure according to the content is displayed in figure 1.
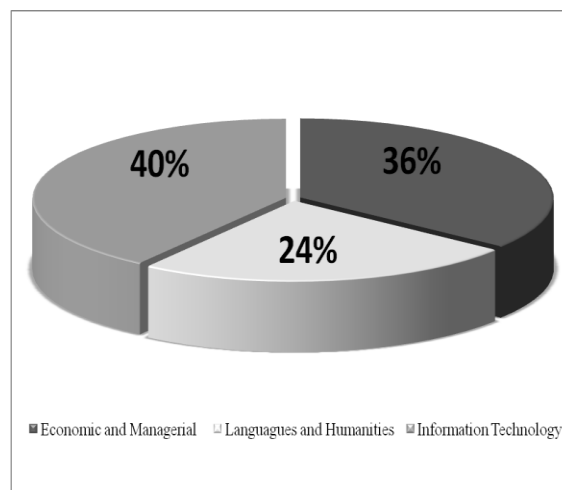

Fig. 1 Structure of e-subjects according to the content

The level of hardware equipment is presented in table 1.

	Servers	PC	PC with Internet access	PC in classrooms	Note books
2000	16	625	581	200	27
2001	18	668	653	221	33
2002	18	770	764	254	41
2003	18	786		282	56
2004	21	892	879	309	56
2005	36	907	875	313	119
2006	56	907	875	375	142
2007	59	1031	1019	413	203

Table 1 Development of HW equipment at the Faculty of Informatics and Management, University of Hradec Kralove in 2000 - 2008

Steps Two and Step Three are usually made at the same time. The Faculty of Informatics and Management offers the present and combined (part time) form of study in several IT specializations, Financial Management, Sports Management and Tourism Management. IT students are highly competent in using ICT at the very beginning of their study. The other students have to gain this competence during their first year studying for ECDL Certificate in the distance way supported by several face-to-face tutorials. At the beginning of each academic year the face-to-face tutorial is provided on how to study in WebCT. Basic information about the learning environment and its tools is presented there and students have possibility to practise them immediately. They also receive a brief printed version of WebCT manual. The animated one is accessible at the university web page. The same media

competence is required from teachers. It can be received in the same way, but without any time limitations. This competence is considered to be the starting point for any level of ICT implementation in the process of instruction, which after some time may result in designing and running e-courses in WebCT. This didactic training is usually provided in the form of distance courses when teachers are in the student´s role, which also contributes to becoming a good tutor. Teachers have possibility to join the e-learning community during the whole academic year as all the educational activities run continuously. Competences required from teachers are presented in the Lee S. Shulman model of Technological Pedagogical Content Knowledge in figure 2.
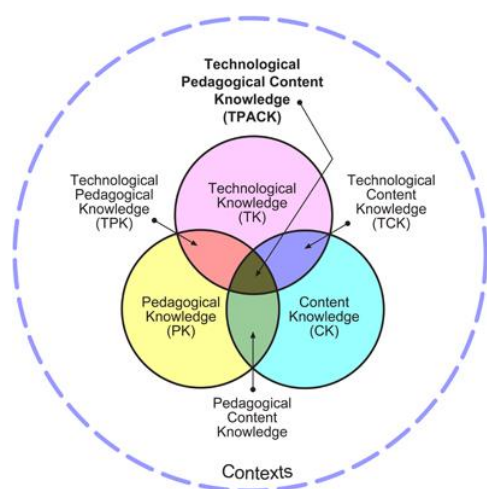

Fig. 2 Technological Pedagogical Content Knowledge

When describing an IT student or IT graduate, we mostly imagine a young man (even though girls also occur) working with computer. Specialists in the field of school hygiene would criticize his/her unhealthy position while sitting and slouching over the computer, unsufficient lighting, long working periods without breaks etc., in spite of the fact the educational institution provides IT students all the conditions according to health directives. The only things an IT student is interested in is availability of the Internet, a source of energy, HW and SW equipment etc. For communication with other world s/he mostly uses modern technologies. In case the oral presentation on a general topic is required, s/he is frightened, and the result may not be good. If the topic is professional, s/he changes substantially - the person's body position, activity, general behaviour etc. That was why we decided to research student-tutor communication in the vitrual learning environment WebCT which is used to support instruction at University of Hradec Kralove, Faculty of Informatics and Management [10]. The research did not focus on discussions dealing with professional topics.

We monitored students´communication with tutors running at the moment of submitting assignments. On the starting tutorial students are informed there exists a tool which offers possibility to add a message or comments when submitting an assignment but they are not intentionally invited to do this. We call this activity a non-invitational,   non-obligatory,   optional communication. Despite this it is desirable, invited and appreciated by tutors, as we think it proves there is something more than an obligation, "a must" on student´s side, we hope a positive relation towards learning has been developed there.

It is generally accepted people vary in the view upon the same situation, they do not do things and see the world in the same way as the others do. There exist numerous psychological, pedagogical and other reasons why a student decides to communicate in the situation like this. The individual approach based on student´s learning style is one of the reasons [11].

1.3 On the theory and application of learning/teaching styles

People differ in the way of perceiving a situation, evaluating it, judging its consequences, making decisions. In spite of these differences, each person is clever and may be right in his/her own manner. Learners vary enormously in learning styles, i.e. in ways and speed of collecting and processing information, forming knowledge and applying it under new circumstances. Individual learner differences are apparent, but what are the underlying actions in the personality? Cognitive psychology provides the answer. It deals with the term of cognitive style covering thinking, processing and epistemological styles which result in metastyles to supersede the whole multitude of them. There may occur some conflicts in the field of degree of learning style stability, reliability and validity of measurements, and in the impact on the educational process in general. Despite of this situation exploring the field is expected to be of great importace for the didactics [12].

The effectiveness of the educational process is given by such factors as learner´s intelligence, prior knowledge, level of motivation, stress, selfconfidence, and learner´s cognitive and learning style. It is generally acknowledged that the instructor´s teaching style should match the students´learning styles. Felder and Silverman say that mismatching can have consequences and cause a wide range of further educational problems [13]. It favours certain students and discriminates others, especially if the mismatches are extreme. On the other hand, if the same teaching style is used repeatedly, students become bored. Gregorc claims that only individuals with very strong preferences for one learning style do not study effectively, the others may be

encouraged to develop new learning strategies [14]. Only limited number of studies have demonstrated, e.g. Coffield et al., that students learn more effectively if their learning style is accommodated [15]. Smith, Sekar and Townsend found the same number (nine) of studies which show that learning is more effective if there is a match, and the same number where there is a mismatch [16]. Mitchell concludes that making the educational process too specific to one user may restrict the others [17]. ICT supported instruction is considered suitable and beneficial for learners of all styles. The reason is it offers a wide range of activities which can be aimed at any learning style and used by any teaching style instructor. The same rule applies to the field of communication. The possibility of individualization of the educational processs from the both students´and teachers´point of view is the greatest advantage. Didactics accepting the ICT implementation is the field which will be developed/will have to be developed quickly [18]. It is not an easy task but at the same time there is no other way how to solve the situation. Or the "computers", which enjoy such wide favour, will do more harm than good.

2   Problem Formulation

These were the main reasons why we decided to research the field of communication. Our point of view does not follow widely spread ways of monitoring student-tutor communication. We devoted efforts to such a type which is not included in the list of requirements for passing the subject but which forms closer relationship between the those involved in the process of instruction. We dealt with following questions:

1 What is the frequency, extent and content of such messages?

2 Are there any differences in these factors according to the subject and the year of study?

3 Are there any differences between men- and women-students?

The main objective of the research resulted from these questions; and it is to monitor the above mentioned factors of the communication in two academic years, analyze the collected data and possibly provide recommendation towards increasing efficiency of the process of instruction.

3 Problem Solution

The problem was solved by the research monitoring the situation first, so that answers to the questions presented above could be found. We intentionally call them questions, not hypotheses. The reason is we do not aim

at the process of verifying hypotheses but observing the situation, tracking student´s activity and reactions, and decide according to the received results what research methods will be applied in the future.

3.1 Research Description

The research ran in 2009 and 2010 academic years at the Faculty of Informatics and Management, University of Hradec Králové, Czech Republic. Five subjects taught in the distance way in the LMS WebCT were included into the research - Professional English I, II, III for students of Informatics in the 1st 2nd and 3rd year (abbrev. E), Management I (abbrev. M) in the 1st year and Database Systems 2 (abbrev. D) in the 2nd year. The courses were tutored by the same teachers of English, Management and Database Systems in both academic years. Respondents were students of five on-line courses who submitted twelve assignments in 2009 and fifteen ones in 2010, totally 1,611 (750 in 2009, 861 in 2010) assignments were included into the research. Communication was analyzed and scaled according to the content of the message which was or was not attached to the submitted assignment. The scale is presented in table 2.

Table 2. Scaling according to message content

Item N.	Message Content	Abbreviation
1	Submitting an assignment without any message or comments	woC
2	I am sending my assignment	A
3	I am sending my assignment + greetings	A+G
4	I am sending my assignment + greetings + some comments	A+G+
5	Apology, but not for late submission	Ap-L
6	Apology for late submission	ApL
7	Apology for late submission + brief explanation (1 line)	ApLB
8	Apology for late submission + medium-sized explanation (2-3 lines)	ApLM
9	Apology for late submission + long explanation (4-more lines)	ApLL
10	Apology for late submission + brief explanation (1 line) + provides some extra work for being late	ApLB+
11	Apology for late submission + medium-sized explanation (2-3 lines) + provides some extra work for being late	ApLM+

12	Apology for late submission + long explanation (4-more lines) + provides some extra work for being late	ApLL+
13	Without apology for being late	woAp
14	Other comments	oC

The table is structured into 14 types of messages which appeared during the process of collecting data. They started from submitting an assignment without any comments (1 - woC); following several types of messages were used when the assignment was submitted (2 – 4, sending assignment+greetings+comments - A, A+G, A+G+); other types of messages when an assignment was submitted late, including apologies for late submissions (5 – 9, Ap-L, ApL, ApLB, ApLM, ApLL); up to providing some extra additional acties for late submissions (10 – 12, ApL+, ApLB+, ApLM+, ApLL+); submitting assignments late without any apology (13, woAp); and finally other types of comments appeared (14, oC).

3.2 Research Results

The received data are presented in tables 3a and 3b. They were collected in on-line courses in LMS WebCT which are designed and run by FIM teachers tutoring them. They are presented in per cent (%). If the data are not available (because the assignment was not set), the dash is used in the appropriate field. Results received in 2009 are on the first line, 2010´s year data are on the second line of each field.

Table 3a. Research results in English I, II, III

Subject	E	E	E	E	E	E	E
Assign.	**1/1**	**1/2**	**1/3**	**2/1**	**2/2**	**3/1**	**3/2**
1 woC	70 / 100	79 / 85	- / 70	75 / 55	75 / 46	59 / 45	- / 45
2 A	2 / 0	0 / 4	- / 25	0 / 11	0 / 19	0 / 22	- / 22
3 A+G	7 / 0	5 / 3	- / 1	9 / 17	14 / 29	15 / 28	- / 28
4 A+G+	1 / 0	6 / 1	- / 0	4 / 4	6 / 0	20 / 0	- / 0
5 Ap-L	0 / 0	3 / 5	- / 4	7 / 2	6 / 4	0 / 2	- / 2
6 ApL	4 / 0	1 / 2	- / 0	0 / 2	0 / 0	0 / 0	- / 0
7 ApLB	3 / 0	1 / 0	- / 0	6 / 0	0 / 2	5 / 2	- / 2
8 ApLM	1 / 0	1 / 0	- / 0	0 / 9	0 / 0	0 / 0	- / 0
9	0	0	-	0	0	0	-

ApLL	0	0	0	2	2	2	2
10 ApL+	0 / 0	0 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
11 ApLB+	0 / 0	0 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
12 ApLM+	0 / 0	0 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
13 ApLL+	6 / 0	0 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
14 woAp	0 / 0	0 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
15 oC	5 / 0	5 / 0	- / 0	0 / 0	0 / 0	0 / 0	- / 0
Total assign.	**107 / 81**	**107 / 81**	**- / 81**	**55 / 53**	**52 / 53**	**41 / 87**	**- / 87**

Table 3b. Research results in Management I and Database Systems 2

Subject	M	M	M	D	D	D	D	D
Assign.	**1/1**	**1/2**	**1/3**	**2/1**	**2/2**	**2/3**	**2/4**	**2/5**
1 woC	87 / 62	91 / 65	54 / 65	81 / 70	88 / 63	77 / 11	68 / 7	- / 78
2 A	13 / 18	4 / 22	4 / 15	4 / 30	12 / 33	0 / 7	11 / 4	- / 19
3 A+G	0 / 3	6 / 5	12 / 5	9 / 0	0 / 0	20 / 0	6 / 0	- / 0
4 A+G+	0 / 6	0 / 5	10 / 5	6 / 0	0 / 4	3 / 0	9 / 0	- / 0
5 Ap-L	0 / 0	0 / 3	3 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
6 ApL	0 / 12	0 / 0	0 / 3	0 / 0	0 / 0	0 / 0	2 / 0	- / 0
7 ApLB	0 / 0	0 / 0	0 / 4	0 / 0	0 / 0	0 / 4	4 / 0	- / 0
8 ApLM	0 / 0	0 / 0	0 / 3	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
9 ApLL	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
10 ApL+	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
11 ApLB+	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
12 ApLM+	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
13 ApLL+	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
14 woAp	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 78*	0 / 89*	- / 4**
15 oC	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	- / 0
Total assign.	**38 / 34**	**53 / 34**	**134 / 34**	**53 / 54**	**33 / 54**	**30 / 54**	**47 / 54**	**- / 54**

*   combined items 14 + 2 or 14 + 6
** items 14+7

The data did not underwent any advanced statistical testing. The reason is they are of the nominal type, and we consider this way of presentation the most suitable and adequate to the objectives we focus on.

The table proves the highest number of assignments is submitted without comments (1, woC) in both academic years. If a brief and simple message is added to submitted files, the score is generally lower in 2010, in English courses it is lower (0 – 2 %) than in Management (4 – 13 %) or Database Systems (4 – 12 %) in 2009; in 2010 the score reaches up to 25 % in English, 22 % in Management and 33 % in Database Systems where comments are seldom used – the only exception is only 7 % of the second assignment without any comments in 2010. Information on submitting the assignment and sending greetings to the tutor appears more frequently in 2010 (0 – 29 %) in comparison to 2009 (0 – 15 %). Other comments are added to greetings up to 6 % of assignments in both years; the only exception is 20 % on the 3rd year of English in the final assignment in 2009 (4, A+G+). Greetings without comments were sent by 28 % of students in 2010 (3, A+G). Students sometimes send apologies together with their assignments (5, Ap-L), mainly in case of technical problems in LMS or hardware or software on their computers. This situation does not occur frequently (max 6 %). If an assignment is submitted late (6-9, ApL – ApLL), apologies are of different forms and extent (brief – long ones) but they are not often used (usually 0 – 3 %, max 9 %). Some student feel guilty, so in rare cases they offer doing some extra work (10-12, ApL+ - ApLL+). Once they have late submission, they always apologize (13). Other comments (14, oC) appeared in one course of English only.

3.3 Result Description and Discussions
From the point of the three questions defined in part two (Problem Formulation), following discoveries and relations appeared:

Ad 1) The frequency, extent and content of messages.
In the English course, 1st year, all the criteria reach lower scores in 2010 (1, woC). The possible reason is that the first assignment E1/1 was submitted in a three-day time after the starting tutorial, the second one (E1/2) in a two-week period. We suppose students did not feel necessity to build any warmer relation to the tutor. They were expected to work successfully in the new environment, apply new methods, and as neither technical, not methodological problems appeared, they only submitted the assignments and did not add any

other messages or comments. The score in all Management assignments is nearly the same (62 - 65 %) but lower than in 2009, i.e. students added some type of message slightly more frequently. In messages of type 2 (sending assignment) and type 3 (sending assignment and greetings) the frequency is rather higher in 2010 in both subjects. Adding the incidence in types 1, 2 and 3 together, the results are very similar in both years and subjects. It proves the same relation to the learning process but the detailed expression differs slightly - it diversifies into three types of messages. In Database Systems communication is low in both years, but slightly more frequent in 2010.

Ad 2) Are there any differences in these factors according to the subject and year of study?
It is generally recognized the topic can influence the frequency, extent and content of the message as well. Assignments in Management were more demanding, of a problem-solving type, i.e. according to the Bloom´s taxonomy higher levels of educational objectives were involved, while English assignments focused on practising vocabulary and pronunciation, i.e. only level one and two were covered. Bloom's taxonomy of educational objectives was designed more than 50 years ago [19]. The authors had never claimed it was complex. Research in Cognitive psychology, Didactics and other fields brought new results, social environment changed and demands for new key competences have appeared. The Bloom´s Taxonomy, Revised version, should help teachers participate in creating curricula, understand and implement them correctly into the instructional process [20]. A two-dimensional framework focusing on knowledge and cognitive processes has been developed to define what students are expected to learn and know. In foreign language teaching/learning the Revised version is strongly recommended to be used because communication skills, in both native and foreign language(s), belong to key competences which are the necessary requirement for those aiming at being successful on the European/world labour market. Effective approach to mastering this skill is emphasized by society and required by students.

The Bloom´s taxonomy, Original version, is structured into three domains: cognitive, affective and psychomotoric. Bloom identified six levels within the cognitive domain, starting from the simple recall or recognition of facts on the lowest level, through increasingly more complex and abstract mental levels, up to the highest order which is classified as evaluation. The cognitive process dimension in Bloom´s taxonomy, Revised version, is also structured into six categories, but their order differs from the original version (table 4).

Table 4 Categories in the Bloom´s taxonomy of educational objectives, Cognitive process

Level	Original version	Revised version
6.	Evaluation	*Create*
5.	*Synthesis*	Evaluate
4.	Analysis	Analyze
3.	Application	Apply
2.	Comprehension	Understand
1.	Knowledge	Remember

The Bloom´s taxonomy, Revised version, has undergone several crucial changes. It is structured in two dimensions. The *Knowledge dimension* covers four categories (Factual, Conceptual, Procedural, Metacognitive). The original category "Knowledge" is emphasized because the "Remember" category forms the first step in the process of creating new knowledge. The *Cognitive Process dimension* consists of six categories (Remember, Understand, Apply, Analyze, Evaluate, Create). The original "Synthesis" category did not include critical thinking and problem-solving which are currently emphasized. It was replaced by the "Create" category which is not understood as putting former elements together, but the creative approach is employed. Approaching a higher category follows after mastering the lower one. Terminology of the Knowledge dimension is presented in the substantive form (Tab. 3, Original version column), while the Cognitive Process dimension is defined in the verbal form (Tab. 3, Revised version column). The "Comprehension" category in the Original version is understood as the first step to "Understand" level in the Revised version. Subcategories in both dimensions do not only explain the content but they function as tools of practical use, they are to help express and classify educational objectives.

Thus, the level of required tasks could be the reason why 6 - 10 % of Management students added greetings and comments when submitting assignments (4, A+G). On the other hand, there can be seen development during a one-year period in English courses. Students who submitted assignments E1/1 and E1/2 in 2009 reached the score 7 % and 5 % (3, A+G) are the same who in 2010 have scores 17 % (E2/1) and 29 % (E2/2). The same situation is in second-year students in 2009 who have 9 % (E2/1) and 14 % (E2/2), their scores increased to 28 % (E3/1, E3/2) in 2010. These results prove students have become more communicative, open, which are some of the factors defining closer relationship to the process of instruction (i.e. topic, methods, people involved in etc.). In Database Systems assignments 1, 2 and 5 do not provide wide communication (63 – 78 % without comments, 19 – 33 % of students add

announcement on submitting their assignment. Different situation have appeared with assignments 3 and 4, where students were asked to provide information about the date of their presentation. In assignment three 78 % of students met this requirement, 11 % of them added another message, mostly greetings or apology for being late. In assignment four 89 % of students met the requirement, 19 % of them added greetings, and only a few apologized for late submissions. Ten per cent of them were the same students as in assignment 3 (both sending greetings and being late with submissions).

Ad 3) Differences between men- and women- students.
This question proceeds from the assumption that women are more talkative, expansive and communitate more frequently than men. The question is difficult to be answered because only few women-students participated in the research, so the sample is not sufficient enough to be seriously statistically processed, and only 2010 year data are available. The data are presented in table 5.

Table 5 Numbers of women in research groups (%)

Year 2010	E1	E2	E3	M	D
Women (in %)	9	13	9	12	19
Number of women / total number	7/81	7/53	8/87	4/34	10/54

In the English course, 1st year, 86 % of women (i.e. 6 out of 7 women did not add any message or comments when submitting three assignments; 14 % (1 woman) submitted the first assignment without message, the second and third ones were supported by the message of type 2 (2, A+G).

In the English course, 2nd year, 43 % of women (3) did not add any message or comments, 57 % (4) added information on submitting the assignment or sending greetings.

In the English course, 3rd year, 25 % of women (2) did not add any message or comments, 2 women added two messages of type 2 (sending assignment), and other 2 women of type 3 (sending assignment and greetings), 2 women sent apologies for technical problems and for late submissions (short and long).

In the Management course 50 % of women (2) did not sent any messages, 50 % added messages of type 2 (sending assignment).

In Database Systems course all women followed teacher´s instructions and provided required information in time, 25 % of them added greetings to the messages.

4 Conclusion
As it results from the above presented data, the ICT development influenced great deal of population, and

currently it is understood to be standard. Thus the rate of computer literacy increases as one of the necessary preconditions of e-learning implementation into the process of education at all types and school levels [21]. The most important question dealing with the research topic is as follows: *Are the new didactic means, i.e. methods and forms supported by modern technologies, able to optimize the cognitive process of creating knowledge?*

We hope the presented results will contribute to the process, particularly in the field of teaching/learning styles. Current approaches to tertiary education mean to tailor the teaching/learning process to both latest requirements of the society, technical development, and individual student´s learning style. Instruction supported by ICT does enable to optimize the process, apply individual learning styles, it offers flexibility of time, place and pace of learning and increases efficiency of the whole process [22]. It is widely accepted that learning styles are difficult to be changed if ever. Our data prove that large numbers of students keep his/her way of communication (58 - 99 % in English courses, 44 % in the Management course, 48 % in Database Systems). Although it is demanding, teacher´s task is to accommodate the required style/s and offer such teaching methods and forms which will match with most students´ learning styles.

In 2002 Richard L. Venezky and Cassandra Davis published the article "Quo Vademus?" dealing their research on the *ICT and the Quality of Learning*. 94 case studies were analysed and resulted in this conclusion: Only providing technologies does 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 [23]. Technologies do not aim at removing traditional educational methods and forms. And, they do not automatic bring positive changes into the process of instruction and study results at all. But the computer–supported instruction (e-learning) may contribute to increasing its effectiveness, under some conditions.

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