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**GRAPHICAL COMPETENCE AS THE INDICATOR
OF THE QUALITY LEVEL OF DESCRIPTIVE GEOMETRY STUDIES**

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Abstract

This investigation has analyzed opportunities of providing qualitative studies of descriptive geometry, and has substantiated the assessment criteria of students' graphical competence. The quality criteria of descriptive geometry are the content of the study process, provision of the study process, teachers' professionalism, and teachers' pedagogical skills. These criteria were taken into account analyzing the quality of graphical education in the studies of descriptive geometry. Students' success and the acquisition level of the study course are indicators of graphical competence. This investigation assessed the students' success in the study course of descriptive geometry. Since a high graphical competence level is provided by the academic knowledge and skills developed during studies, the criteria were worked out both for assessment of academic knowledge and graphical drawing skills.

Aim of the research: *determine the quality level of descriptive geometry studies.*

Objectives of the research:

- 1) *analyze the theoretical aspects of the study quality in literature sources of pedagogy;*
- 2) *analyze the theoretical aspects of graphical competence in literature sources of pedagogy;*
- 3) *carry out a pedagogical experiment to determine the quality of descriptive geometry studies.*

Key words: *descriptive geometry, quality of studies, graphical competence.*

1. INTRODUCTION

The beginning of graphical communication dates back to Paleolithic era when one of the most ancient drawings was created. That is a Babylonian map drawn on a clay plate and can be considered as the beginning of a draught (6th century BC). In 1798, when a French scientist, Gaspard Monge, engineer and educator first developed his techniques to solve geometric problems and provided the overall motivation for the methods used in graphical works, descriptive geometry was mentioned as a science. G. Monge was also the founder of a polytechnic school where descriptive geometry was included as one of the fundamental sciences. Nowadays, descriptive geometry is the basis of engineering technical sciences for such important study courses as engineering graphics, architectural construction, theoretical mechanics, construction mechanics, and machine elements. In all the mentioned study courses, it is necessary to draw graphical works of different complicity level.

Types of graphical works, including documentations, are multiform: draught, sketch, schema, technical drawing, draft, technical and artistic illustration, graph, diagram, symbol, logotype, and brand.

The quality of completion of graphical drawings at the last stages of designing affects significantly the success of the project, opportunities of its funding and implementation. At the stage of generating ideas, drafts, schemas, graphs, diagrams, technical drawings, and sketches are of a special importance. Graphics is an important means of any kind of product at all stages of project designing.

The aim of the development of graphical competence for students is the development of their spatial reasoning the basics of which is spatial conception. Abilities of spatial reasoning are one of the best quality indicators of engineering activities.

A. Botvinnikov in his didactic studies demonstrated that graphical activity facilitated the learners' mind development, activated processes of spatial memory, imagination and logical way of thinking (Ботвинников, 1968).

I. Jurgena has suggested that the student's theoretical knowledge and professional skills in the process of their development, improving their experience, show the professional quality but the competence is the quality manifestation (Jurgena, 2002). I. Tiļļa, in her turn, considers that the competence is a result of a certain activity quality level (Tiļļa, 2005). The author agrees with these scientists and is of the opinion that any activity performed in a good quality is one of the competence indicators.

2. DESCRIPTIVE GEOMETRY STUDY COURSE

The content of the study course is developed in compliance with analysis of the study course program and prerequisites of development of graphical competence. The content of the descriptive geometry study course in the 1st semester comprises 16 themes to be acquired.

Each lecturer is allowed to operate with the theme placement and succession to be delivered within the framework of the study course. Figure 1 shows the structure and content of acquisition of high standard graphical education and graphical competence.

At the beginning, the author offers to get acquainted with projection methods used in the descriptive geometry course. When students have acquired these methods then it is necessary to acquire idealized geometric basic elements occurring in reality – point, straight line, and plane. In addition, research shows evidence that the basic elements are best comprehended when represented simultaneously both in plane (in a complex technical drawing) and spatial (axonometric).

After that, it is necessary to start operating systematically with the basic elements, i.e. one must know how to estimate positions of these elements with various methods used in the descriptive geometry course. A continuous analysis of the basic elements is needed, which is impossible to carry out without the adequate knowledge.

Next step in the descriptive geometry course is design of surfaces with geometric basic elements followed by analysis of the surface and surface elements. It is needed to see the surface both in total and divided into simple basic elements. These operations are necessary to be performed simultaneously in the complex technical drawing and axonometric. Additionally it is needed to prepare the surface spread that is a practical application of descriptive geometry.

The surface intersection with a plane is the next logic step in acquisition of descriptive geometry because one must know how to find not only the basic elements on the surface but also be able to determine the intersection lines or points of the surface and geometric basic elements. For the graphical competence development these constructions are needed to depict both in plane and space.

The intersection of the surfaces is the final theme where by dividing two surfaces into simple basic elements and applying auxiliary surfaces or auxiliary geometric elements we determine the surface intersection lines.

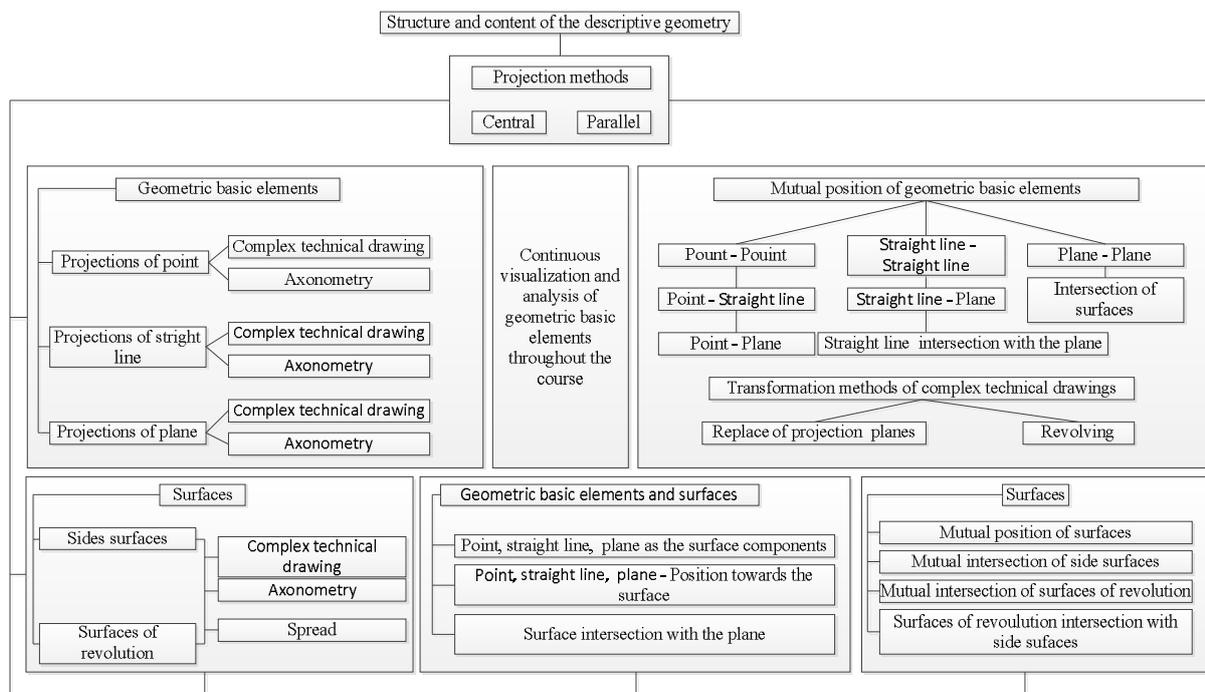


Fig.1. Structure and content of the descriptive geometry course

The structure of the descriptive geometry course for the 2nd semester is also developed in a similar way – including systematically more complex elements. At the same time, students analyze them and compare with those basic elements acquired during the 1st semester.

In order to provide a high standard graphical education it was necessary to determine the structure of the descriptive geometry course, namely how the graphical competence was acquired (see Fig. 2).

By the technological schema of the descriptive geometry study process, we can judge about the lecturer, student, and teaching aids interaction in the development of graphical competence.

Before the lecture, students print out the lecture work sheets from the e-learning environment and fill in during the lecture.

At the lecture, multimedia are used that enables to show the plane objects in dynamics; to represent all the graphical constructions step by step considering the visual principle; theory is explained verbally. In addition, students' attention is attracted by questions that develop their spatial reasoning and imagination because it is impossible to answer the question without imagination of the situation.

If the student could not fill in the work sheets during the lecture, it can be done in the e-learning environment where there are fulfilled colored work sheets. Furthermore, in the e-learning environment students can watch the lecture video version (animation). Tests are available to check ones theoretical

knowledge. In case any technical terms are not clear, you can find them in the dictionary. Questions of interest can be discussed in the forum among group mates and teachers.

Before the practical training, the filled in work sheets are checked, i.e. to see whether the student is ready for the practical class theoretically. After that, students get specially prepared graphical work sheets to be filled in at the practical class in the presence of the teacher. For the rough copy, spatial models or lectures are used. Teacher or group mates may help each other as in each group there are at least two similar graphical tasks. The fair copy of the graphical task is designed independently.

The graphical competence develops at individual speed in each student, as well as the spatial reasoning that requires an individual approach.

At consultations, it is possible to find out unclear issues, to discuss them with group mates and share experience.

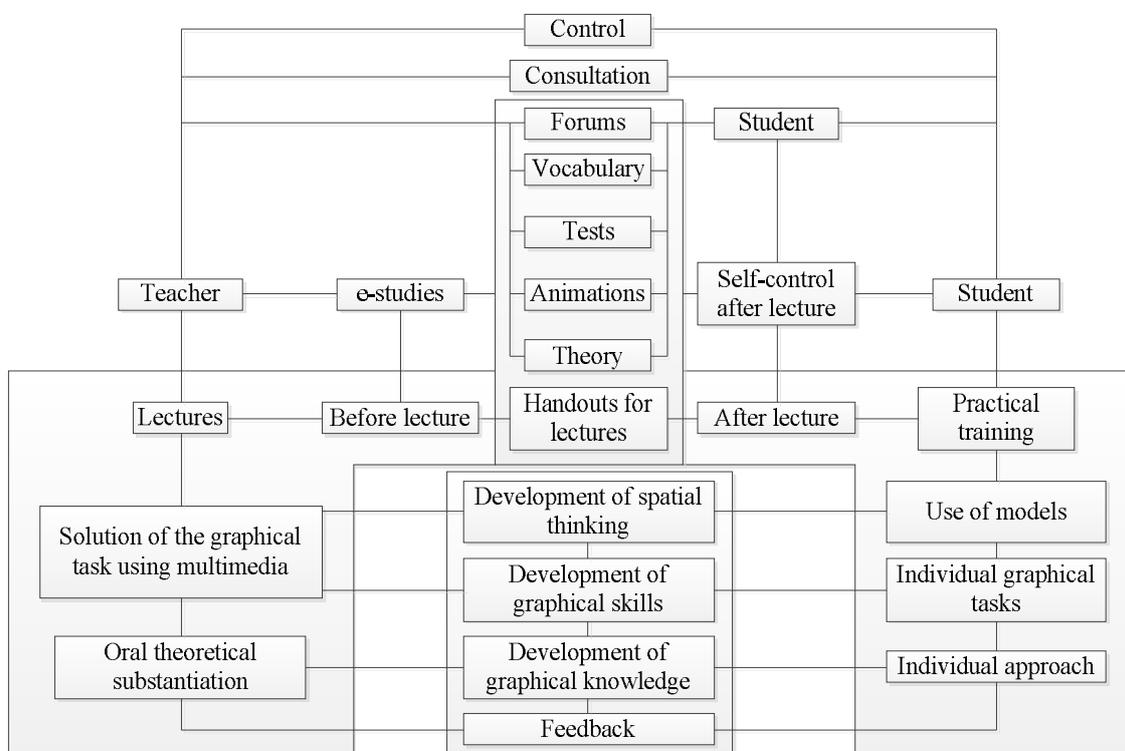


Fig. 2. Technological schema of the descriptive geometry study process

T. Petlina in her studies, graphical skills criteria considered as qualitative indicators but levels as quantitative indicators that were dependent on the choice of criteria. Indicators of components T. Petlina defined as follows (Петлина, 2007):

- *Completeness* – compliance of the amount of the needed graphical activities with the task to be solved;
- *Precision* – fulfillment of the operations proper to task requirements;
- *Sequence* – logically well-grounded, sequencing each other;
- *Variability* – the possible combinations, variants of the task solving;

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- *Flexibility* – skills to choose the right task-solving model from the many well-known models.

This division of criteria is close to the graphical competence criteria and indicators the author has used in his research because it includes students' knowledge, skills, and spatial reasoning, which, in the author's opinion, are the most essential parameters of graphical competence.

This research assessed the students' graphical competence by the following criteria.

Time criterion includes the student's attitude to the assignment to be solved. If the attitude is positive and student hands in his work in time, then the assessment scores are not taken away. Whereas the student's attitude to work is negative and he delays to hand in his work then it is assessed with a negative score, for each week of delay one assessment score is taken away, respectively.

Skill criterion includes skills connected with the theory requirements. Disregard of this criterion is assessed with a negative score depending on the complexity level of the criterion.

The following skills criteria were set:

- cleanness of the technical drawing;
- performance of technical writing;
- construction of technical drawing (*completeness*);
- performance of lines;
- position of views.

Standard criterion (precision) includes compliance to EN ISO standard. Disregard of standards is assessed with a negative score depending on the significance of the drawback of the standard disregard.

The following standard criteria were set:

- standardized size of the drawing list;
- compliance with the standard scale;
- compliance with the types of lines;
- compliance with the axonometrical projection standard.

Knowledge criterion is the most important to determine the graphical competence development because it shows the student's further development possibilities. Without knowledge in descriptive geometry, it is impossible to solve further assignments. This criterion determines also spatial reasoning and imagination level.

The following indicators were considered as knowledge criteria:

- independence of work performance (*sequence*);
- volume of theoretical knowledge (*variability*);
- proficiency in technical terms;
- ability to operate with spatial objects (*flexibility*).

Such a system of criteria has been implemented in the acquisition of descriptive geometry course and has proved itself as effective and motivating.

3. MATERIAL AND METHODS

Students from the Faculty of Rural Engineering two programs – Landscape architecture and planning and Environment and water management of the Latvia University of Agriculture participated in this research, in total 30 respondents. They studied descriptive geometry for two semesters and passed examination.

In the present research, the following quality criteria of descriptive geometry were compared: *content of the study process, provision of the study process, teacher's professionalism, and teacher's pedagogical skills*. Each quality criterion of the descriptive geometry course had several criteria indicators which were analyzed and evaluated by respondents. The research data were quantitative variables, and for the data measurement the nominal scale was used. Compliance of the division of the sample observation number with the theoretical observation number was verified by χ^2 criterion.

To determine the education quality, a questionnaire was prepared with described graphical education quality criteria and indicators. The value of indicators was determined by respondents' answers.

Respondents evaluated the content of the study process, provision of the study process, teacher's professionalism, and teacher's pedagogical skills.

4. RESULTS

Respondents of the questionnaire about the quality of the descriptive geometry course evaluated four criteria: the content of the study course, the study process, teacher's professionalism, and teacher's pedagogical skills.

When using χ^2 criterion, it is necessary to verify whether the number of respondents' answers is equal to the number of the quality indicators of the descriptive geometry studies for each criterion. Table 1 presents results of χ^2 criterion analysis of all quality criteria of descriptive geometry.

Table 1. Results of χ^2 criterion analysis

	<i>Content of study process</i>	<i>Provision of study process</i>	<i>Teacher's professionalism</i>	<i>Teacher's pedagogical skills</i>
<i>Chi-square</i>	3.342	2.670	0.182	8.461
<i>df</i>	10	3	3	8
<i>Asymp.sig</i>	0.972	0.445	0.980	0.390

Research results show that $p\text{-value}_{\text{content}} = 0.972 > 0.05$, $p\text{-value}_{\text{provision}} = 0.445 > 0.05$, $p\text{-value}_{\text{professionalism}} = 0.980 > 0.05$, and $p\text{-value}_{\text{skills}} = 0.390 < 0.05$. A conclusion can be drawn that the number of respondents' answers compared to the study quality indicators of descriptive geometry are divided evenly with probability 95%.

The obtained results show evidence that respondents considered all the study quality criteria (*content of the study process, provision of the study process, teacher's professionalism, and teacher's pedagogical skills*) indicators equally important.

Figure 3 reflects values of the teacher's professionalism criteria indicators that allow to draw a conclusion that students were satisfied with the teacher's professionalism indicators.

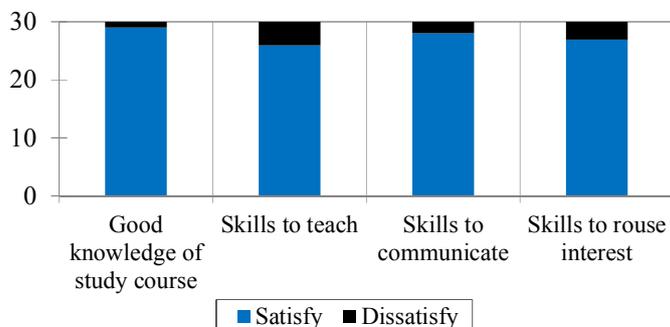


Fig. 3. Criterion of the teacher's professionalism

In respect of indicators of the provision of the study process criterion (Fig. 4), all students were completely satisfied with the authors prepared e-learning materials, but the least satisfied with the textbooks used in the study process.

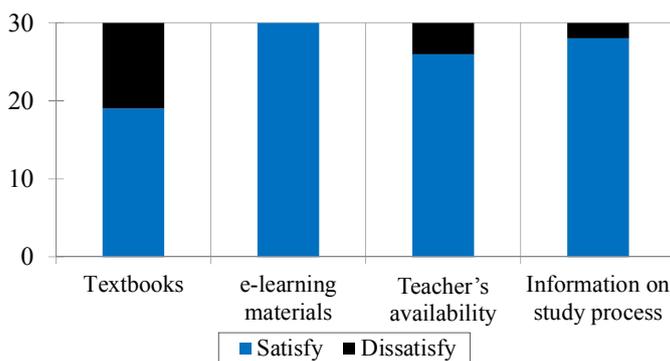


Fig. 4. Criterion of the provision of the study process

Indicators of the study process criterion also satisfied students (Fig. 5).

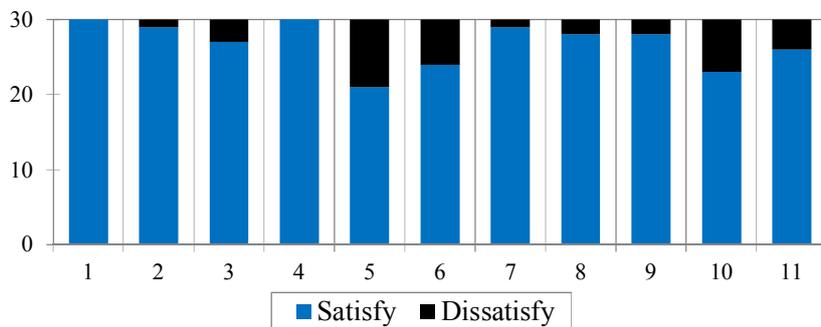


Fig. 5. Criterion of the study process content

- 1 Content of the descriptive geometry course
- 2 Teaching methods
- 3 Content of practical training
- 4 Content of lectures
- 5 Organization of students' independent work
- 6 Lesson division between lectures and practical classes
- 7 Methods of lecture delivering
- 8 Methods of holding practical classes
- 9 Methods of graphical work assessment
- 10 Methods of control work assessment
- 11 Methods of independent work assessment

Respondents' answers show that the teacher's pedagogical skills criterion indicators were evaluated positive with a prevailing excellent and good evaluation (Fig. 6).

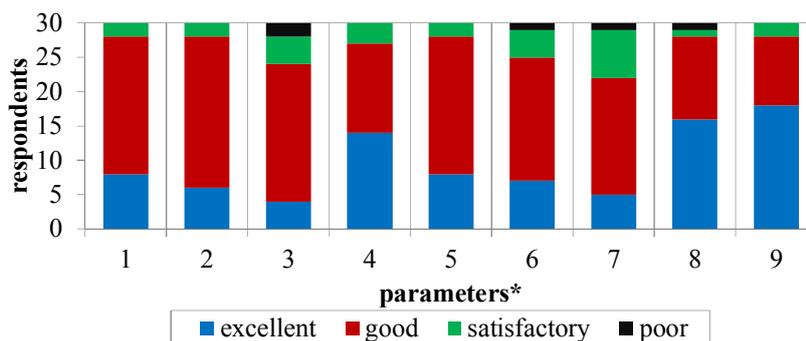


Fig. 6. Criterion of the teacher's pedagogical skills

- 1 Ability to present material clearly, comprehensibly
- 2 Stimulates independent thinking
- 3 Ability to rouse interest
- 4 Perceives precisely listeners reaction, answers students questions
- 5 Uses various teaching forms and methods
- 6 Acquisition of knowledge results in a complete idea about the study course in total
- 7 Assessment system is fair
- 8 Tactful, attentive and friendly
- 9 Always can get advice and consultation

5. DISCUSSION

Quality is the attribute of an object or unit that determines its ability to meet certain and predictable needs (International Organization for Standardization, 2005).

Analyzing European and Latvian materials prepared by a working group, A. Rauchwarger associates quality with particular norms and standards achievements (Rauchwarger, 2004). Similar explanations are found in other authors' writings defining quality as a compliance with the aim (Kristoffersen, Surssock & Vesterheiden, 1998) that is matched to the study course. Such an approach is provided both by the standards of the ISO and on them based quality management mechanisms.

One of the author's offered competence criteria (*standard criterion*) is also connected with the above mentioned approach that determines the quality of the graphical work performance compliant with the EN ISO standard. Such quality aspects as management and administration, infrastructure, teachers' education, teaching process, students' achievements, or learning results (Fig. 7) characterize education as a system.

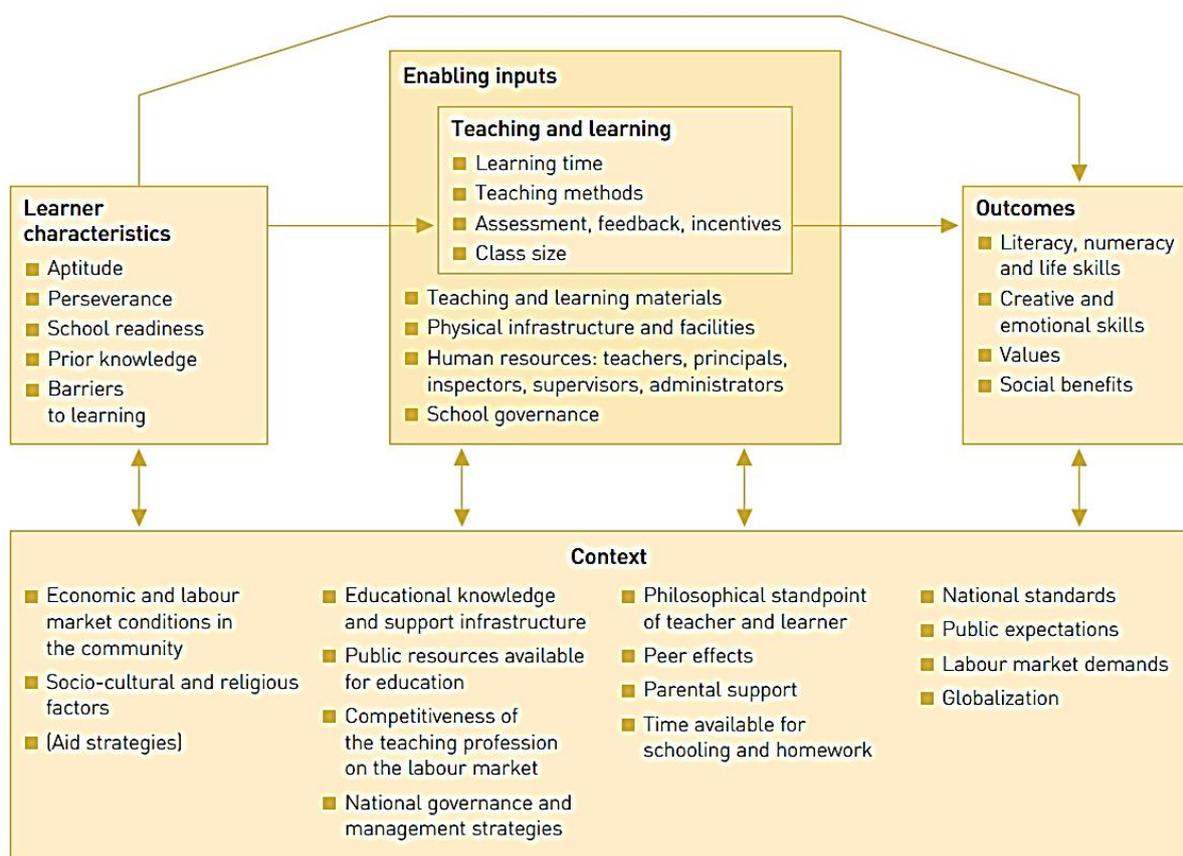


Fig. 7. A framework for understanding education quality (UNESCO, EFA global monitoring report, 2004)

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From all aspects presented in Figure 7, the author relates to the study quality of descriptive geometry the following aspects:

- student's attitude and preliminary knowledge;
- teaching methods and materials, assessment;
- knowledge and skills.

D. Maslov, J. Vilgina & J. Krupnova carried out investigations on determination of the education quality (Маслов, Вылгина & Крупнова, 2006).

For comparison, the author had chosen indicators used in his research. D. Maslov, J. Vilgina, J. Krupnova's inquired students *were satisfied* with the following indicators:

- content of study subjects;
- methods of holding practical classes;
- good knowledge of the study course;

were dissatisfied with:

- content of practical classes;
- provision of methodology;
- skills to rouse interest;
- teacher's availability;
- biased evaluation (Маслов, Вылгина & Крупнова, 2006).

I. Maslo and I. Tiļļa are of the opinion that for the quality level determination of a particular situation and improvement of the quality of an activity, as an analytic category should be used competence (Maslo & Tiļļa, 2005).

The notion of competence, in turn, many scientists associate with the importance of knowledge. For instance, according to J. Purcell's opinion, knowledge plays a great role in the acknowledgement and evaluation of the competence. The individual of society as a personality has to solve certain tasks (professional, personal) in a particular situation. That is why he/she should be able to apply his/her knowledge creatively in an unexpected and unusual situation (Purcell, 2001).

B. Briede indicates that competence is a very complicated notion, as it is mainly used to characterize a person's intellectual potential and significantly developed qualities. In Latin, the word *competo* means to be useful, suitable. B. Briede indicates that such components as knowledge, experience, skills, reflection are often used for the characterization of competence. Typically, competence is usually determined by how knowledge and skills are demonstrated in activities. Competence is associated with performing particular duties by a particular person who is responsible for them.

B. Briede defines competence as a body of knowledge, skills, and reflection abilities that are possible to verify by documentations and such activities in which the individual agrees to participate actively with a sense of responsibility. It is necessary to obtain abilities to learn how to adapt oneself in the changing environment (Briede, 2003; 2004a; 2004b).

E. Jutumova's research deals with geometrical-graphical competence as the level of students' knowledge and skills based on a developed spatial reasoning (Ютумова, 2005).

The author is of the opinion that the graphical competence is dependant on the body of knowledge, skills, and attitude based on the technical, spatial, and logical way of thinking.

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6. CONCLUSIONS

Development of graphical competence can be judged by the quality of graphical activity.

Quality of graphical activity is dependent on the content of the study process, provision of the study process, teacher's professionalism, and teacher's pedagogical skills.

The structure, content, and process of the descriptive geometry study course, developed by the author, satisfy students thus giving them opportunity to acquire graphical competence in a good quality.

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RESEARCH POTENTIAL AND ITS MANIFESTATION AMONG UNIVERSITY STUDENTS

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Abstract

The unity of learning and research is the core of higher professional education and has an impact on the would-be specialist's personal professional development. Therefore it is not only important to know psychological grounds of students' learning facilities and be able to study it, but their research potential as well. In this paper research potential is considered a specific characteristics of a person's research activity and the theoretical status of research potential, some approaches to its study, its main attributes and different manifestations among undergraduate and graduate students majoring in various fields.

Key words: *research potential, differentiation of manifestations of research potential among students*

1. INTRODUCTION

A student's research potential has always been and remains the most important component of higher education and professional training. However in today's society amid the market of innovative projects and new technologies, under the conditions of higher school and research institutions modernization process, the content and nature of scientific research, its social status and its management has been changing as well as the subject of research itself. The university student age is a sensitive period for personal professional development and most notably for intellectual, creative and personal potential enrichment (according to the advanced studies in the field of differential and developmental psychology) whereas the student community is the social category of young people, who the society is laying hopes on in innovative social, economic, business and scientific development.

Timeliness of a student's research potential study consists in searching efficient methods for developing the research skills of students and selecting among them the more willing, capable and ready to do post graduate research or work in research teams investigating new technologies and cutting-edge problems in the relevant fields of knowledge.

The reason for studying a student's research potential is that the university students of different years of study and majoring in different fields show different levels of interest in research activity and cope with the research tasks with different level of success. The purpose of the actual study consisted in searching answers to the following questions: How the concept of 'research potential' should be read within the boundaries of psychology? What psychological environment is necessary to unlock a student's research potential? How do the university students of various years of study, majoring in various fields and taking various educational programmers (Bachelor's or Master's) differ in their research potential?

2. THE CONCEPT OF 'RESEARCH POTENTIAL' AND AN APPROACH TO ITS STUDY

In philosophical and sociological writings the researchers introduce and discuss the concepts of 'human potential', 'labour potential'; in psychology they study 'intellectual potential' (M.A. Kholodnaj 1992; R. Sternberg 2003, and others), 'creative potential' (D.B. Bogojblenskaia 2002, and others), 'personal potential' (D.A. Leontjev 2011, and others).

The term 'intellectual potential' was introduced by educators (I.V. Kleschova 2003), and currently this term is representing a predetermined object of scientific analysis and study rather than an object for scientifically grounded evaluation of the means of its manifestation and development. This methodological background is explained by the fact that today the scientific community has not any holistic comprehension of this phenomenon at its disposal. Neither educators, nor psychologists have detected its distinctive features or described its components and structure and therefore they became the experimental units for this study.

If the concept of 'research potential' does not serve purposefully to evaluation of successful and efficient research activity, it loses its significance. Therefore the concept of 'research potential' introduced in this paper is connected with the subject of research activity, his/her ideas, values, knowledge, actions and behaviour. In this regard the study of research potential was done within *the subject-activity approach* and follow *the principles accepted in psychology to study potential* as an essence capable for self-actualization (V. Frankl 1990; M.K. Mamardashvili 1992; G.-P. Sartr 2000).

When developing the structural-functional model of a researcher's potential, we rely upon the following *theoretical principles*:

- The systems broader than research potential are the following: first, research activity, and secondly, a man in the role of a researcher as a bearer of research potential, therefore the concept of 'research potential' includes the ideas of research activity and a research actor.
- Research potential is considered here as human capability, achieved due to the previous education and development (intellectual, personal, creative), that allows to achieve the results in the sphere of cognitive and exploratory, educational and research activities at present, in the past and in future, valuable for a personality as well as for the whole society.
- Research potential is relied on the internal human resources, but it does not limited by them, because the resources are just the whole of the existed possibilities, irrespective of how, how far and in what amount they are used, and what the man could achieve with their help in the process of a particular case study.
- In reference to the structure, research potential is a three-tier bio-psycho-social system, which is formed in the situations of exploratory behaviour and research activity as the result of integration of individual's natural endowments, inclination, developed abilities, cognitive, exploratory and research experience as well as social and cultural, educational, life experience and their transference into the researcher's potential.
- Research potential is a developing phenomenon and this fact determines its systemic nature and presupposes its structural and functional description and the study of dynamic changes.
- Research potential is characterized by at least three properties: 1) qualitative content of distinctive features, 2) quantitative characteristic as a degree of realization, 3) progression level.

It is known that the main feature of research activity is orientation at new knowledge discovery and retrieval (or knowledge acquisition in the course of training), work methods and strategies, and

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experimental verification of their efficiency. This means that research activity is directed at new knowledge accumulation in a certain problem-subject field of human activity. Since research activity is characterized by exploration and problem-solving actions, by a variety of research strategies for solving problems and tasks of various dimension and complexity, the concept of 'intellectual potential' is used to determine the characteristics of research process mental regulation. From this point of view research potential reflects the peculiarities of mental regulation of the research procedures accomplished by a person and research actions that he/she aimed at, the dynamics and diversity of problem-solving actions, which differ in subject-research content complexity, means and research methods.

Research activity has another important feature – *activity of the subject*, as it plays a significant role in professional training and various types of cognitive, professionally-oriented and research activities and helps the subject in his/her development. In this context we can define at least three functional parts that provide the efficiency of research activity:

- the subject should be willing to do research, i.e., incentive system (incentive component) is important;
- the subject should be able to do research, and for this end it is necessary to develop some competences on intellectual level (a person should know and realize) and operational level (a person should implement) - (cognitive and executive components);

Research activity is considered here in a wide range and includes adaptive reproductive and productive activities, that is most pronounced on different stages and in all kinds of research activity. Since the success of cognitive process is determined by the peculiarities of psychology, the concept of 'research potential' is similar, to some extent, to the concepts of 'intellectual potential', 'personal potential' and 'creative potential'. At the bottom, it is congruent to the structure of research process, that can function as an integrity of cognitive, exploratory and creative processes.

With reference to the above mentioned subject, research potential, from our point of view, is an integral formation of the entire psychological structure of a person, who is a subject of research activity. The essence of research potential depends on the range and degree of manifestations of human *research capacity* in some certain and specified as well as in new and uncertain conditions, intensity and scale of its manifestations. This is multidimensional and multilevel system of social and psychological characteristics that provide stability to a researcher's behaviour and research activity.

The significant characteristics of a person having research potential are curiosity and taste for knowledge, the importance to identify the truth, persistence in verifying a hypothesis, faith in boundlessness of knowledge and power of science, pronounced aptitude for subject-cognitive activity in a certain field. In this case the approach of I.V. Kleschova is essential (2003). She defines research potential of a student as his/her personal growth and in addition she specifies its functions which are aimed at enhancement of knowledge and allow to change the character of cognition process qualitatively.

Subject-performance goals, value-semantic properties, characteristics of research activity in a certain way organize the relevant mental processes and reflect emotional and intellectual personal characteristics of a researcher. Therefore we consider research potential as a resource for self-regulating system of interconnected informative-cognitive, emotional-volitional, executive-regulatory processes, that allows a person to solve the research problems and tasks successfully and efficiently. This conception makes possible to consider the incentive and cognitive spheres of a researcher and the peculiarities of research activity self-regulation as the components of research potential.

So, the concept of 'research potential' includes:

- Structural unity of internal components - incentive, cognitive, behavioural. The basis for internal action of structural components of research potential is the intensity of a person's research activity aimed at an object, phenomenon or process.
- Personal characteristics and qualities of a subject, manifested in researcher's behaviour and his research activity.
- The ability of a person to modify his\her research potential (increase and decrease), to modify oneself under the pressure of external and internal factors.

The structural-functional model of a researcher's potential developed in the course of research serves the theoretical foundation for selection of exponents and development of methodological tools.

3. DIFFERENCES IN RESEACH POTENTIAL MANIFESTATION AMONG UNIVERSITY STUDENTS

In this section the results of statistical analysis are presented. The empirical part of this research is aimed at the study of research potential properties among the students of Russian universities (Saint-Petersburg State University, Herzen State Pedagogical University of Russia, State Pedagogical University of Nizhny Novgorod). The students of various schools participated in this research: schools of natural sciences, mathematics, economy and pedagogy; the total number of students is 172, among them: 79 students of the 3rd year of study, 53 students of the 5th year of study and 40 students of the 6th year of study.

Research methods: research potential questionnaire ((N.V. Bordovskaia, S.N. Kostromina, S.I. Rosum, N.L. Moskvicheva, N.N. Iskra); Kirton's method, comparative analysis (the Mann-Whitney U test, chi-square test), correlative analysis (Spearman), regression analysis.

In data processing we set the following empirical objectives.

The first objective of the empirical part of the research consisted in searching the answer to the following question: What exponents in research potential evaluation (research potential total score, incentive, cognitive, behavioural components) do expose the difference between students of different years of study and majoring in different fields?

Table 1. displays the most statistically significant differences between the students majoring in natural sciences, mathematics, economy and pedagogy (level of significance - $p < 0,05$).

As the Table shows that in the result of comparison of the students majoring in natural sciences and mathematics, natural sciences and economy, pedagogy and mathematics, pedagogy and economy no statistically significant differences in evaluation of research potential (research potential total score) were found. Significant differences were found in the result of comparison of the students majoring in natural sciences and pedagogy ($p < 0,016$). Among would-be teachers this index is more pronounced. This fact might be explained by different methods used in organization and conduct of students' research activity in the spheres of natural sciences and humanities.

No statistically significant differences related to research activity were found between all the students, irrespective their major (natural sciences, mathematics, economy and pedagogy). According to the Q-data and data resulting from the advanced study of N.L. Moskvicheva – one of the members of our research team, research potential is summoned up and fulfilled to a greater extent if students' research

activity is motivated by success and commitment to the outcomes, rather than the process of scientific inquiry per se or demand for searching the truth.

Table 1. Differences in research potential manifestations among the students, majoring in different fields

№	Parameters for comparison	Major	Mean Rank	Std. Deviation	Asymp. Sig (2-tailed)
1	Research potential	natural sciences	30,46	52,244	0,016
		pedagogy	43,76	39,079	
2	Cognitive component of research potential	natural sciences	29,68	16,681	0,009
		pedagogy	44,13	16,146	
3	Cognitive component of research potential	mathematics	60,73	14,081	0,040
		economy	44,99	16,639	
4	Behavioural component of research potential	natural sciences	29,86	20,063	0,010
		pedagogy	44,05	16,375	
5	Behavioural component of research potential	mathematics	22,10	15,042	0,006
		pedagogy	38,01	16,375	

The students having their major in natural sciences and pedagogy ($p < 0,009$) and the students, majoring in mathematics and economy ($p < 0,040$) differ markedly according to the developmental level of cognitive component of research potential, but according to the same characteristics no statistically significant differences were found between the students majoring in natural sciences and mathematics, the students majoring in natural sciences and economy, the students majoring in mathematics and pedagogy. Moreover among the students majoring in pedagogy (cf. the mean rank - 44,13) the cognitive aspect of research potential is more pronounced than among the student majoring in natural sciences (cf. the mean rank - 29,68), whereas the development of cognitive abilities of would-be mathematicians in the position of researchers differs markedly from that of the would-be economists (cf. the mean rank - 44,99). This is attributable to the fact that the students majoring in mathematics more often deal with research tasks and strategies than the students majoring in economy, and also to the fact that the students majoring in mathematics by themselves have likely higher grade of intelligence. The experience of updating the staff of economists in the period of reforming the Russian economy proves this assumption, as recruitment of the economists of new formation was from the specialists, holding the Diploma of Higher Education with qualifications of “mathematician” or “physicist”. Additional data resulting from the study of innovative thinking and correlative analysis prove that assumption. The exponents ‘cognitive component’ of research potential and ‘innovative thinking’ (Kirton’s method) correlated for the entire number of students. It means that the students with high developmental level of cognitive component of research potential in the process of investigation more often use new approaches and strategies to solve not only research tasks, but all the other tasks of problematic nature, including the professionally-oriented ones.

In the behavioural component of research potential no statistically significant differences were found between the students majoring in natural sciences and economy, the students majoring in pedagogy and economy, whereas the differences were found between the students majoring in natural sciences and pedagogy ($p < 0,010$), and the students majoring in mathematics and pedagogy ($p < 0,006$). Among would-be teachers the exponent showing development and implementation of the behavioural component of their research potential is more pronounced (cf. the mean ranks - 44,05 and 38,01).

In search of significant differences between “research potential” of the students of the 3rd, 5th and 6th year of study at the university another study was undertaken and its results are given in Fig. 1, 2, 3 and 4. In the course of solving the second objective we found statistically significant differences in realization of cognitive component comparing the students of the 3rd and 5th year of study ($p < 0,000$), and comparing the students of the 3rd and 6th year of study ($p < 0,000$). These empirical and statistical data reflect and prove the dynamics of research potential development, and first and foremost, its cognitive component in the period from 3rd to 6th year of study which covers the period of transition from Bachelor’s to Master’s Level; within the last one the proportion and value of research activity of the students substantially increase.

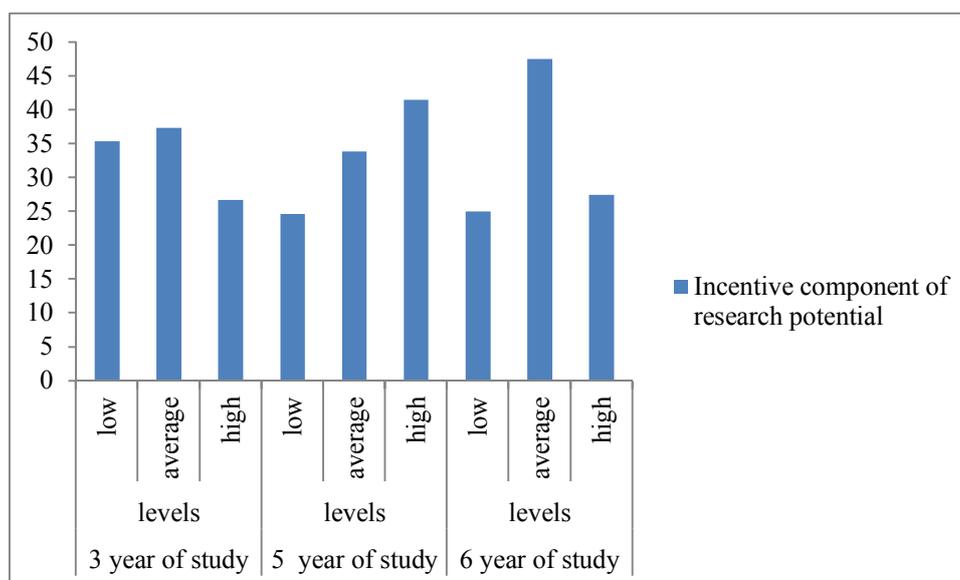


Fig. 1. Developmental levels of incentive component of research potential among the university students of different years of study

According to the data of our study, the experience of academic education and research activity management among the Saint-Petersburg State University students of the 3rd year of study majoring in economy (Fig.3) at the Bachelor’s Level, needs to enhance motivation of students to research, if comparing to the students of the 5th and 6th year studying in other universities. In the process of evaluation of the incentive component two groups (low and high levels) stood out of the 6th year of study students.

Evaluation of development of the incentive sphere of a personality as of a researcher by Master's students majoring in natural sciences (28% - low level and 32% - high level) and the students of the Institute of Childhood, Herzen University (24,5% - low level and 35,8% - high level) differ markedly. Moreover among the students of the 5th year majoring in natural sciences 21% of students value their attitude to research activity at a low rate and 35,7% of students give a high rating, whereas among the students of the 6th year of study 36,3% value their attitude to research activity at a low rate and 27,2% give a high rating of it.

The students of the Institute of Childhood, Herzen University value their intellectual resource (cognitive component of research potential) at the lowest rate (0,060) (Fig. 2). Among the students of the Institute of Childhood, Herzen University and students of the Economic School, Saint-Petersburg State University evaluating the cognitive component of their research potential we revealed two groups with lowest level of development (15% and 34,1%, respectively) and two groups with highest level (50, 9% and 21,5%, respectively).

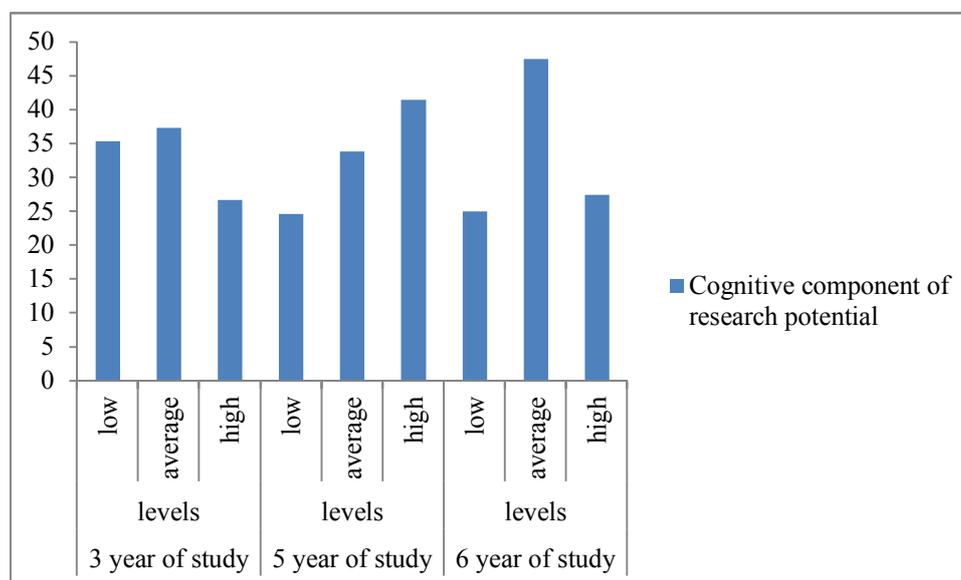


Fig. 2. Developmental levels of cognitive component of research potential among the students of different years of study

In the process of evaluation of the cognitive component of research potential two groups (low and high levels) stood out of the students of Institute of Childhood, Herzen University and students of the Economic School, Saint-Petersburg State University.

Evaluation of the degree of readiness to research activity (behavioural component of research potential) some differences were also detected (Fig. 3), in this case, between the Master's students, majoring in natural sciences (0,045) and the students majoring in mathematics (- 1, 215); their value is rather low.

When comparing the evaluation results for all three components of research potential among various groups we can observe some essential differences. For instance, Master's students majoring in natural sciences overrate the incentive component and underrate the behavioural one; Master's students majoring in mathematics have the highest rate of behavioural component. Master's students of the Institute of Childhood, Herzen University underrate cognitive component and give a higher rating to behavioural component of their research potential. However the students of the Economic School, Saint-Petersburg State University, overrate both incentive and cognitive components of their research potential.

In research potential total score (Fig.4) the average value dominates in all categories of students, but among Master's students (the 6th year of study at the university) two groups stand out - two groups with high and low levels of research potential.

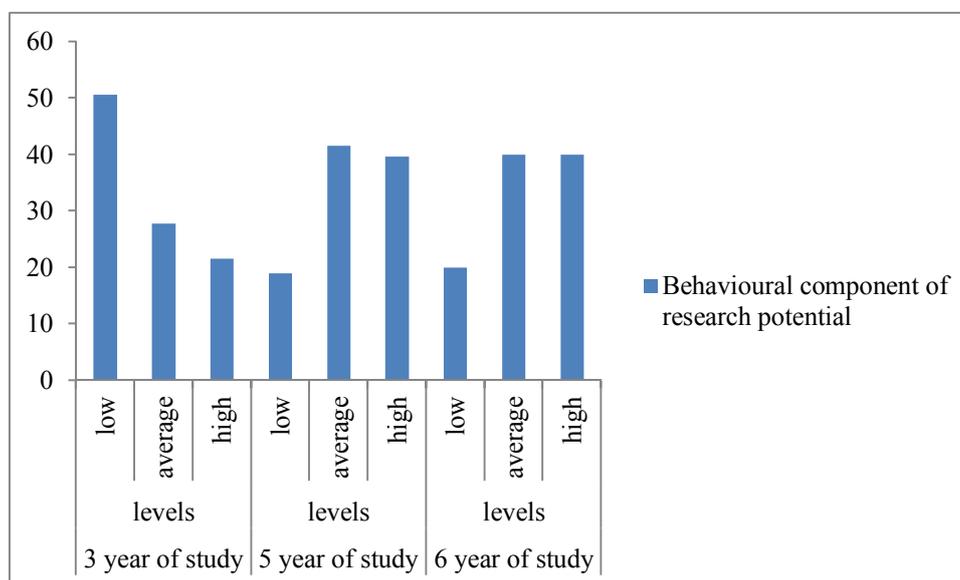


Fig.3 Developmental levels of behavioural component of research potential among the university students of different years of study

The results of the statistical analysis (asymmetry) indicate that high value of research potential dominates among the students of the 5th and 6th years of study. Among all the categories of Master's students higher rates are characteristic for those who are majoring in mathematics and lower rates are characteristic for the students of the Institute of Childhood, Herzen University.

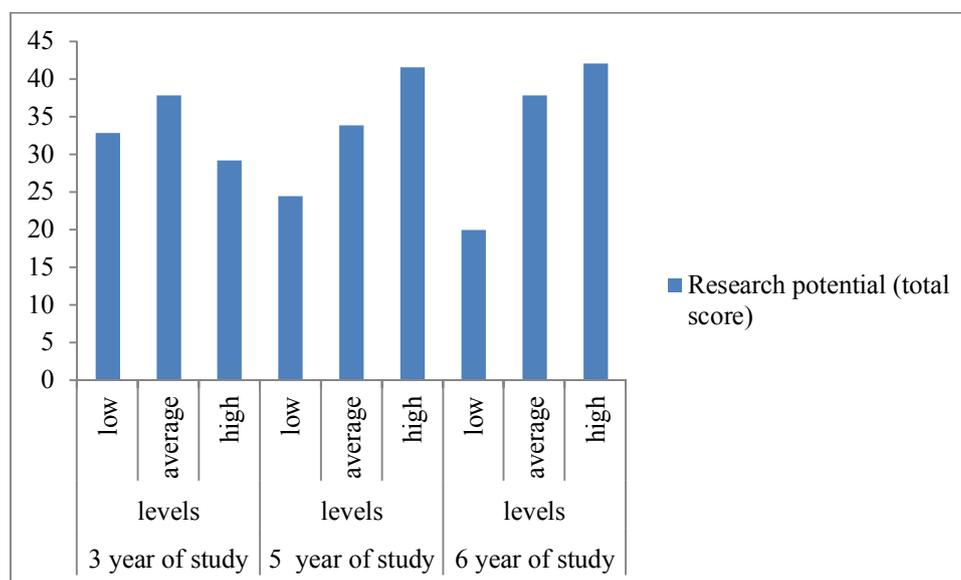


Fig. 4. The peculiar features of research potential development among the university students of different years of study

Among the students majoring in natural sciences there are 4% of those who have a high score in evaluation of their research potential and all its three components, 8% of all the respondents have an average level of development judging the evaluation of both, research potential and all its components, and 12% of respondents have a low level of development. Among the students majoring in mathematics in each group (with high, average and low score in evaluation of research potential and all three components) an equal number of students has been detected that is rated 13,2% for each group of the total number. Among the students majoring in pedagogy there are 22,6% of those who have high score in evaluation of their research potential and all its three components; 7,5% of all the respondents have an average level of development judging the evaluation of both, research potential and all its components and 1,9% of respondents have a low level of development. Among the students majoring in economy 12,6% have a high score in evaluation of their research potential and all its three components, 13,9% of all the respondents have an average level of development judging the evaluation of both, research potential and all its components and 29,2% of respondents have a low level of development.

4. CONCLUSION

The analysis performed within the study of students' research potential from different universities and schools gives grounds for the following conclusion:

- research potential growth trend was registered among the students of the second level (Master's) comparing to the students of the first level (Bachelor's) irrespective of their major;

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- it is necessary to increase motivation of the Bachelor's students to do research (that is lower comparing to that of the Master's students) in the course of their academic studies and in the process of students' research activity management;

- among the students of the second educational level (Master's) correlation in development of incentive and cognitive components of research potential was detected, whereas no essential dynamics was detected in their evaluation of a personality's exploratory properties and readiness to independent research activity.

Empirical data and the findings of the study provide reasons enough to improve the management of the academic studies and research activity of the students in the universities that served as the basis for our research.

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**THE MEDICINAL PLANT CURRICULUM FOR ELEMENTARY SCHOOL
IN MONTENEGRO**

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Abstract

Medicinal plants curriculum taught in the elementary school in Montenegro is analyzed in this work. The curriculum covers the medicinal plants of woods, karsts and meadows, the use and importance of medicinal plants as well as their conservancy. The curriculum has structure, logical course of content and valuable broadening of knowledge in the area of: botany, ethnobotany, horticulture, plant identification, chemistry and understanding of the myth, tradition and science of the native medicinal plants. The curriculum enhances the knowledge and values by learning the biodiversity and vegetation, both, at: theoretical classroom classes and practical activity in the surrounding environment. It is highly praised that in the natural sciences curricula, the curriculum medicinal plants is present.

Key words: *medicinal plants curriculum, elementary school, Montenegro*

1. INTRODUCTION

In the era of the great scientific, technical – technological and social changes the educational system of every country seeks to improve and adapt education to the development needs of pupils and the society. The reforms of the educational system in the former Yugoslavia were frequent. The changes in the natural sciences curriculum were smaller than in the social sciences. The reforms of the curriculum, in the former Yugoslavia, were not complete, because they were the results of various decisions and were not following the technical and scientific educational needs. The curriculum reforms of natural sciences that are taking place, at the moment, try not to repeat the mistakes of earlier reforms. Former reforms were based on moving some teaching units from one grade to another and did not include the latest scientific achievements of natural sciences (Miljanovic et al., 2004). The latest reforms intend to make the curriculum more varied, more comprehensive, more interesting and attractive to pupils. The goal of the latest curriculum is that pupils gain knowledge that will serve them later in the further schooling and life. This is the difference to previous education, in this geographic region, where the knowledge learned at school had no use and benefit in everyday life. The changes of the curriculum, printing of school books and school equipment are the conditions to be completed in order to achieve the successful ongoing educational reforms. The curriculum reforms in Montenegro have started and elective courses were introduced into the curriculum. Seven elective subject groups were introduced and one of them is a group of natural sciences and mathematics. Within the elective subject group of natural sciences and mathematics is the subject Medicinal plants (Predmetni program Ljekovito bilje, 2008).

2. MEDICINAL PLANTS CURRICULUM FOR PRIMARY SCHOOL IN MONTENEGRO

From the year 2004, Republic of Montenegro has started with the nine year elementary school (Informator o devetogodisnoj osnovnoj skoli, 2004). Primary school in Montenegro is obligatory and free for all children and there are no private elementary schools (Montenegro in the XXI century – in the era of competitiveness, 2010). By moving to the nine year primary school from the eight year primary school, the curriculum has changed (Informator o devetogodisnoj osnovnoj skoli, 2004). Among other changes, elective courses were introduced. The elective courses are grouped in seven groups: the languages, the natural sciences and mathematics, computer science, social sciences, technical sciences, fine arts and physical education and an interdisciplinary group of subjects. In the group of natural sciences and mathematics subjects are: Mathematical workshop – combinatory and elementary theory of numbers, Mathematical workshop – geometry, Mathematical workshops – groups, relations, functions, Measurements in physics, Oscillations and waves, Chemistry through experiments, Characteristics of the marine ecosystem and Medicinal plants. The elective course Mathematical workshop – combinatory and elementary theory of numbers is taught in the seventh grade, the elective subject Mathematical workshop – geometry is taught in the eighth grade, while the elective subject Mathematical workshops – groups, relations, functions is taught in the ninth grade with a total number of classes of one hour per week. The elective course Measurements in physics can be chosen in the seventh grade, while the Oscillations and waves can be chosen in the eighth grade of the nine year elementary school and are taught with one hour per week. The elective course Chemistry through the experiments can be taught for two years or shorter during the eighth and ninth grade. The number of hours is two hours per week. The elective subject Characteristics of the marine ecosystem is the subject that is not tied to the grade and can be studied in the seventh, eighth or ninth grade with one hour per week. The elective course Medicinal plants can be selected in the eighth grade and is taught with one hour per week (Katalog izbornih predmeta u osnovnoj skoli za 2009/10. skolsku godinu, 2009). The curriculum Medicinal plants has the following lecture topics: The first thematic unit is: Medicinal plants of forests – fertility and pH of soil, climatic factors, storey, plant systematics, plants' growth stages and shift phenomenon, the degradation. The second thematic unit is: Medicinal plants of karst - fertility and pH of soil, climatic factors, plant systematics. The third thematic unit is: Medicinal plants of meadows – edaphic factors, orographic factors, underground storey, plant systematics, growth stages and phenological shifts, the aspect. The fourth thematic unit is: the application and importance of medicinal plants – folk medicine, tinctures, balms, bees and honey. The fifth thematic unit is: the protection of medicinal plants – physical, chemical and biological protection, the red book (Predmetni program Ljekovito bilje, 2008).

The three thematic units of the curriculum study medicinal plants in three ecosystems: forests, karsts and meadows. In the biology book for the seventh grade of the nine year elementary school (Bozic – Krstic et al., 2010), is described the terrestrial environment which is divided into forest ecosystems and herbaceous ecosystems. Types of forest ecosystems are further divided into deciduous, coniferous and hard leaf forests. Herbaceous ecosystems are divided into natural and artificial ones, in the group of the natural ones are: turfs and meadows, while the artificial ones are: meadows, grasslands and agro ecosystems. The biology book for the seventh grade in the Chapter: Broadleaf deciduous forests the concept of storey is introduced and organisms that live in every level are described. It is described that the plants that live in deciduous forests in the level of trees are: oak, beech, hornbeam, linden, poplar, elm, ash and maple. In the shrub level plants present are: dogwood, hazel, hawthorn, blackthorn, blackberry, holly, elder and broom. The ground floor is inhabited with: ferns, wild strawberries, snowdrop, primrose, moss, etc. In the coniferous forest the tree level is inhabited with: White Bark Pine, spruce, fir, white pine, larch, spruce, and lichens. Within this thematic unit the story is presented

to pupils about Pancic spruce: that on the mountain Tara in 1876th Josif Pancic discovered Pancic spruce which represents the rest of the great forest communities that have disappeared during the last ice age on the Earth. To pupils is introduced the term relic which is defined as an ancient species that has managed to survive the ice age. For yew is mentioned that this is a shrub that has been cut excessively in Montenegro and is a species protected by law. The level of the low bushes in the deciduous forests is inhabited with: raspberries, currants and mountain cranberry. In hard leaf forest, in the level of trees grow: oak, alpine pine, pine nuts and olives. The shrub level has: laurel, myrtle, strawberry, etc. In the ground layer grow: ferns, climbing plants and grass. The story of growing olives is described to pupils in the part of hard leaf forests. There is a belief that the young man could not marry until he planted ten olives. Olive trees were planted by two so today it can be found that the two olive trees grow side by side, their branches intertwine. The authors methodologically introduce the terms maquis and karst which were a result of the deforestation and the soil erosion. Plants growing in the karst are: hornbeam, thorn, holly, sage, wormwood, etc. The authors mention, at this place, the concept of environmental degradation caused by cutting the trees. The authors, further, methodologically introduce the herbaceous ecosystems the: meadows and pastures. Flora of meadows and pastures is the most numerous one. Within this ecosystem grow plants that man uses as food and for making teas. It is mentioned that there are plants, which alone or in mixture with other plants show healing power to human beings and that dates back to Hippocrates, to the 4th century BC. Plants collected in the field are used for making tea, and the authors give an example of mint and sage. Meadow plants used as spices are mentioned and are: thyme, basil, oregano, cumin, and others. The authors further describe the use of young dandelion leaves and roots of the same plant which is used for making tea that has the power to discharge excess water from the human body (Bozic – Krstic et al., 2010). The biology book for the seventh grade of the nine year primary school is well written and after lessons of biology in the seventh grade pupils have the base for taking the elective course Medicinal plants.

The curriculum of the elective course Medicinal plants provides knowledge about the importance, use and protection of medicinal plants. It is recommended that this subject can best be learnt through the field work and work in groups. For example, the field work can include: gathering of medicinal plants and making notes on medicinal plants from the people who do it professionally. It is recommended that the teaching is realized by accepting the theoretical knowledge with the application of learning through self, team and experimental work. It is anticipated that the pupils learn the proper use of medicinal plants on the basis of scientific theory and gets the knowledge which has the application in everyday life. The content of the curriculum should develop the wish in pupils to discover new, through curiosity, independence and constant interest in biology. Teacher should explain to pupils the anthropological changes of ecosystems and develop in pupils the biological and ecological thinking in order to preserve medicinal plants.

3. CONTENT AND OPERATIONAL OBJECTIVES OF MEDICINAL PLANTS CURRICULUM

Content and operational objectives of Medicinal plants curriculum include topics on: forest medicinal plants, karst medicinal plants, meadow medicinal plants, the use and importance of medicinal plants and the protection of medicinal plants (Predmetni program Ljekovito bilje, 2008).

Montenegro has varied relief and different types of climate are present so the vegetation cover varies in different parts of Montenegro. Every school will have different medicinal plants on their locality. On the location of the mountain Komovi pupils are able to gather medicinal plants: St. John's wort

(*Hypericum perforatum*, Hypericaceae) which grows on the edges of forests and meadows in May and June, juniper (*Juniperus communis*, Cupressaceae), purple fruits that are harvested in late summer to early winter and dried in the air, yarrow (*Achillea millefolium*, Asteraceae) that grows in fields, and the flowers are harvested from June to August. At this place teachers should introduce to pupils the term essential oils. Medicinal plants that grow on the mountain Komovi are numerous. To pupils the next medicinal plants should be described: ribwort plantain (*Plantago lanceolata*, Plantaginaceae), which is in the genus of coniferous, cowslip (*Primula officinalis*, Primulaceae) which is a perennial herbaceous plant with short roots and blossoms in April and May (Fig. 1.). Cowslip's parts that are collected are: the root rhizome, flower and leaf. The root can be collected with a knife during the flowering time of the plant, the leaves are harvested when young and healthy, during flowering, while the flowers are harvested when fully developed. The root is dried in the shade and windy place, while the flowers are dried in shadow and needs to be dried quickly, because it turns green and decompose. It is used as a tea or syrup against the cough. Next medicinal plant, that can be found at that locality is great yellow gentian (*Gentiana lutea*, Gentianaceae) where the piece of root, about 5 cm long, is placed in a bottle of brandy and within common people is known as a good remedy for blood stream. The root is collected in autumn or early spring from older plants. Fresh root has an unpleasant odor, while the dried root has the aromatic smell. It is advisable to dry the roots quickly. Breckland thyme (*Thymus serpyllum*, Lamiaceae) contains essential oils which can be obtained by distillation. The plant contains tannin and manganese. Tall mallow (*Malva silvestris*, Malvaceae) flowers are collected from June to September. The root is harvested in spring and autumn. It is used as an ingredient for tea against the cough. Nettle (*Urtica dioica*, Urticaceae) due to its nutritive values is considered a vegetable and a medicament (Fig. 1.). Bilberry (*Vaccinium myrtillus*, Ericaceae) is growing in coniferous forests. The leaves are collected before fruit ripening and are dried in a dark and windy place. The fruits are gathered in summer and dried in the sun. Wild strawberry (*Fragaria vesca*, Rosaceae), leaves and flowers are gathered at the time of flowering and dried in the shadow (Fig. 1.) (Bilten Botanicke baste planinske flore Crne Gore, 1998).



Fig. 1. Some of the medicinal plants on the mountain Komovi. From the left to the right: nettle (*Urtica dioica*, Urticaceae), cowslip (*Primula officinalis*, Primulaceae) and wild strawberry (*Fragaria vesca*, Rosaceae)

Pupils on the locality of the mountain Durmitor are able to collect, for example, following medicinal plants: coltsfoot (*Tussilago farfara*, Asteraceae) where the leaf is part of a tea against the cough. Common people use the leaf, smeared it with grease or oil and put it on wounds (Fig. 2.). The wolf's-foot clubmoss, (*Lycopodium clavatum*, Lycopodiaceae), spores have hydrophobic characteristics and are used only for external use. Purple betony (*Stachys officinalis*, Lamiaceae) grows on the hilly meadows and light woods. It is used to treat wounds. Black mustard (*Brassica nigra*, Brassicaceae) is

used to prepare mustard flour, compresses, baths and mustard essential oils which are an effective antiseptic and antibacterial agent (Fig. 2.) (Tucakov, 1984, Tasic et al., 2004). Barren strawberries (*Potentilla tormentilla*, Rosaceae) grow on the hilly and mountainous areas and are used against dysentery (Fig. 2.). Saffron (*Crocus sativus*, Iridaceae), dog rose (*Rosa canina*, Rosaceae), wild strawberry (*Fragaria vesca*, Rosaceae) and red raspberry (*Rubus idaeus*, Rosaceae) are plants that pupils can collect on the mountain Durmitor.



Fig. 2. Some of the medicinal plants on the mountain Durmitor. From the left to the right: barren strawberry (*Potentilla tormentilla*, Rosaceae), coltsfoot (*Tussilago farfara*, Asteraceae) and black mustard (*Brassica nigra*, Brassicaceae)

Pupils at the Adriatic coast can get to know the Mediterranean medicinal plants. Olive (*Olea europea*, Oleaceae), the fruit is used as food and for pharmaceutical purposes flower and leaf are used (Fig. 3.). At home, pupils' family is using olive oil and surely most pupils know that olive oil is obtained by cold squeezing of the fruit (pericarp) of olives. The fig (*Ficus carica*, Moraceae) is a Mediterranean plant and is used fresh, dried, for jams and jellies (Fig. 3.). The fig syrup is used as a laxative. Pomegranate (*Punica granatum*, Lythraceae) has a fruit rich in vitamin C (Fig. 3.). The synthetic antihelminthics have removed the use of the pomegranate peel (Bojovic et al., 2010). Laurel (*Laurus nobilis*, Lauraceae), is harvested in November and is used as a spice. Rosemary (*Rosmarinus officinalis*, Lamiaceae), is used as a spice for fish and seafood specialties, to aromatize the olive oil and olives when preserved.



Fig. 3. Some of the medicinal plants at the Adriatic coast. From the left to the right: fig (*Ficus carica*, Moraceae), Pomegranate (*Punica granatum*, Lythraceae) and Olive (*Olea europea*, Oleaceae)

The first three themes: forest medicinal plants, karst medicinal plants and medicinal plants of meadows have operational objectives which include: to gather the knowledge about the physico – chemical characteristics of wood, karst and meadows and include the activities where pupil needs to connect prior knowledge with new knowledge. This includes the knowledge on soil fertility, soil pH values and knowledge of climate and its influence on plant growth. The advice is to acquaint pupils with the conditions in the forest, karst and meadow through the analysis of the influence of climatic factors (light, temperature, air flow) on medicinal plants. Further anticipated operational objective is to introduce the forests, karst and meadows medicinal plants through the collection, classification and analysis of forest, karst and meadows medicinal plants, through making the herbarium and connect that knowledge with the thematic units learned during the lessons of plant systematics learnt at the lessons of biology in the previous year of schooling. The projected goal is the understanding of differences in morpho – physiological characteristics of forest, karst and meadow medicinal plants on the basis of the collected plant material and analysis of plant organs. The fourth thematic unit provides learning and application of important medicinal plants. It is necessary to explain to pupils the way medicinal plants are collected and the time of collection. Pupils can learn how to use medicinal plants, to get acquainted with the content of recipes for making balms, baths and other natural remedies and to learn about the beneficial effects of medicinal plants on the human body. Pupils should get to know the basic concepts of making honey. The fifth thematic unit provides learning the protection of medicinal plants. The objective is to get the knowledge on protection of medicinal plants through the analysis of safety measures and knowledge of physical, chemical and biological measures of protection of medicinal plants. Pupils should wide their knowledge on red book what was learnt during biology classes in the seventh grade and broad it with medicinal plants. The pupil should be trained to evaluate the influence of human beings on medicinal plants. Didactic recommendations are along with the current demands of education. In addition to theoretical lectures, the lectures should also be held in the field. The work, observation, classification, identification and collection of medicinal plants for the herbarium at that locality is recommended to be done. Teachers have the freedom to choose the type of class, the choice of teaching method and forms of the work, the choice of teaching material and activities for every topic.

4. CONCLUSION

The elective subjects in primary school education have made the learning of science more interesting for pupils and the great progress has been made for the education. The analysis of the chosen elective courses in elementary schools for the school year 2008 was done in 75 elementary schools in Montenegro (Katalog izbornih predmeta u osnovnoj skoli za 2009/10. skolsku godinu, 2009). The results showed that most pupils have taken the elective subject Sport for athletes, what is very commendable that pupils choose a physical activity for an elective course. Further, pupils have chosen the language group of subjects for the elective subject and chosen foreign languages were Italian and Russian, which is also commendable that pupils want to learn foreign languages. The elective subject Medicinal plants were chosen by 584 pupils distributed in 25 groups, what is commendable and is a contribution to the general, scientific and biological education of pupils. In teaching the subject Medicinal plants methods present are: traditional instruction and learning, methods that encourage pupils to learn independently and the fieldwork. The elective course in Medicinal plants indicates that primary school education tends to increase the content of science and general education in its content where the contribution of the subject Medicinal plants is significant. The knowledge on medicinal plants pupils can use in many aspects of everyday life. During the course Medicinal plants pupils develop the spirit of experimental work through the work in the nature. Technical – technological

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progress and urbanization is hard to resist and human beings are more and more away from the nature. The introduction of the elective subject Medicinal plants is making the opportunity to pupils to explore the nature, its benefits and beauty. All warm approbations for the introduction of elective subject Medicinal plants in primary school. The addition to the traditional biological disciplines: botany, zoology, ecology, then to the modern biological disciplines: genetics and molecular biology, the biological group of subjects in the primary school education has been expanded to the Medicinal plants which also includes the knowledge on biodiversity and how to preserve threatened and endangered plant species.

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**TRAINING SCIENTIFIC AND ENGINEERING SPECIALISTS AT THE SCIENTIFIC
EDUCATIONAL CENTER “THE CENTER OF RADIATION RESISTIVE DIAMOND
NANOELECTRONICS AND INNOVATIONS” OF SRC RF TRINITI**

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Abstract

Well-educated qualified specialists are the guarantee of modern problem harmonious solving. So the quality of the education is an important problem determining present and future of the civilization. At present education of engineering, natural-science and mathematical professions have a particular significance. Scientific educational centers at research institutions are one of the effective education methods. Problems of training of scientific and engineering specialists at the “Center of radiation resistive diamond nanoelectronics and innovations” of SRC RF TRINITI will be discussed.

Key words: *Scientific educational centers, problems of training, engineering specialists*

1. INTRODUCTION

The Science and higher education are major factors which determine the development of modern World. Achievements as Space exploration, control of nuclear and thermonuclear energy, computer, genetic engineering and biology become part of daily life and demand an «army» of high-class professional for servicing. Majority of people, deciding the fate of World and providing control of essential objects, have higher education. The higher education enhances chances of people to get a good job, to provide respectable standard of living, to satisfy their ambitions and to put into practice their intellectual faculties creatively. This means that at present training of high-class professional is important task.

Well-educated competent specialists, who able to make right decisions, are the guarantee of modern problems harmonious solution. It takes a long period of time to train those professionals, about eight - ten years, including the study in university. In this case the study is to be efficient, to include progressive methodology of the training, to have effective verification of knowledge, and to realize conception of lifelong learning. The Modern education is basis, governing present and future of civilization. At age of nuclear energy, nanotechnologies, bioengineering and so on, an attention have to be paid to training of engineers and scientist.

At present we live in the circumstances of the continuous information revolution, so it is dangerous to teach “Neanderthals” who are frivolous “playing” with toxins, genes and nuclear forces. A modern specialist has to be responsible for his activity consequences, has to forecast his actions and he has to understand his heedless step could lead to irretrievable results. So, probably the time has come to swear an oath of no harm to humanity by their research, and respect to the science should be cultivated in the society as long as understanding of role of the science for present and future. At all time the

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culture of communication has a great significance. So, acquired humanity knowledge have to be directed to creation of designing program of social communication and psychological training.

Existing system of higher education is based on knowledge transmittance from teacher to student and it makes student passive. Seminars and labs trying to some extent fix that bug, but due to a huge amount of information students don't have enough time to comprehend received information carefully and he can't use it creatively. Not uncommon cases when student "complexes" are evolved and are not afford them to apply knowledge creatively. For example, if there are 20 students in a class and an average seminar duration is 80 minutes, then a teacher spares 4 minutes per student a week, or approximately 1 hour per term. Practice shows that much more time of teacher-student communication is required to study a subject by student well especially for engineering, natural science, and mathematical specialties. So innovation approaches are required then. If we don't consider the problem of effective training of specialists, we'll get abundance of diploma specialists and we'll lack of people able to solve a complex problems.

One of the new forms of such training is scientific-educational centers in research institutes. In this case the time spent by the tutor on every student increases because in definite specialization the quantity of students reduces significantly. Students and postgraduate students together with institute collaborators do a research work and obtain an experience of research activity. In this case they have ability to work on modern equipment and to get an excellent practice. In present report problems of students training in "The Center of radiation resistive diamond nanoelectronics and innovations" of SRC RF TRINITY are discussed.

2. SCIENTIFIC-EDUCATIONAL CENTERS: MAJOR TASKS, KEY ACTIVITY COURSES

The educational center was based in 2009 with the purpose of implementation of innovation educational courses, carrying out research activities in the field of radiation-resist diamond nanoelectronics and trainings of perspective scientists. The center's mission is achievement of world class scientific results in the field of radiation-resist nanoelectronics, forming of effective viable scientific team. In 2009 the Training Center got the funds for fulfillment the scientific project (State Contract № 02.740.11.0048.) from the Ministry of Education and Science of Russian Federation. Students and post-graduate students took part in performance of contract. Some modern equipment were purchased too. In this case, teachers, students and postgraduate students earned extra payment.

Major tasks of Training Center:

1. Development and realization of educating world class programs on specializations:

- controlled thermonuclear fusion and plasma physics;
- nanotechnology in radiation-hard electronics;
- ionizing radiation measurement instruments;
- plasma technology.

2. Development of fundamental and applied nanotechnology investigations. Particularly, development of technology of a single diamond material and creation of elements of radiation-hard electronics on this base.

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3. Development of ionizing radiation detectors of different types for controlled thermonuclear fusion, nuclear power, medicine, ecology, radiation technologies applications, cosmic and thermonuclear fusion researches and so on.
4. Initialization of formation of regional enterprises of scientific production consortium and education institution.
5. Arrangement of an extra training courses within the framework of innovation educational programs.
6. Embedding to "The Program of researches in the field of nanotechnology and nanomaterials until 2015 year in Russia Federation".
7. Funding attraction from russian and international funds.

Key activity courses of the Training Center:

1. The training objective is to improve researcher's skills in physical basis of nanotechnologies, and to enhanced efficiency of use of human resources and experimental equipment.
2. Research activity aimed to design physical basis of nanotechnologies in the field of radiation-hard electronics for ionizing radiation registration applications.
3. Innovation activity aimed to further scientific research and technological design in the field of nanotechnologies and practical application of it for creation of competitive science intensive product.
4. Activity aimed to organization and cultivation of commercial trainings.
5. Enhancement of partnerships with international scientific centers dealing with development and application of nanotechnologies. Searching of investors and capital attraction.

The Training Center structure

The Center is a structure which consist of scientific-educational groups:

- nanotechnologies in radiation-hardness electronics;
- mathematical modeling;
- technical design.

The Training Center implements its activities in close collaboration with scientific, manufacturing and educational organizations of Moscow, Moscow region, in particular: • Institution "Project center ITER"

- National research center "KURCHATOV INSTITUTE";
- Moscow Engineering Physical Institute (MEPhI);
- Federal State Budgetary Institution Technological Institute for Superhard and Novel Carbon Materials;
- Moscow Institute of Physics and Technologies;
- Moscow State University, Institute of Nuclear Physics.

The Training Center mission is to promote establishment and development of partner relationships with other scientific, manufacturing, and educational organizations carrying out activities in the fields of innovations and nanotechnologies.

3. STEPS OF STUDENTS TRAINING

The plan of students training includes the following steps:

1. **Information about profession.** At present computer capabilities discover an extensive possibility for visual presentation of information. A huge number of videos are created to demonstrate various phenomena or different device operation. By using internet videos the series of clips is created to demonstrate various crystal structures, impurity center and structure defects formation dynamics, processes of crystal fabrication and annealing. Some phenomena are assumed to be represented in animation.

2. **Theoretical background.** Theoretical background has a high significance. The course adapted to methods of ionizing radiation measurement, electric pulse registration with detailed theoretical description of phenomena students meet with at researches and labs is created. Especial attention is paid to estimations and major formula working out as well as plasma diagnostics and nuclear physics.

3. **Applied mathematics and programming training.** Plans of training provides knowledge of main algorithms (and realization of PC codes): calculation of integrals, solution of ordinary differential equation systems and simple tasks of mathematical physics. A set of training programs for calculation of neutron and gamma-radiation interactions with diamond crystals was created. The following codes were developed: code for calculation of a detector response function, code for reconstruction of neutron and gamma-radiation spectra by response function of detector, code for calculation of neutrons and gamma fields by Monte-Carlo method.

4. **Experimental training.** Principal part of training is experimental one. Students are supposed to have to perform the following lab activities: manufactory of detectors, crystal annealing, diagnostics of crystal surface by electron microscope and AFM, crystal surface processing by ion beams. After that students carry out research activities under institution employee.

5. **Design.** Students have to get some experience of engineering design. While students carry out engineering design under experienced engineer supervision they learn standards. Students are assumed to work in our workshop, where they could produce devices by themselves.

6. **Working with documentation.** Students are assumed to start working with documentation which regulates device manufacturing and safety rules.

7. **Physical and mathematical competitions for students.** It is assumed physical & mathematical competitions to be once a year. Solving of tasks with enhanced complexity allows students paying attention to nontrivial mathematical and physical approaches.

4. EQUIPMENT OF THE TRAINING CENTER. The training center is equipped with the following devices: High-temperature vacuum annealing furnace, technological complex for diamond crystal sawing, vacuum deposition equipment, atomic force microscope, electron microscope, optical stand, ultrasonic welding and so on. Some installation images are represented in figures 1-6. Wide range of problems can be solved by using those devices.

High temperature vacuum furnace. High temperature vacuum furnace is for material processing in vacuum or inert atmosphere. It is completely suitable for lab researches and makes possible to carry out quenching, agglomeration, annealing and other thermal processes with small dimension samples. The furnace consist of vacuum housing (10⁻⁶ mbar), heated graphite (or nitride of boron) crucible covered by thermal shields is placed inside housing. Heating temperature is up to 2200°C. Annealing regime is stationary, technological cycle duration – 2-6 hours.

Technological complex for diamond crystal sawing and manufacturing outfit(Fig.2). While manufacturing the detector with small crystal volume necessity of diamond crystal sawing occurs as well as furniture production for different technological stages. For purposes of diamond sawing technological complex DIAMAX is exploited. It contains neodymium glass laser, optical system, and specimen table. The complex provides software controlled precision handling of diamonds in arbitrary configuration.

Film deposition installations. Vacuum film deposition installation DESK V TSC is designed to deposit metal films by magnetron dispersal in plasma of direct current discharge technique. It provides good parameters of deposited films at low temperature of substrate, high operational rate, automatic and handle control regimes, and good results repetitiveness. It is used to deposit electric contacts on the detector.

Ultrasonic welding. Ultrasonic welding provides creation of high quality contacts between metal detector surfaces and housing contact pads.

High vacuum ion beam cleaning. High vacuum installation of ion cleaning of crystal surface by oxygen beam is to preliminary prepare the crystal surface. For example, after the stage of preliminary processing of surface by solvents, it contains some impurities, including hydrogen, and ammonia groups. To purge contaminations from the surface it is processed by plasma beam handling. The purpose of mentioned events to oxidize the surface. Also there is a capability to handle the surface by quazineutral oxygen or argon beam with ion energy varying from 20 to 200 eV.

Electron microscope. It helps to examine the crystal surface of samples by back electron scattered method as well as cathode luminescence image indicating position of areas of crystal with enhanced density of dislocations, impurities, and strengthen areas in the crystal. Crystal quality monitoring implements at various stages of technological process.

Atomic force microscope. It provides capability to investigate crystal surface and contacts adhesion. Vacuum is not needed. Objects of different nature cab be investigated. Researches can be performed without significant damage to the specimen.



Fig.1. High temperature vacuum furnace



Fig. 2. High vacuum installation for ion cleaning by oxygen or argon beam

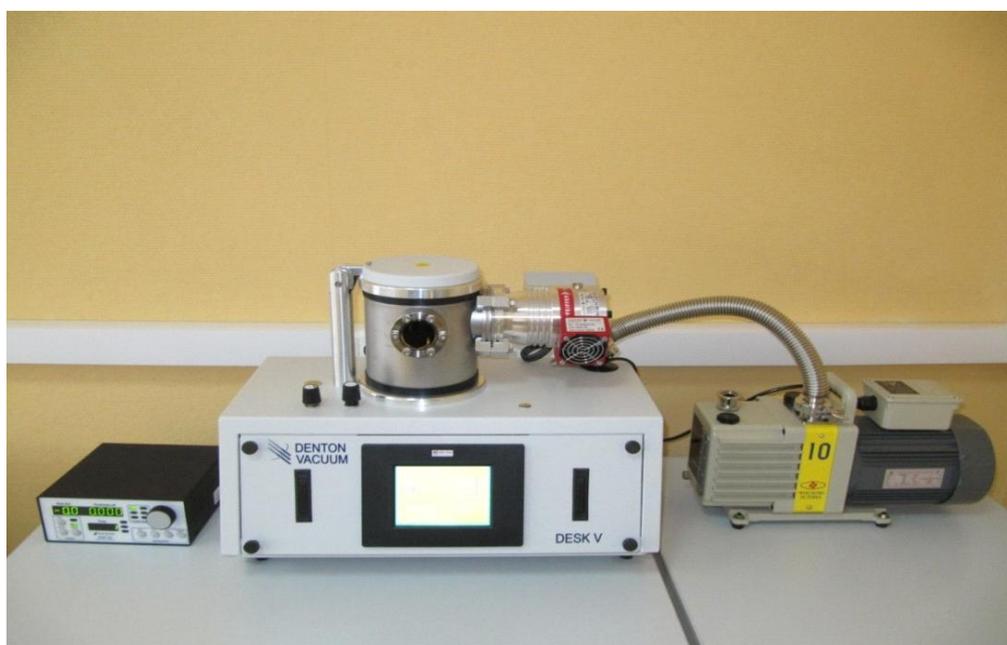


Fig. 3. Vacuum film deposition machine



Fig.4. Ultrasonic welding.



Figure 5. Electron microscope.



Fig. 6. Atomic force microscope

4. CONCLUSION

At present education of engineering, natural-science and mathematical specialists have a particular significance. One of the effective educational forms is scientific training centers at research institutions. In this report methods of student and postgraduate student training in “The Center of radiation resistive diamond nanoelectronics and innovations” of SRC RF TRINITI were discussed. The Training Center has skillful team and it equipped with up-to-date installations. During 2009-2011 years employee, students and postgraduate students published several papers. Some scientific work was indicating in references. Soon this plan is supposed to be completely implemented and results will be summarized. We invite to collaborate with us all interested specialists, teachers and students.

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**E-LEARNING AND TEACHING OF ENGLISH AS A FOREIGN LANGUAGE
AT UNIVERSITY**

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Abstract

Contemporary educational environment is closely connected with the application of information and communication technologies at different levels of general education and professional training. It is also essential for the development of communicative competences in a foreign language. Some specific features of foreign language communicative competences are defined. ICT integration in practice of teaching English as a Foreign Language and Language for Specific Purposes is studied. The application of different internet sites, their educational value and potential are described. Pedagogical aspects of learning and teaching English with ICT are highlighted.

Key words: *communicative interaction, foreign language communicative competence, modern information and communication technologies, integration of ICT into the practice of a foreign language teaching, gamification, ICT potential, browsing through Internet site, communicative competences of LSP, simulation of professional minded situation.*

1. INTRODUCTION

Overall globalization and integration of social processes as well as the tendency to preserve cultural identity and national integrity are both sides of a modern society and civilization. Great changes occurring nowadays in social environment make effect on the content and development of communication which is considered as a process of shaping and development of contacts between individuals realized in course of their mutual activity, change of information data, thoughts, emotions. Communication is equally important for both a person and a group of individuals in multilateral cooperation and understanding. Communication is studied from different scientific approaches by philosophy, sociology, psychology, linguistics etc. Communication is realized by a communicative function of the language in speech situations including situations connected with the students' profession.

Updated information technologies such as mass media, net, cellular and satellite means of communication are also connected with new forms of communication caused by various kinds of communicative interactions. Issues of worldwide integration and communicative adaptation to the contemporary multinational and cross-cultural environment are of utmost importance for the development of individual communicative competences both in the native and a foreign language. Economic, political and cultural cooperation between nations and people speaking different languages and living in diverse social environment increases the significance of foreign language communicative competences both in oral speech and in writing.

Foreign language communicative competences are developed and taught in education establishments of different grades in the course of foreign language learning. Special attention is paid to this issue in the course of learning English as a foreign language at University.

2. COMPETENCE APPROACH

There are different approaches to the definition of a communicative competence. Primarily Noam Chomsky formulated the distinction between competence (knowledge of grammatical rules necessary to understanding and producing language) and performance (actual language use in context) (Chomsky N., 1965). Dell Hathaway Hymes objected to this approach and proposed the notion of communicative competence as knowledge necessary to use language in social context (Hymes D.H., 1972). In 1983 M. Canale defined communicative competence as “the underlying systems of knowledge and skill required for communication” (Canale M., 1983). According to the National Capital Language Resource Center, Washington, DC “Communicative competence is the goal of language acquisition, namely the ability to use the language correctly and appropriately to accomplish communication goals” (<http://www.nclrc.org/essentials/goalsmethods/goal.htm>). We consider communicative competence as a state standard to foreign language training, unanimity of definite actions in a foreign language in a general and professional fields.

In 1996 the Council of Europe provided the Common European Framework of Reference for Languages: Learning, Teaching, Assessment, abbreviated as CEFR, where general and particular communicative competences of foreign language users in various contexts of social life (namely, educational, occupational, public, and personal) were distinguished (Common European Framework ..., 2004). General competences include ability to learn, declarative knowledge, skills and know-how.

Language communicative competences comprise linguistic (regular knowledge of all aspects of the language: grammar rules, vocabulary, syntax); sociolinguistic (the ability of appropriate use of a language unit in a situation matching speakers' communicative intentions, their communicative status); discourse (interpretation and construction of larger contexts, creation of coherent, logical utterances of different functional styles both orally and in writing).

Practical experience proves the importance of teaching sociocultural competence that implies knowledge of customs, habits and rules of every day lingual behavior in a foreign language speaking country. Besides communicative competence includes (a) strategic competence which gives an opportunity to communicate when the knowledge of a foreign language is not sufficient or there is no communication experience in a foreign language environment; and (b) social competence, i.e. intention, desire and ability to communicate with other individuals.

Speaking about the development of foreign language communicative competences in a non-linguistic university, the professional interest of the students and the significance of the professional approach to teaching EFL should be taken into account. Professional component should be integrated in teaching all above mentioned constituents of the communicative competence.

Foreign language communicative competences are developed starting from the secondary school and so school-graduates achieve some level of competences in foreign language communication. At a higher education institution this level is a starting point for further development of foreign language communicative competences especially such competences as linguistic, sociolinguistic, discourse and sociocultural. Strategic and social competences are less connected with foreign language teaching and learning and are subject matter of other sciences and subjects studied at the junior stage of higher education.

To achieve the above-mentioned goals special teaching methods should be chosen, traditional linguadidactic know-how and modern information and communication technologies should be used in unity. The integration of ICT into the practice of a foreign language teaching provides the transfer of knowledge and skills in a particular professional field; the ability of self-studying of the subject, the

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development of personal cognitive activity, the adaptation of a learner to a new educational environment.

3. E-LEARNING FOR BEGINNERS

Studying a foreign language at a university starts with a revision of basic knowledge of phonology, grammar rules, lexicology and the use of lexical units in simple grammar contexts, i.e. the components of linguistic competence. An application of a traditional student's book and making a great number of exercises under the supervision of a teacher at classes or as a home assignment may be quite efficient but sometimes take too much time. And the shortage of time in the curriculum of foreign language learning is one of the main problems at non-linguistic university. In some cases general methods of teaching English as a foreign language make no effect. And then different information educational resources might be helpful. First, some national sites of the Russian Federation such as <http://real-english.ru/> can be used for students of levels A-1 and A-2 according to the Common European Framework (Common European Framework..., 2004). The course comprises of 6 units which include the main rules of phonetic and grammar systems of the language. On studying the rules a student can do some training exercises on-line. Firstly, the new words are given, and then some assignments for self-assessment are available. Finally students can practice in reading stories adapted according to Ilya Frank's Reading Method [<http://franklang.ru/>]. Each story is divided into several excerpts which are accompanied by detailed linguistic comments, audio recording and an implied translation that can be used if necessary.

The part for students of A-2 level contains the excerpts from the novels of the English and American writers and some vocabularies on the topics such as "Christmas Greetings", "About Family", "Dating" and others.

Computer games of different complexity might also be used for teaching and language learning. To investigate the potential of the gamification 'Teaching and Language Learning through Gamification' (TLLG) has been formed [<http://tllg.wikispaces.com/>]. Computer games can help to incorporate the reality of the world and online challenges. Gaming concepts can also be incorporated in the classroom practice and will enlarge a wide selection of activities that can be used while learning and teaching. At the site of educational games for different grades, ages and subjects can be found. Here learners can be taught spelling and reading skills, they can learn colours, animals and other topics [<http://www.knowledgeadventure.com/games/battleship.aspx>].

4. FURTHER STEPS OF E-LEARNING

Starting from the Pre-Intermediate – B1 level students are supposed to use the information from the section "Learning English of the"BBC" site [www.bbc.co.uk/russian/learning_english/; <http://www.bbc.co.uk/worldservice/learningenglish/>]. The main advantage of this section is its authenticity and relevance. The data of the section as well as the data of the site is updated regularly. A student can not only read but listen to the commentaries of the British teachers on different topics. There is also an opportunity to apply the obtained information in practical assignments as well as to check the knowledge on a definite topic on-line with the help of crosswords, quizzes and other tasks. Some tests imply the use of multiple choice techniques which, as we consider, develop the sociolinguistic competence. Such sections of the site as "The Real English", "Topical Glossaries" are of special interest.

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Further development of the communicative competences of the students imply the application of sections “News English” and “Business English” of the BBC site in the practice of learning English as a Foreign Language. Here students can learn the language of mass media or the rules of writing summaries, essays and curriculum vitae in English etc.

Tests taken at BBC site reflect different sides of British lifestyle and consequently regular execution of the tests helps students to get acquainted not only with every day expressions of general English but with the situations of real life where these expressions are used. So sociocultural competence as a component of the communicative competence along with other components of the communicative competence namely linguistic, sociolinguistic, discourse, strategic and social competences are being developed while foreign language learning in a non-linguistic university.

Sociocultural competence implies the knowledge of customs, rules and standards of manners typical of people living in the English speaking countries. It also means the awareness of national character and specific features of native speakers’ communicative behavior and the ability to communicate with a native speaker in a proper way.

Earlier the main source of this knowledge was the information obtained either from a teacher and mass media or read in a book, a magazine, a newspaper. Cinema and video also played an important part in learning the life of English speaking countries.

5. APPLICATION OF INTERNET

Nowadays the main source of the most essential information about foreign countries is the Internet. Here we can learn much new about the national customs and standards of behavior both of contemporary conditions and of previous epochs. Such sites as “USA TODAY”, “USA Youth”, “UK couriers” and “About USA”, “United States History”, “UK history”, “BBC History”, “British History” might be of great use. Forum of the site “UK youth online” gives students an opportunity to exchange opinions on different topics that are of great interest for young people both in the country and abroad. A web-camera application makes such communication close to real life and true face-to-face discussion. Moreover social Network “Facebook” can be used for communication in the English language. Discourse, strategic and social competences are being developed as a result of such communication.

When students start studying the language of mass media they usually deal with the sites of different “serious” newspapers e.g. The Times (<http://www.thetimes.co.uk/tto/news/>), The Sunday Times (<http://www.thesundaytimes.co.uk/sto/?CMP=INTni26>), The Telegraph (<http://www.telegraph.co.uk/>). First each student browses through the sections “News” or “Opinion” and chooses the article which to his mind might be discussed at class. Then with the help of ICT (e.g. “Skype” or “Facebook”) the students of the same group consider pro and contra of each article, come to a common decision and choose the article that will be discussed further at class. As a teacher also participates in the procedure of making decision he minds the language of the communication i.e. the participants speak only English. After the article has been chosen the students get over the linguistic difficulties they face while dealing with the article with the help of the teacher and consulting on-line dictionaries and encyclopedias if necessary. After that general topics for further discussion at class are outlined.

Moreover the newspaper and TV company sites (e.g. BBC and CNN) are dealt with when students start reporting “the current events” i.e. short pieces of information on the world developments that are usually reported at class.

So first a student obtains some information about the English-speaking country, its culture, life style, latest developments in social and political areas, and then a student can get use of the information obtained while communicating with the representatives of the national community. Both procedures namely obtaining and application of the information essential for a student can occur almost simultaneously due to ICT potential. The realization of this task can be fulfilled by a student either independently if it corresponds to his interests and impetus or by the guidance of a teacher, if a definite assignment to search some particular information, to interpret and to assess it has been given. For this purpose “Conference” mode in “Skype” program should be available.

As a result all above mentioned components of the communicative competences are developed besides students learn how to cooperate in a mutual activity such as making projects, to make decisions, to settle disputes, to take personal responsibility for a common work realization etc.

6. LEARNING AND TEACHING LANGUAGE FOR SPECIFIC PURPOSES

The curriculum of a foreign language studies (e.g. English) in a non-linguistic university usually implies two stages namely General English and Language for Specific Purposes (LSP). The development of LSP competences often starts when the basic course of General English is over. Our approach is to start an English language professional teaching along with the course of General English or to integrate some separate elements of teaching LSP in the basic course.

Researchers and practitioners in lingu didactics emphasize that the goal of a foreign language teaching of students in non-linguistic faculties and universities is to develop communicative skills that will assist them to realize professional contacts in a foreign language in different situations, to support the intention of a specialist to show his language skills and competences both in Russian and in English in relevant situations of a different character, various modes and styles of professional cognitive activity in a foreign language.

Learning Language for Specific Purposes from the first days of studying at University assists our students to realize interpersonal and intercultural communication with their counterparts from English-speaking countries or with professionals with high level of development of foreign language communicative competences. Besides learning LSP helps students (1) to create a professional-minded outlook and culture of students, their constantly growing requirements in obtaining further knowledge in their profession; (2) to develop specific way of thinking; (3) to be ready to perform their professional duties and responsibilities.

Teaching Language for Specific Purposes from the first year at University implies the development of communicative competences connected not only with learning General English but with early development of communicative competences in LSP closely connected with a future professional activity of a student. Some researches in lingu didactics suppose that communicative competences in LSP include two components: a business and a specific ones (Крупченко А.К., 2007).

A business component of communicative competences in LSP is the ability of an individual to participate in interpersonal oral and written communication with specialists from different areas of science, economy, social field. It should be taken into account that this component is invariant to almost any area. This ability can be realized in negotiations and presentation, on the one hand, and in official letters and messages, on the other hand.

A specific component of communicative competences in LSP comprises of functional and intersubject components. A functional competence is an ability of an individual to fulfill his professional duties in

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a foreign language. An inter subject component is an ability to transform professional, linguistic and cultural knowledge and skills while learning Language for Specific Purposes.

The ability to use various comprehensive specialized dictionaries and encyclopedias on-line is also of a primary importance for students of non-linguistic university. When integrating such resources into teaching LSP their didactic potential should be differentiated starting from the list of short definitions and finally the detailed and extended information including cultural and historical background.

Much essential information about customs and rules, standards and manners of behavior in situations connected with the profession of students can be extracted at some Internet sites (e.g. www.refdesk.com/factlaw.html, www.findlaw.com, www.alllaw.com etc.).

Contemporary technologies such as Wi-Fi and such equipment as laptop, pad etc. afford great opportunities to apply ICT almost in any classroom and at any class (session). First, students search for the appropriate site, e.g. "BBC-news" and then move to links "Explore the BBC - A whole lot more...The complete directory of BBC sites (Click on the letters to browse the content alphabetically) - Law in Action". Here are different articles, reports, recordings of statements and public speaking, court proceedings, files with cases and violations of the law, proceedings with lawyers' debates and discussions. Some information is accompanied with broadcasting audio files under the title "Law in Action». Such contents of Internet sites give much opportunity to unite different types of reading (skimming, scanning, intensive etc.) and listening comprehension or reading with consecutive listening comprehension.

Integration of ICT in learning and teaching LSP is based upon general education principles such as didactic, lingu didactic, psychological etc.

The application of Internet sites in teaching and learning English as a second language and Language for Specific Purposes at a higher school was considered above. At present the teaching staff of People's Friendship University of Russia has an opportunity to make their local site. Any lecturer of the University can download the information, tasks, assignments and e-resources for the students to study further. With the help of the web-local any student can chat or send a message or e-mail to any lecturer. In his turn a lecturer can place any announcement, video file for studying or students' progress rating. The local site of the foreign language department contains the information about the teaching staff, curriculum, educational resources and the subjects studied as well as e-resources of glossaries and encyclopedias. Some facts about scientific research work of the staff and the students, recommendations how to get ready for bachelor, magistrate and postgraduate exams can also be found here.

7. SIMULATION OF PROFESSIONAL-MINDED SITUATIONS

Efficient development of communicative competences in LSP depends greatly on (1) the creation of learning environment that should be professional-minded in nature; and on (2) the solution of the task-based problems simulating true-to-life situations which a specialist-to-be may face at his professional activity. Designing the situations of a specific professional communication in a foreign language gives an opportunity to simulate an actual situation of the professional activity in a foreign language, in our case it's the field of law and legislation.

Professional duties and responsibilities of our students can include examination and compiling some law papers, public speaking and arguments in competent authorities both in Russian and in a foreign language. While communicating in a foreign language a lawyer has to deal with different legislation,

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interpret and clarify the law, explain somebody's rights and obligations, prove his point, satisfy the jury and the court, and give arguments. As speaking activity in a foreign language has always a definite purpose, it implies a conscious selection of linguistic structures, means and ways to achieve the goal.

To solve the tasks of learning and teaching of LSP in a more efficient way the creation of law-minded learning environment and simulation of true-to-life situations can be realized with the application of Internet. At the starting level of LSP learning students can select, match and comment on the proverbs reflecting different aspects of their profession namely law and legislation

(<http://legalproverbs.blogspot.com/>;

<http://www.famous-quotations.com/asp/aquotes.asp?alpha=L&curpage=2>).

Lawyers-to-be can also study childhood, University years, career and life experience of well-known personalities who studied law

(<http://ask.reference.com/related/Famous+Lawyers+in+History?o=15096&l=dir>;

<http://www.whitehouse.gov/about/presid>;

<http://www.theinjurylawyers.co.uk/injury-lawyers-blog/2008/06/29/top-10-famous-lawyers/ents>)

Such sites as (<http://www.communitylegaladvice.org.uk/en/legalhelp> (Community Legal Advice – Frequently Asked Questions) and www.adviceguide.org.uk. help students to get legal information and useful links on different topics of British legislation as well as to simulate situations connected with their profession. Students can act out a getting advice procedure between an expert from Citizens Advice Bureau and a client. A student acting a client can choose any topic from the menu on the site (“Benefits”, “Employment”, “Tax”, “Family”, “Health”, “Education” etc.) and select a question to be discussed (e.g. “Can I carry on getting my benefits if I go to live abroad?”, “I think I'm being treated unfairly at work because of my religion, is this legal?”, “I want to take out a mortgage to buy a house. What do I need to know?”). A student playing the role of an adviser can find the appropriate information at the site and give the correct answers from the point of view of British legislation.

Standards, rules and customs of everyday behavior in a professional environment can be learnt from the sites “English for Specific Purposes – Other Subjects – Law and Legal Information resources”. The site “BBC-news” also has much essential information for lawyers-to-be.

8. CONCLUSION

The application of traditional pedagogical and educational methods and techniques and contemporary information technologies in teaching a foreign language as EFL develop both a communicative approach to teaching English at nonlinguistic University and different components of communicative competences. First a student realizes a search of definite information on the subject studied, on the professional environment and culture of the English speaking country, and then he uses the knowledge obtained in real communication. Contemporary ICT can not be used instead of traditional text books but serve as an effective teacher's assistant. Up-to-date technological devices can help to form a personal educational environment of a student and serve as a means of assessment and self-assessment.

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If contemporary information technologies are used in education process regularly the students' foreign language communicative competence components are developed more successfully and the motivation to learning is increased.

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**VARIETY IN STRUCTURE OF RESEARCH POTENTIAL
AT DIFFERENT LEVEL OF RESEARCH ACTIVITY**

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Abstract

The current study examines a variety in structure of the components of research potential at different level of research activity in a sample of 79 first level (Bachelor's) students, 94 second level (Master's) students and 40 professors of university. Valid differences between groups suppose that some characteristics of research potential are developing and changing in the process of education and research activity. Intolerance to novelty, Self-control, Adaptability, Assertiveness and Critical thinking are the characteristics of research potential that are developed in the process of learning in the higher school. Intellectual curiosity, Logicality, Quickness (of thinking) develop in the process of research activity. Characteristics of Motivational, Behavioral and Cognitive components of research potential have no interconnection with age. At the same time Originality of thinking does not differ between groups. All components of research potential have no interconnections with age.

Key words: *research potential, structure of the components of research potential at Bachelor's, Master's and Professor's level.*

1. INTRODUCTION

Research activity is a current subject of modern studies. During the graduate and postgraduate studies students should develop their research competence. One of the most important parts of research activity and research competence is research potential. Research potential involves range (limits), spectrum and manifesting of research human possibilities in given and new conditions (Bordovskaia, N.V., Kostromina, S.N., et al, 20012, p 81).

On Bachelor's level students get basic skills as a researcher while on the Master's level students advance of research and teaching skills. Professors carry out scientific research and train students in research activity. In this connection understanding of changes in the structure of the components of research potential depending on the level of education reveals variety of the characteristics of motivational, cognitive and behavioral components at different level of education.

2. METHODOLOGICAL BASE OF RESEARCH

The research is based on the model of research potential of a student (Kostromina, Rozum at el, 2012). The model consists of motivational, cognitive and behavioral components. For future investigation we select certain characteristics of these components.

Motivational component creates willingness and is required for supply of research activity. Motivational component of research potential consists of Intolerance of ambiguity, Satisfaction from

solution of the problems, Intellectual curiosity, and Intolerance to novelty. Intolerance of ambiguity is a capacity to positive feelings in the new, unstructured, varied situations. Intolerance allows perceiving such situations as challenge (Nosenko, Shapoval, 2002, p. 97). Satisfaction from solution of the problems is a capacity to feel a gratification from the process of the finding ways and means for resolving scientific tasks. Intellectual curiosity is conscious desire for receiving information on objects and enjoying from learning. Intolerance to novelty reveals intensity of the desire for experimentation, innovations and so on.

Behavioral component of research potential consists of self-organization, self-control, adaptability and assertiveness. Self-organization is the way of structuring of a researcher personal activity to reach objectives. Self-control reflects the possibilities in following the research procedures and an ability to complete work tasks. Adaptability allows to reduce time, which is necessary to accept the changing conditions of a research task. Assertiveness is considered as stability for working in instability conditions.

Cognitive component provides knowledge and skills for realization of research activity. It includes flexibility of thinking, critical thinking, logicity, quickness and originality of thinking. Flexibility of thinking is a capacity of a person to widely use the experience, to study subjects in their new relations and connections and to overcome unoriginal thinking. Critical thinking is a capacity to reveal mistakes and inconsistency, to correct errors, to find the strengths and weaknesses of the evidence, to justify validity of hypothesis. Logicity of thinking is an ability to using facts and laws for confirmation of the accuracy of conclusions in proper time. Quickness (of thinking) is an ability to understand the situation and to find decisions under the time deficit. It depends on knowledge and level of development of thinking skills. Originality of thinking is a capacity to propose new, unusual ideas.

3. RESEARCH OF VARIETY OF CHARACTERISTICS OF COMPONENTS OF RESEARCH POTENTIAL

The empirical part of this research is aimed to investigate a variety of research potential characteristics among the students and professors of Russian universities (Saint-Petersburg State University, Herzen State Pedagogical University of Russia). The students of various levels and professors of University participated in this research: Bachelor's students (79 students), Master's students (94 students) and professors (40). All participants are studying or teaching humanitarian courses.

Research methods: Research potential questionnaire ((N.V. Bordovskaia, S.N. Kostromina, S.I. Rosum, N.L. Moskvicheva, N.N. Iskra);

Data analysis: Data analysis was conducted using Mann–Whitney test for comparison between groups. The differences were accepted as significant at a level of 5 % ($p < 0.05$). The correlation analysis was used for studying the interaction of characteristics of research potential and age of participants. The interactions were accepted as significant at a level of 5 % ($p < 0.05$).

Results

Interactions between age and characteristics. Conducted correlation analysis does not show any statistically significant relationships between age of participants and characteristics of the components of research potential.

Comparison between groups.

The Motivational component.

Pairwise comparison of groups of Bachelors and Masters students revealed differences presented in figures 1 and 2. The obtained results indicate that Intolerance of ambiguity has no differences between Bachelors' and Masters' levels students but has valid differences between Bachelors' and Professors' and between Masters' and Professors' level. Higher rates of this characteristic in Professors group probably suggest that the experience of scientific activity leads to the ability to perceive the scientific uncertainty as a challenge that requires an answer in the form of resolution of the problem.

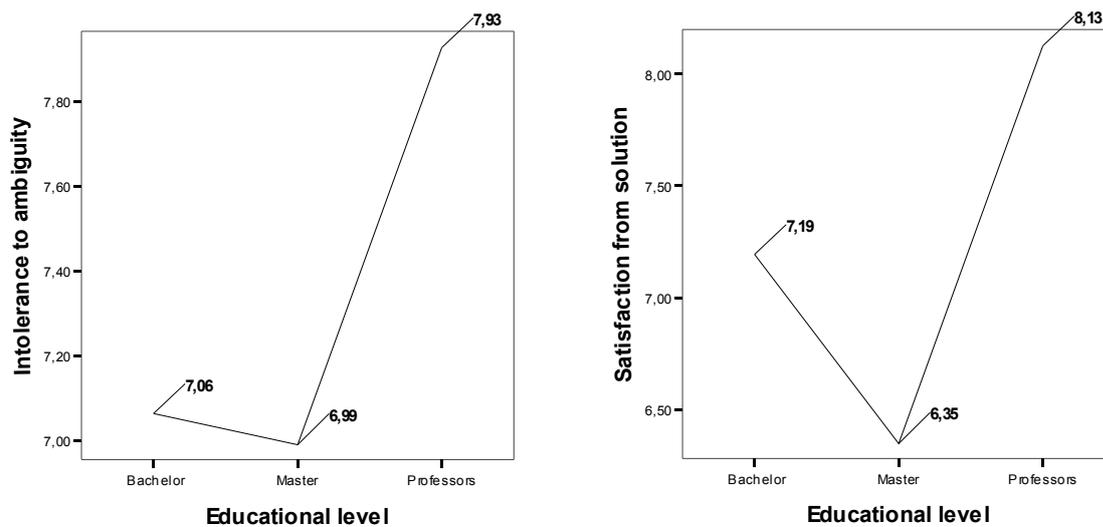


Fig. 1 Differences between groups on characteristics of Intolerance to ambiguity and Satisfaction from solution.

The highest rates on characteristic of Satisfaction from solution of the problem were obtained from a group of Professors, average rates from a group of Bachelors, the lowest rates – from a group of Masters. We can assume that the differences indicate that the level of scientific problems solved at level of Bachelors, allows solving them faster that makes it easier to achieve satisfaction of the resolution. Decreasing of this rate at level of Masters may be due to the fact that their scientific work is expressed in a long-term (2-year) period of work on master's thesis, which makes it difficult to meet the rapid achievement of satisfying scientific results. We associate the higher rates of the characteristic in the group of Professors with a variety of timing and quality of scientific work they do.

Intellectual curiosity increases linearly in rates from Bachelors' level to level of Masters and then to level of Professors (figure 2). Probably, the accumulation of scientific knowledge and experience of research leads to an increase in the desire to find scientific information and motivate researchers to expand the scientific boundaries.

The highest level on characteristic of Intolerance to novelty is achieved at Masters, decreases at Professors and even lower rates are at Bachelors (figure 2). In other words, willingness to experiment and use new and unknown ways of solving problems is most expressed at Masters' level. Perhaps the experience in the scientific activity has a nonlinear effect on expression of this characteristic.

Low characteristics of Intolerance to ambiguity, Intellectual curiosity, Intolerance to novelty and average rates of Satisfaction from solution are presented at Bachelors' level. This may indicate that the motivational component of research capacity at Bachelors' level is not formed enough, having the basic support on satisfaction (reward) from solution of the problem. Low characteristics of Intolerance to ambiguity and Satisfaction from solution with average rates of Intellectual curiosity and high rates of Intolerance to novelty are revealed at level of Masters. Perhaps this shows that the main motivating factor in Masters' research work is the opportunity for experiment, search for different new ways to solve the research problem. High levels of characteristics of Intolerance to ambiguity, Satisfaction from solution, Intellectual curiosity, and the average rates of Intolerance to the novelty are found at level of Professors. It suggests that during the permanent research and experimental activity the need in searching for new scientific solutions may decrease.

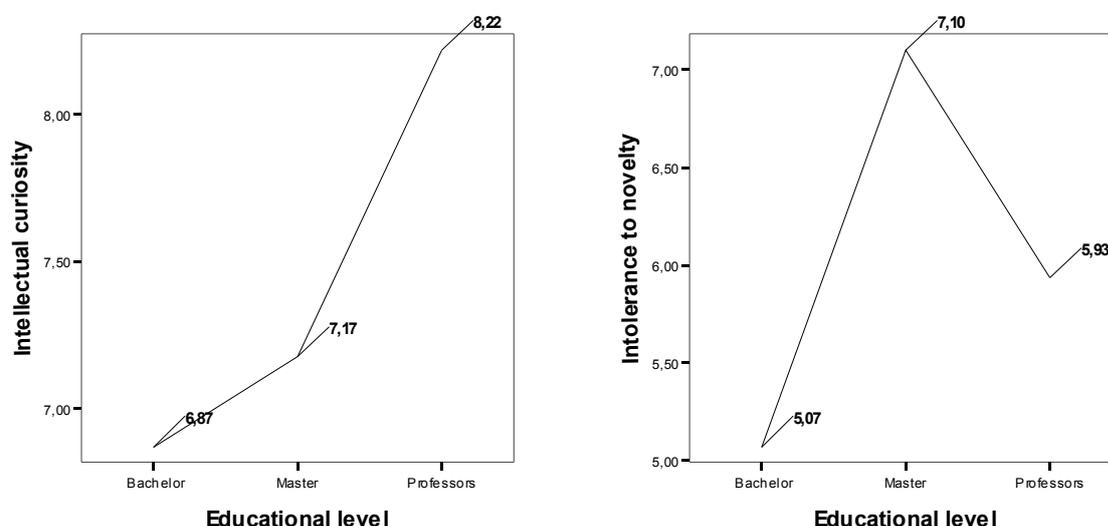


Fig. 2 Differences between groups on characteristics of Intellectual curiosity and Intolerance to novelty

Thus, the motivational component has characteristics that may vary nonlinearly depending on the level of education and, consequently, on the experience of scientific research, which shows the indirect effects of these parameters (experience) on these characteristics. They are Intolerance to ambiguity, Satisfaction from solution, Intolerance to the novelty. At the same time there is a characteristic - Intellectual curiosity, which varies linearly: increasing with the increase of the level of education and experience of scientific activity, which suggests that learning and working conditions, may affect its development.

The behavioral component. Pairwise comparison of the characteristics of a behavioral component showed the difference between the groups. It can be seen that the level of Self-organization in research potential is the highest at the high school teachers and at Bachelors' level, decreasing at Masters' level.

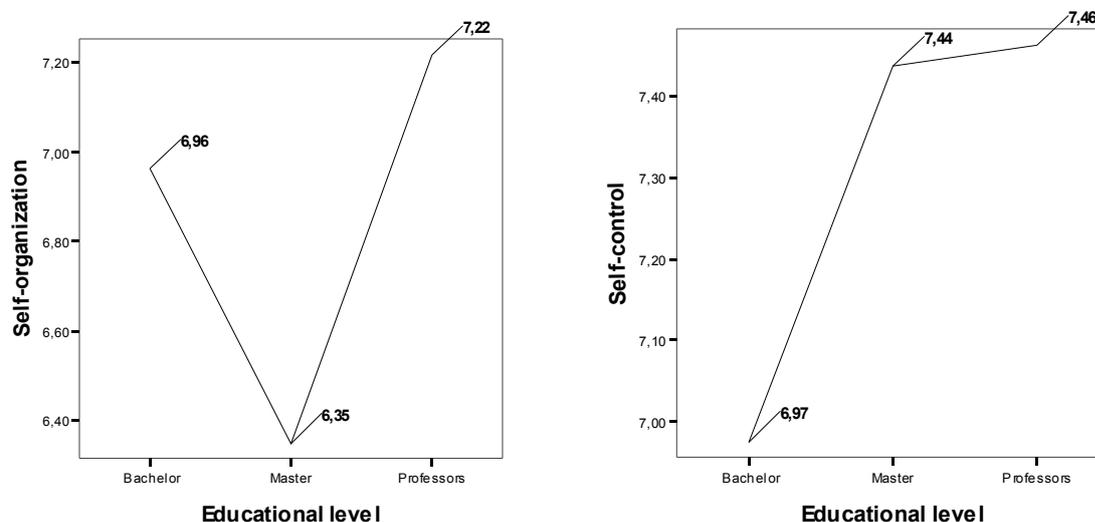


Fig 3. Differences between groups on characteristics of Self-organization and Self-control

Educational and research activities take equal parts at Masters' level. The difficulty of scientific problems increases with a simultaneous change of the involvement of a supervisor in academic work of the students. Probably, these points of scientific activity and the experience obtained during Masters' level, lead to a decrease in self-organization of scientific activity.

Changes in self-control during research activities are shown in fig. №3 It is seen that the rate of self-control is significantly different between groups of Bachelors and groups of Masters and between groups of Bachelors and groups of Professors, while is not significantly different between Masters and Professors. This may indicate that self-control is developed during the research work in the final years of education when students implement their final research work by themselves. At the third year of education research activity is carried out mostly under the control of a teacher.

Adaptability characteristic increases from level of Bachelors to level of Masters and does not change from level of Masters to level of Professors. Probably, the accumulation of experience in research leads to a decrease in the time needed to adapt to the changes of scientific problem, or the appearance of new conditions.

Assertiveness (a characteristic) significantly increases from the level of Bachelors to level of Masters, and not significantly reduces at level of Professors.

So, Bachelors are characterized by lower rates of self-control, adaptability and assertiveness with a high rate of self-organization. This fact may indicate that students of this level of education do not have any formed behavioral stability to external influences and changes in terms of research activities that compensated by a high level of self-organization. Masters level students are characterized by high rates of self-control, assertiveness, and adaptability and low rates of self-organization, which indicates that behavioral stability is developed and scientific work can be done in a lower level of self-organization.

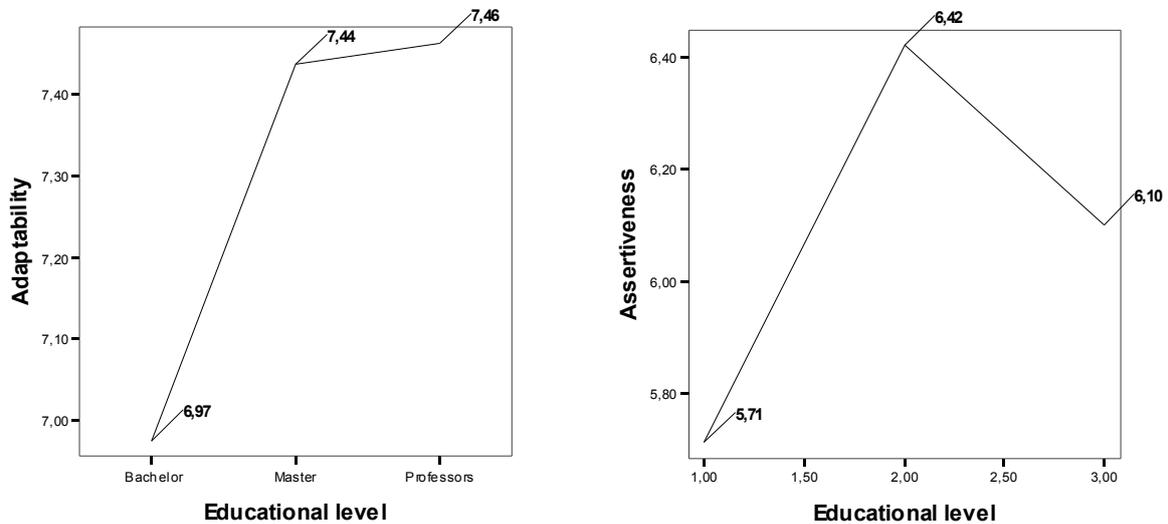


Figure 4 Differences between groups on characteristics of Adaptability and Assertiveness

The cognitive component. The highest level on characteristic of Flexibility of thinking is achieved at Professors as it is shown on Figure 5. Rate of Flexibility of thinking is not significantly different between Bachelors and Masters students.

The characteristic of Critical thinking is linearly increased from Bachelor' to Master' level and has no significant differences between Master' and Professor' level.

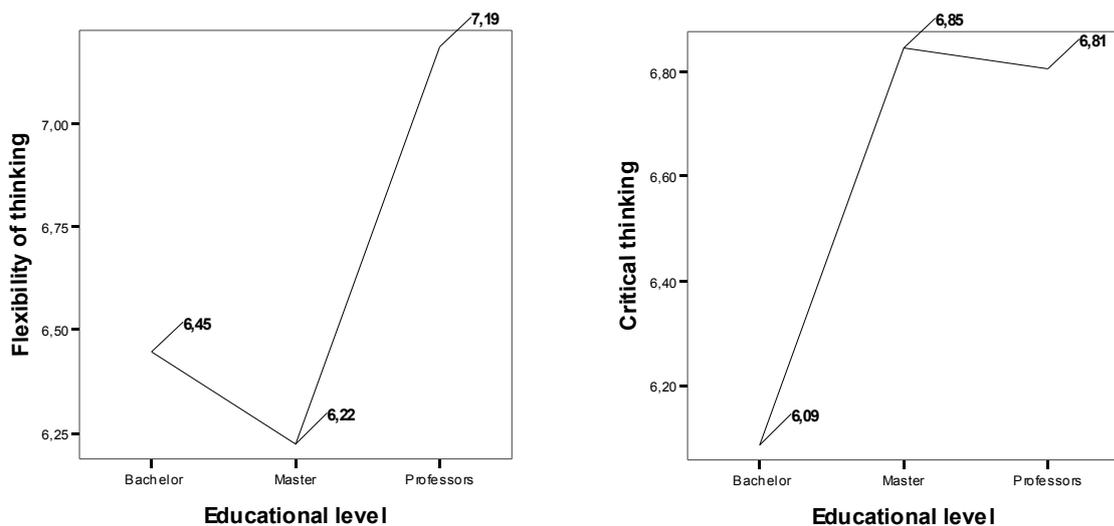


Fig. 5 Differences between groups on characteristics of Flexibility of thinking and Critical thinking

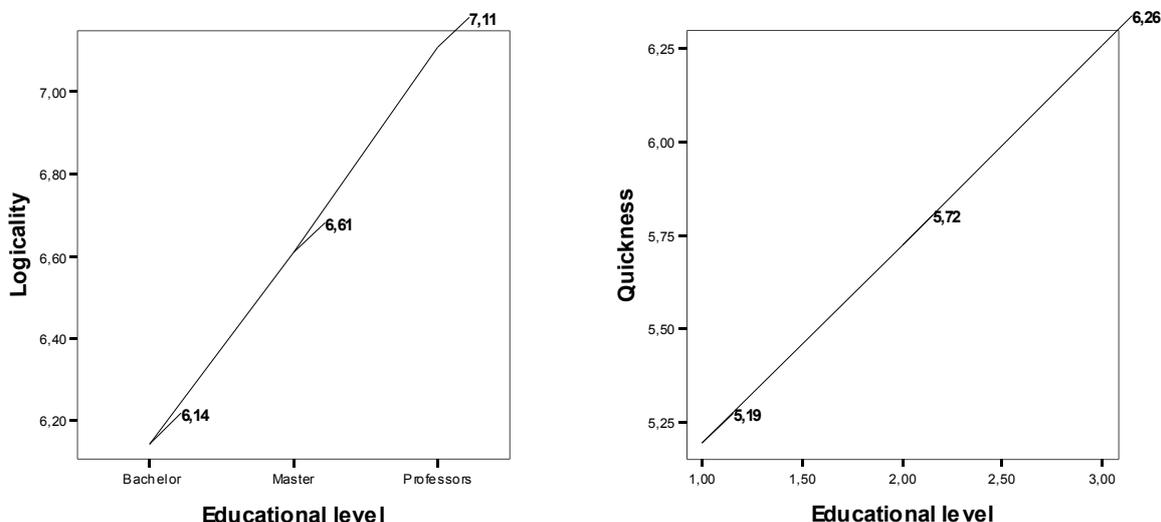


Fig 6 Differences between groups on characteristics of Logicality and Quickness (of thinking)

Characteristics of Logicality and Quickness (of thinking) is linearly increased from Bachelor's level to Master's level and then to Professor's level (Fig. 6). It can mean that these characteristics of research potential develop in the process of research activity and with the growth in experience in statement of the scientific problems, looking for variants of their solutions.

Originality of thinking has no differences between groups. It may be due to this characteristic does not training in the process of learning and doing of research work.

Thus Bachelors are characterized by lower rates of Flexibility of thinking, Critical thinking, Logicality and Quickness (of thinking). Masters are described as having average rate of Logicality and Quickness, lower rate of Flexibility of thinking and high rate of Critical thinking. All characteristics of the cognitive components of research potential have highest rate at the professors level.

CONCLUSIONS

The analysis performed within the study of characteristics of research potential at Bachelor', Master' students and Professors of University enables to conclude that:

- Characteristics of Motivational, Behavioral and Cognitive components of research potential have no interconnection with age.
- Intolerance to novelty, Self-control, Adaptability, Assertiveness and Critical thinking are the characteristics of research potential that are developed in the process of learning in the high school.

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- Intellectual curiosity, Logicality, Quickness (of thinking) develop in the process of research activity more than in the course of academic studies.

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E-LEARNING FOR LOGIC

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Abstract

For increasing the efficiency of educational process it is necessary to substitute the passive forms of knowledge acquiring to more effective activated forms in which the individual study is mostly asserted. One of these education forms is admittedly e-learning. It is known that efficiency and success of e-learning depend mainly on quality and attractiveness of electronic materials. Therefore, in paper we describe our e-learning course for subject The Logic for teaching in humanity oriented university study.

Key words: education, e-learning, logic

1. INTRODUCTION

Modern information technologies are changing not only a lifestyle; they are changing ideas about good and bad, justice and sacrifice. And finally, they are changing man himself, because they are “using” this man as an information system able to learn himself. And we need to consider whether we like it or not.

Constantly expanding information space is a characteristic feature of modern society. Hidden information attacks have a negative impact on the lives of individuals and society in general. Under these conditions it is necessary to develop a proper way of relation to reality that would help to deal with various forms of opinion manipulation of individuals and their inner world, such as commercial tricks or improper practices of PR (public relations) campaigns. We assume that study of logic is really important recently. Considering present trends and the direction of higher education teachers are forced to use modern teaching means, to which the e-learning belongs. Therefore we decided to solve the project of creation learning materials and e-learning course for subject The Logic for teaching in humanity oriented university study.

2. E-COURSE

It is evident that the effectiveness and success of e-learning largely depends on the quality and attractiveness of electronic materials. The various types of creations of e-learning courses allow to achieve higher quality and speed of acquiring knowledge and skills. Interactivity should allow students to move from passive to active roles. All types of electronic study texts have to meet a number of characteristics - they have to be attractive, motivating, actual, accessible and easy to understand, so that they be possible to facilitate self-learning and encourage students to successfully achieve their educational goal.

The project of creation of our course has the following global objectives:

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- Create textbooks and e-presentation of the subject Logic in bachelor and master degree for students in full-time and part-time forms of study.
- Place them in the Moodle system of the University of Žilina. E-presentations will be simultaneously used in the teaching process (lectures).
- Prepare e-learning study texts and interactive e-course of the subject Logic.
- Compare the success of teaching by traditional form and by using e-learning.

To write a good text for an e-course is a hard work. It is very different from writing scripts for traditional learning. The rules of didactics, that are appropriate for presence (normal) courses, cannot be applied in e-courses mechanically. Transforming of classical teaching materials into e-courses suitable form requires a time-consuming preparation [1].

For creation of e-texts it is necessary to become aware that they have to meet certain criteria because a student is studying text alone without direct contact with the teacher. There is no direct feedback between students and teachers, a student reading text can't directly ask questions as at the lecture or seminar.



Logika pre mediamatikov

Úvod do logiky | Výroková logika | Sylogizmy | Pojem a meno pojmu | Teória definícií

Kurz "Logika pre mediamatikov" je určený študentom bakalárskeho a magisterského stupňa v študijnom programe mediamatika a dokumentácia kultúrneho dedičstva na Fakulte humanitných vied Žilinskej univerzity v Žiline.

Základným cieľom kurzu je nadobudnutie znalostí a zručností, ktoré sú dôležité pre jasné a presné vyjadrovanie a formulovanie myšlienok a logicky dôsledné uvažovanie. Podstatné je taktiež naučiť sa odhalovať logické chyby vo vyjadrovaní a uvažovaní a osvojiť si logické prostriedky, ktoré umožňujú odstránenie týchto chýb a spresňovanie jazykových výrazov. Dosiachnutie týchto cieľov predpokladá nevyhnutné zoznámenie sa s elementárnym logickým pojmovým aparátom.

V jednotlivých tematických častiach kurzu sú taktiež predstavené niektoré filozofické problémy logiky, základné systémy neklasických logík, základné metódy dôkazov a základné spôsoby logického usudzovania.

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Fig. 1: E-course “Logic for mediamatics” (in Slovak language)

Since consultations with teachers take place electronically, there is a time lag between asking questions and receiving answers. Therefore, it is appropriate that the creator of a distance text take into account all these facts in the stage of preparation.

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Between criteria that must be defined before the creation of e-course belong:

- students profiles (level of knowledge, relationship with the computers, study conditions),
- type of teaching topic (theory, exercises, methods),
- motivation of students to successfully manage the course.

Electronic course using in e-learning includes parts that are follow-up to another parts and so make a complex. They are mainly:

- study texts,
- illustrative examples with solving procedure for understanding of the topic,
- exercises with results,
- exercises without results,
- control questions,
- tests with assessment.

E-learning course will be created in Adobe Flash. Adobe Flash (until 2007 known as Macromedia Flash) is a multimedia platform originally acquired by company Macromedia. It is now developed and distributed by Adobe Systems. This is a rather complicated program, but enables us to create fully animated, interactive courses.

3. THE NEED OF LOGIC

It is always assumed, that knowledge of logic is necessary for an educated person. The logic is also one of the theoretical basis of computer literacy. Therefore now, with the growing importance of computer literacy, the value of those knowledge is increasing. Each individual uses logical operations - for example, such as definition, classification, evidence, refutation, etc. - in its intellectual activity [2]. But the individual uses these operations unconsciously and often with errors, with no clear idea about the whole depth and complexity of mental activity, which is associated with each act of thinking.

Try to ask students at the first lecture of logic: "What is the difference between two statements?: Everything genius is simple. and Everything simple is genius." The answer will probably be very evasive and ambiguous. You can ask the same question not only students but also academically qualified people. Clear answers will be heard seldom. Before every graduate of grammar school, where the logic was a compulsory subject, would has answered this question immediately.

In classical logic, a significant difference between the statements: "Every A is B." and "Every B is A." raises no doubt. Using the "inverse" (converted) statements is not so harmless as it seems at first sight. It is known to mathematics that in many cases the truth value of the "inverse" statement is false. Some people think that the logic is a tool of straightforward routine thinking. And that the logical criticism kills the creativity and makes people very limited in their approaches and solutions. These claims are in general false and misleading.

Sylogizmy

- Predikátová logika, kvantifikátory
- Subjekt-predikátová logika
- Logický štvorec
- Deduktívne vyplývanie
- Kategorický sylogizmus
- Vienňové diagramy**
- Kontrolné otázky

- Obory pravdivosti pojmov S, P, M zakreslíme ako vzájomne pretínajúce sa kruhy. Potom znázorníme situáciu, keď sú všetky premisy pravdivé, t.j. vyšraľujeme plochy, ktoré odpovedajú prázdny triedam objektov (všeobecné predpoklady).

- Označíme krížikom plochy, ktoré isto nie sú prázdne (existenčné predpoklady). Pričom krížik dávame len vtedy, keď neexistuje iná plocha, kam by on mohol eventuálne „padnúť“.

- Nakoniec overíme, či vzniknutá situácia znázorňuje pravdivosť záveru.

Príklad:

Všetky cicavce sú stavovce.	M a P
Všetky veľryby sú cicavce.	S a M
Všetky veľryby sú stavovce.	S a P

M  P

Ak záver vyplýva z premis, potom v realite, ktorá je vyjadrená premisami, musí byť „skrytá“ aj realita, ktorá je vyjadrená záverom. V krokoch 1 a 2 sme nevyšrafovali len tú časť kružnice S, ktorá je

Fig. 2: E-course – Chapter from part about syllogisms (in Slovak language)

The traditional way of teaching and explaining the logic (philosophical as well as mathematical) gives weight only to the weakest points of the logic. This traditional way of teaching the logic leads the students for one-dimensional critical thinking, which is, of course, very conservative as opposed to all creative moments. We should not be confused logic with the current courses of teaching logic, because just we would walk through the straightforward routine thinking. Modern logic is the first science that leads us to a new phase of rational thinking. But until now, with rare exceptions, we teach the logic in "traditional" style, as if its development would be stopped in the middle of 19th century - just when her appearance began to change rapidly.

3.1 THE LOGIC FOR TEACHING IN HUMANITY ORIENTED STUDY

In teaching humanity oriented students such a subject as Logic we need to put students sensitively, and become aware of that some students chose this study program because of its humane orientation. Logic culture is not innate characteristic. It forms only in the process of knowledge, thinking and in the study of logic. The logic is the only science that combines mathematics, computer science and humane education. Logic is a tool for working with complex formal concepts and will be useful only if there will be well coordinated the higher mathematics with informal elements.

In the interpretation of logic we consider to be right to align the formal and informal elements, so that students understand the need to know how to communicate using the power of argument, not using argument of force, and not to feel victimized that they have to do with "any mathematics". There are, and they are not a few, logical anomalies that can be identified only if we have certain logic skills and knowledge.

This lack of education proportion fills mathematics. But then those students who prefer to study in the humane orientation, it remains only to rely on intuition (natural logic). Although the man has a natural ability to infer, however, this natural intuition is not always able to find a solution or offer a false solution. Here we see the need of learning and practice of logic.

Therefore it is not possible to imagine modern logic without the use of mathematical methods. We can say that they play a leading role in the logic. This fact - is the best proof of the unfounded "distancing" some "humanitarian" from the mathematics, which we encounter absolutely everywhere. Many of current humane oriented people insist on their right - to have no idea of mathematics and natural sciences - is the pure obscurantisms. Man is not only a "king of nature" but also the part of nature and therefore, although the science of man and of the human community cannot be reduced to the science of nature, but they must cooperate with it.

Natural sciences, especially those of them that largely use mathematical methods, actually very strong influence upon humane knowledge. Therefore, professionals who deal with the humanities will inevitably need at least an elementary knowledge of the methods of mathematics and natural sciences. The study of logic is very important, because it helps to create a culture of reasoning, without which there can be no scientific research in the domain of humanities. For the last named the logical culture is specially necessary, since all the "objects", with which they work, are essentially abstract designed and therefore everyone who wants to work in the humanities or to teach it must be prepared for some effort in the study of logic. The logical theory is peculiar. She expresses about the common human thinking that it may seem us as unnecessarily complicated. Moreover, its main content is formulated in a separate, artificial language specially created for its own purposes. Hence, the first introduction to the logic is complicated: one should try to look to known and established things with fresh eyes and try to see new depth where before everything appeared us and seemed absolutely simple and clear.

Logika pre mediaticikov

Úvod do logiky | Výroková logika | Sylogizmy | Pojem a meno pojmu | Teória definícií

Úvod do logiky

- História
- Úsudok
- Kontrolné otázky

HISTÓRIA

- Teória vystavaná tak, aby v nej nebolo rozporov, aby sa neplietol jazyk v ktorom sa hovorí s tým, o ktorom to celé je.
- Dejiny formálnej logiky sa väčšinou rozdeľujú do štyroch období. Antika, stredovek, novoveká logika, súčasná logika.

1. Antická logika

Základy európskeho myslenia nachádzame v starovekom Grécku. Vývoj sa tradície rozdeľuje do troch období:

(1) Pripravné obdobie

- Aristoteles - „Topiky“
- Aristoteles sa považuje za „otca“ logiky

(2) Aristotelisko-megarsko-stoické obdobie

Fig. 3: E-course – Chapter from history (in Slovak language)

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The modern society tragedy, recognized by J. Whitehead at the end of 19th century and strengthened in the 20th century, is the growing absence of understanding between experts in different areas of science. [3] The tradition of knowledge classification according to subject fields contributes to this bad situation. Logic teaches us from the very beginning to see the similarity in knowledge, without the dependence on a particular subject orientation. Also, logic is the only science specializing on fundamental questions of work with knowledge. Therefore, logic is the science that might and shall start the relations between different fields of knowledge. Logic has enormous depth, analysis strength and results that have completely changed the scientific vision on things during the 20th century.

The logic gives to students a base that teaches them to critically analyze concepts, arguments and conclusions. And it allows them to be oriented in any area of science and life. The logic can be taught right from the first class. After all, teaching experience shows that elementary school students are looking for answers in the material level and not in accordance with the requirements of formal education.

Next periods favourable to perception of Logic are last year of secondary school and the first year of university study. At this point, as the desire to handle critical thinking is increasing, subject of logic could be the basis of collaboration for most of other subjects. But the subject of logic, being outside of the three traditional courses of education (mathematics, humanities and professional), can connect them together.

Usually, logic is divided into two parts: mathematical logic and philosophical logic. The main topics of logic have philosophical character and they solve fundamental questions about the nature of human reasoning. Mathematization of logic started between 19th and 20th century, when mainly problems of formalization of human reasoning were being solved.

Therefore, it seemed to make an impression that there are problems in logic that are not solvable by this mathematization and therefore are exclusive domain of the so-called philosophical logic. This division has its historical background that we will not specify more deeply. Today it seems to be a little bit artificial, unnatural and overcome. Therefore it is necessary to eliminate attributes of the subject of logic - "mathematical" at mathematical faculties and "formal" at philosophic faculties. The reasons why mathematicians fought with dialectics finished. The reasons why the logicians defended of mathematization are also forgotten. The logic is not purely "humanity-oriented" or "exact" science [4].

4. CONCLUSION

Goals for education of high qualification specialists lie in the creation of knowledge system, not in the "darning" their diverse knowledge. It is always possible to add what has been neglected to the system. We hope that our course contribute to the improvement of the educational process.

One must have the right skills to be well versed in the situation, to relate different information, to make possible conclusions and to choose the appropriate action.

The perception supposes the development of observation, concentration, reaction speed, memory, etc. The reflection means the formulation of perception, the translation of information to languages, natural as well as formal. The comparing means to find dependencies between different facts and considerations.

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Drawing conclusions means the construction of a judgment based on facts available, as well as adding an action, which we expect to carry out, anticipation and assessment of consequence of this action, and a substantiation of a choice. The logic skills and knowledge make up a significant part of skills. Logic is the science of the mind forms, the tool of the mind and also - as it is strictly defined by I. Kant - "censorship of the mind."

Speaking of logic is both simple and difficult, as well. It is simple because the logical laws are the basis of our thinking. They are intuitively well known to everyone. Every thought process is based on these laws, and without them is not possible. It is common knowledge about logic.

One of Moliere's comedy heroes just chanced to find that all life speaks prose. So somehow it is also with the logic that we have adopted piecemeal. We can continually apply laws and still has no clear idea of either one of them. Just be aware that piecemeal acquired habits of ideal thinking and scientific theory of such thinking are totally different things [5].

Similarly as the art of speaking existed before the creation of grammar, the art of correct logical thinking existed before the origin of logic. The vast majority of people even currently think and consider without aid of special science. Some of them are even inclined to the idea that their thinking is actually the same natural process as, for example, walking or breathing. Of course, it is a misconception.

In the 20th century logic as science has completely changed its appearance. Symbolic Logic which uses strict methods can serve as an effective tool for analysis and understanding of science, what is important in higher education. Logic is the only tool that allows man to deal with the avalanche of (dis)information.

Apart from the role of logic as a fundamental basis, now appeared also its major application value. Mathematical logic is the main theoretical basis of computer science. Rapid computerization of society leads to the understanding of the foundations of computer science has become the key to the effective work in any field of efforts.

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VIRTUAL UNIVERSITIES AND CHALLENGES

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Abstract

The tremendous development in ICT provided a good opportunity for improving the world of education. One of the major developments in this area is the appearance of virtual universities which students can access from anywhere at any time. They don't need to travel to the university because the university will come to them where they are. Students can access their institution, instructors, colleagues, and course materials regardless of place and time.

Virtual universities have so many advantages for students, instructors, and the institution. There are some challenges that face virtual universities need to be addressed such as administrative challenges, quality and accreditation challenges and security challenges.

Key words: *virtual university, e-learning, online learning, , virtual classroom*

INTRODUCTION

Virtual university is described as university without buildings. The students know about the university, apply to it, register for programs, receive their teaching materials, study these materials, contact their professors and classmates and get their degrees all through the electronic media and the internet in particular.

E-learning transcends typical time and space barriers, allowing students to access learning opportunities day and night from various corners of the world. Kamal Kishore (2003)

The administrative personnel in this kind of universities face a lot of challenges because they deal remotely with students and instructors from different countries with different languages and backgrounds.

Since all the operations in this kind of universities are done electronically, it is very important to secure the university systems against hackers. Failure to do this will result in the loss of money and reputation of the institution.

THE CONCEPT

The term virtual university as the Wikipedia says is used to describe any organization that provides higher education programs through electronic devices such as the computer. Some of the universities are real institutes, the bricks and mortar type that provide online learning as part of their extended university course while others provide courses only online.

Studying in a virtual university is different than studying in a traditional university. In the virtual university there are no buildings and no campus to go to because students study on the internet. In most cases, only a personal computer and an internet connection is needed.

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The concept of the virtual university is to bring the university to students rather than taking the students to the university. To adapt the university programs to students instead of adapting students to the university. It is a student-centric process rather than instructor-centric process.

In the virtual university all the university services and functions are simulated in the internet so that no physical interaction is needed to complete a study program.

Joseph Bajit (2003) described virtual university as "Evolving from an industrial age university to information age university, from bricks-based university to electronic components-based university, from wall surrounded university to wire surrounded university, from human professors to digital professors and from hard books to electronic books"

The virtual university system is designed for working adults who are busy and can not afford the time away from their work and their families. "Students who enjoy traveling can attend classes regularly with a laptop and wireless Internet card that will allow them to go to school from any location". Kara Page (2012).

THE NEED FOR VIRTUAL UNIVERSITIES

Anya Kamenetz (2012) stated that "According to a 2009 report by the United Nations Educational, Scientific and Cultural Organization (UNESCO), today 150 million students are enrolled in some kind of education beyond high school, a 53 percent increase in less than one decade. With such numbers, there is no foreseeable way enough traditional universities could be physically built in the next two decades to match the demand. "

This is why we are seeing virtual universities being established everywhere in the world. Many virtual universities has been established in Asia, Africa, and the Middle East. Wagdy Sawahe (2011) spoke about the establishment of e-universities in Bahrain, United Arab Emirates, and Kuwait. He also spoke about the plans of setting up an electronic university to provide bachelor and masters programs in Saudi Arabia in partnership with internationally renowned distance education institutions.

TEACHING MODES IN VIRTUAL UNIVERSITIES

The major part of the teaching modes in virtual universities is online courses. Course materials can include printed materials, books, audio and video cassettes, TV programs, CDs, software, and web sites.

Program delivery in virtual university is administered through information communication technology (ICT) such as web pages, e-mail and other networked sources.

Modules, courses, and degrees are delivered to learners through the internet. Learners interact with the university administration and with their professors as well as teaching materials in both real time and delayed time (synchronous and asynchronous) modes.

Homework assignments are normally submitted electronically as an attachment to an e-mail. When help is needed, lecturers, tutors, or fellow students, or help desk are available, just like a real university. The difference is that all communication goes via electronic media.

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FEATURES OF VIRTUAL UNIVERSITIES

- a) Virtual learning allows quality education to reach much wider audience both locally and internationally.
- b) Any student can register and study through the internet from any where in the world and at the time of his/her convenience.
- c) Students can find more choices, more delivery methods, lower cost and increased flexibility.
- d) When you enroll in a virtual university program, you can select from the courses offered by any of the participating universities.
- e) You can save money and time by getting the programs of foreign universities through the internet instead of travelling to these foreign countries, pay large amounts of money, waste a lot of time, and risk the loss of your identity.
- f) Virtual universities increase the access to global educational resources throughout the world. You can access virtual libraries from any where at any time.

MODELS OF VIRTUAL UNIVERSITIES

a) National Model: The Virtual e-University of Uganda

It is the first virtual university in Uganda that offers its courses solely over the internet. According to Moodle News (2011) "It's electronic backbone—servers, and backup support—is overseas, in Germany and the Netherlands, a decision prompted by the instability of local service providers (internet and electricity). The classrooms, meeting rooms, registry and a library that can be accessed by the general public are fully virtual, using a Moodle platform hosted in the Netherlands. Its administration offices, meanwhile, are in Muyenga. "

(b) Regional Model: The African Virtual University (AVU)

The AVU started in 1997 to serve more than 15 African countries by bringing quality education to them in their homes. Joseph Barjis (2003). AVU is an institution committed to increasing education access through the use of information and communication technologies (ICTs). The Headquarters is located in Nairobi, Kenya . Regional office in Dakar, Senegal. It is considered the largest e-learning network in Africa that operates in 27 countries with more than 50 universities. One of the complicated factors mentioned by Dr. Bakary Diallo in an interview conducted with him by The University World News stated that these participating countries speak more than three languages. Professors from universities in the US and Canada deliver courses from a studio classroom. The courses are transmitted to the central uplink countries. The ICT undergraduate program was launched in 2009. In 2010 and students started enrolling in the bachelor's degree program through the 12 participating universities in the 10 participating countries. Education Insider News (2011).

c) International Model: The Virtual University for Small States of the Commonwealth (VUSSC)

It was conceived by the Commonwealth Education Ministers in Canada December 2000. The proposal was indorsed at their 15th conference in October 2003. Currently, 29 of the commonwealth countries are actively participating in the VUSSC. The main focus of these countries is to develop a postsecondary skills-related courses in specific areas. James Keivy et al. (2008).

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PURPOSE OF VIRTUAL UNIVERSITIES

The purpose of setting up a virtual university may vary from one institution to another according to the goals of each one of these institutions. Virtual universities in the developed countries are set up to achieve goals different than those in the third world or under-developed countries. According to the purpose we can categorize virtual universities into the following categories. Ohbe (2004).

a) Export-based Universities

The main purpose of this type of virtual universities is to export domestic university programs to the international market. They tend to combine online provision with face-to-face support through partnership with educational institutions in the other countries.

Usually this type of universities is found in the developed countries because they want to export their education programs to the third world countries.

UK e-Universities Started in 2000 for exporting the UK education provision to other countries in different parts of the world. This institution was closed in 2004 because of some financial reasons.

b) Widening Participation Universities

The main purpose is to widen the participation and access to higher education by attracting people with work and family commitments or who live in remote areas far away from the universities.

This model also provides students already enrolled with wider choices of courses.

A good example of this type is the Swedish Net University (SNU) which started in March 2002.

The Canadian Virtual University (CVU)

Launched in September 2002 as a consortium of 13 Canadian universities based at Athabasca University.

c) Research and Development Focused Universities

The aim is to develop digital content and platforms to the member universities in order to promote and develop the adoption of ICT in universities.

A good example of this type the Dutch Digital University (DDU) (English)

Started in April 2001 as a consortium of 10 universities managed by a council of participants.

The university focuses on the development of digital education products and knowledge for higher education.

d) Industry Focused Universities

This type of universities is often found in the developing countries in order to improve their economic position. Rather than focusing on improving existing universities, some countries create virtual universities to bring foreign education programs in the country.

The Syrian Virtual University (SVU) could be considered an example of this type.

The university offers courses from different universities from the US, Canada, Europe and Australia

VIRTUAL UNIVERSITIES CHALLENGES

There are some challenges that face virtual universities. The subject challenge one of these challenges. E-learning materials developed on one particular platform using a particular software package could not be used on another platform. Henk de Wolf (2001). But the main challenges for virtual universities are:

a) Administrative Challenges

The administration of virtual universities is not like traditional universities. Many challenges face the administrative personnel in virtual universities.

The administration in virtual universities is responsible for the production of teaching materials, delivery of these materials to students, managing financial transactions between students and the institution as well as between professors and the institutions.

Also the administration in virtual university deals with students and professors from different countries with different languages and backgrounds. The AVU is the best example for this heterogeneity. They serve countries speak three different languages. Their programs is accessed even from outside the African continent. Dr. Bakary in his interview with the University World News said " We announced the launch of AVU's open educational resources (OERs) portal in January 2011. When we looked at the Google analytics from April to May 2011 we found 80% or so of the visitors are from outside Africa. They're from Brazil, from France, from the United States and from Kenya. From the first ten countries we had one African country ". Education Insider News Blog (June 2011)

The administration personnel need to protect their consumers against the claims of unauthorized providers.

They also need to provide security for the systems of registration, assessment and students' records.

In virtual university systems a number of partners who form a consortium may be from different countries and some of them might not be educational institutions.

Another issue is that there are many tasks to be handled like curriculum design, preparing teaching materials, teaching, and certification. Each one of these tasks may be given to different provider. The administration need to integrate all these efforts in order to get the best outcomes.

Because virtual universities are boarder-less universities they face challenges in importing and exporting online learning. Examples of these challenges as stated by Robin Middlehurst (2003) are:

National legislations and higher education policies in different countries.

Visa and customs' regulations.

Telecommunication laws and costs.

Intellectual property rights.

Quality assurance arrangements.

b) Quality Assurance Challenges

One of the major challenges to virtual university is the quality assurance issue. The quality involves the teachers who teach students, the content of the courses, and the method of teaching. Quality is the main factor that gives the reputation to the institution and the accreditation to its programs. Students who graduate from virtual universities using e-learning methods are compared to students who

graduate from universities using standard face to face instruction . Students are concerned with reputation of the institution, reliability of providers, and the recognition of the awards by governments and employers. Establishing a qualification framework is becoming a global phenomenon.

One of the main features of virtual universities is crossing the boundaries and the national borders. Crossing the borders gives rise to particular quality assurance challenges. A variety of quality assurance issues need to be addressed. Robin Middlehurst (2004) mentioned some of these issues which include “customs and visa regulation for transnational students, telecommunications’ regulations, and pricing controls, Intellectual Property Rights (IPR) for virtual courses, recognition and licensing arrangements for providers, arrangements and regulations for the transfer of educational credit and methods of controlling fraudulent providers”.

James Keevy et al. (2008) stated “more than 60 countries across the world, including most EU member states and sub-Saharan African countries, are at different stages of developing national qualification framework, with at least three regions having made progress. When asked about the effectiveness of e-learning, Stephen Lenser (2011) replied “it depends upon the quality of the learning experience and the situation. A poor instructor can make an exciting topic very boring; likewise a poorly designed e-learning module will lead to sleep as well”. Hall (1999) mentioned that some studies indicate that students can learn via the web just as effectively, or in some cases more effectively, than those in traditional classrooms’

c) Security Challenges

Security is a very important element of on-line learning. According to Edgar R. Weippl (2005), it is very crucial in virtual universities to secure the following:

- i. Tests and exams need too be protected from unauthorized modification.
- ii. Students' records are also subject to unauthorized modifications by students or other people for different purposes.
- iiiv. The financial records also need to be protected from intrusion which results in loss of money.
- iv. The website itself needs to be protected from viruses, denial of service attacks, and intrusion.

Security is considered a technology that increases the complexity of the process but it is a fundamental requirement for virtual universities. People do not use a system that they do not trust.

The main issues involved in the security of information in virtual universities are:

Integrity:

Integrity can be defined as: To insure that information is accurate and complete by Protecting it from unauthorized modifications.

Confidentiality:

To insure that Information is shared only among those who are authorized to receive it both in data storage and data usage (even during the transmission of data) by Protecting it from unauthorized disclosure.

Availability:

What we mean by availability is to insure that data is accessible when needed.

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Non-Repudiation:

To insure that users are unable to deny having carried out an operation. In other words it must be possible to reliably trace who has performed what.

Protection

To accomplish a good protection we need to have

Strong passwords and good distribution of security levels.

A well-defined firewall to protect the system from unauthorized access.

A very good and updated Antivirus and Antispyware software to protect from viruses.

Intrusion Detection System (IDS) that can trace any attempt to break into the system.

CONCLUSION

The concept of distance education, which started in the 19th century, passed many stages of developments. By the end of the 20th century, and as result of the information revolution and the appearance of the internet, distance education turned to use the technology of online education which gave it the name of virtual university.

Virtual university is a university of no limits of time and space. This new concept created a very good chance for adults who are busy with work and family commitments and those who live in remote areas to continue their education. The concept also enabled the third world countries to bring better education programs to their people without spending huge amounts of money. Concerning the quality of virtual university outcome we can say that virtual education, if it is implemented properly, can compete with traditional type of education and can get even better results.

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TOTAL QUALITY MANAGEMENT IN HIGHER EDUCATION INSTITUTIONS

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Abstract

Characterized the present age the emergence of the concept of quality and spread widely prevalent, as one of its core features, so it can be described current era of quality and its relationship with the settings: quality, comprehensive, and that the wide use of this term in many aspects of contemporary life. Since it is difficult to find the only institution and seeks to employ this concept or use. The reason for expansion in the use of the concept of quality, its association with a state of abuse and perhaps due to the lack of or decrease in the development of criteria and standards set for the meaning of quality in a timely manner. This research has focused on total quality management concept of absolute, by which access to the aspirations of the nation through higher education institutions, especially universities, focusing on key issues must be considered and adopted .and focuses on three items principally through the title and their compatibility to achieve the desired effect, a management and its relationship to the will and the freedom granted to institutions of higher education, and then quality and its relationship to education and how can we guarantee the quality of our higher than the concept of overall quality and how to manage them.

Key words: *Quality, Management, Higher education*

1. INTRODUCTION:

Saw higher education in the Arab world major developments was the expansion of universities and the increasing number of students, and the enthusiasm of the private sector to invest in higher education, and the emergence of new types of education such as education open and distance education, and to observe these developments felt influential institutions in the communities - especially universities - the need to adjust the quality of higher education to ensure quality under the circumstances and the educational systems of new, has called such thinking in the process of self-evaluation and external continuing to higher education institutions and programs in the Arab world carried out by the educational institutions themselves and professional institutions are eligible to carry out the external evaluation on a voluntary basis.

The second half of the twentieth century - in particular - has seen intensive efforts for upgrading the educational process and learning, and extended those efforts vertically to include the individual since joining the kindergarten, and until he reaches the end of the educational ladder-class university and beyond, also extended these efforts horizontally to include elements of the process all education, from the building and its facilities and curriculum development, and teacher preparation, and management modernization and development

Faced with the times in which we live a lot of difficulties and challenges in the forefront: the subject (the quality of higher education), which has become a challenge for administrators of higher education

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institutions and decision-makers, the issue was held several conferences, educational levels: global, regional, and local discussion this subject, in order to draw the attention of educators to seriously was confirmed at the (UNESCO) for higher education in the twentieth century atheist and what should governments, education institutions and work in this regard, in terms of the search for quality and quality in all thing, especially in light of the tyranny of quantity; because of the huge demand for higher education institutions, with emphasis on the need to seek continued to develop the skills of teachers of higher education in both: the scientific and professional in accordance with special conditions granted to them.

And notes by following the process of educational systems that the majority of countries do not spare no effort in order to raise the level of the educational process, from that man is the best investment, and that its construction is not only education, the finest, is that despite efforts often raise the questions of concern which are not facilitate their answers on the learning outcomes and level and efforts, and these questions: What is the concept of quality, what are the quality of your choice, and is there a clear vision of quality, and is there a complete strategy - from input to output - to raise the level of quality to the other questions.

2. PREVIOUS STUDIES:

(Najjar, 1997) "university education for the production and effectiveness of humanity." The aim of this study indicate the role of TQM in universities, the study also diagnosed with the current situation in universities; proposing new frameworks for the development of the university using the mechanisms of strategic planning.

(Solomon, 1998) "vision of the future to evaluate the quality and ensure the quality of higher education in Egypt in the light of some international experiences." The study aimed to identify the global experience of total quality in higher education, proposing, inter alia: the participation of higher education institutions in the provision of quality, loyalty and Almzamilh and attention to continuous improvement.

(Abu Nabaa, and Massad, 1998) "Total quality management in higher education institutions." The study aimed to identify the concepts of total quality management and areas of cooperation between universities, and quality applications at foreign universities, also addressed the possibility of applying quality management in Jordanian universities and the possible constraints in the application, and then ended the study to build a strategy for total quality management in private universities in Jordan.

2.1 Previous studies results:

Considered these studies that the quality of higher education means the ability of all the properties and characteristics of educational product to meet: the requirements of the student, and the labor market and society, and all those internal and external beneficiaries, we know very well that the achievement of quality education requires direct all human resources, and policies, and systems , and the curriculum, and operations, and infrastructure; in order to create favorable conditions for innovation and creativity to ensure meeting the educational product of the requirements that create a student reach the level that we all seek it, we add another case, namely, the culture of total quality and the conviction and release.

The culture of quality and programs, dissemination and conviction of the leads to the involvement of: individual, management, and unity of scientific, and student and faculty member; to become part of

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this program; so the quality is the driving force required to push the system of university education is an effective and positive; to achieve its objectives, and mission assigned by the community and the many parties of interest to university education

The concept of quality in education is concerned with all the traits and characteristics that relate to the educational area, which shows the quality of the results to be achieved, "a translation of the needs of the student expectations to specific properties are mainly in education and training; service learning educational Vsaghtha in the objectives so as to match the aspirations of students expected.

In the eyes of some of the definitions that the total quality in education: the set of properties, or attributes that accurately reflect the universality of the essence of education and their situations, including all its dimensions: inputs and processes and outputs of the near and far, and Ngdah due, as well as the reactions continued that lead to the achievement of the objectives and appropriate to a particular community, and as the safety of the public; different levels of quality (Anatis 2000) And the definition of the American Society for Quality: it is the body and overall characteristics of the product (good or service) that appear and reflect the ability of that product (good or service) to satisfy the needs of the explicit, the other implied. It can be seen that there are three dimensions of quality in higher education should not neglect any of them:

A. Academic dimension: it is stuck to the Foundation: standards and levels of professional and academic research.

B. The social dimension: it is stuck to the institution satisfying the needs of important sectors of the society consisting in which they exist and serve.

Individual dimension: it is stuck institution of higher education students' personal growth by focusing on their needs varied. Thus we see that the same quality with different concepts, according to the position of the individual and society, or organization, Quality is achieved through the beneficial characteristics, and overall features of the product, or service to the community or the consumer, and society and, therefore, social responsibility, for all.

3. QUALITY

Quality is not the words said, but what we do, and that element of the definition lies in the service of users (students), quality is not derived from: the size of grants and budgets, and rates of faculty to students, and the number of folders in the library, and the magnificent buildings and facilities at the university only but of interest to serve the needs of (students), whether from within or from outside in the surrounding community, taking into account two important points for quality, especially in higher education: the first is the view that the concept of quality in higher education should focus on the reputation of the institution or its sources For example, the institution with the best facilities are expensive to be good, the second believes that the concept of quality should be enhanced and strengthened through the application of the philosophy of quality improvement.

Affected by the measurement of quality in large measure comprehensiveness and integration of the definition of quality, definition, which links quality objectives confirms in the measurement of quality output and definition, which looks at quality as a term standard focuses on the characterization of the quality of the normative basis of the measure, but it is not necessary to emphasize the importance and inevitability of quality measurement standards, sophisticated, honest and consistent as possible, has emerged in the field of quality measurement in this area in several phases, including:

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Measuring quality in terms of inputs. Measuring quality in terms of operations (procedures and practices). Measuring quality in terms of output. Quality measurement, according to expert opinion. Measuring quality in terms of objective characteristics. Holistic perspective in the measurement of quality. Manage the transition towards total quality management in education:

The shift to total quality management requires the application of total quality management, namely:
Strategy: to have an idea of what senior leadership wants to be in the coming years (3-5) years, and of course that the training is the best option.

Structures: that is, organizational restructuring and change of responsibilities and functions, and re-building teams. Systems: the development of new systems such as improving the output or increase the efficiency and effectiveness of operations or add innovations of inputs. Workers: the treatment of individuals properly, and the satisfaction of their needs and demands of any human relations approach to follow. Skills: It means improving human capacity through training so that they are active and innovative capacity. Style: be a management style and leadership of the kind that leads the Total Quality Management throughout the organization. Shared values: creating a new organizational culture, identifying the dominant values and exchange of culture and protective fit with the continuous development (Cherkaoui 2003)

The administration focuses on the bottom line, how we can accomplish certain things better? The Supreme Command lines and questions: What are the things that we want to accomplish? Or, as both Peter Drucker and Warren Benson: "The administration doing things the right way, and leadership are doing things right." "Management is efficiency in climbing the ladder of success, leadership and determine whether a peace based on the right wall (Covey 1996) It could be argued that the most important requirements of the application of quality in educational institutions are:

Conviction and support and the support of senior management to total quality management and the adoption of management and personnel management philosophy of total quality and cooperation in their application with the specific objectives derived from the needs of target groups and the pursuit of management and working together to achieve them, in addition to Zlkmenh workers confidence while encouraging them to perform the work and estimate the outstanding of them without intervention in both large and small, and finally move away from the policy of intimidation and bullying in institutional work.

3.1 Definition of quality:

Structural organization of policy-making

Incentives and rewards design quality

Put levels of function effects

Surveillance systems to resolve issues

The supervision of executive management

Quality measurement to improve quality

Adoption of control systems, quality assessment

3.1 The basic elements of a culture of quality:

Policies

Resources

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Central values

Leadership

One said administrators at Motorola, "We have achieved success and speed the process because of the successful management"(Georje 1998)The administration is the key to the case of abnormal conditions or illegal, so we have to ask ourselves if the management of an enterprise: Where we were in the past? . Anne, then where are we? Then where do we go? And how we want to reach? So, we have to think (how), not (if).

Before talking about quality, we talk about 'What is management, the expected quality, even we get the quality we have to start first establishes the future vision of the institution along with the reasons and goals and then to the results of the administrative processes in three visions of planning and control and improvement, the administration associated with the quality defined by (Fred Naggar), saying: "an integrated approach is applied in all branches and levels of learning organization; to provide for individuals and teams the opportunity to satisfy students and beneficiaries of education." or is "effective to achieve the best educational services research and consulting the most efficient methods, less costs and higher quality possible (Najjar 1999), taking into account that individuals who manage quality must excel talents and capabilities of a personal characteristic to enable them to exercise their business successfully with a high degree of commitment and trust.

With regard to resources and the structure of the organization-based management and the procedures they must re-consider how to recruit and invest resources efficiently and effectively, and restructuring the organization in a manner consistent with the reality of the curriculum, so it is necessary to review the contents and objectives on a regular basis, to see their compatibility with the requirements of modern life, and meet the needs of beneficiaries, and the community to which they belong. And must be accompanied by the consensus of all improve the quality of the curriculum in terms of content, and clarity of purpose and feasibility, and attention must be paid to developing teaching methods and means of the calendar. In the end we can say that this process requires a lot of effort, and require a deal of patience; because the process of construction that are not in the day and night, but in a long time (Anatis 2000).

Mr. Jean Kay John kay, Director of the School of Management at the University of Oxford that "can not manage a successful company if the staff did not care" (Griffin 1999). The function of leadership is very important and necessary to achieve organizational goals. Managers and whether they are in the senior management level Oalosty, or the direct influence can be positive or negative trends and expectations of their subordinates (Mustafa 2001).

Include quality management organization processes necessary to ensure that the organization will meet the needs that played to them, they are all activities related to the job's overall management and that determine quality policies, objectives, responsibilities and apply the methods and means, such as quality planning, quality control, quality assurance quality improvement within the quality system . The planning process must take into account the strengths and weaknesses internal to the organization and include financial, human resources, production and marketing. Valtmsk and build on the strengths with the attempt to minimize the weaknesses lead to the success of the planning process in the organization. Institutions to communicate with the community outside and the surrounding environment and also have the leaders of these institutions to have a vision for the future on matters of interest to their institutions, Valmngarat many and the managers of planning of all things, must abandon the old methods of management and replace modern methods to ensure success.

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Failure to meet the quality requirements can have serious negative repercussions for any party to the institution, it represents "the properties of the entity, which holds within the capacity to satisfy the needs of the explicit and implicit (Duncan 2002).

If we want to get to the high level of quality, management and design and the will to achieve them we must consider the following:

Analyze, measure and describe the strengths and weaknesses of each department and the College of Science and the University.

Identify global opportunities and local and regional threats with various surrounding the university.

Building tables and specific objectives of the University.(Najjar 2000).

To achieve total quality in the organization we set some standards, can be implemented, including:

Institutional framework:

Clarity of vision and mission and goals as a frame of reference for all the Foundation's programs and activities.

Quality of planning and methods of resource allocation and institutional renewal.

The relevance of financial and human resources and knowledge available and convenient to use for planning and development with the administrative structure to achieve the goals of the institution. Attention norms in university programs and public activities.

The academic effectiveness in:

The relevance of human resources responsible for the planning of the Foundation's programs with the appropriate policy to accept students with the institution's mission and goals to fit with the programs and curriculum preparation and qualification and training.

4.ATTENTION TO QUALITY:

It is not surprising that educators interested in quality, but also for quality control and external evaluation of her, and said, especially quality systems and total quality management (TQM) mention some of the existing institutions on the issue of "quality" in the United Kingdom:

Higher Education Funding Council England (HEFCE)

Higher Education Funding Council - Wales (HEFCW)

National Council for Vocational Qualifications (NCVQ)

Continuing Education Funding Council (FEFC)

The United Kingdom is not alone in this area, as referred to in the contents of the report issued by the Hong Kong about the emphasis on quality. There is also a journal of higher education that created a recurring theme among the pages, called it "The debate about the quality." (Doherty 1999).

Tools of total quality management in universities (TQM)

It is the most important tools of total quality management in universities use the following list:

Training and continuing education.

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Self-evaluation.

Focus on community service.

Planning and guidance.

Democratic leadership.

The management of universities today, required more than ever that the application of total quality management in the implementation of all administrative operations. It is through this policy to the university administration can make continuous improvements in all the most active academic and administrative facilities in the student as well.

The standards and international standards in the universities began to work in some higher education institutions and will be based in all universities in the near future; because it does not need the university administration, however, and make use of the concept of total quality management in all its operations management to ensure success and continuity and to be at the level of international standards for higher education institutions.

RECOMMENDATIONS:

Create a "center of development of university education" of teachers and talented creators and owners of talents and capabilities of scientific and practical skills, the main tasks of providing services, expertise and training to help faculty members, lecturers and teaching assistants.

Curriculum development process and the development of competencies to keep pace with the needs of development processes and the labor market.

Composition of advisory bodies of the University of the various institutions of government and civil sector, professionals and eminent and successful in their fields that are relevant to the functions of colleges and document the process in the university or the university you want Basthaddatha in the future.

Add the follow-up (TQM) to the Dean of Planning and Development at the University to activate the application in university departments and faculties, departments and academic and administrative follow-up committees and quality teams. Establishment of an award for quality in the university within the scientific criteria and objective of an independent candidacy by a competent, impartial and experienced, efficient and credible, objective and give it to each of: -

The best course serves the University and the community.

The best research university course serves the University and the community.

The best university professor serves the University and the community.

Or any other preferences the university deems appropriate.

Work to promote a culture of quality in higher education institutions and adopted as an integral part of the philosophy and culture of the institution and the adoption of the concept of Total Quality Management (TQM) in the management of institutions of higher education to satisfy the needs and expectations of students, especially as well as to create units self-evaluation within higher education institutions and other to develop their potential and achieve their goals and work to address weaknesses and accept them, as is the quality management system to complement the overall modern management systems that include the success of the enterprise

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The adoption of a new management team that is working in the university and this encourages cooperation between all units and departments and centers to achieve the top scorer and specified standard.

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**TEACHING IN CLASSES WITH RESEARCH TECHNIQUES - CASE STUDY IN
THE ELEMENTARY EDUCATION IN REPUBLIC OF MACEDONIA**

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Abstract

In our country, in the past two decades, serious attempts have been made to make the educational process more effective in order to achieve optimal development of pupils' competencies, primarily, via programs and strategies for their active involvement in the process of learning. With this regard, the main purpose is to influence the most important segments of the educational process (EP), such as the process of pupils' learning and the one of teaching, which should be directed to practical competences development that will enable pupils to participate independently in changes and events in all segments of everyday life. In that sense, based on the insight of relevant institutions about the need for modernization of EP, at the Faculty of Education in Bitola, within the project Modernization of the education in the Republic of Macedonia, the program Learning through research was designed for training the teachers who are already involved in EP. Our paper presents the characteristics and practical implications of the Learning through research training program whose main goals were to deepen the knowledge of teachers about the research techniques (RTs) in elementary education, to train teachers for didactic-methodological designing of daily classes by use of RTs, to develop pupils' learning competences through research as well.

Our paper, in its essence, is a case study, which from the teachers' perspective, gives a presentation of teaching and learning implications of Learning through research (LR) program in elementary education in the Republic of Macedonia.

Key words: *teaching, active learning, research techniques*

1. INTRODUCTION

As a result of the new tendencies and changes in all aspects and segments of social life, the school should be the place where the basis of the social development is formed, and the pupils should be the future researchers who will provide their own social and personal progress and development through independent research activities. In that sense, the role of the pupil in class has been changed. Pupils are now active participants who are being trained for independent learning, their ability for self-assessment of the personal progress and learning is being developed, and the motivation emerging from the clarity of the goals that are set and from the wish for achievement of the same (intrinsic motivation) is being built in and developed, pupils easily and freely communicate in interpersonal relations, use their own initiative and are capable of choosing alternatives, they are methodologically skillful, know and use research methods etc. In this regard, the development of pragmatic abilities for independent participation of pupils in daily changes and events is of great importance. Therefore, utmost importance is also given to the use of appropriate methodological approaches in realization of the teaching process in elementary schools in the Republic of Macedonia, which will make the active

learning more effective and will bring about the development of practical competences with pupils. Teachers' didactic-methodological training is one of the key factors upon which the extent of the development of these competencies with the pupils depends. It is due to this stated factor that the idea for an Elementary Education Teachers' Training Program emerged, designed for teachers already involved in the educational system in the Republic of Macedonia to be trained for effective application of RTs in class, which would lead to active participation of pupils both in teaching and in learning¹. The more appropriately used in teaching, the more satisfactory the results of the class are, and the pupils develop a more solid basis for independent learning through research. Contemporary research of this didactic-methodological issue suggests that teaching with RTs is an efficient way for pupils to become independent, capable, creative beings of sharp judgment.

Teaching through RTs is a set of procedures with research characteristics, by the use of which the teacher deliberately directs the pupils' learning. RTs are infallible part of the research process², but in practice, very often in the first cycle of elementary education, RTs are applied as independent techniques in realization of the content³. LR is a learning approach by application of RP and includes the activities of pupils (and of the teacher) during the RT observing, comparison, experimenting etc. In order to realize LR and the research process successfully, aside from the many conditions, it is necessary to choose appropriate RTs with certain activities of the pupils, which should correspond to the research situation that proceeds from the objectives and contents of the lesson.

The analysis of the Program content, of the data of the survey questionnaires and informal conversations with the teachers, shows that the need for their further methodological training and for development of the skills for applying the RTs in teaching, which will result in improvement of the process of pupils' learning, is necessary. Namely, this situation primarily emerges from the fact that a large number of the teachers didn't have courses in methodology of research and in strategies of learning and teaching in their diploma studies⁴.

The training program is based on the principles, methods, and techniques for teaching adults. The methods and techniques which used in the training program, and taken into consideration during the analysis of particular aspects of teaching with research techniques in class are: discussions, simulation exercises, survey and informal conversations with teachers.

¹ In order LR to become one of the primary approach for gaining knowledge and skills, primarily in the natural sciences field, through authentic situations in practice, the teachers are trained for application of the research process and RTs in class and to incorporate them in the students' learning styles so that they contribute for the improvement of their achievements.

² The research process in the methodological literature is differently defined by individual authors, but an attitude prevails that the process be performed in six phases stated further down in the paper. Following the goals of the paper, we do not go deeper into the definition of the research process and the stages of the research, s. Цветко Смилевски, (2006): 37.

³ Бојо Колонцовски, (2001): 75.

⁴ In the background education of the subject teachers, aside from pedagogy and psychology, as well as the basis of the methodology of the given subject to be taught, other didactic-methodological content was not included. But, the current reforms in the high education are now following the course of expanding the didactic-methodological training of future teachers; therefore, nowadays this situation is considerably improved.

2. BRIEF DESCRIPTION OF THE PROGRAM, APPROACHES, TEACHING TECHNIQUES AND METHODS APPLIED IN TEACHERS' TRAINING

The initiative of the Ministry of Education in the Republic of Macedonia and the Bureau for development of education, in accordance with the National program for the education development in the Republic of Macedonia, resulted in a project of statewide innovation of the educational process. Namely, within the project *Modernization of education*, the relevant institutions funded by the Dutch government announced the tender for training courses for teachers in elementary education, offering a variety of content appropriate for the teaching process. The relevance of the program of the training courses was determined on the basis of the overall previous analyses for the teachers and pupils' needs in the educational process in the Republic of Macedonia. In addition, the elementary schools were free to choose from the offered programs both the bidder of services and the content reflecting their needs for working with pupils. In that regard, on behalf of the Faculty of Education in Bitola, training program based on the pupils' active participation in the process of learning was designed and, upon its relevance, accredited as *Learning through research*, the main goal of which was the development and deepening of teachers' knowledge about RT application in class.

The project was being realized in two stages. The first stage included the theoretical and practical part preparation of the Training Program, and the second stage included the practical/field realization of the Training Program in the period from January 23 till May 7, 2010. In the realization of the second stage, altogether, 87 class and school-subject teachers from seven elementary schools from all around Republic of Macedonia participated.

Table 1. Quantitative presentation of the LR training program content according to topics and sub-topics and their realization (number of classes and schedule of realization)

Topics and sub-topics of the elementary school Teachers' Training Program	Classes	Schedule of realization
Notion, definition and meaning of the research process and RTs in the class	4	1
Goals of RTs in the class	1	2
Teacher's and pupil's tasks in the RTs in class	1	3
Particular review of the teacher's mentor role in the RTs	1	4
An individual and whole-group approach in the application of RTs	4	5
Observation in class – components, stages and types of observation	3	6
Survey and interview and their application in the class	3	7
A case study – who, when and why to use a case study?	6	8
Role-play	5	9
An experiment and its application in the class	1	10

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The realization of the Training Program content was based, in the first place, on the principles and methods for teaching adults – everybody learns from everybody because everybody has some knowledge (a cooperative learning), the content was elicited from everyday life situations significant for the participants and altered through their common experience, developing self-confidence and respect with the participants. Adults have strong internal motivation to learn something new and thus, those were encouraged to use their own experiences as learning resources. Problem situations were set before them to take active roles in.

The adult teaching procedures that were used most are as follows: experiential procedures (group discussions, simulation exercises, activities directed to problem solving, study cases). As the most common procedures in the realization of the training content we select the following: presentations, brainstorm, demonstration, small group discussion, large group discussion (reflection, analysis and application), simulation, role-play, survey, interview, experimenting, work in pairs, work in small groups, walk-in-a-circle.

The methods that prevailed in the realization of the contents of the program are as follows: dialogue, method of working with text, method of problem solving, method of oral presentation etc.

At the very beginning, we started with the determination of the level of prior knowledge of the teachers involved in the training. The general conclusion was that the groups were homogeneous. Homogeneity was expressed in terms of the level of education, the prior knowledge of the teachers and in terms of their methodological competences to apply the research process and RT.

Table 2. Structure of participants in training

	Level of education		
	Non-university education	University education	Master's degree and higher
<u>Position/s in school</u>			
Headmaster		2	1
Teacher-in-charge-of - a-class	3	24	
Subject coordinator	1	18	2
Class teacher	2	21	2
Subject teacher	3	5	2
Pedagogue		1	

The methodological framework for goals of this paper includes: research procedures and instruments, methods of scientific knowledge and methods of scientific conclusion. In this sense, the research procedure where by the data on the practical implications of the program was obtained was the survey via questionnaires for the teachers at the end of each working day and at the end of the Training

Program content realization. Furthermore, there were discussions and informal conversations conducted with the teachers about the practical implications of RT application in the teaching practice.

Scientific knowledge was based on the causal-descriptive method, and the methods for scientific conclusions were: method of deduction, analysis, and synthesis.

3. GOALS AND TASKS OF THE TRAINING PROGRAM *LEARNING THROUGH RESEARCH*

Why teaching with RTs? The objectives of the program proceed from the efforts of all institutions relevant to improve the teaching performance, one of the most important segments of EP in the Republic of Macedonia, via pupils' active participation in the process of learning by means of RTs. The task of the program is to improve the teachers' methodological competence in applying RTs (observation, survey, interviewing, study case, experimenting etc.) in class, which yields better results. Furthermore, the task of the program is to allow pupils more effectively to: become independent in planning and make a more realistic assessment of the way leading to the solution of a situation/problem; improve communication skills at all levels through the established interactive and communication relationships; improve socio-emotional relations in the group; become capable of taking initiatives and venturing future research exploits etc.

Teaching by application of RTs and LR provides the *pupils* with the following benefits: motivational classes with a navigation towards active dealing with problems, changes, and current events; training in independent planning and making more realistic assessments; training in self-evaluation of the achievements in learning process, improving the communication through interactive mutual relations, improved cooperativeness; training in taking initiatives; stimulating and holding down pupils' interest and spurring and developing the motivation for learning; spurring and developing creativity and critical thinking; training in the use of different resources of knowledge within the learning process; ensuring everlasting knowledge applicable in practice etc.

The main benefits of teaching by application of RTs for the *teachers* are: broadening and deepening of knowledge about RTs and their significance for the research process; active inclusion of pupils in the process of learning by selecting appropriate RTs; ability of pupils to independently apply the RT's when being taught; to design everyday classes in a didactic-methodological way by using RTs in terms of optimal development of the pupils' competences etc.

4. ANALYSIS OF PROGRAM CONTENT FROM THE ASPECT OF PRACTICAL IMPORTANCE FOR TEACHERS

The content of the program was realized through various activities given in three parts: activation of the teachers' prior knowledge, theoretical approach to the research process and the specified RT and to the possibilities for its application in practice. In addition, the teachers were independently and freely expressing, discussing and analyzing their own opinions and views.

The beginning of the second stage, respectively the practical realization of the Training Program started with the workshops content and activities regarding the notion, definition, and the meaning of the research process and RTs in class. The methodological training of teachers to use the research process was conducted in six phases: 1. Identification, definition, and concretization of the research problem; 2. Designing a research plan or project; 3. Implementation, conduct and application of the

research methods, techniques and instruments⁵; 4. Data processing and hypothesis verification; 5. Analysis and interpretation of the results and deducing conclusions from the research; and 6. Writing-up and publishing a report, and presentation of the results of the research. Moreover, the teachers' training in teaching with the use of the research process started with their prior knowledge.

Discussions during the activities in the workshops and the teachers' stands analysis in terms of the theoretical approach and the practical application of RTs in class indicated that their knowledge about RTs and the research process in class deepened and widened, as well as the possibilities for the application of the same. In that regard, the benefits, the significance, and the role of RTs and the research process in acquiring the content in elementary education are presented in the following statements of the teachers: *by means of RTs an issue or a problem for which an answer must be found using a variety of resources is set up; by using RTs the pupils are faced with authentic situations similar to those from real life and they can more easily deal with them later on; with the use of RTs all intellectual capacities of the pupils are put into action; the pupils are being faced with real situations and learn to critically think, make research, look for answers to their questions, collaborate, work in teams etc.; RTs help the pupils to become able to live in the real-life society; RTs encourage the independence, improve the work in groups, the team work, and the leadership; RTs reduce absence from classes through frequented cooperation; RTs enable the pupils to use their knowledge further in life.* As advantages of the application of the research process in class the following ones are mentioned: *team work, leadership, enterprising spirit, communication skills, critical thinking etc.*, and disadvantages of the application of the research process in the teacher's practice before the training, are expressed with the following statements: *insufficient knowledge to formulate: a phenomenon, a problem, a goal, an objective, hypotheses in a research; difficulties when accessing relevant information, library, computers and alike, insufficient knowledge to discern relevant information about the question set or the objective to be reached; insufficient knowledge to analyze the information; difficulties when stating sources etc.*

Further on, a very important thing to be pointed out is that it was realized what a liable role and tasks both the teachers and the pupils have with RTs in practice for the class to get the desired effect. In the RT application, the teacher's task is: to give the necessary assistance to the pupils when they are thinking of the solution of the problem and learning via research; to pay attention to the prior knowledge of the pupils and to set the research problems in accordance with it; to motivate them to recognize facts and to generalize the ideas and presumptions; to take into account to what extent the sources offered to the pupils are available; to take into account whether pupils are previously trained to use the resources, for example, whether they have been trained in using computers or they need any additional training in the use of the same and alike.; to make sure that each pupil clearly knows his/her role and responsibility within the group; to train the pupils in reflection and integration of what has

⁵ In the literature of methodology, the term *research techniques* is a frequently used phrase which can be considered a synonym to the term *research procedures* used in our terminology, s. Цветко Смилевски, (2006): 110. Furthermore, methodologists do not have a concerted stand for distinction between the concepts of research methods and research techniques. Thus, the observation, the experiment, etc. are sometimes called research methods, s. *Research Methodology: An Introduction*, (2012): 7. However, the prevailing opinion is that research techniques and research instruments are the constituents of the research methods. For instance, possible research techniques within the research method *Examining documentation* are: content analysis, statistic operation, organization, while research instruments are analytical lists, records and alike.

been learned; to train them in evaluation of the acquired competences with RTs, evaluation of the methods, techniques, instruments and alike etc.

In this sense, the very complex role of the teacher in LR is seen, as s/he necessarily has to put the RTs in correlation with the goals of the class. By way of illustration, the teacher is to plan what types of cognitive, affective, and social competences s/he wants to develop with the pupils in LR by using RTs (for example, to train them in making a clear comparison among: the phenomena, the processes and the objects; to train them in team work etc.); what meta-cognitive competences s/he wants the pupils to develop (to think about LR, to direct the pupils to evaluate the effectiveness and efficiency of the methods that would improve LR); and has to think about the kind of the problem that s/he wants his pupils to solve (to get trained to make research, to apply scientific methods); has to decide on/think of the concepts and principles that s/he wants used by the pupils (for example, the application of the basic principles of ecology and environment protection in their life and knowledge about the relations between the cause and effect)⁶. In that regard, the teacher's lesson plan for learning through research may include the following questions: *Which goals do I want to attain with RTs (gaining knowledge, developing skills etc.)? How should I make the groups? Which questions should I pose to the pupils in order to motivate them to research/learn? Which resources do they need? How to prepare and involve the pupils in work? How should I navigate the pupils' work?*

Some of the pupils' tasks in LR with RTs are to: do a research, to perceive, to compare, to contemplate and produce ideas; to search for and find solutions; to collaborate with each other and with the teacher; to reflect; to apply their prior knowledge in new situations, to learn through experience, use a variety of resources, evaluate their work; think critically, solve problems etc.⁷

The training proceeded with workshops in which the importance of the RTs *observing, surveying, interviewing, study case*⁸ etc. and their application in class was pointed out.

Observation in class. The observation is an appropriate, systematic, and organized RT for understanding the objects, phenomena, and processes, and the teacher is responsible for making the observation active, consciously directed and organized.

Therefore, the goal of the Training Program is to train teachers in effective use of this RT in class via the content *Observation in class - components, phases, and types of observations*⁹. In that sense, the teacher should make sure that the pupils become familiar with observation as an act of understanding the reality first, and then to train them to use it on their own.

There were also some conclusions that proceeded from the teachers' discussions regarding the pupils' training in observation: ensuring a permanent flow of senses information for thinking processing that should always serve the goal; familiarity of the pupils with the goal, namely, when training the pupils to observe, the teacher should guide them towards defining the goal of observation until they are trained to independently define the same; training the pupils to discover the aspects of the goal, to analyze facts, relations, to compare, and etc., to plan and perform the observation, firstly by sticking to

⁶ Herman, Achbacher, Winters, (1992).

⁷ Милена Пејчиновска, (2012), *Хоризонти II*, 7: 670-673.

⁸ Contents for experimenting and playing roles as important RP in the class, which are not to be analyzed for the papers' goals, were pointed out, Violeta Janusheva, Milena Pejchinovska, (2011): 439-44.

⁹ Милена Пејчиновска, (2010), *Хоризонти*, 6: 413-416.

the offered phases of the observation performance, and then through an independently designed plan, to collect and sort data, to make conclusions and to present findings, to evaluate the successfulness of the observation so that they can form a critical attitude towards the results etc.

The advantages of RT observation in acquiring the content of the teaching programs in the elementary education are summarized in the following statements of the teachers: *with this RT a close observation of the object, the process, or the phenomenon is provided; the organized, well-planned, and systematic observation leads to a formation of rich, concrete perceptions and notions, which is especially important for the future processes of generalization and formation of the concepts; by means of this RT authenticity of the situation is provided and the aspects observed in accordance with the goals of the teaching are easily singled out.* The opinions regarding the disadvantages are: *a possibility to observe the problems current at the time of the observation but not the past ones; the characteristics of the social phenomena are very difficult to follow; the observation often is slow and the data can be very difficult to access, confidential etc.; destination, object, or process either in danger or inaccessible and alike.*

Questionnaires and interviews. Through the Training Program the teachers grew familiar with the characteristics and the use of questionnaires and interviews. After the training the teachers declared that they were trained to: *to explain the possibilities of questionnaires; to identify the disadvantages and advantages of using questionnaires depending on the problem of the study; to use questionnaires as an RT in the classroom simply and easily; to create and design practical formats of questionnaires; etc.*

Regarding the interviews, the teachers expressed their opinions that the exercises at the Training Program enabled them to: *explain the possibilities of using the interview as an RT in the research process in the classroom; to identify the problems and advantages of using interviews; to use interviews simply and easily etc.*

A case study of RT in class. The case study (CS) as an RT in class enables a contextual use of theoretical knowledge in solving practical problems. The pupils are faced with real life problem situations for which they find solutions, most frequently when working in groups, in addition with the CS the educational process realization focuses on the pupils and not on the teachers as with the traditional approaches to education. In the Training Program, teaching with CS encompassed groups' generating and offering possible solutions to a set problem, giving reasons for the solutions and deciding on the priorities that would optimally solve the problem/the situation.

Starting from the fact that learning through CS is active learning which promotes teamwork and synergic problem solving, this act is of great importance because of the value of the practical knowledge acquired through real situations. The following statements are some of the statements reflecting the opinions of the teachers regarding the question on the importance of this technique for LR: *enhanced interest and motivation with the pupils for the subject; teamwork and positive interpersonal relations; acquiring independent research skills; acquiring skills for selection and elaboration of the collected data; a development of the presentation and communicative skills.*

Further down some of the teachers' opinions on the ways in which CS can be developed and used in class more effectively are stated.

In order to develop an effective CS, it is necessary: that the school's interests and needs with the research be considered and taken as the most preferable starting point (and this refers primarily to the vocational schools and their goals, to their connecting with the labor market through training in solving practical problems from the area of interest; that the personal research interests of the pupils be

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considered; the possibility of including visiting lecturers, experts, and professionals in the fields such as industry, civil engineering, architecture, and alike, who are the guarantee for an effective development of CS from the very beginning by sharing their experience in that field (with regards to the topics that they work on, the strategies that they apply and alike) etc.

With regard to the use of CS in class, the teachers pointed out the CS-in-class plan as a very practical and simple one:

Steps for development of CS upon a concrete problem chosen to be researched	
1. What are the specific reasons for using CS for this problem? (what should the pupils develop, pupils competences, what are the goals to start from, etc)	
2. How was CS designed?	
- Duration	
- Level	
- The objective of CS (see number 1)	
- Main skills that will be developed with the pupils	
- Evaluation (what to evaluate, what to use for grading the final result of the pupils, whether to evaluate in the course of the CS or only at the end etc., whether to grade a final presentation or a test on the problem researched?)	
- Additional material for the pupil	
3. What is the role of the teacher and what is the role of the pupils?	
4. Realization of CS - Each member of each of the groups makes his/her own list of the 5 most important solutions necessary for solving the subject of research	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
A final list of 5 most important solutions is made in the group according to priority and the reasons for the same are given.	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
5. A presentation (in front of all of the groups, with one representative presenting)	
6. Discussion	

It can be clearly seen from the analysis of the program, from the standpoints and contemplations of the teachers, primarily from the aspect of its practical implementation in the teaching process and from the aspect of the pupils' benefits that the Learning through Research Program has accomplished its goal.

5. ANALYSIS OF THE DATA FROM THE QUESTIONNAIRES ANSWERED BY TEACHERS ON DIFFERENT PROGRAM ASPECTS

The teaching implications of the training program LR are evident from the analysis of the teachers' statements in the questionnaires at the end of each work day and at the end of the training (the fifth day of the realization of the Program).

a) How do you evaluate the effect of the content realized in *Learning through Research*? b) How do you evaluate the need for an active inclusion of the pupils with the use of RT in LR?

completely true 4	quite true 3	partially true 2	less true 1
63	22	2	0
highly necessary 4	quite necessary 3	quite unnecessary 2	mainly unnecessary 1
45	40	2	0

Commentary: As the tables show, the effects of the realized content and the workshops are quite satisfactory. The quality of the content offered regarding the teaching effectiveness, the possibility of an active inclusion of the pupils in the teaching process, the optimal realization of the goals that were set, is estimated as a very good one by most of the participants. Further on, most of the surveyed teachers point out the necessity for active didactic-methodological solutions and that those based on the learning through research approach - with the use of RT, are quite necessary in the elementary education.

c) The methods, the practical implications of RT, and the methodological findings are useful for your future work!

completely true 4	quite true 3	partially true 2	less true 1
59	26	2	0

d) After the training program LR you have a greater knowledge about RT and about the research process covered with the training!

completely true 4	quite true 3	partially true 2	less true 1
52	33	2	0

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Commentary: The content of the program and the research methodology became clearer for most of the participants at the end of the third day of the training. Most of them evaluate the content and information obtained in the workshops as useful for their future work. The number of participants with increased level of knowledge about the topics covered with the Program is significant; the methodological knowledge about the research process and the meaning and use of RT in the pupils' learning has deepened. It is a sufficient indicator of the pupils' progress regarding the practical implications of the knowledge acquired with the Program in the teaching practice towards a more effective learning process with pupils.

e) Which methods of teaching, content, and practical exercises from the training did you like most?

Participants' statements	Frequency
The discussions	9
A possibility for expression, sharing experiences	4
The organization, work materials, the approaches in explanation of the unclear aspects of the techniques	12
The collaboration and communication among the instructors and the teachers	8
The joint work and work in groups	1
The mode of presentation	7
The communication within the groups	2
An excellent program, clear, comprehensible, solutions practically applicable, giving sufficient information about RT	4
I am very pleased, I learned through this Program how to get to a complete research by surveying.	3
I like the lecturers' approach	6
Familiarization with the observation process as an RT, with the help of which all senses of the pupils are involved.	5
All practical workshops	9
The research work methods	5

It is evident that the statements of the teachers that stress the commitment to ensure practical implementation of the offered content in the everyday practice with the Program are the most frequent ones. Furthermore, the statements that stress the convenient way in which the content is presented and the unclear aspects of the methods are explained are outstanding. As shown by the teachers' statements, the fact that one of the considerably important goals of the program was realized is very important, which was to give the pupils an opportunity to express their comments freely and autonomously and show their experience as a source for learning as much as possible through the Training Program in a direct way.

6. TEACHERS' OPINIONS AT THE END OF EACH WORKDAY ABOUT THE TEACHING BY USING RT IN THE PROGRAM

The analysis of the opinions obtained from the questionnaires within the Training Program confirmed the need for using RTs during the learning process. Their application in the field of natural sciences is especially important, where teaching should be based on practical performances by the pupils.

a) Successful accomplishment of the goals set by using RTs. Out of 87 teachers, 33 or 34% of the surveyed teachers answered that the teaching knowledge and skills obtained with the help of RTs during the training improved and lead to a great success in the realization of the goals set in classes. 29 of the surveyed teachers (30%) answered that their teaching skills with the help of RTs largely improved with regard to the successful accomplishment of the goals set, whereas the teaching skills and knowledge with 18 of them (19%) improved considerably, on the basis of which they successfully accomplished their goals set in the classes.

b) Creating a positive and productive environment and a good communication by using RTs. The use of RTs and the creation of a positive and productive environment and communication with the pupils are all expressed through the following teachers' opinions: 20 of the surveyed teachers (21%) answered that the use of RTs had a great influence to the creation of a positive and productive environment, 34 of the surveyed teachers (35%) stated that these actions had great influence, 27 of the surveyed teachers (28%) stated that these actions had some influence, but that it depended on numerous other factors in EP, while the opinions with 11 of the surveyed teachers (11%) show an unchanged situation.

c) Activation of the interests and motives of the pupils by using RTs. The motivation for work and the instigation and holding the interest of the pupils during the realization of the teaching contents with the use of RT are shown in the following teachers' opinions. Namely, 24% or 23 of the surveyed teachers think that the situation of the activation of motivation and interest of the pupils has been significantly improved by using RTs in class, 26% or 30 of the surveyed teachers think that the situation of the activation of motivation and interest of students has been greatly improved, while none of the surveyed teachers thought that the situation of instigation and keeping motivation and interest of pupils has not been improved with the use of RTs. With the situation determined as such, a conclusion can be drawn about the efficiency and effectiveness of LR in the realization of the teaching goals regarding the instigation of motivation, as well as holding and increasing the interest of pupils.

d) Possibility for application of the research process in class. The teachers' opinions regarding the application of the research process in class after attending the Training Program are as follows: 21 of the teachers (22%) have improved their ability to notice the problems in the realization of the teaching content that can be taught by applying the research process in LR. 31 of them, or 32%, have frequented the application of the research process in realization of the teaching contents in class. 28 of the surveyed teachers, or 29%, use the research process when there is an opportunity for that, in accordance with the objectives and content of the lesson.

7. CONCLUSIONS

It is evident that although at present the development of the pragmatic competences of pupils is increasingly being taken into account, the process of learning should continuously be improved and made more effective. Moreover, the strategies for learning and teaching and the active approaches in the process have great significance. Therefore, the objective of the program *Learning through*

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Research was to raise the awareness among the teachers for the importance and the role of teaching with RTs in EP and promotion of teachers' skills for their effective implementation, in order to increase the activity and the involvement of the pupils in EP. In EP, the need for methodological training of the teachers can still be felt, and it is a joint goal of all relevant institutions in the country. Namely, no methodological items and didactic-methodological content were included in the subject programs of the prior education of the school-subject teachers. In line with this, it was of great importance for the teachers to be able to apply the research methodologies in the learning process of the pupils. Thus, the Program is related in its essence to the upgrade and development of the teaching staff that will be able to make the learning process more effective, while the pupils will be actively involved in the learning process.

From the case study in this paper, it can be concluded that linkage of theory and practice as a very important component was achieved through the completion of the project, by which the aspirations of the Ministry of Education and the Bureau for the Development of Education in the Republic of Macedonia to revive the programs for training in practice and for the purpose of this kind of professional development of the teachers for the learning process of the pupils was confirmed. The content of the Training Program contributed to the expansion of the methodological knowledge of the teachers, along with the expression of willingness and ability to apply the learned in an everyday educational workplace. It was evident that the teachers had motivation for the didactical-methodological modeling of classes by applying RTs in teaching in their daily educational work. Most of the participants in the training clearly emphasized that the offered contents are characterized with very high effectiveness in terms of their teaching characteristics, with the possibility of actively involving pupils in the learning process, as well as the opportunity for optimal realization of the set goals, etc.

The study has led to the conclusion that after the implementation of the program, the research methodology has become clearer, and that the offered content and information obtained from the workshops are very useful for the future work of trainees. This unambiguously alluded to the personal professional progress of the participants in terms of practical implementation of methodological knowledge, knowledge for the application of the research process, the meaning and application of RT in the learning process, etc.

It is very important to emphasize that the knowledge of the participants was enriched through the Program thanks to the open discussions after each activity in the workshops, which in a direct way put forward their own experience as a learning source.

The importance of active methods and the application of RTs in teaching practice were also noticed. Namely, the advanced teaching skills through training, with most trainees, have led to a greater success rate in the realization of the goals set by using RTs and the research process.

In addition, the study has led to the conclusion that the application of RTs in classes has created a positive and productive environment that has improved the communications among the pupils. Also, the general conclusion is that the efficiency and effectiveness of RTs in the realization of the teaching goals encourages motivation and it holds and increases the interest of pupils in the process of learning.

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**NEW CHALLENGES: MASTER IN EDUCATIONAL AND THERAPEUTICAL
INTERVENTION ASSISTED WITH ANIMALS**

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INTRODUCTION

The attention to the different disabilities and the families of the disabled; the recognition in the form of requiring, in the elderly for all the work done; and the inclusion and social rehabilitation and employment opportunities for those at risk of exclusion, we believe that are part of the Welfare State of a country, providing care, support and assistance to where and when we require, so far as we can.

In recent years, arise with strength, in different countries, actions in which animals are those that offer such care, support and help.

The beneficial results of these interventions, both relational and social family and state, are usually evident in the very short term. The beneficiaries and their families feel comforted and helped in their day to day, creating a more balanced and fluid climate.

Our small contribution to something as large as the Welfare State is to have created, developed and worked this Master from the work that the animals have always done naturally, while believing in our students as part of it.

ORIGINS AND JUSTIFICATION

The first historical use of animals as a complement in an institution dates from 1792, in an asylum in York, England. This center included animals as part of the usual environment and encouraged the patients to keep them. Precursor of positive reinforcement programs, the York Asylum adopted positive means rather than punitive means to control the behavior.

The following reference that has witness was Bethel, an institution in Bielefeld, Germany, founded in the year 1867 for the treatment of epileptic patients, although later extended their treatments to other diseases. Dubbed “an institution without walls”, Bethel incorporated animals of farm and a nature reserve for wild animals, as well as common pets and a very successful equestrian program.

Regular use of animals as therapeutic aid in the United States began in the Convalescent Hospital for Army Air Force in Pawling, New York, in 1944. A Lieutenant with a very serious wound in one leg and had to remain interned for quite some time, informed the hospital his desire to have a dog as a pet. The direction of the hospital agreed and gave him a puppy German Shepherd, Fitz. Fitz accomplished wonders with the patient who saw increase their interest, safety and sense of responsibility by having to deal with the dog. The success of this experience produced a requests avalanche between the

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officials and patient soldiers. Later there interfered also animals of farm, small amphibians and reptiles of the nearby forests.

But the Animal Assisted Therapy (AAT) did not appear officially until 1953, thanks to a furry dog named Jingles and its owner, the psychiatrist Boris Levinson. It was not allowed Jingles to enter the consultation when the doctor was attending to his patients, but yes that could do it when they were alone.

One day when Jingles was in the consultation of Dr. Levinson that they did not expect any visit, arrived unexpectedly a mother with her son very upset. . The boy had passed a long therapeutic process without success. While Dr. Levinson was greeting the mother, Jingles approached towards the child and began licking him. To the surprise of the two adults, the child was not frightened but hugged the dog and began to stroke. During the session, the child expressed his desire to return to play with the dog. In this way, Dr. Lenvinson began to treat the child always with the presence of Jingles. This one was acting as intermediary between the doctor and the child. This way it was since little by little it could treat the child and help him to his recovery.

When the Dr. Levinson presented his results in a convention to the rest of the medical profession, it received comments of all kinds. While the majority of attendees showed their enthusiasm, others laughed out loud. Subsequently many psychiatrists and child psychologists confessed you that they had had similar experiences with pets and therapy centres offered to cooperate in investigations.

The animals have unique qualities that facilitate, encourage and accelerate the therapeutic process. Only its presence supposes an increase of the self-esteem, the confidence and the capacity of social relation, as well as a reduction of the stress and the anxiety.

In 1990 the Affinity Foundation presented formally the “therapy assisted by company animals” to the medical profession and to society in general, finding, from a principle, the support and advice of the Spanish society of Psychiatry. This led to organizing of the first International Congress ' Pets: source of health ', and the implementation and financing of programmes TEAAC in Spain scientifically controlled in line with those serving elsewhere in the Western world.

Nowadays, Spain has more than 20 private and social entities fully dedicated to the realization of intervention Programs Assisted with Animals.

This Master degree in Educational-Therapeutic Intervention Assisted with Animals is born with the intention of announcing the benefits, the applications and the typology of the above mentioned programs, from its preparation to its development and evaluation, as well as of professionalize and regulate academic level a sector that one finds in incipient state.

TECHNICAL EXPLANATION AND ORGANIZATION.

The Master's degree in Educational-Therapeutic Intervention Assisted with Animals is a proper title of the Universitat of Barcelona, of 64 credits ECTS.

It has a modular structure with three linked Postgraduate courses, with option to realize the Postgraduate courses separately or the Master.

The Master is structured into five modules, which in turn, form three Postgraduate of 30 ECTS credits each:

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Module 1

Applications of the educational-therapeutic Intervention Assisted with Animals (8 ECTS)

Module 2

Educational-therapeutic Intervention Assisted with Dogs (15 ECTS)

Module 3

Educational-therapeutic Intervention Assisted with Horses (15 ECTS)

Module 4

Educational-therapeutic Intervention Assisted with Marine Mammals (15 ECTS)

Module 5

Master's final project (11 ECTS)

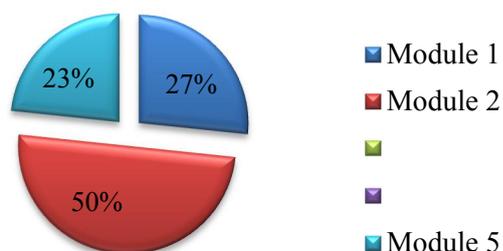
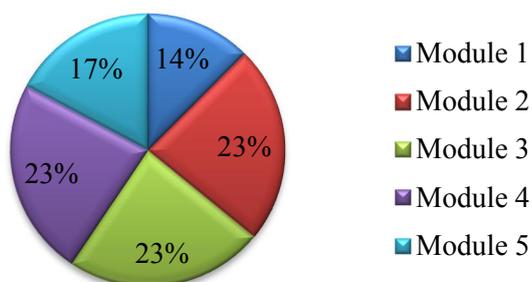
The achievement of postgraduate courses is as follows:

Module 1 + Module 2 + Project (7 ECTS) = Postgraduate in educational-therapeutic Intervention Assisted with Dogs.

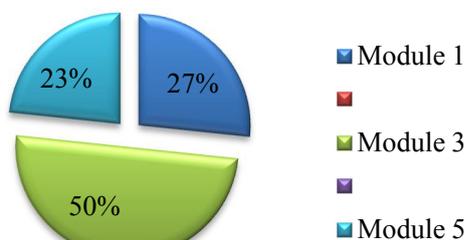
Module 1 + Module 3 + Project (7 ECTS) = Postgraduate in educational-therapeutic Intervention Assisted with Horses.

Module 1 + Module 4 + Project (7 ECTS) = Postgraduate in educational-therapeutic Intervention Assisted with Marine Mammals.

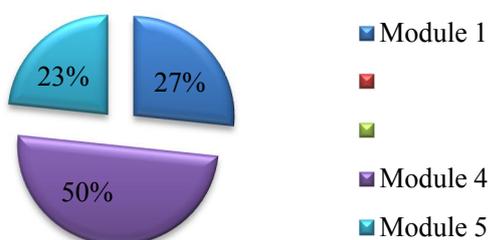
Master in ECTS



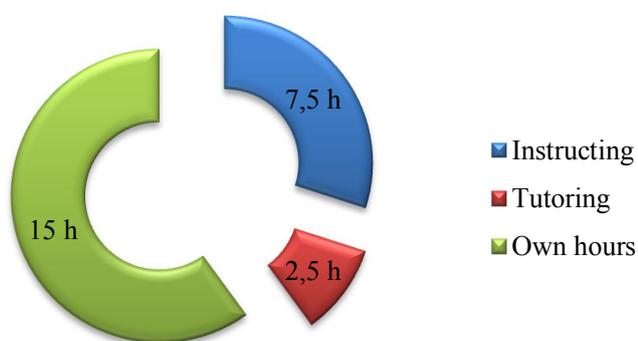
Postgraduate in IAH in ECTS



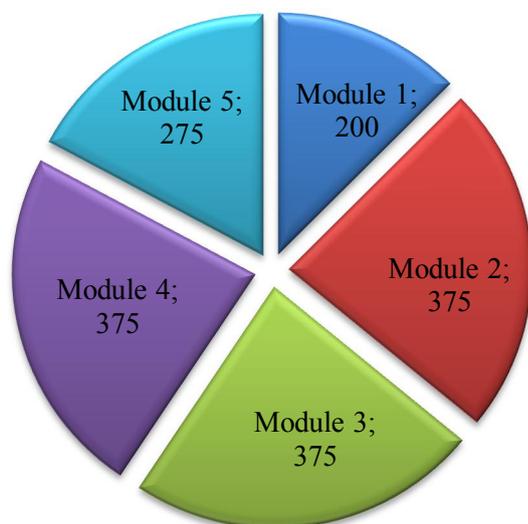
Postgraduate in IAMM in ECTS



1 ECTS in hours



Master in HOURS



CONTENT AND PRACTICES

The master is developed with the intention of providing all possible knowledge for preparing, commissioning, development and evaluation of a program of educational-therapeutic intervention assisted with animals.

Thus, in Module 1, Applications of the educational-therapeutic Intervention Assisted with Animals, we find the following contents:

- ✓ Theory and history of the assisted intervention with animals
- ✓ The person-animal bond
- ✓ Applications of the AIA in the disability field

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- ✓ Applications of the AIA in the area of insertion and social reintegration
- ✓ Applications of the AIA in the area of psychopathological disorders
- ✓ Introduction to assisted intervention (animal welfare, training and intervention)

In the Module 2, Educational-therapeutic Intervention Assisted with Dogs, we find:

- ✓ History and introduction of the assisted intervention with dogs
- ✓ Canine Ethology
- ✓ The training of the dog
- ✓ Applications of the educational-therapeutic Intervention Assisted with Dogs (the field of the disability, of the social exclusion and of the psychopathological disorders)
- ✓ Practical Cases
- ✓ Evaluation of the educational-therapeutic Intervention Assisted with Dogs (evaluation of the environment, the dog, the session and user).

In the module 3, Educational-therapeutic Intervention Assisted with Horses, we find:

- ✓ History and introduction of the assisted intervention with horses
- ✓ The horseback riding as base of the educational-therapeutic Intervention Assisted with Horses
- ✓ Knowledge and handling of the horse
- ✓ The training of the horse (natural horsemanship and clicker training)
- ✓ Applications of the educational-therapeutic Intervention Assisted with Horses (the field of the disability, of the social exclusion and of the psychopathological disorders)
- ✓ Practical Cases
- ✓ Evaluation of the educational-therapeutic Intervention Assisted with Horses (assessment of the user, session, environment and intervention program).

In the Module 4, Educational-therapeutic Intervention Assisted with Marine Mammals, we find:

- ✓ History and introduction of the assisted intervention with Marine Mammals
- ✓ Aspects to be taken into account in the aquatic environment
- ✓ Introduction to the training of marine mammals and other animals of Zoo
- ✓ Applications and evaluation of the educational-therapeutic Intervention Assisted with Marine Lions
- ✓ Dolphins and Dolphin therapy
- ✓ Marine Mammals in captivity

During the school year, students can attend different programmes of intervention assisted with dogs as observers, making an observational practices program.

The nine programs offered are carried out in different time zones, and may include the following pathologies:

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- ✓ Children with disabilities
- ✓ Adults with disabilities
- ✓ Third Age
- ✓ Adults with autistic spectrum disorder (in specialized Center for autism)

On the other hand, The Master's degree offers the possibility of realizing a program of practices of educational-therapeutic Intervention Assisted with Dogs and Horses in a in a school for special education of Barcelona and in an Educational Center of Minors, Girona.

The Article 73 of the LOE (Law of education from Spain) refers to students showing special educational needs which requires, for a period of schooling or throughout the entire period, certain supports and specific educational attention arising from disability or serious behavior disorders.

Likewise, article 74 reflected the schooling of students who have special educational needs is governed by the principles of standardization and inclusion and ensures its non-discrimination and effective equality in access and retention in the education system, and measures of flexibility of the different educational stages, can be introduced when deemed necessary.

On the other hand, the LEC (Law of education from Catalonia) differentiates two types of students with educational requirements: students who have special educational requirements and those who have specific educational requirements. In the first group we find students with physical, mental or sensory disability, those who manifest disorders of personality or behavioral and those suffering from serious degenerative diseases. In the second group we find the students of late incorporation the educational system and those who live particularly disadvantaged socio-economic situations.

Thus, participatory internship program offers the possibility of conducting a programme of intervention assisted with dogs in pupils with special educational needs and a programme of intervention assisted with dogs and horses in young people at risk of social exclusion with specific educational requirements.

Educational-therapeutic intervention Assisted with Dogs in pupils with special educational requirements

The program is framed in the Special Education School Auxilia, of Barcelona, and is realized in school schedule (every Wednesday of 11 '00 to 12' 00h), during the months January to June.

The programme is addressed to all students of the school, doing 4 sessions with each group-class, and has the following structure:

- December:
 - ✓ Examination of the dogs of the students to evaluate its aptitude to be dogs of intervention and/or therapy.
 - ✓ Establishment of student groups, composed by a student with the role of technician and his dog (according to tests conducted assessments of these) and four students with the role of technical assistants (focusing on users).
- January to June:
 - ✓ Realization of the program, at a cost of 4 sessions by group class:

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- ✓ First session: evaluation of users and planning of the 3 following session, with specific objectives according to the initial assessment.
- ✓ Second, third and fourth session: implementation of the programme assessment of each of the sessions through an assessment of each of the users, the dog and the environment
- ✓ Realization of the final report of the effectiveness of educational intervention assisted with dogs.

The program is supervised by a technician with Animal Assisted Intervention from Association of Social Action DISCAN. The Tutoring consists in the realization of the recordings of each and every one of the session, in common with each of the groups and tracking both the technical and the dog that made the session as the planning, development and assessment of the same.

Educational intervention Assisted with Dogs in young people in risk of social exclusion with specific educational needs

The programme fits into the center of minors Montilivi, Girona, during school hours, Wednesday 11'15 to 12 '30, during the months of December to June.

The program is aimed at a small group of 8 internal with specific problems of emotional neediness and social family. In this case, the program makes a technician in intervention assisted with animals from Association of Social Action DISCAN with two dogs (labrador retriever and golden retriever) and two students of the master to participate during 6 consecutive session, with the following tasks:

- ✓ Initial assessment of users through observation at the first meeting (held by the technician in IAA)
- ✓ Realization of programming for 5 sessions:
 - Realization of activity sheets (see Figure 1)
 - Realization of necessary materials
 - Realization of the observational questionnaire
 - Implementation of the report of the session: evaluation users, dogs, development of activities.
- ✓ Making the final report

Intervention Assisted with Horses in young people in risk of social exclusion with specific educational needs

The program is part of a riding of Girona, in a natural environment, and takes place on Fridays from 15'00 to 17'30 h. The programme is aimed at young people at risk of social exclusion with different issues: addictions, affective deprivation, family destruction, etc..The programme is carried out entirely by students of the master, tutored by a technician in Intervention assisted with animals from the Association of Social Action DISCAN with young derivatives of Social services of the region of Girona, in that the students have to:

- ✓ Assess the derivation of social services
- ✓ Evaluate the user
- ✓ Describe and develop intervention program, as well as determine their timing
- ✓ Make the choice and preparation of the horse

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- ✓ Evaluate the effectiveness of the intervention assisted with horses in young people at risk of social exclusion

Each individual programme is carried out by 3 students of the master.

THE PROFILE OF THE USERS

All the modules of the master are structured according to three major areas of action: the area of disability, the area of the risk of social exclusion and the area of psychopathological disorders.

Its approach is given by two parallel lines, educational and therapeutic, thereby affecting the educational content and concepts on the one hand, and in specific treatments for each case.

Inside the area of the disability, we can find infantile Cerebral palsy, Cerebrovascular Accidents, spinal cord injuries, Down syndrome, among others, taking into account that the intervention assisted with animals can be beneficial for any type of disability (motive, cognitive, sensory or multi-disabled).

THE PROFILE OF THE PROFESSORSHIP

The teaching team of the Master's degree is made up of professionals from various industries and backgrounds. Of the academic world, we find teachers of the branches of sociology, psychology, physical education and veterinary. Of the professional world, we find psychologists, physiotherapists, teachers of special education, veterinary, etc; and other professionals in the animal world (coaches, technical environmental enrichment and therapy technicians), some of which provide us the acquired wisdom, for years, in the "trenches" of projects elaborated and developed from the base.

THE PROFILE OF THE STUDENTS

In our history, we can cite various professions with university degrees were launched without her, exercising with great professionalism and much craft, but did not have a university degree. We are talking about large professions: journalism, nursing, professorship of physical education, etc. At present, regulated already the academic qualifications, it is almost unthinkable that some of the mentioned professions could exercise without its corresponding qualifications.

The University is increasingly close to social reality, and in the society, currently, there are people who are dedicated to the therapy with animals. People that they have formed with effort and self-taught to the that we decided not to leave out both for its contribution to the Master, as a recognition to the professional work carried out up to that moment, thus giving them the opportunity to obtain a university degree and, who knows, if as pioneers of a possible future university qualifications with the profile of "Degree in educational-therapeutic Intervention Assisted with Animals".

The profile of our students is diverse and varied, from the specialties of psychology, veterinary, psychomotor skills, pedagogy, teaching staff of different specialties, physiotherapy, sociology, Social work, occupational therapy and biology and High School students with degrees and average cycle Vocational Training.

The qualification for university students is that of masters in in Educational-Therapeutic Intervention Assisted with Animals or Postgraduate in educational-therapeutic Intervention Assisted with Dogs / horses / marine animals (depending on the postgraduate course that is).

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The qualifications for not university pupils will be that of Certificate of Course of University extension in educational-therapeutic Intervention Assisted with Dogs / Horses / Marine Mammals.

DEPARTURES PROFESSIONALS

The evolution of societies often involve many, and sometimes painful changes. And one of those changes is usually the creation of new professions. We are delighted to think that, with this master, we are contributing to this.

The possible departures professionals, some of which are already a fact, are:

- ✓ Creation of an entity or own company
- ✓ Development of projects there where our students are already working (Schools, centers of the 3rd age, disability centers, etc.)
- ✓ Hiring on the part of particular entities interested in create a post of technician work in therapy with animals (specialization / creation of place of work)
- ✓ Hiring by entities in which there is already a job of technician in animal therapy
- ✓ Teaching and training (provided that there is previous experience)

And we believe that from now on, there will be still more labor projections that are not visible in this moment.

METHODOLOGY

The Master's degree in educational-therapeutic Intervention Assisted with Animals has character blended being essential go every Thursday (3 hours) for do the classes attend them. In addition to these classes attend them theorists, practical classes are realized attend, on-line practical classes (across the recordings), on-line theoretical classes (across the virtual campus), lectures, sessions of Roll Player, practical assumptions, sessions of reflection, on-line activities across the virtual campus and debates participativos on-line.

The space used is varied:

- ✓ Physical Classroom (at the University of Barcelona) for theoretical classes
- ✓ External labour camp for the training of dogs
- ✓ Equestrian Centre, aimed at handling classes and take care of the horse and assisted intervention with horses
- ✓ Zoological garden, destined for the theoretical-practical classes of the module of marine mammals
- ✓ Swimming pool, destined to realize the teórico-practical beginning of the flotation

The tutoring of master offers since the beginning of the course, and can be in person or online (via mail or skype) and is based on the possible theoretical doubts that may arise throughout the course, as well as specific tutorials submission and defense of the final draft, taking into account also any tutoring of a personal nature that may arise.

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The competitions worked during the course are the following ones:

- ✓ Ability to show initiative in the resolution of problems.
- ✓ Ability to show attitudes consistent with the ethical and deontological conceptions relating to animal welfare and the rights of persons with disabilities, among others.
- ✓ Ability to work in interdisciplinary teams.
- ✓ Ability to design, develop and manage projects.

EVALUATION

The evaluation of postgraduate courses considers the assistance, participation in the discussions (includes the realization of the online activities), the presentation of a final paper and the optional assistance to different activities scheduled during the course.

- ✓ Final work: up to 40%
- ✓ Assistance: up to 22% (it starts counting with 75% of assistance)
- ✓ Participation in the discussions: up to 30%
- ✓ Optional assistance in different activities: up to 8%

The evaluation of the master's degree foresees the assistance, , participation in the discussions (includes the implementation of proposed activities), the optional assistance to different activities scheduled during the course and the presentation and defense in a court of the final work of Master.

- ✓ Final work and Defense: up to 45%
- ✓ Assistance: up to 21% (it starts counting with 75% of assistance)
- ✓ Participation in the discussions: up to 27%
- ✓ Optional Assistance to different activities: up to 7%

CONCLUSION

We would like to emphasize the importance of the values that govern the formation of our students as are the Pedagogy and Humanistic Education. Humanism, understood as compassion (not pity), compassion and deep respect for all living beings involved in the process, present and future, as students and future professionals and all those projects that they develop.

The well-being of the animals above all. We do not want to forget that, in fact, the therapist is the animal, and it doing it very well, by their own nature and that humans are just guides, bridges, and intermediaries. Perhaps would be more appropriate, here and now, talk of Animalism instead of humanism. (Saying in distended tone). We propose, then, a big respect and care of the animals with whom we work and we will work, with gratitude in the heart.

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BIBLICAL TEXTS AND METHODS USED IN VOCATIONAL EDUCATION

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Abstract

This study deal with the vocational education process reflected in Hebrews Epistle. The text remembers Israelite education, conceived in ethical terms, after Jesus' sonship relation with God. Because religious teaching is perceived in vocational education field, Christians have adapted Greek and Jewish statements about instruction, founding the modern concept of education in European society, without pain, but enjoying with community.

Key words: *vocational education, Hebrews Epistle, wilderness pedagogy, Greek education, joy*

INTRODUCTION

The conclusions of the Lisbon European Council in 2000 according to which, by 2010, "the European Union should become more competitive and dynamic, based on the knowledge of the world, capable of sustainable economic growth with better and more numerous jobs and a greater social cohesion" have had an impact on vocational education in Romania as well (** 2010: 2).

First of all, when defining in our study the concept of "vocational training", we mean religious education, with both its educational and artistic-religious components. That is why the vocational education does not pursue new basic content, but new ways of anchoring the formative and educational elements in today's society and its members.

The role of vocational and technical education is to train young professionals in an area that is suitable for everyone because each person has talents that are often discovered in childhood or later, in certain circumstances, sometimes even unexpectedly. (Draghiciu 2008: 68).

Vocational courses require hours of theory, written research papers, project activities and practical work. The number of students in a class is relatively small, allowing students to benefit from increased individual attention. There are continuous assessments and written exams. Vocational training can be done in colleges/high school seminaries, vocational education institutes and higher education institutions.

Starting from the Christian inheritance on which the European culture and society were built, through the process of amnesia or recalling, we use the text of the Holy Bible as peremptory document, interpreted according to social context, on which we build professional and personal skills. The memory of the ancestors, then, is used as a fundamental document that is stimulating for the new man, the new millennium.

EDUCATION IN JEWISH TRADITION REFLECTED IN HEBREWS 12

The author of the Epistle to the Hebrews rewrites the history of the people of God as an extended period of wandering in wilderness. In the summary of the history of the people of Israel, the author

states that they have not received what they were promised, but they would do so only with the readers of the Epistle to the Hebrews: "And all these, though well attested by their faith, did not receive what was promised, since God had foreseen something better for us, that apart from us they should not be made perfect" (11:39-40).

It will be argued that the quote from Proverbs 3:11-12 and subsequent discussion about teaching (παιδεία) in Hebrews 12:5-13 should be understood as an allusion to the chastening (παιδεία) that the Israelites lived during the wilderness period.

The quote from Proverbs 3:11–12 and the subsequent discussion on the nature of God's punishment from the Hebrews 12:5–13 should be interpreted in connection to the Hebrew concepts related to the period of wandering of the people of Israel as a period of chastening (παιδεία).

In Hebrew 12:5 the author reminds his readers of what they appear to have "completely forgotten" (εκλελησθε), just as in 10:32 he tells them to "remember" (αναμνησκεισθε) their earlier enthusiasm. In this case it is a passage of Scripture (Prov 3:11-12) that the author introduces in two ways. First, he calls the passage (απαρακλησεις), the same term he uses for his own composition (13:22), and which can bear the sense of "comfort" as well as of "exhortation" (Lenski 2008: 337). The Scripture passage contains both. Second, the author contemporizes the passage: it does not simply speak to ancient students of the sages. It speaks for God, who now addresses the author and his hearers as "sons" (υμιν ως υιοις). It is, therefore, about their present education as "sons" that Scripture is understood to speak.

The citation from the LXX is precise, except that many manuscripts add the personal pronoun "my" (μου), to form "my son" (Montefiore 2000: 351). Otherwise, the text of Scripture is thought to speak clearly and directly to the author's own day.

Hebrew 12:5 -6 NKJ	Hebrew 12:5 -6 GNT	Prov 3:11-12 LXX
<p>5 And you have forgotten the exhortation which speaks to you as to sons: "My son, do not despise the chastening of the Lord, Nor be discouraged when you are rebuked by Him;</p> <p>6 For whom the Lord loves He chastens, And scourges every son whom He receives."</p>	<p>5 καὶ ἐκλέλησθε τῆς παρακλήσεως, ἣτις ὑμῖν ὡς υἱοῖς διαλέγεται· υἱέ μου, μὴ ὀλιγώρει παιδείας κυρίου μηδὲ ἐκλύου ὑπ' αὐτοῦ ἐλεγχόμενος·</p> <p>6 ὃν γὰρ ἀγαπᾷ κύριος παιδεύει, μαστιγοῖ δὲ πάντα υἱὸν ὃν παραδέχεται.</p>	<p>11 υἱέ μὴ ὀλιγώρει παιδείας κυρίου μηδὲ ἐκλύου ὑπ' αὐτοῦ ἐλεγχόμενος</p> <p>12 ὃν γὰρ ἀγαπᾷ κύριος παιδεύει μαστιγοῖ δὲ πάντα υἱὸν ὃν παραδέχεται</p>

The two sentences go together, with the connective γὰρ in verse 6 indicating that it explains the previous statement. The son is not to "neglect" (ολιγορει) the Lord's instruction (παιδεία). The verb means to "treat as little or lesser" and tilts the response in the direction of "despise" (cf. Josephus, *Ant.* 5.132). If παιδεία is translated sometime as "discipline", it must understand the specific meaning of "instruction," which includes but is not limited to forms of discipline (Milligan 2010: 142). The son is not to treat the instruction of the father lightly or dismissively, but neither is he to "shrink away" or "grow dispirited" by being rebuked or corrected (ελεγχόμενος). The text of Proverbs here provides one of the verbs (εκλυειν) used for his hearers by the author in 12:3. If the son treats the instruction too lightly, he cannot be educated; but if he cowers before correction, he cannot be educated either. In

this case verse 6 could proper understanding in these manners. First, the son must accept that instruction is an expression of love from father to son. Second, the son must understand that the son who is fully accepted by the father will indeed be disciplined the application of the whip (μαστιγῶν) prevents the son from self-destruction through failure to recognize the dangers in certain behaviors (Johnson 2006: 311).

The athletic image found in Hebrews 12 must be placed in a new context: while it would urge a Roman-Greek to consider the metaphor of moral life as an athletic challenge, the language of pedagogy, developed more in the Roman-Greek Judaism, evokes a certain struggle – the struggle endured by the Israelites in the wilderness (Ellingworth 1993: 648). Thus, the athletic imagery and the discussion on education from the Hebrews verses 12:5 - 13 are rather "ordinarily offensive"; using such language, the author draws attention to his readers to imagine their lives as wilderness, as a place where believers have always found themselves. The wilderness period of the Israel people has a similar role to the Greek institution of the sports competition (Johnson 2006: 320). The fact that the readers of the Epistle to the Hebrews find themselves in the competition of the wilderness should encourage them, proving their legitimacy as sons of God and the possibility, for those who are ready, of enter the promised rest.

From Deuteronomy 8:5, in a verse paralleled with Proverbs 3:11-12, the wilderness period was seen as a disciplinary action of God (Croy 1998: 273). Deuteronomy presents the events of The Exodus and the wandering in the wilderness as a period of punishment, in order to direct people towards obedience to the law (11:2). The Septuagint (LXX) translation of Deuteronomy states that God tells off (παιδεύω) the people of Israel as a father tells off his son (8:5) and corroborates this with the suffering in the wilderness (8:2 - 4): "And thou shalt remember all the way which the Lord thy God led thee these forty years in the wilderness, to humble thee, and to prove thee, to know what was in thine heart, whether thou wouldest keep his commandments, or not." From the book of Deuteronomy we notice the tradition that emphasizes the educational aspect of the period of wilderness and not the chastening aspect of that period (Johnson 1978: 239). This tradition is extended in the translation of Deuteronomy. The possible ambiguity of the Hebrew word יָרַב is clarified and restored by παιδεύω (chastening).

Deuteronomy presents the wilderness period as a time required for learning, a time when God's people is prepared for entering the promised land. The fact that the tradition of seeing the wilderness as a time of discipline as outlined in the Hebrews Epistle is not surprising, given the influence of Deuteronomy on the Letter (Bruce 1990: 261).

In *Introductory Studies* 163-177, a fragment in which Philo uses the wilderness period as an allegory of life, linking the events of Marah (Exodus 15), Deuteronomy 8, Proverbs 3:11 - 12 and the face of Esau. For Philo (Colson 1929: 144), the wilderness period means life, trials (like the waters of Marah), and chastening (παιδεία) while Egypt is passion (πάθος). As for the verse Exodus 15:25, according to which God put them to test (πειράζω) at Marah, Philo argues that in trials (δοκιμασία) there is much sorrow, bitterness that makes some lose hope, like the exhausted athletes (ἀθληταί) do, drop their hands in sickness (χεῖρες ὑπ' ἀσθενείας), prompting them to return to Egypt to endure suffering (Introductory Studies 165). Others, however, face the suffering of the wilderness (ερημος) with patience and perseverance in the struggle of life (τόν ἀγώνα τόν βίου διήθλησαν, 165). In light of the values of the tests, Philo advises his readers not to avert (ἀποστρέφω) from trials like them, "for the reprov'd soul (νοουθετουμένη ψυχή) is fed with the teachings (παιδεία) of the doctrine." (167).

Thus, he asserts says that these things must be interpreted allegorically, through the word κακῶ (bad), which means that God chastened them (παιδεύω), he reprov'd them (νοουθετέω) and soothed

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them(σωφρονίζω) (*Introductory Studies* 172). This clearly shows that suffering is a good thing - something that can be understood by less wise people. In fact, the chastening is a such a great blessing that its most humiliating form, slavery, is considered valuable, which is what Philo demonstrates when referring to the blessing of Isaac, when Esau is condemned to slavery for Jacob (Genesis 27:40). In Philo's opinion, this is why Solomon said: "My son, despise not the chastening (παιδεία) of the Lord, neither be weary of his correction. For whom the Lord loveth he correcteth, even as a father the son in whom he delighteth "(Introductory Studies 177; Proverbs 3:11-12). Philo concludes that chastening brings everyone closer to God, because there is no closer relationship than that between a father to his son.

Thus, Philo's discussion on chastening (παιδεία) in *Introductory Studies* proves that close verbal similarities between Deuteronomy 8:5 and Proverbs 3:11 - 12 were not lost in the Hebrew writings of the author of the Hebrew Epistle throughout the times. Philo's description about the chastening (παιδεία) from the wilderness in terms of an allegory of the life struggle (ὁ ἀγών τοῦ βίου, *Introductory Studies* 165) is similar to the one from Hebrew 12:1 - 2, where the author, in the context of the continuous exodus of the people of Israel, urges readers to participate in the struggle (ἀγών) they face with perseverance.

By using the verses from Proverbs 3:11 - 12, the author of the Epistle to the Hebrews shows to its readers that the difficulties and trials they had to face as a people does not mean that God has forgotten them, on the contrary, these trials represent the chastening (παιδεία) of God and this shows that they are children of God: "My son, despise not the chastening (παιδεία) of the Lord, neither be weary of his correction. For whom the Lord loveth he correcteth, even as a father the son in whom he delighteth "(Hebrews 12:5-6; Proverbs 3:11 - 12) (Fox 2000: 217).

After taking the readers back to the wilderness period, the author refers to the negative example of Esau, who was seen in the Hebrew tradition as the best example of unlearned person, a negative character. For example, in *Allegorical Interpretation* 3.2, Esau signifies allegorically the undisciplined life (ἀπαιδευσία). Philo repeatedly portrays Esau indulging in vice and lust. In *Questions on Genesis* 4165, he has a wild, rebellious, difficult, cruel and beastly mind; some are like dogs because they will indulge in the intemperate impulses and behave in a crazy manner, with anger (Lane 1991: 2424). Besides this, being a man of the field, he is a man without a city, fleeing from the law, not knowing the correct behaviour; he is unbridled and rebellious, having nothing in common with the honest, good people.

Esau sold his birthrights (πρωτοτόκια) only for food and therefore had no right to blessing. Unlike Jesus, the firstborn (πρωτότοκος), who receives the legacy of a better name (Hebrews 1:4), Esau is the example of someone who refuses the blessing (12:17). In fact, the author argues that Esau found no opportunity to repent, despite the shedding of tears. In addition, if the readers of the Epistle to the Hebrews readers do not face God's trials, they could become immoral and would lose their inheritance as well, which includes God's promised rest ((Colson 1929: 149).

Hebrew 12:1-13 verses are critical to understanding both the Christology of Epistle and its vision of discipleship. We are, in fact, within the same metaphor as in 12:1—4, where the moral life was sketched in terms of participation in athletic games. The first clue is the use of the verb γυμναζομαι in 12:11, and the second is the consistent use of παιδεία throughout the passage (Johnson 2006: 319).

These verbal clues point us in the direction of the ancient gymnasium as the locus both of sports and education, where the "training" (γυμναζειν) of body and mind went together, where the exercising of physical muscles and the exercising of moral faculties (see 5:4) were learned through instruction and

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practice and discipline. The gymnasium was the place of preparation for participation in a great athletic contest (10:32) before a great cloud of witnesses (12:1), and it was the place as well for the preparation of the mind and will of young men who were to take up full participation as citizens in the life of the Greek *polis* (Jaeger 1985: 169). The main point here is that the physical and mental activities were so intertwined that the term *παιδεία* could be used for the entire process of instruction, as well as for the "instruction" that addressed the mind and the "discipline" that addressed the body.

So central was this institution and its practices to Greek life that it is no wonder that the term *παιδεία* can mean "education" and also "culture" in the broadest sense, for the entire point of the process of education/training was to socialize young men into the mores and values of Greek culture (Jaeger 1939: 203). What is of importance in all this for the passage in Hebrews is that we understand the same subject matter to be running through the entire discussion: the hearers' transformation into "sons" who are "perfected" through the suffering ingredient to obedient faith, as was their pioneer, Jesus (Moule 2009: 104).

Hebrew 12: 7 it can read the broad educational/cultural/athletic metaphor-field. Translations of *εἰς παιδείαν ὑπομένετε* not as a command ("endure for the sake of discipline") but in sense: it is the instruction that makes endurance necessary; one would not endure in order to bring about discipline (Hodgson 1999: 104). It's better to read the verb as the present indicative, in the author's clarification of their experience in light of the scriptural citation: "you are enduring for the sake of an education."

What sorts of education provide God in this text? God is treating them in the manner that fathers treat their sons. From 2:10 we learned that God intended not only to perfect Jesus as Son through his suffering, but that Jesus was to be the pioneer of "many sons" whom God would lead to glory, that is, to God's own presence. God is treating them "as sons," that is, as God's own sons.

By designating his hearers as "sons" whom God is educating, the author picks up from that earlier statement, and from the characterization of Jesus as "pioneer and perfected of faith" in 12:2. The Jesus' own process of perfecting is expressed in 5:7-10: "although he was a son, he learned (*εμαθεν*) obedience from the things he suffered (*επαθεν*)." "It was in the use of the Hellenistic educational maxim: *μαθειν παθειν*, "to learn is to suffer" or "to suffer is to learn" (Thiessen 2007: 364).

The suffering experienced by Jesus was integral to his obedient and faithful response to God. In the same manner, the author insists that sufferings experienced by these discouraged and disappointed Christians are the very means by which they are now to be educated into the status of "sons" like the Son of God, Jesus. When the author of Hebrews Epistle contented in 12:7 that "God is treating you as sons," he means also that "God is treating you as God treated his own beloved Son."

After the linking between education and the father-son relationship, the author can elaborate four dimensions of that relationship, exploiting the analogy between the human parental role and the divine.

1. The first statement begins with a rhetorical question, "What father does not educate his son?" The intended answer must be, "There is none." It is unconceivable.
2. In the next sentence reveals two cultural assumptions built into the question. The first is that in the Hellenistic household, the father's responsibility was to extend the education of sons once they had passed from the care of mothers and pedagogues (Plutarch, *Education of Children* 7-9). This assumption underlies a number of other New Testament passages (see 1 Cor 4:15-20; Gal 4:19; 1 Thess 2:11; 2 Tim 2:1). The second Greco-Roman cultural assumption is that education process was restricted to "freeborn" or legitimate children. So, the corollary of education process is that God

regards the subjects of education as his true sons, children who are, as Scripture attests, "loved" and "accepted." The next term of the analogy, in verse 9, takes the form of a "lesser to greater" argument, so characteristic of this composition (Johnson 2006: 316). If the hearers show respect (ενετρεπομεθα) to the "fathers in the flesh" (της σαρκος ημων πατερας), should they "not even more (ου πολυ δε μαλλον)" submit themselves to the Father of spirits and live? Is the only time in Hebrews when author use the designation "father" for God (in respect to others than Jesus [cf. 1:5]). We can see our "submission" to the Father in terms of the obedience of faith demonstrated by Jesus, and our "living" as a share in God's life, a reward secured for all who follow Jesus in faithful, who has gone there first through his exaltation to the right hand of God's throne (12:2).

3. The third elaboration of the analogy (in v. 10) provides a twofold contrast between God's instruction and that carried out by human fathers. (Bruce 1990: 175) The first is that human fathers can only instruct according to their own perceptions and often their own prejudices (κατα το δοκουν αυτοις). God's instruction, however, is always επι το συμφερον ("for our benefit"). The term συμφερον is used widely in moral discourse for what is to one's advantage or benefit (cf. Plato, *Republic* 341E; Josephus, *J.W.* 1.158; 4 Macc 5:11). God's instruction leads us to what is truly our advantage. The second contrast is founded on respect to the earthly cult and the eternal priesthood of Jesus. Human fathers instruct "for a few days" - their influence is temporary and transitory (Croy 1998: 244). But God's instruction prepares us for God's own presence, so that we can participate (μεταλαβειν) in his holiness (της αγιοτητος αυτου).

4. The final clause of this elaborated analogy underlines in 12:11 the contrasts between pains of the experience with the joy of the result. As long as any instruction or discipline is on-going (το παρον) it causes λυπη ("sorrow" or "grief) rather than χαρα ("joy"). We understand here the example of Jesus, who endured the cross "for the joy (χαρα) that was set before him" (12:2). No student of any art or craft would disagree, nor would the practitioner of any sport: the practice involved in any training is most often painful, a stretching of muscles and emotions and ideas (Jaeger 1985: 249). It is the result that brings joy. Those who are "thoroughly trained" (the nuance of the perfect tense γεγυμνασμενοις) receive back as their reward "a peaceful fruit of righteousness." This conclusion echoes the statement in Hebrew 5:13-14, where the author contrasted an infant "untested by a word of righteousness" to a mature person, who is able to eat solid food, those who have their moral habits thoroughly trained for the discrimination between good and evil (Pajares 1992: 309). The effort of learning gives way to the peace given by a maturity measured by "the righteous one" who truly lives out of faith (10:36).

Having clarified what is happening to them in their sufferance, the author closes this paragraph with a return to the physical imagery of the race or athletic competition, which stands for their pilgrimage toward God. They are to "straighten up," that is, strengthen, their make straight paths for their feet. If they do not become healed, then their disability will grow even greater. The call to make straight paths for the feet is a call to continued progress in their moral transformation, their education in sonship, the participation in the great pilgrimage of faith toward the living God.

2. KNOWLEDGE AND VOCATIONAL EDUCATION

This paper addresses the composite question of whether it is better in vocational education to allow students to design their own models and guide them while doing so, or to provide them with ready-made models. To answer this question we set up a design experiment in which students were asked to

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work on real-life assignments, guided by teachers in the process of designing their products while learning the necessary concepts and skills as they went along. The use of models was required during the design stage.

Practically, the students of Theology learn to imitate the perfect and ethical model –Jesus Christ- in mediation of priests and teachers in visual sacred art. If Bible recommend *imitatio Christi*, the disciple have theoretical knowledge, which must exemplified by teachers life.

The concepts of personal professional theory summarize a personal knowledge base in which professional knowledge and beliefs are internalised. This vocational concept of pedagogy are built upon a combination of declarative and procedural knowledge and are stored in the long-term memory, compiling knowledge which can be specified and applied to different professional situations. So, the concepts of personal professional theory develop through an interrelated process of internalisation and socialisation, in which students grow into the existing body of shared knowledge and collective norms, values and beliefs of professionals of an occupational domain. Any theoretical knowledge – internalised by theoretical concept required in learning process are, also, a communitarian dimension, in which the vocational disciple became a ecclesiastic member and subject in conversation with others. The teacher’s guidance tended to be based on simply providing the students with ready-made models.

Knowledge in competence-based vocational education is conceived as the result of interactions between different individuals in schools, workplaces, directly related to the performance and actions of people, who are personal meaning. This article agrees with Pajares (1992: 317), who postulates that knowledge and beliefs are inextricable related. The symbiotic relation between knowledge and beliefs primarily refers to personal knowledge (Kagan 1990: 442).

From research into the human cognitive architecture it is known that both long-term memory and working memory are integrally related in storing knowledge. Long-term memory incorporates a massive knowledge base that is central to all of our cognitively-based activities, while working memory is where cognitive processing occurs (Kirschner, Sweller, and Clark 2006: 79; Meijer 1999: 48). The knowledge in long-term memory is permanently incorporated in the mind of a person (Anderson 1980: 156). The nature of knowledge in long-term memory is organised, stable and meaningful (Mayer 1981: 103).

In the context of innovative vocational education environments, learning in simulated workplaces is supposed to motivate students and provide them with the concepts, skills and mindsets necessary for further education and subsequent employment (Mittendorff et al. 2008: 76; van der Sanden and Teurlings 2003: 131; Boersma et al. 2009: 10).

Although the assignment clearly included many opportunities to help students gain a better understanding of theology and humanist- artistic models, the school’s workshop culture was based on the precept of ‘get things finished’. Hence, the use of models appeared to be situated and tacit, while the relevant knowledge and the models used remained situation-bound. Neither the modelling process nor the relevant knowledge was explicitly reconstructed. Hence, by participating in communities, students may be compelled to aim for new goals that encourage them to adopt appropriate new practice-related tools, including concepts, symbols and models (Gravemeijer et al. 2002: 14). In guiding the participation process, teachers help their students understand the use and meaning of the concepts, symbols and models as tools in a range of similar practices. At the same time, the teachers themselves are participants in the same community and co-construction process as the students. It is important to remember that the teacher is not just a guide in this process of meaning-making, but also a genuine participant (van Oers 2001: 62).

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CONCLUSIONS

Greek education, as a whole, has meant a lot to the history of the human spirit. It became the foundation of European humanism. Highest purpose pursued by the Greek teacher was to give society a man who was an expression of perfect images as Plato says that "we want to be reflected in people who are subject to the educational process". Greeks discovered the need to address children soul, to be modeled, like the potter who shapes the clay.

One of those who have attempted to link pedagogy of the Greek Old Testament is Philo, who, by the allegorical method, in the time of Christ, emphasized firstly the great merits of education in human life. If the Hebrew education was centered on adapting the knowledge acquired moral life of the ancestors, for Christians it is a means of moral improvement and community, with an obvious benefit. Analysis of the Hebrew 12 text reveals the foundations upon which modern education are build, especially from the vocational-theological pedagogy, following the application of concrete to anchor the contemporary vision of modern Europe.

Models are structured representations of physical or ideal realities, functioning in education as well as in science, as tools in problem-solving activities. As such, they are important in both individual and social cognitive processes (van Oers 1988: 138).

By collaboratively reflecting on, and improving the production process, participants learn to understand the, often tacit, rules and codes of the workplace and the knowledge that underlies such rules and codes. As prototypes, models could function as tools to aid students to think ahead and reflect on their own processes. As a result, students' understanding could grow.

The important role of the teacher, as guide to knowledge acquisition and understanding in practical environments, also includes introducing students to the practice of reflecting religious feelings with theological and visual-artistic tools.

The intervention started with a session with the teachers in which the aim of the intervention was explained and discussed. The teachers were provided with an educational instrument that consisted of a lesson plan and examples of problems that might occur during the students' design processes. Teachers were supposed to pay explicit attention to relating situated knowledge to more general knowledge; moving from practical problems to modeling by the use of ethical and theological-scientific concepts.

When learning takes place in a workplace setting, the agents involved (students and teacher) may be characterized as a *community of practice* (Lave and Wenger 2005: 150). In such communities, the participants share basic assumptions regarding the community's rules and purposes.

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**STUDENTS' PARTICIPATION IN FORMATION OF QUALITY LEVEL OF EDUCATION
AT FACULTY OF ENGINEERING MANAGEMENT
AT POZNAN UNIVERSITY OF TECHNOLOGY.**

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Abstract

Students participation in formation and improvement of internal system of education quality providing in Poland is one of requirements included in the law on higher education. The authors present how community of students takes part in shaping the level of education quality at Faculty of Management Engineering at Poznan University of Technology. In the paper, there are some practical solutions applied to cooperation between Faculty authorities, employees and students and striving for continuous improvement of education quality level presented

Key words: *quality of education, quality shaping, student, university/ higher school, student's role*

1. INTRODUCTION

Bringing up issues of the forming of the level of the quality of education, explicit defining this issue is necessary. It is possible to define the quality in the term of quality in different ways, considering the way possibly closest to pondered problems

Modern definitions of encyclopedic capture the concept of quality primarily in terms of philosophical and social issues. PWN Encyclopedia defines quality in terms of philosophy and describes it as "essential features of the object, distinguishing it from others and providing for its specificity in a given respect" (PWN, 1993).

In the broader literature many different definitions and concepts of quality are presented. To a large extent, the multiplicity of definitions arise from the aspect in which the concept of quality is concerned, we can distinguish the quality (Olejniki and Wiczorek, 1982):

- in terms of philosophy, as the separation of objects and phenomena of items that can be regarded as qualitatively homogeneous,
- in terms of law, as compliance with quality standards contained in relevant legislation,
- in sociological terms, as users respond to the specific characteristics of products,
- the humanistic aspect, as the development of living and working conditions conducive to growth in the level of culture and morality of the human environment,
- the technical aspect, as to understand the qualitative properties of preference for certain objects broadcast, in order to demonstrate the usefulness of the social optimum and satisfying consumer expectations,

- in the economic aspect, as the inclusion of social value, assigned to products of quality properties.

Quality is one of those concepts that are not easily defined. One of the reasons for this is that the quality is not a concept unique, and often the meaning depends on the context in which it is used (Mazur and Golas, 2011). Denis Lock recognizes quality as "the degree to which a product or service to meet customer requirements" (Lock D, 2002). According to Juran quality is "fitness for use or application" (Prussak, 2006) and should be considered as:

- degree of satisfaction of customer needs,
- the degree of consumer satisfaction calls,
- the degree of compliance with the standards and requirements,
- the degree to which the purchaser acquires the product, take precedence over other
- trait or syndrome, which can be differentiated.

Definition of W.E. Deming recognizes the concept of quality as "the expected reliability achieved at homogeneity and at low cost and according to market requirements" (Mazur and Golas, 2010) or the degree of market needs at minimal cost.

A suitable example of presenting the many aspects of perception of quality, by given Faculty of Engineering Management entities (universities, government departments, staff, students, etc.) Kano model is shown in Figure 1, according to which customers, or in the case of university students perceive the quality of services due to three levels of requirements.

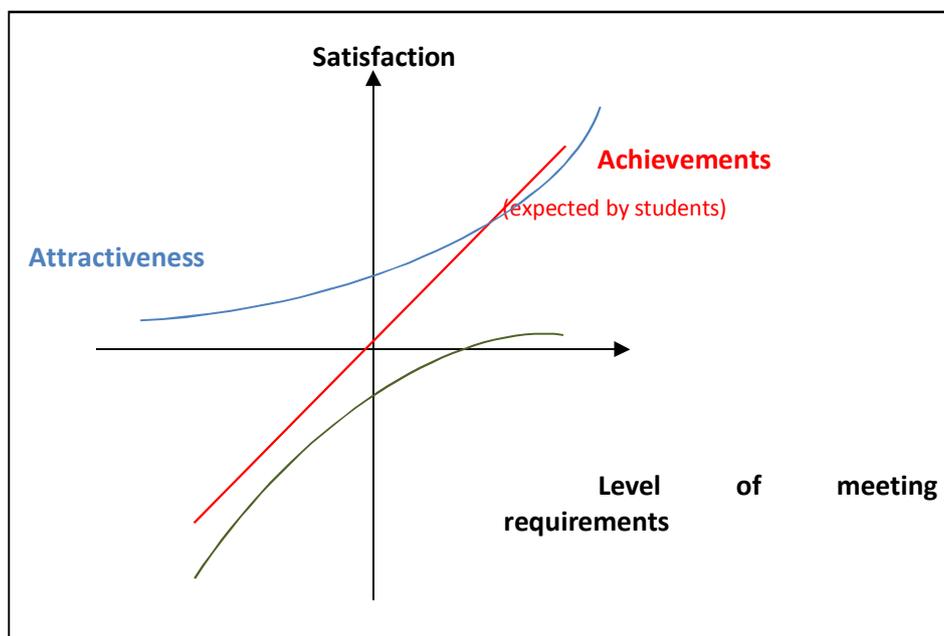


Fig. 1. Kano Model (Prussak, 2006)

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Various approaches to the formulation of the concept of quality has made the International Standard Organization also decided to define this term as "the degree to which a set of inherent characteristics fulfills requirements" (ISO 9000:2006).

Understanding the concept of quality as a category in itself, leads to the conclusion that the quality of education should be understood as the degree to which set of characteristics in terms of education, is able to satisfy the needs of stakeholders. Quality assurance in higher education are all planned and systematic actions directly related to maintaining and improving the quality of education and research necessary to establish the appropriate degree of confidence as to the educational service that meets agreed quality requirements 'clients' internal and external (Skrzypek, 2001).

The main task of shaping the quality of education at institutions of higher education is to provide stakeholders with optimal conditions for the realization of their objectives (related to education) so as to achieve satisfaction and satisfaction with the level of service performance. Stakeholders of university are the candidates, students, faculty and administrative staff, employers, organizations and scientific associations and employers, many other graduate students. Quality of education and its development involves many steps from shaping the quality of learning programs offered by the Faculty of Management directions, organization of classes, the quality of teaching and evaluation of performance, ensuring access to teaching aids, ending with the environmental quality of education, care for students and their mutual relations. Given all these issues, we can understand how a wide area of operation is this quality of education. This area can be divided into three smaller sections, to which the relevant legal regulations concerning the quality of education:

- external quality control schemes
- internal control systems and quality assurance,
- creating / building a culture of quality.

Summing up the above analysis it can be concluded that the quality of education is a set of certain rules related to the improvement of teaching.

2. LEGAL REQUIREMENTS CONCERNING QUALITY OF EDUCATION AT UNIVERSITY

Formation of the broader quality of Polish universities, subject to the necessity of adjusting the education system to control the social, legal and organizational issues, which have adopted the European Union countries. Creating internal quality assurance systems is determined by factors affecting them, they can be characterized in two areas. First, external conditions in the area of international and national conditions created in university environment, in the second inter-university, pro-quality of organizational behavior. Different groups of factors are as follows:

A. External factors:

1. Bolognese declaration signed in 1999 by European countries. It initiated the so-called Bolognese Process focusing on substantial changes and moving the educational systems of individual European countries close, in order to create the European Higher Education Area. As part of the Bolognese Process a cooperation of European countries is one of key activities in ensuring the quality of education (<http://www.ehea.info>).

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2. Results of the work of the conference of ministers of the higher education of countries participating in the Bologna Process, in particular the conference in Berlin (2003), where creating the country of the system of ensuring the quality of education in everyone was declared, an accreditation system or similar procedures is functioning, as well as a participation of foreign experts is considered and realization of other forms of the international cooperation. As part of this system the well-defined scope of competence of all involved institutions exists, with the participation of students an evaluation is being effected (internal and external) of programs of studies or the institutions, and its results are being published. The next conference significant for the quality of education was the one in Bergen (2005), where standards and clues concerning ensuring the quality of education in the European Higher Education Area were suggested.
3. Action of the ENQA network (European Network for Quality Assurance in Higher Education) to which the conference of ministers of the higher education in Berlin entrusted executive works associated with coordinating systems of the quality assurance of educating in Europe. The result of ENQA work was document and Guidelines for Quality Assurance in the European Higher Education Area approved during Conference in Bergen Standards (<http://www.enqa.eu/>). In this document standards and concerning guidelines were suggested: of the internal system of ensuring qualities of education at the college, the outside system of the quality assessment of programs or institutions as well as the agency of ensuring qualities of education (of "accreditation agencies") (Kraśniewski, 2009, Wawak, 2011).
4. Drifting of the Parliament of the European Union from 2008, placed in the official journal of the C 111 European Union / 01 from 06.05.2008 on establishing the European Qualifications Framework for the lifelong learning. The European Parliament determined common principles of the quality assurance which will be referred to qualifications acquired in the higher education and vocational education and training put in national qualification systems to the European Qualifications Framework.
5. Operations of the Polish Commission Accreditation, being an independent institution, acting as part of the higher education system in Poland for improving the quality of education. Assisting Polish public and non-public colleges in building educational standards up to the standards of the best models being applicable in a European and global academic space is a basic aim of the Committee (www.pka.edu.pl).
6. Regulations including the Act the Law on the higher education and regulations of Science Department and the higher education directly and indirectly influencing the quality assurance at higher education institutions.

B: Internal factors:

1. The mission accepted by colleges and the development strategy and the internal quality policy built up to provide assurance of pro-quality domestic and EU readings.
2. Holistic understanding the process of the quality (from the level of providing the quality assurance to the level for the quality of education in all processes carried out at the college).
3. Level of the centralization/decentralization of the decisions, the functions and quality cells at the college, along with hierarchical relations and the formal structure of units.

4. The determination and the consequence of the staff managing the college and individual basic units of the college in implementing, the realization and the evaluation of processes of the quality assurance.
5. Attitude of the academic staff and students towards the completion of the process of the quality assurance (particularly in the area of the quality of education) and of consequences resulting from actions taken.
6. IT infrastructure held by colleges, supporting processes of the quality assurance.
7. Spotting the quality, as the factor of the competitiveness on the educational market, both of national, as well as foreign colleges.
8. Internal documents so as: articles of association, regulations, electoral law, regulations of the Rector etc. as essential for stakeholders of the College, most closely applying to defined principles and rules at the institution.

3. STUDENTS PARTICIPATION IN EDUCATION QUALITY FORMATION AT THE FACULTY OF MANAGEMNT ENGINEERING AT POZNAN UNIVERISTY OF TECHNOLOGY

Correct work of education quality providing system depends on strategy developed by the University. One of the elements necessary for shaping and improving education quality is involvement of the University stakeholders, including students, in the whole process. More and more often, universities notice that the element most important in the process of providing and improving quality of education is a student. Quality of education is being improved for students mainly and well educated graduates of each university is its best flagship. The place of students among stakeholders of the Faculty of Management Engineering at Poznan University of Technology is presented in the figure below (fig. 2).

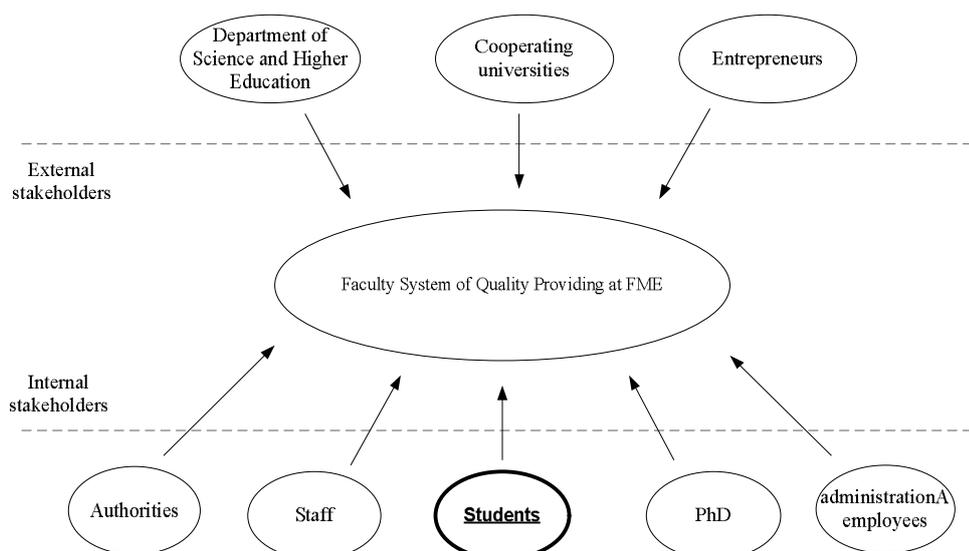


Fig. 2. External and internal stakeholders influencing education quality of the Faculty (own work)

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The law on higher education defines obligation of including students, through their representatives, to some of the tasks realized. For example, in the art. 68 the following requirement is presented “*one of the specific competences of a council of a basic organizational unit is: 1) (...)2) definition after consulting with students self-government and in consistency with requirements defined by senate of public university or collegium of non-public university plans of courses and education programs*”. What is more in the art. 104.2. it is written that “*scholarships defined in part 1 are given to students and PhD students after consulting with executive body of students self-government defined in the statute of students self-government and with executive body of PhD students self-government* (Book of laws (DZ.U) from 2005. Nr 164, issue 1365 with later changes). There are numerous similar records in the bill and thorough analysis leads to the conclusion that students should participate actively in shaping education quality at their universities. At the Faculty of Management Engineering at Poznan University of Technology students take part in formation of internal system of quality control and education quality providing. Because of the above mentioned, students representatives take part in development of education programs and courses plans. Students focus mostly at developing and correcting courses plans. There is a student in each faculty commission for education at each course and he/she influences decisions concerning courses programs taken and changes introduced into them. As commission members they can introduce comments, f.ex. connected with mistakes which can negatively influence education level. Students reps are a link between all the students of a course and the rest of commission members, deciding on importance of each subject for education cycle. Students also take part in sessions of Poznan University of Technology Senate, basic councils and collegiate units of university. Thanks to membership in the above mentioned bodies and commissions students are able to take part in the Faculty Social Commission. As they are the majority of the commission their vote is decisive in decisions concerning other students. The issues considered include mostly benefits the students can apply for when their financial situation is poor. The principles for applications assessment are defined in the Statute for material aid granting. This is how students help other students, improving image of the Faculty and leading to customer (student) requirements meeting which is priority from education quality shaping at FME point of view. Also according to the Rules of the Faculty Committee on Quality of Education, the team, in addition to quality specialists of one representative of Student Government. Faculty Committee for Quality Assurance has taken steps to maintain and improve the internal quality assurance system of education at the Quality Engineering Department University of Technology. The task is the student's active participation in committees and the indication of the impact of students on the processes of the Department. The student as a full member of the committee shall attend all its meetings and deliberations. Thus contributing largely to improve the quality of education at the Faculty. This year, the work of the Departmental Committee on Standards in substantial part focused on the preparation for the certification of quality management system implemented at the Department of Management Engineering. Currently, the Faculty has been certified ISO 9001:2008 in education full-time students and part of the first and second degree and doctoral studies and postgraduate studies. Students also participate in the evaluation of teachers and assessment of the classes. Questionnaire design is one of two forms of evaluation of educational quality.

It is conducted by the University in close collaboration with the student government. The survey shall be completed via the Internet at the end of each semester. When completing the student survey is an easier task, because once they are proposed, leading to corresponding data items. The form is the same for all courses of study at the university. Surveys conducted on both the object and the teacher. The questions in the survey raise issues such as preparation leading to the classes, the impact of teaching on student intellectual development, form of proof of knowledge or understanding of the material is

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driven. Once developed, the results of surveys shall be reported to the Dean, who draws the appropriate conclusions from them.

Because of involvement of students self-government and regular motivating to questionnaires filled out questionnaires number increases continuously. Additionally, the Department of Management Engineering, each academic teacher has the right to conduct a survey among its students, to the views of issues related to education within a given subject. These surveys are not mandatory, and each student who wishes to participate in the study contributes to the improvement of education quality. Students and their representatives have the opportunity to choose and influence the proposals of elective courses, and elective subjects.

Faculty of Management University of Technology allows students to choose specific items. Examples of this are elective courses or freely chosen by the students. With a list of courses, students shall select the most interesting of subjects, thus ensuring for future education. Faculty of Management regularly takes care of the increasing knowledge in science subjects such as mathematics and physics. Students who were in the first year after writing a test checking their existing knowledge are recruited from the elective courses listed above in science. Participate in such activities, students who dropped out in tests to check the least. Therefore, the Faculty of Management strives to make its graduates have a high level of education. Poznan University of Technology students are also involved in making many decisions by the Department of Engineering Management, has 20% representation in the Council and the Faculty Senate, University of Technology. They also have the possibility of membership in the electoral college, the same shall not be passive when such important measures as the election of university authorities, the Department of implementing its strategies and policies. The main area of interest is the analysis of the students of the Faculty of Management Strategy in terms of its bias to increase the quality of training packages, training, development of the university, interdisciplinary, and most importantly the relationship with students. In the area of external quality control systems the role of student is also noticeable and mainly consists of the activities of the Polish Commission for Accreditation as an expert Student. Activities of the Polish Accreditation Commission regulates the Law on Higher Education. The team visiting an institution comprised of 2 to 8 people depending on the type of visit or the size of the University. Also, student (other than the visited institution) is one of the members of the team. Under the Statute of Polish Accreditation Commission is the expert Student Parliament of Polish Republic. The visiting team of the unit also includes other experts and members of the Polish Accreditation Commission. Student Activities in the band consists of analysis of student affairs at the visited unit. During the accreditation of expert Student checks the university to adapt to the requirements of the Act and evaluates its work from the perspective of the student. Through meetings with students and interviews with staff verifies the information received, creating a partial report. Then a common version of the final report of the visiting team is developed, which includes comments and compliments are indicated by each of its members. By his/her remarks in the committee a student who raises the quality of education at the location visited the Faculty / University. Faculty of Management University has among its students PSRP Expert at the National Accreditation Commission, which evaluates a different look to the department and helps in the work affect the improvement of the quality of education. In terms of creating / building a culture of quality, students take their own initiatives to improve the quality of student learning: training, conferences, creation of research groups. The Faculty of Engineering, Management currently operates eight research groups. Each of them is aimed at self-education. Students therefore ensure that their level of knowledge is constantly rising. Organized by students for students and conferences always have a great interest and involve any number of positive experiences. At the Faculty of Management Engineering at Poznan University of Technology students play a very important role both as consultants in making decisions

affecting the quality of education, as well as the design of many solutions influencing the quality of education. Figure 3 presents a summary of the discussed areas of the student at the Department of Management Engineering of the quality of education.

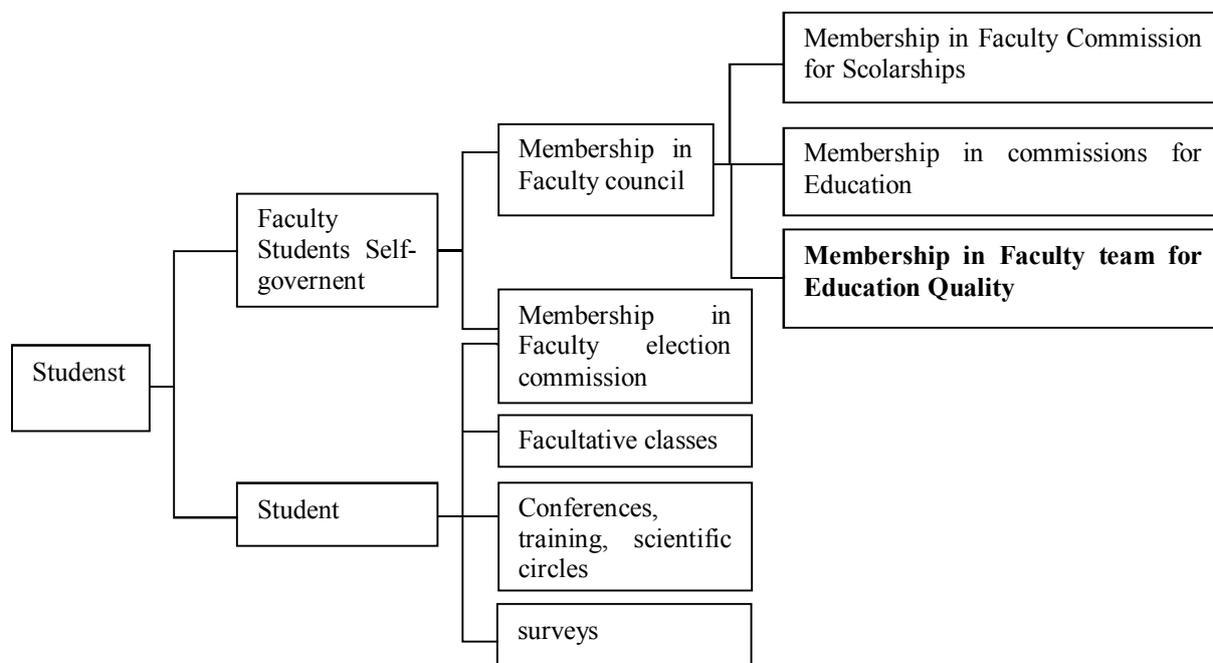


Fig. 3. Students of FME at PUT participation in processes striving for quality (own work)

Students can influence quality of education thanks to both membership in students self-government bodies and to active participation in faculty life and initiatives taken (surveying, scientific circles, research projects etc). however, the stress should be put on the most important role of students which is their active participation in shaping and improving education quality providing system. Holistic approach to the problem provides opportunity for its correct analysis, solution and improvement. Without students help verification and solution is not possible as it is necessary to have a look at a problem defined from the main education service receiver, a student, perspective. It is important to take a feedback between organizational units into consideration.

4. ORGANIZATION OF EDUCATION QUALITY PROVIDING SYSTEM AT FACULTY OF MANAGEMENT ENGINEERING AT POZNAN UNIVERSITY OF TECHNOLOGY

The main tool used by the Faculty of Management Engineering to take care for education quality is the Faculty System of Providing Education Quality. Its main goal is adjusting proper mechanisms of designing, monitoring and improvement of education process to courses provided. The Faculty System of Providing Education Quality consists of:

1. Assessment of education process at courses and specializations provided.

2. Assessment of lectures and seminars quality and conditions they are conducted in.
3. Assessment of quality and availability of information concerning education at courses and specializations provided.
4. Assessment of consistency of courses content with requirements and standards defined by KRK for the courses and their fitness to requirements of local labor markets
5. Implementation of tools to be used for realization of the activities defined above.

At the Faculty of Management Engineering at Poznan University of Technology, the model applied to development, functioning and improvement of quality providing system is continuous improvement cycle, also called Plan-Do-Check-Act cycle or Deming cycle (Gołaś and Mazur 2011). In the figure below (fig. 4.), the model of internal system providing quality with students participation is introduced.

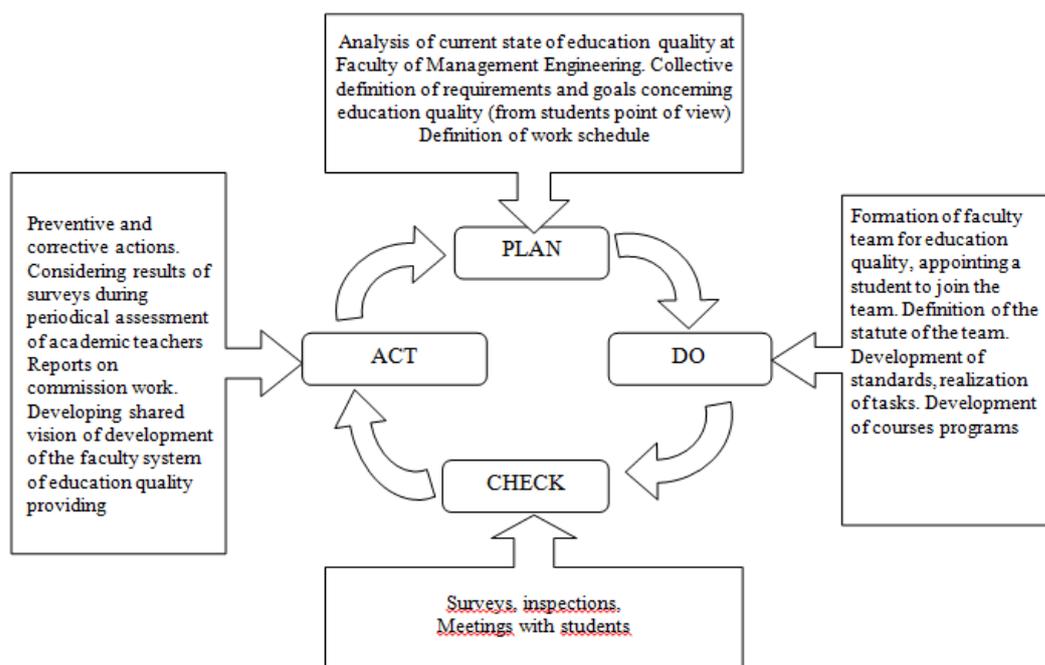


Fig. 4. Faculty system of education quality providing at Faculty of Management Engineering at Poznan University of Technology – activities with students participation (own work)

The System of Education Quality Providing at the Faculty of Management Engineering at Poznan University of Technology is constituted according to the resolution passed by Senate of Poznan University of Technology and referred to introduction of the University System of Education Quality Providing. The basic goals and assumptions of the system are presented in the document entitled “Faculty system of education quality providing” and approved by the Council of Faculty of Management Engineering. The model presented above includes the following activities realized during exploitation of the system:

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- assessment/analysis of current state
- definition of goals for the ranges given
- work scheduling
- definition of unit responsible for shaping and improvement of education quality providing system,
- realization of assumptions and jobs ordered
- evaluation of results
- corrective and preventive actions and continuous improvement.

The basic unit responsible for internal system of education quality providing is the Faculty team responsible for Education Quality, responsible for:

- development of clear procedures concerning education quality providing at the Faculty,
- increased importance of didactic work,
- continuous improvement of quality and condition of work of courses conducted at the Faculty,
- development of mechanisms for management, monitoring and improvement of Education Quality Providing System at the Faculty,
- improvement of communication systems for students and employees and potential candidates for students and all the parties interested in studying at the Faculty,
- improvement of process of informing potential candidates for students, their future employers and local authorities about quality and level of education.

Faculty Commission for Education Quality Providing consists of the Dean of Faculty of Management Engineering, representatives of academic teachers (their number should be defined by the Faculty Council) and representatives of students. List of names of Commission members, its president and secretary is suggested by the Faculty Dean and approved by the Council of Faculty of Management Engineering. Every member of the Faculty Commission for Education Quality Providing is entitled to take part in trainings and seminars concerning quality of education as long as financing with the Faculty means is possible. The president is leading the works of the Faculty Commission for Education Quality Providing. The Commission meets at least once during each semester and the date is appointed by the president, the discussion is documented by the secretary. At the beginning of each academic year, the Faculty Commission for Education Quality Providing develops a plan of its work. Once a year (till 31 March) the Commission presents a report on its work to the Dean of Faculty of Management Engineering. The Dean is obliged to present the report to the Faculty Council no later than at the closest Council meeting. The protocol of the Council meeting concerning education quality is passed to the Vice-chancellor for Education till the end of May each academic year (Statute nr 93 of Academic Senate of Poznan University of Technology dated on 30 May 2007). After the report is approved by the Council, it is kept by the Commission Secretary.

The tasks of the Faculty Commission for Education Quality Providing at the Faculty of Management Engineering also include the following:

- active participation in preparatory actions taken for quality audits and accreditations,

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- initiating, organizing and co-organizing trainings, meetings and seminars concerning issues connected with educations quality,
- cooperation in the Faculty promoting initiatives including periodical meetings with youth and secondary school teachers, open lectures, open days, science festivals, seminars and conferences, seminars etc.,
- analysis and assessment of all activities influencing education quality at the Faculty.

Students play an important role at every stages of the work, and influence the Faculty System of Education Quality Providing at Faculty of Management Engineering with all the other stakeholders.

ACKNOWLEDGEMENTS

Development of a new concept of quality for Polish universities depends on necessity of adjusting education system to social regulations, legal system and organizational requirements accepted by member countries of European Union. The Law on higher education, novelized in 2011, along with executive documents connected, creates new perspectives for creating internal systems of quality providing systems in Polish universities. In the paper, all the legal regulations supporting taking actions striving for increasing quality of education are introduced. The approach to internal system providing quality formation introduced in the paper and implemented at Faculty of Management Engineering integrates both formal requirements defined in EU and Polish law regulations and attitude of students and their commitment in activities supporting continuous improvement of education quality at Faculty of Management Engineering at Poznan University of Technology.

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**THE RULES OF QUALITY MANAGEMENT – AN EXAMPLE OF IMPLEMENTATION OF
THE FACULTY OF MANAGEMENT ENGINEERING POZNAN UNIVERCITY OF
TECHNOLOGY**

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Abstract

In 2011, the Department of Management Engineering was certified with quality management system compliant with ISO 9001:2008. Application of the principles of quality management is necessary in terms of meeting the requirements of the system, its correct operation and continuous improvement. The authors present the steps in implementing the quality management system, a model and practical ways to implement quality management principles on the example of the solutions adopted at the Department of Management Engineering of PUT.

Key words: *quality management, continuous improvement, quality management principles, quality planning, quality providing, quality controlling.*

1. INTRODUCTION

The mission of the Department of Management Engineering of PUT is education at all levels of higher education and scientific research and R & D in the broader engineering management and engineering project management, in line with the needs of society in the emerging knowledge economy (www.fem.put.poznan.pl). The realization of this mission, forcing the need for modern management methods department, with particular emphasis on the needs of the education market in Poland. The realities of the free market in education (Włodarkiewicz – Klimek, Migas, Kałkowska, Trzcieliński, 2011) and training at tertiary level, forces the approach to the management of the department with particular emphasis on quality and continuous improvement of the quality of educational services. Therefore, for the Faculty of Management as an independent organizational unit of the Technical University of Poznan, the faculty decided to implement certification and quality management system conforming to ISO 9001:2008.

2. THE MAIN ASSUMPTIONS OF QUALITY MANAGEMENT

Quality management is a coordinated action on directing the organization and its supervision on the quality (ISO 9001:2006). Quality management is a function of managerial responsibility for all aspects of quality of service provided by the university. It is planned and organized system of managing the impact of managed system (Hamrol, 2008), is the set of processes in the functioning of the department of composition, which comes all that is going directly to meet the quality requirements.

Quality management is multidimensional and interdisciplinary. Selected aspects of quality management are related to different fields of knowledge and science, are presented in Table 1.

Table 1. Areas of quality management and related fields of science (based on Hamrol, 2008)

QUALITY MANAGEMENT AREAS	FIELD OF SCIENCE
Planning quality objectives	Marketing, Sociology, Management
Planning and keeping resources necessary to achieve assumptions of quality policy and quality goals	Management, Economics
Motivation to achieve quality goals	Psychology, Sociology, Management
Creating safe work environment	Ergonomics, Sociology
Standardization and organization of quality system	Law, Management
Internal and external communication	Computing, Sociology, Psychology
Project design and process design oriented to customers	Technical sciences, agricultural sciences, optimization theory
Evaluation and quality assessment	Qualitology, Qualitometrics, Metrology, Statistics
Quality controlling, quality improving	Management, Control theory, decisions making
Providing product quality in distribution and exploitation	Reliability theory, Marketing
Analysis of quality costs	Economics, accounting

Primary task of quality management is continuous improvement. The process of continuous improvement is a management function directly oriented to increase the efficiency and effectiveness of interventions. It is part of the management focused on increasing capacity to meet the requirements of quality (Hamrol, 2008). Literature extensively presents the need for continuous quality improvement. Quality is often defined as anything that can be improved (Imai, 2007) so continuous improvement is the pursuit of services, processes, actions, etc.

Quality management includes all activities of management, which determine the quality policy, objectives and responsibilities (Hamrol and Mantura, 2005), and their implementation within the quality system, by means such as:

- quality planning,
- ensuring quality,
- quality control (meeting requirements),
- improvement of quality (Pszczolowski, 1978).

Quality planning at the Department of Engineering Management includes activities associated with determining the quality objectives, as well as any resources, processes and responsibilities associated with the achievement of those objectives. Quality assurance is to ensure that quality requirements are met. In this area, special attention is concerned with aspects of the functioning of the internal quality

assurance system of education. Quality assurance in higher education are all planned and systematic actions directly related to maintaining and improving the quality of education and research necessary to establish the appropriate degree of confidence as to the educational service that meets agreed quality requirements 'clients' internal and external (Skrzypek, , 2008). The guarantee is to ensure that the requirements designed, implemented and continuously improved the quality of education system, whose key elements are the external and internal quality systems. Quality Assurance System at the Department of Management Engineering of PUT established pursuant to Resolution of the Academic Senate of the University as on the introduction of a system to ensure Institutional Quality Education. Basic assumptions and objectives of the system are set out in the "faculty quality system of education" and approved by the Department of Engineering Management. This system refers to the central government, the education quality assurance system in force at the Poznan University of Technology. Adopted at the central university system defines the framework conditions and activities related to the quality of education and includes general principles and guidelines for the quality of education, which are implemented at the Department of Management Engineering.

Quality control is to prevent defects implemented at the faculty of education, shortcomings and incompatibilities, and to maintain compliance with the requirements while maintaining an optimal level of cost. Quality improvement is to continuously increase the capacity and ability to maintain an appropriate level to meet the requirements (Golas and Mazur, 2011). To improve the quality to be effective and have endeavored to continuous improvement of the processes necessary to comply with quality management principles, which stipulate the organization and its employees generally understood the problems of quality (Baginski, 2004, Jazdon, 2002), and identify in a simple and concise goals and job quality policy pursued by the management (Prussak, 2003, Wolniak and Skotnicka, 2007). In 1997, the ISO Technical Committee TC 176 has published a document entitled "Principles of quality management and guidelines for their use" (Golas and Mazur, 2010). It defines eight quality management principles:

1. Customer Orientation
2. Leadership
3. Involvement of people
4. Process approach
5. System approach to management
6. Continuous improvement
7. Making decisions based on facts
8. Mutual relations with suppliers

The importance of quality management principles are presented in Table 2

3. THE QUALITY MANAGEMENT SYSTEM IMPLEMENTED ON THE FACULTY OF MANAGEMENT ENGINEERING POZNAN UNIVERSITY OF TECHNOLOGY

The quality management system designed and implemented at the Faculty of Management Engineering of PUT is in compliance with ISO 9001:2008. Work on developing this system, its design (Jasiulewicz-Kaczmarek and Misztal and Tiggy-Winkle, 2011), implementation, and improvement can be divided into four main phases (Golas and Mazur, 2011): planning projects related to the introduction of the QMS, the QMS design, implementation of the QMS, maintenance and improvement of the QMS (operating system). The characteristics of these phases, together with the activities undertaken at each stage are presented in Figures 1 to 3:

Table 2. The meaning of quality management principles

Principle	The meaning of quality management principle
Pro-customer orientation	Organizations depend on their customers and should therefore be to identify and understand current and future customer needs to be met with their requirements and exceed customer expectations. Customer requirements for the educational services market in Poland is determined by the requirements of the labor market, the needs of students and graduates of secondary schools. Faculty of Management has developed its own model of cooperation with the business, which is the basis for building offer for the customer (Włodarkiewicz - Klimek and Nadolna and Migas and Kałkowska, 2011).
Leadership	Leaders establish unity of purpose and direction of the organization. The role of leadership is to create and maintain the internal environment of organizations in which people can become fully involved in achieving the objectives of the organization. The principle of leadership at the Department of Management Engineering faculty actively pursue the authorities participating in defining the objectives, identifying options for achieving them, and motivating researchers and teaching faculty to implement the strategy.
People commitment	Employees are the core of the organization and their full involvement enables their potential for the good of the organization. Employees must know what their responsibilities are and what role in shaping the quality of services. Faculty of Management maintains a high scientific level of their staff, ensures the continuous development by engaging employees in a number of projects in research, development and organization.
Proces approach	The desired result is achieved if, activities and related resources are managed as a process, which is a collection of interrelated elements that transform inputs to outputs (Brilman, 2002, Hammer and Champy, 1996, Fiddler, 2002). The process approach is the concept of universal, very good blending into the characteristics of different organizations (Mazur and Golas, 2007), and therefore college faculty. The process approach allows the integration of all the key mechanisms of the Faculty of Management (the process), which enables the planning, supervision, monitoring and analysis activities undertaken in such a way that the management of the department was effective. Appropriate identification process allows for clarification of responsibilities and accountability, monitoring the efficiency of information flow, and also to agree on the allocation of costs, which in view of the department of management is very important (Mazur and Golas, 2006).
System approach	Identifying, understanding and managing interrelated processes as a system contributes to the efficiency and effectiveness in achieving goals.
Continuous improvement	It is necessary that continuous improvement of the functioning of the entire organization was the constant aim of the organization. Emergency action to improve the sporadic use in places that require it, has nothing to do with the idea of continuous improvement. Justified in terms of the effectiveness of the procedure is only consistent with the principle of continuous improvement PDCA (Plan-Do-Check-Act), which guarantees the periodicity and regularity of improvement actions (Mazur, 2009). The issue of improving the Department of Engineering Management is very timely and is carried out continuously. Decision making always carries some risk. To be effective decision-making must be based on an analysis of data and information. Analysis of performance and ability to interpret from the perspective directions of development of the Faculty of Management, offers educational excellence and continuous improvement of internal

	processes is a key success factor.
Decisions making based on facts	Decision making always carries some risk. To be effective decision-making must be based on an analysis of data and information. Analysis of performance and ability to interpret from the perspective directions of development of the Faculty of Management, offers educational excellence and continuous improvement of internal processes is a key success factor.
Relations with suppliers	The organization and its suppliers are interdependent and mutually beneficial ties enhance the ability of both parties to create value. The role of the Faculty of Management is to build relationships with suppliers in order to guarantee on the one hand, the smooth implementation of the main process building on the other policies of mutual benefit and satisfaction.

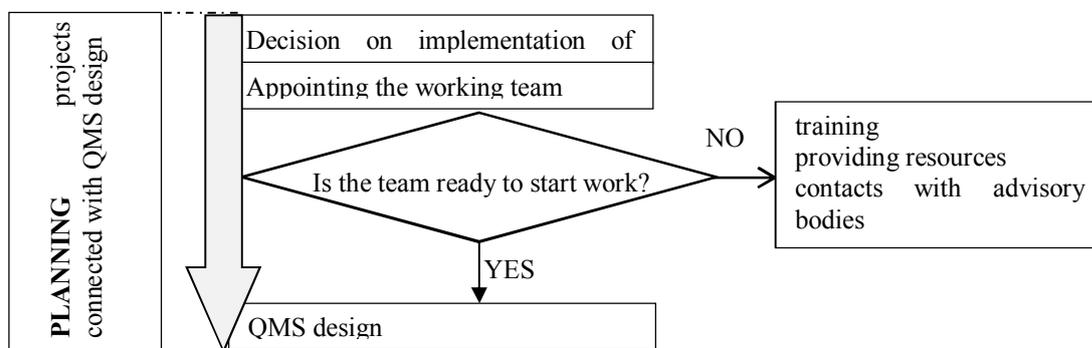


Fig. 1. QMS for Poznan University of Technology planning

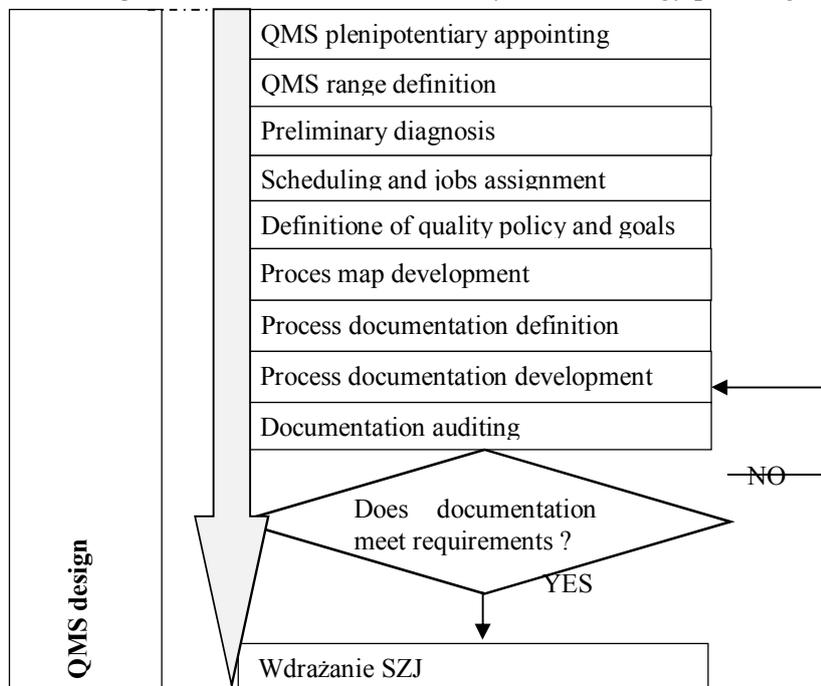


Fig. 2. QMS for Faculty of Management Engineering at Poznan University of Technology design

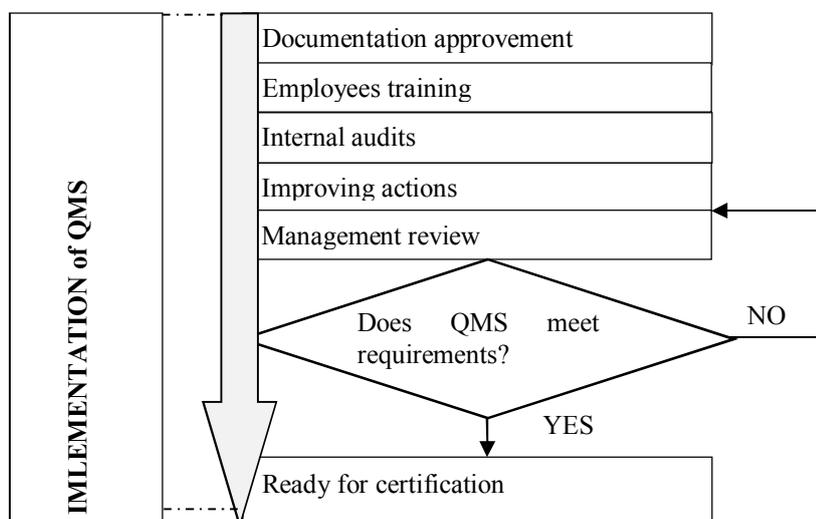


Fig. 3. QMS implementation at Faculty of Management Engineering at Poznan University of Technology

The decision to introduce a Quality Management System at the Faculty of Engineering was taken, Dean of the Faculty of Management has guided the prospect of its development, adaptation to the requirements of stakeholders, as well as the need to document the internal processes in order to properly plan, implement and monitor improvement. For the working group persons having knowledge and practical experience in developing management systems in organizations of different industries were appointed, and therefore it was not necessary to conduct additional training and develop cooperation with consulting and advisory bodies. In accordance with the requirements of ISO 9001:2008 Plenipotentiary for Quality was also appointed, his/her duties and powers were defined, and the position of the Plenipotentiary for Quality in the organizational structure of the Department was indicated. When defining the scope of quality management system the decision was made to focus on the processes involved in education and research area within the framework of the Department evolution over the next few years. Therefore, the scope of the quality management system at the Department of Engineering Management covers the full-time students and part of the first and second degree and doctoral studies and postgraduate studies as well.

Initial diagnosis was made at the Department to show the level of compliance with the requirements of ISO 9001:2008, it was carried out using the author's checklist, and documented results of this diagnosis were input to the scheduling of work and division of tasks between the members of the working team. The next step was to develop a quality policy of the FME, to analyze this policy in terms of compliance with the overall strategy of the Faculty and the University, its approval and then to define the result of the policy objectives of quality.

Processes have been identified at the Department to set out its framework and the interrelationships of processes as shown on the map. Determination how the tasks carried out within the framework of the processes are standardized and documented was an important stage, and then proceeded to develop the documentation. The last stage work was the development of the QMS documentation of the Quality of the FME. After processing the documentation assessed its compliance with the requirements of ISO 9001:2008 and after all necessary corrections submitted documentation to the approval of the Dean of

the Faculty. From this point of the Quality Management System at the Department of Management Engineering was considered to be implemented. A series of training for the Faculty, distributed processes and internal standards, is scheduled internal audits. After conducting internal audits, auditors focused attention on improvement proposing a number of corrective and preventive actions in different areas of functioning in the Department. The results of audits and improvement activities, and other aspects of the operation of the QMS were analyzed on a review of management, which also played important role for control of readiness to pass the certification.

The detailed process of quality management system certification shall be in accordance with the procedures of imposing an obligation on the certification body. The Faculty of Engineering, Management Representative for Quality formulated inquiries to the two certification bodies, on this basis, the choice of certifying body - TUV Rheinland. TUV Rheinland auditors, in accordance with its procedures, at the Department conducted a preliminary audit in order to familiarize themselves with the work of the Faculty, its location and the authorities. During the initial audit, the assessor assessed the degree of preparedness for the quality management system certification and its maturity. Proper certification audit began with an opening meeting, which was attended by the authorities of the Department and the team preparing for the certification of Department and two assessors. During the audit documents and records were analyzed by assessing compliance of the requirements of ISO 9001:2008, also pointed to opportunities for improvement. The audit ended with a closing meeting, during which the auditors presented their observations and comments, and pointed to the strengths of the Department. Audit completed system recommendation to grant a certificate of quality management system conforming to ISO 9001:2008 in education full-time students and part of the first and second degree and the doctorate and postgraduate studies.

4. QUALITY MANAGEMENT RULES IMPLEMENTED ON THE FACULTY OF MANAGEMENT ENGINEERING POZNAN UNIVERSITY OF TECHNOLOGY

Principles of quality management at the Department of Engineering Management have been implemented together with the requirements for quality management system. They are an integral part of the system, the directions and areas of improvement and are the driving force behind going into the Department of the higher levels of management excellence. The importance of the principles was presented in Table 2, therefore, in this chapter the authors will present their application at the Department of Management Engineering of PUT.

The first principle on which work began, was a customer orientation. The working team has identified all the stakeholders (internal and external) who have their expectations and requirements for the training conducted at the Department (Table 3).

The requirements of each party are identified and analyzed during the annual running of the training and also during the time of the academic year. As major stakeholder of the Faculty are students surveys of satisfaction with the classes are carried out periodically. This survey is available to each student via the Internet and the results are made available for conducting classes on-line. Each of the educators can therefore keep correcting his own way of teaching to enhance student satisfaction as confirmed by the use of the current practice of the sixth principle of quality management: continuous improvement. The Department also carried out projects related to establishing cooperation with enterprises.

Table 3. Stakeholders (internal and external) (basing on the att. nr 1 to FME Book of Quality)

Process	Internal stakeholders	External stakeholders
Preparation of the training	Rector, Senate, Senate Committees, Library, Student Government and graduate students, organizational units, PP participating in the educational process of the FME	Ministry of Science and Higher Education, Research Organizations and Society, and employers and other universities, labor market
Realization of the education process	Rector, Senate, Senate Committees, Department of Audit and Internal Control PP, and PhD Student	the candidates, the labor market
Evaluation of education process	Rector, Senate, Senate Committees, the University Committee on the Quality of Education, Rector's Plenipotentiary for Quality of Education, and PhD Student, Students, PhD, PP entities participating in the educational process at the Department	Work market

The result of these activities are numerous panel discussions during which the requirements are defined in the labor market to their students as future employees and the university as such. Because Faculty of Management tailors its training packages under the current needs of industry and provides continuous knowledge of the realities in which Polish plants operate. An additional benefit is opportunity to find internships for students, opportunities to gain experience by designing and implementing solutions for production and logistics and increased employment opportunities.

According to some studies (Hamrol, 2008) success depends on quality management in 50% of the people and the style of management which confirms the finding that the quality of a company depends on the quality of management. The Faculty of Management Engineering Dean realized the principle of leadership by documenting the vision, mission and strategies, and conducting management review during which sets annual goals and objectives for employees of the Department. Part of the strategy presented in Figure 4.

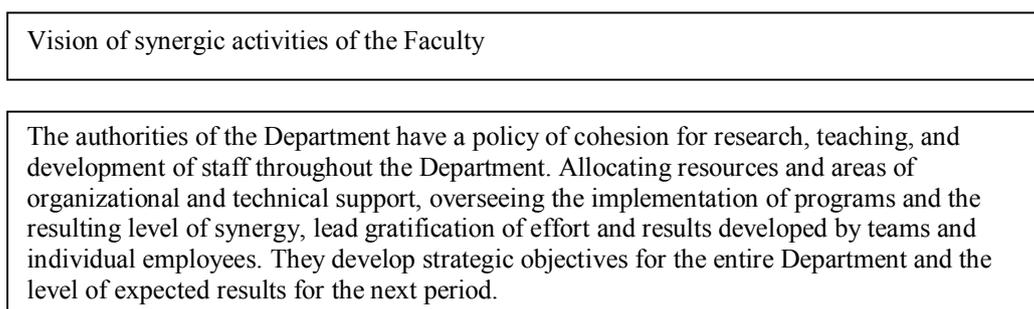


Fig. 4. Part of Faculty of Management Engineering strategy (www.fem.put.poznan.pl 2012)

Additionally, in order to ensure effective implementation of the strategy the faculty developed strategic scorecard, translating objectives into four perspectives: financial, customer, internal

processes and the development and improvement. For each of the identified perspectives key success factors for academics such as research and development will be evaluated by:

- publications in domestic and foreign journals,
- participation in conferences, seminars and training,
- participation and conduct research and design,
- participation in scholarships and internships and abroad,
- obtaining academic degrees and titles.

The developed strategy is to be implemented by the staff, whose commitment, in addition to professionalism, availability of resources and organization of work, create basic conditions for high-quality activities. Employee's involvement obviously depends on many factors such as organizational culture, motivation and team work (Hamrol, 2008). The Management Engineering team work is used for many years. It works especially in situations where it is necessary to implement the solutions resulting from new legislative requirements or preparation of the Faculty for important events such as ISO certification. Employees' involvement is also apparent, in large motivation to work and self-development research. Each of the scientific staff cares about their achievements, gaining experience in industry or cooperation with other research centers. These activities are supported by the Department at which friendly environment is built to create desire to continually improve their skills and acquire new knowledge.

The quality management system was built at the Department basing on the principle of a process approach. This means that the Department is focused primarily on processes performed and not on the organizational units, workstations, or functions, and that stakeholder requirements are determined by the results in the chain of processes, not as a sum of individual units (Hamrol, 2008). The basic document in the system is a map of the processes, which are presented in Figure 5.

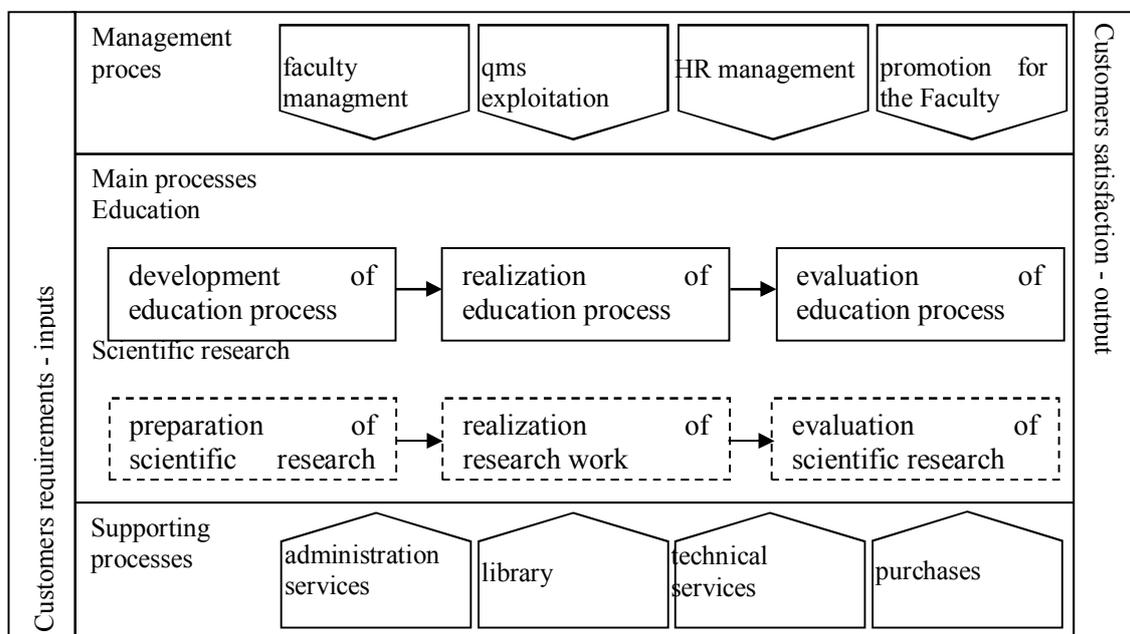


Fig. 5. Map of the processes of Faculty of Management Engineering

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Map of the processes is in the Quality Manual, is updated and improved. The dotted line of the main process of scientific research indicates that this process occurs at the Faculty but is not covered by quality management system.

Every process of quality management system has been described by card process, which were characterized:

- the name of the process,
- the purpose of the process,
- the process owner,
- input into the process,
- output from the process
- the scope of the process,
- documents describing the principle of the process,
- the assessment process.

An important advantage of the card is to indicate which documents domestic law (the university) and external (ministerial) apply in the process. This knowledge is the foundation of good management of the process owner, who is accountable to the Dean for its operation and achieving the target. Documents listed in the Charter and observance of the resulting conditions ensure that the process will run properly. When preparing papers for the working group process have the opportunity to see that knowledge of these issues is weak. Figure 6 presents the card section of the process, "Preparation of the education process".

Process Name: Preparation of the training		
Purpose of the process: Preparation of the learning process in a manner that the subsequent implementation process for the customer in accordance with its requirements, legal requirements and internal law, University of Technology.		
Process owner:	Proces inputs:	Proces outputs
Dean	<ul style="list-style-type: none"> – ISO 9001:2008 Senate Resolution – PUT, – Statute of PUT – the Rector, – Study Regulations, 	<ul style="list-style-type: none"> Developed curricula – ECTS Cards – students Folders – observing plans and questionnaires
The scope of the process <ul style="list-style-type: none"> • definition of fields of study • develop programs of study (I, II, III degree) to develop the content of education (ECTS cards, KRK) • Recruitment of candidates • planning of the academic year and preparing loads for staff departments and laboratories • planning assessment of the learning process (for observing and surveying) 		
Documents describing the rules for the implementation process:		

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- | |
|--|
| <ul style="list-style-type: none">- Decree No. 4 of the Rector of the University of Technology on 12 January 2012 (RO/I/4/2012) on the conclusion of full-time students- "Schedule of the academic year 2011/2012" referred to in the letter of the Rector of University of Technology R1K-4012-01/2011 number of 4.4.2011, the- "Rules of full-time and part of the first and second degree and single degree of" approved by Resolution No. 89 of the Academic Senate University of Technology 04.28.2010 years of the adoption of rules on the merits of study,-Letter R1K-4012-02/2011 number of 04.13.2011, the Vice-Chancellor for Education on the date for meetings for part-time students conducted in absentia in the academic year 2011/2012-Standards of education and levels of courses that are in the Annex to the / in the Regulations-Resolution No. 82 University of Technology Academic Senate of 24 March 2010 on the fixing and settling of the annual size of classes |
|--|

Fig. 6. Part of the proces chart „education process preparation”

Process Management at the Faculty of Engineering and Management is structured comprising the following steps (Mazur and Golas, 2007):

- 1) planning process, a key step in the management of the department and include:
 - identification processes and their breakdown,
 - prioritizing processes and determine the relationship between them,
 - description of processes at the appropriate level of executive
 - Setting targets and indicators processes, allowing to analyze the effectiveness of actions taken,
 - specify how monitoring processes;
- 2) implementation of processes according to plan;
- 3) overseeing the processes involving the monitoring and measuring processes in the usual way in relation to corporate strategy, and to the defined objectives;
- 4) improvement of processes involving the correction of errors found and preventing the recurrence of their occurrence.

The process approach is inextricably linked to the principle of system approach to management, because each of them uses a synergy effect. Systems approach means that the processes are not treated as strings of actions carried out autonomously, on the contrary: it is emphasized that there is exchange of information and materials between them. Places where the processes of the "encounter" requires special attention because of the frequent discrepancies (Hamrol, 2008) should be identified. Therefore, the design phase of the system at the Department is of great importance and was attached to a clear identification and understanding of data input and output from the process. The system processes the output of one process often is the input to another process, and this causes the process is once again supplier of customer and system, etc. This approach is also to ensure repeatability of actions and willingness to implement comprehensive solutions, removal of ad-hoc, unplanned and unsuccessful.

An important principle which manifests itself in various aspects of the system is continuous improvement. The department uses the following tools for the improvement: the cycle of Deming, teamwork, indicative assessment processes, quality objectives, corrective and preventive measures, data analysis and internal audits. Deming Cycle is mainly visible in the main process, where the position of the sequence of processes, planning, implementation and evaluation makes it possible to

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assess the overall activities carried out in order to provide students with appropriate learning process (process map, Figure 5). In addition, the Department systematically applies:

- anonymous questionnaires concerning the implementation of the duties of teaching completed voluntarily by students of the faculty,
- opinions of graduates from the department of curriculum, teaching staff, organization and conditions of the training and education results achieved,
- periodical of classes,
- assess compliance with the subject field of study,
- professional preparation of teaching graduate students and junior teaching staff,
- opinions of students engaged in practice, the expectations of employers about the qualifications, skills and knowledge of students and graduates in a given direction.

Department of Management is a complex and multifaceted entity and its main feature is the continuous decision-making process. As in any organization, these decisions should be based on accurate and reliable data, and therefore designed and implemented a number of gauges to ensure an adequate picture of the functioning of the Faculty. Examples include measuring instruments, which are used to assess the prospects for strategic scorecard assessing the strategy of the Faculty (Table 4).

Table 4. Examples of measures [Skurce: internal FME materials]

Interested parties	
1S	Number of foreign students at the Faculty compared to general number of students
2S	Number of hours of active education forms (exercises, laboratories, Project) to general number of hours
3S	Number of hours of classes conducted with IT support to general number of hours
Finances	
1F	Costs of educational activities compared to general cost of the Department
2F	Costs of administrative processes to general cost of the Department
Internal processes	
1W	Number of students of the Faculty to the number of employees who are not academics or teachers
2W	Number of students of the Faculty associated in scientific circles to general number of students
3W	Number of scholarships awarded by Ministry to the number of Students applying
Research and development	
1B	Number of scientific papers to the number of academics employed
2B	Number of cooperational scientific papers (student – employee) to number of scientific papers
3B	Number of points collected to the number of employees

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In addition, most of the processes is indicated in the safety process, the rate of effectiveness, which is calculated basing on the review of management or after decision of the Dean. The last principle of quality management refers to mutually beneficial relationships with suppliers. The quality of purchased services, both in terms of equipment and services which teaching, has a large impact on the evaluation of the Faculty in the eyes of students. The principle of mutual beneficial relationship was difficult to implement because of the force in the Polish public procurement law, which favors the lowest price as the main criterion for suppliers selecting. Therefore, the Faculty of Management has applied this principle in its relations with service providers such as workshops and lectures by guests from other universities, other European countries or the world. For several years, once a year the Department held a workshop conducted by lecturers from Finland. Students can attend lectures, but also discuss their opinions and experiences. Each year there is more students interested in this form of learning. This cooperation is of mutual benefit, as a lecturer of PUT lead workshops on home institution of our guests as well. Such an exchange allows to raise awareness, improve relationships between universities, the understanding of different of approaches to the same issues and language skills.

5. SUMMARY

The authors presented the process of implementing the quality management system at the Faculty of Management Engineering, Poznan University of Technology, which can be used for any other university. The benefits for the Faculty system, include, among others:

- arranging documents regulating the functioning of the Faculty and its processes,
- mechanisms for evaluating, analyzing and perfecting work of the Faculty,
- document the vision, mission, strategy and quality policy,
- use four-stage approach to process management: planning, implementation, testing and operation,
- a systematic survey of students and engaging them in work on the issues of the Faculty.

The set of quality management principles implemented to a large extent contributed to the successful implementation of the system. They provide a good basis for further continuous improvement activities and ensure the correct operation of the system. The rules presented in the article should not be examined individually, autonomously since they are closely interrelated and together produce a synergy effect crucial for system approach to quality management.

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**THE USE OF GROUP AND PEER TUTORIALS AS A TECHNIQUE FOR THE
IMPROVEMENT OF THE ACADEMIC PERFORMANCE OF STUDENTS**

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Abstract

Introduction: Today's teacher needs to assume the role of guide and mediator, focusing mainly on designing activities and monitoring the learning process.

This study sees tutorials as a special teaching method, which can take two forms: group tutorials and peer tutorials.

Method: Our main objective was to check the effectiveness of the tutorial in improving students' academic performance. In order to evaluate this improvement we carried out a quali-quantitative study based on the students' own reflections during the process of the study, a semi-structured questionnaire and the results of their final examinations, comparing those of the group studied with those of the control group.

Results: The results were organised into three categories: describing and comparing the academic performance of the pilot group students and the control group, describing the characteristics ascribed to the tutor by the students and looking at the advantages of this technique in improving students' academic performance.

Discussion: The importance of using different assessment techniques is central to achieving more reliable scoring criteria and implementing techniques to help students successfully achieve the competences described in each area.

Key words: *peer tutorials; group tutorials; students' academic performance; higher education*

1. THEORETICAL FRAMEWORK

In some countries in the European Union, Spain included, Higher Education has traditionally been characterised by a teacher-centred approach, through which the teacher presents the student with the knowledge that he/she is expected to acquire. Now, however, few would question the need for the teacher to assume the role of guide and mediator, focusing his/her efforts entirely on designing activities and on monitoring the learning process from beginning to end (Benito and Cruz 2005). For this reason, a new methodology has evolved in Higher Education, leading to the use of new teaching techniques which facilitate active learning on the part of the student (Knight 2005).

In this study we will consider the potential of the university tutorial as an excellent resource for the achievement of the above teaching objectives and thereby as a means of improving the quality of Higher Education in general, the tutorial constituting a complimentary tool, an extra source of support,

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in the training of the university student. This is based on MacLuhan's idea (1967) that the different components of the teaching-learning process include elements that stimulate the process itself.

In our study we use two forms of tutorial; the small group (group tutorial), where the teacher leads the group, and the peer tutorial, where the group is led by one of the students. Each type of tutorial follows its own personalised approach according to the student's pace of learning, a high degree of communication and of empathetic exchange being fundamental elements of this approach.

Our aim is to use tutorials as a means of improving the academic performance of our students. These students are in their first year of university and are training to be teachers. Thus, we consider it important that they acquire some methodological techniques and strategies which they in turn will be able to apply in their own classrooms in the future.

We know from Goodlad and Hirst (1989) and Saunders (1992) that the peer tutorial can produce positive results, by increasing the academic performance both of the tutees and of the tutors, by reducing the level of certain variables which negatively effect student performance, such as anxiety, and by producing a positive attitude towards the subjects studied and a general improvement in the behaviour of students.

We also decided to use the peer tutorial as a co-evaluation, or peer assessment, technique, whereby assessment becomes a powerful tool for the improvement of the teaching-learning process and, for the student in particular, another means of learning (Allen, 1998; Blythe, Allen and Scieffelin-Powell 1999; Sluijsmans et al. 1998; Dochy et al. 1999). This is a form of what is known as 'formative assessment', a means of assessment which Black and Wiliam (1998) conclude can be seen to make a real positive difference to the learning of students.

Smith, Cooper and Lancaster (2002) and Wheater et al. (2005) point out that peer assessment is useful both as a tool for reflection by students and as a method of reducing staff marking loads. With this technique the student learns through reflection, analysis and the diplomatic criticism of his/her fellow students (Falchikov 1995). If we review the publications of recent years, we will find various experiments in peer assessment that have not only demonstrated their contribution to the development of assessment criteria (Langan et al. 2005), but also various other advantages (Habeshaw et al. 1993), along with some disadvantages that we will try to avoid in this project (Van den Berg et al. 2006).

With regard to the conditions required in order to conditions to implement this technique in a university context, in principle, all that is needed is a basic level of computer literacy on the part of the teacher and the students and a classroom that is arranged in a way that permits the students to move around and work in groups. As indicated by Rodríguez Izquierdo (2003), the objective of such new educational approaches is to link face-to-face teaching with autonomous learning. This entails an evolution in the role of the teacher, whereby he/she is not only responsible for setting course content but also for helping students to develop the research skills and the critical judgement necessary to their acquisition of knowledge.

2. DESCRIPTION OF THE EXPERIMENT

The experiment took place with first year students training to be primary school teachers of Music and Physical Education at the University of Vigo, Spain (on the Pontevedra campus).

A total of two teachers and 106 students participated – 51 trainee Physical Education teachers and 55 trainee Music teachers, all of whom attended class regularly. The experiment was carried out over one

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semester, with the duration and organisation of each different group varying according to the project, as explained below.

In the implementation of the experiment, three important elements were taken into account:

1. The significant change brought about in recent years by new advances in information technology, which permits not only the rapid exchange of information but also an element of built-in instant feedback. These technologies allow for innovation and improvement in teaching quality, as they open up to students the possibility of a more flexible and constructive learning process, via the methodology of applying ECTS.

2. The importance of the acquisition of new methodological techniques which facilitate a more meaningful learning experience and an increase in motivation on the part of the student. In this pilot, the learning experience is measured in terms of the productivity of the student. However, according to Guskin (1994), this is only feasible if the teacher recognises the necessity of reducing the time spent by the student in passive classes and instead adopting strategies which foster the personal engagement and self-study of the student.

3. The key to increasing learning and personal development as lying in the conditions that motivate students to devote time and energy to educational activities both within and outside the classroom. That is to say, we need to foster a strong connection between academic learning and life outside the classroom, so that the former can adapt to the needs of the labour market (Kirkwood-Tucker and Fuss 2004). Huh (1996) presents a synthesis of the conditions that foster learning on the part of the student and which encourage a more meaningful experience of university.

With these principles in mind, the academic activity of the students consists of new projects centred around the following structure:

1. Presentation of material by the teacher, with a duration of approximately 30 minutes. The objective of the class is to explain to the students the key concepts associated with the area being studied, the organisation of the different sessions and the final product to be presented individually and in groups.

2. Group work. These groups are formed at the beginning of and maintained throughout the course. In each session, a coordinator is appointed. In this way, by the end of the course, each student will have been coordinator at least twice. Two types of tutorials are established within this process:

- Taught tutorials or group tutorials: these tutorials can take place in the classroom, in the teacher's office or online, depending on the type of task carried out. The tutor has two roles here; on the one hand he/she provides the student with assistance and additional, individualised explanations of the area being studied (course tutorial) and on the other hand he/she provides guidance to the students on the organisation and planning of their work via a digital platform, in which each student has his/her own open space (structured tutorial).
- Peer tutorials: the coordinator of the group acts as assistant to the teacher and is responsible above all for maintaining the positive environment of the group, encouraging the completion of tasks and providing help to those members of the group who fall behind. He/she is also responsible for informing the teacher of any difficulties within the group and for organising and planning meetings and teamwork. Goodlad and Hirst (1989 p. 189) define the peer tutorial as "the system of instruction whereby the students help others and learn themselves through the process of teaching".

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3. Personalised work: via the digital platform FaiTIC (the distance learning portal of the University of Vigo). Each student has access to the necessary documentation for carrying out the individual tasks and activities assigned to him/her.

The platform is generally used:

- To support and complement the teaching and learning process.
- To transcend the time and space limits of the classroom, re-defining those physical meetings as opportunities to construct and share new learning.
- To engage students in an active and autonomous learning process.
- To increase spaces available for collaborative work, by means of tools which promote dialogue and exchange.
- To extend spaces available for individual and group reflection.
- To develop the skills of critical and creative use of new technologies.

Our objective is to attempt to improve the academic performance of students, encouraging their motivation towards a learning process directly related to that which they themselves will apply in their own classrooms in the future and therefore directly related to their professional development.

In this way, in this study, the students' academic performance becomes a direct indicator of the productivity and achievement of the objectives proposed in the course programme. Various techniques have been used to assess this performance, with the aim of covering all areas of work (conceptual, procedural and attitudinal) and of being valid and reliable, attempting to measure as objectively as possible that which the students have truly assimilated (Nirenberg et al., 2000).

During this process, each project was assessed from various perspectives:

1. Initial assessment

A questionnaire was completed by the whole class and group interviews were carried out during the group tutorials. The sole objective of the assessment techniques employed at the beginning of the project was to obtain information about the students' prior knowledge and level of understanding of the key concepts of the area to be studied.

2. Process assessment

This assessment is formative in nature and permits the detection of a problem the moment in which it occurs, along with an analysis of its causes and the measures required to put it right. The following techniques were used:

- A personalised questionnaire made up of short questions or a test on the contents of each unit of work connected to the project.
- A single, one-off question posed at random to a member of the group but taken as representative of the group as a whole.
- The presentation of a group dossier in each project. The group dossier consists of the work each group has to hand in at the end of each project.

3. Final or summative assessment

The final or summative assessment takes data collected during the formative assessment, i.e. obtained during the process assessment, and adds them to more isolated samples of data, thus allowing us to establish whether or not the degree of learning indicated by each student has truly been achieved and at what point further intervention is needed.

This assessment is carried out by means of an end of semester examination. This examination has been used to compare the two groups of students who took part in the experiment with those from the two control groups. This examination assesses only conceptual content and procedural knowledge but not its practical application. Each student also has to hand in an individual dossier at the end of the semester.

In each of these different teaching methods there was an attempt to diversify evaluation techniques in order to obtain data about the conceptual, procedural and attitudinal areas. Thus the questionnaires, tests and final examination provide conceptual data and the interviews, one-off questions and dossier provide procedural and attitudinal data.

For this reason, the assessment process is designed in the following way:

Table 1. Assessment Methods and Techniques.

			ASSESSMENT	
METHOD	PARTICIPANT/S	ACTIVITY	TYPE	TECHNIQUE
TAUGHT CLASS	Teacher	Explanation and clarification of concepts, queries etc. Group administration.	Initial or diagnostic	Questionnaire Group Interview
GROUP DYNAMICS	Students Teacher	Maintain group dynamics, encouragement in the carrying out of tasks, supplying help, communicating problems, organising and planning team work.	Process	Questionnaire or Test Random one-off question Group dossier
INDIVIDUAL	Students	Reflection, critical analysis and carrying out of tasks	Final or Summative	Final examination Individual dossier Individual interview

In this way, each student in each project has two group marks (one from the dossier and one from the one-off question) and an individual mark from the questionnaire. The dossier mark was allocated by the students themselves, who were required to provide justification for it, using observable criteria.

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This mark should serve as a means of feedback, through which potential errors can be corrected before the individual dossier is handed in.

In this experiment, peer assessment comprised the assessment of a student's performance by his/her own peers. This is a method of assessment that aims to involve the students themselves in assessing what has been learnt and in giving feedback to their peers, which in itself can constitute a factor contributing to the improvement of the quality of the learning experience. Our objective is that the use of peer assessment will motivate students to feel part of a learning community and encourage them to participate in key aspects of the learning process by making critical and reflective assessments of the work of their peers.

This peer assessment was carried out taking into account the criteria outlined by Bangart (2001), who provides several suggestions to help prepare students for peer assessment: (1) emphasize its purpose; (2) articulate the relationship between peer assessment and learning outcomes; (3) ensure students understand elements of high-quality, proficient performance; (4) develop analytical scoring criteria systems; (5) encourage collaborative discussions; and (6) train students to apply scoring criteria in a consistent and unbiased manner.

All the marks are given in numerical form, ranging from 1 to 10, and, with the exception of the tests, they are all accompanied by the detailed comments of both the teacher and another student.

At the end of the nine projects, each student received a total of twenty-seven marks (nine from the one-off questions, nine from the questionnaire or individual test and nine from the group dossier). In order to avoid the pressure that marks can exert on students, they were permitted to drop their five worst marks, given that certain skills or competencies are duplicated in some of the projects.

The final mark for the subject is the average of the twenty-two remaining marks, combined with that of the final examination and the individual dossier. All students taking the subject have the same final exam, which consists of short questions of a practical nature, involving the solution of concrete hypothetical situations. The individual dossier is a collection of all the individual work carried out in groups during the course.

This final mark is qualified during the individual interview, in which the student is asked if he/she feels that the mark reflects the effort he/she has invested in the subject and why (not). In summary, there was an attempt in the experiment to emphasise aspects such as the following in the assessment stage:

- The use of multiple means of obtaining, processing and complementing information, looking at it from the different angles of varied techniques, results and sources.
- The use of both quantitative and qualitative methods for the evaluation of results, with an attempt to consider the context and the unique nature of each student's educational situation, along with the student's future professional development.
- The use of methods and techniques which favour student participation in the assessment, in this case in groups, in order to obtain a more comprehensive insight into the students' learning.

3. THE STUDY

Basing our work on the principles of Action Research (Kemmis and McTaggart 2000) and on the research carried out by Cohran-Smith and Lytle (2002), we have attempted to identify the extent to which the tutorial system contributes to the improvement of students' academic performance and the difficulties that accompany this system. Moreover, we have also assessed the degree of satisfaction the students have shown with their academic studies.

To this end, a descriptive and qualitative/quantitative study was carried out, using the students' personal reflections during the process, a semi-structured questionnaire and the final examination reports, in this case comparing the marks of the pilot group with the control group.

The individual interview was also used to confirm whether the students felt that the use of peer tutorials as an academic resource had helped them to improve their performance or if they felt that there was no real difference between their performance and that of the students in the control groups who did not use these methodological strategies.

The pilot and control groups were selected according to the methods used by each teacher. In this way, the control group was taught in a more teacher-centred manner, whereas in the pilot group a more cooperative methodology was employed.

The object of our study was the hypothesis that the use of group tutorials improved both the academic performance and the degree of satisfaction of the student body.

The project was formally presented to the students taking part by means of a joint talk to both groups, who would be working in parallel but separately on their particular course of study. In this talk the general aim of the study and its potential academic benefits for the students taking part were explained.

In total, 106 students in the pilot group from the 2007-2008 year-group took part in the study. The participants were mainly women (89.22 %), due to the fact that education degree courses are largely female dominated in Spain. The ages of the students varied between 18-20 (91.38%) and 21-29 (8.62%). The profile of the typical student can be defined as a young adult who is entering Higher Education for the first time, after completing secondary education. For the majority (96.9 %), this was their first choice of degree subject, which would probably imply a high level of motivation among the students.

4. THE RESULTS

Once analysed, the results were organised into three categories for further analysis. In the first category, the academic performance of the students who participated in the pilot is described and compared with that of the control group. The second category constitutes a description of the characteristics ascribed to the tutor by the students during the activities carried out throughout the course and their degree of satisfaction with the methodology employed. The third category looks at the advantages and limitations of this technique in terms of the improvement in the students' academic performance, from the point of view both of the student and of the teacher.

If we only take into account the final exam results (we must remember that the content of the exam was mainly conceptual), the improvement in academic performance of the pilot group is similar to that of the control group, with no significant differences between each group.

Table 2. Final Marks.

	<i>Percentage of students who passed the course</i>	<i>Percentage of students who failed the course</i>	<i>Average</i>
PILOT GROUP	91.7%	5.2%	7,8
CONTROL GROUP	87.3%	7.3%	6,9

With regard to procedural and attitudinal content, a very significant improvement can be observed over the course of the academic year on the part of the students of the pilot group, above all in areas such as independence in carrying out individual tasks; taking responsibility within their group; the facility to justify and defend their own decisions; acceptance of differences in opinions in the solution of problems; respecting and valuing the opinions of their peers, according them the same level of importance as the opinions of the teacher; and improvement in the communicative skills.

What is more, in the students' reflections and the results of the questionnaires, a dramatic improvement in motivation, and participation in academic and non-academic activities can be observed on the part of the students in the pilot groups.

The reasons given by students for the improvement in their motivation in this subject include the following: the immediate solution of difficulties encountered during the learning process (97%), the direct relationship between the classroom activities and tasks they will face in their own classrooms in their future career (82%), a reduction in their anxiety about the final exam (80%), the direct access to the course content (73%), the reassurance experienced in group work (67%) and control over their own learning (62%).

Where the students' personal development is concerned, in our monitoring of their work we detected a higher degree of reflection and critical capacity, a greater level of personal involvement in their work, as reflected in the significant improvement observed between their initial and their final marks, and a higher degree of mutual support, collaboration and teamwork. Moreover, all of the students from the pilot group took part in at least one extra-curricular activity organised by the university or by student associations, as opposed to only 5 of the students in the control group (5.1% of its members).

With regard to the qualities valued by the majority of students in the tutor, mastery of the subject was highlighted, along with understanding and patience, above all in the planning of activities and the explanation and clarification of different aspects of the project.

Other characteristics mentioned were respect for the opinions of others, along with respect for the stage at which each student finds him/herself in the learning process, resulting in a process of individual monitoring within the group. It was also considered important for the tutor to be conscientious in the preparation of activities (to produce personalised learning plans, to inform students in advance of valuation criteria, to include alternative activities and plans for different contingencies when organising sessions and to be consistent in following the proposed course plan).

However, the students' degree of satisfaction with the course activities was not as high as might be expected. On a scale of 1 to 5, the average score was 3.9. We believe that the reasons for this are related to the following difficulties that the students describe as having experienced with the course methodology:

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- Problems adapting to the classroom dynamics in the initial projects. The students had little experience of student-centred teaching methods. The majority (97%) had only previously experienced teacher-centred methods.
- A lack of computer literacy. The majority of the students had never used information technology before. Nevertheless, with practice the necessary skills for subsequent sessions were soon acquired, so that by the end of the study, with the exception of a few isolated cases (4 in total), all of the students demonstrated complete mastery of the applications used.
- The third difficulty students experienced was in learning to plan their work daily and to correct and redraft it according to new information worked on in the group or to the teacher's feedback and modifications. The students were accustomed to doing this only after examinations and thus felt that they were being assessed constantly every day, the teacher informing them of their errors and then moving onto new material.
- The fourth difficulty lay in becoming aware of the importance of every member's contribution to the group and in learning to work in a team and to develop trust within the group.
- Among the advantages of the use of the group tutorial as a teaching tool, the following were identified:
- The entire course content is laid out from the beginning of the course, which renders the course easier to follow and provides access to its theoretical content at all times.
- New strategies are employed to promote a deeper understanding of the course content, most importantly discussion, debate and analysis of the contributions of fellow students.
- The student feels supported through the decision-making process. When mistakes are shared, the student feels encouraged to keep going, as it is clear that all students have the same problems.
- The learning and mastery of teamwork techniques, which is considered to be of fundamental importance to potential teachers.
- The improvement of computer literacy through the need to use information technologies with which the student might not otherwise come into contact.
- The realisation of immediate feedback, meaning that errors are corrected with a minimum of delay.

With regard to assessment, the students were very critical of the work of their peers, even more critical than the teacher. However, the resulting marks were very similar to those of the teacher, which leads us to conclude that they were indeed valid and reliable.

The students showed an appreciation of the advantages of co-evaluation, or peer assessment, as they found these assessment sessions useful, learnt from their own mistakes, felt obliged to help other students in order to improve the group mark and increased their understanding of the material studied and of the role of assessment in general.

Those students who did not take an active part in the experiment, justified their position by explaining that they felt more comfortable with the traditional teaching format to which they were accustomed, did not feel able to assume the responsibility required by the methodology used in the study and felt uncomfortable evaluating their peers.

4. DISCUSSION

The need for a change in hierarchical and bureaucratic teaching structures involves the use of methods and techniques that favour a multi-objective approach to assessment in higher education, with the aim of designing a system more appropriate to the teaching-learning process (Heywood 2000).

Indeed, the latest pedagogical trends promote a learning environment quite different from the traditional one, an environment in which each member is committed to the construction and acquisition of new knowledge and skills (Bielaczyc and Collins 1999).

If we focus on the academic performance of the student, we need to take into account the various different interpretations that each individual can make of the same piece of information. This comes to light when decoding the meaning of a mark for example, or when establishing assessment criteria. As demonstrated in various studies (Thomson and Falchikov 1998; Sambell and McDowell 1998; Stefani 1998; Wen and Tsai 2006), even innovations can be interpreted differently by teachers than by students, or indeed between two different students or teachers. For this reason multiple means of obtaining and processing information have been used here.

Our objective of motivating students to learn, improving the results or outcomes of assessment by means of different types of interaction and redressing the balance in teacher-student dialogue succeeded in promoting in students the development of such qualities as responsibility and teamwork. Salcedo (1999) already found that a genuinely communicative approach, as well as a functional approach, facilitates the achievement of the verification, feedback and motivational functions of assessment.

Tutorials with heterogeneous groups of students permitted a free-flowing exchange of information which fosters homogeneity in student knowledge and skill levels. This is due to students who have already mastered specific material assisting those still struggling with it to assimilate and apply new concepts. In fact, peer tutoring can enable teachers to accommodate a variety of different learners within the same classroom and to improve academic achievement across ability levels and content areas (Cohen et al. 1982).

Student involvement in assessment was found to promote a positive attitude towards the work and effort involved in carrying out the tasks set. The simple fact of having to assess others led students to increase their efforts to improve their own academic results (Falchikov 2001). Indeed, Keith Topping (1998) points out that peer assessment is of adequate reliability and validity in a wide variety of applications. Peer assessment of writing and peer assessment using marks, grades, and tests have shown positive formative effects on student achievement and attitudes. These effects are as good as or better than the effects of teacher assessment. Evidence for such effects from other types of peer assessment (of presentation skills, group work or projects, and professional skills) is, as yet, more limited.

In our study, we can observe, like Hughes (2001), that peer assessment has produced the following results:

- Peer marking improved student marks. Students who were involved with peer assessment learned how to improve their work through the peer assessment process.
- Peer assessment saves staff time and students were slightly stricter than staff in the marks they gave to each other's verbal presentations. However, in our study the students were able to produce reliable assessment scores of their own essays.

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Moreover, the experience of feeling an active part of the teaching-learning process and accepting that this process is not merely the responsibility of the teacher promotes in students a much more positive attitude towards learning and towards others' assessment of their work, thereby increasing their motivation for and interest in their studies. The level of student engagement influences their motivation to achieve classroom goals (Ryan and Deci 2000).

For Wheater et al. (2005) there are good reasons to involve students in assessment. Indeed, the avoidance of problems associated with student empowerment (e.g. inexperienced assessors, concerns about validity and reliability) requires schemes fostering open dialogue, good planning and close monitoring in the early stages. The suggestion here is not that courses should be dominated by peer-assessment but that there does seem to be room to integrate this practice into teaching at all levels.

Falchikov and Goldfinch (2000) also propose that students need to become assessors within the context of participation in practice, that is, in the kinds of highly contextualised learning faced in life and work.

With regard to the reticence to participate in the project shown on the part of some students, Black and Wiliam (1998) identify certain barriers that influence whether or not students accept the practice of formative feedback. Some students have no aspirations to learn as much as possible and are simply content to pass the course and 'get by'. Some beginner-level students feel so insecure about their own potential as successful learners that they focus almost entirely on producing the 'right answer' in the teacher's eyes, regardless of whether they understand it. What is more, fear of failure can inhibit students' effort to the extent to which they will do all they can to avoid it and may fail to recognise formative feedback as an aid to improving their future learning.

Finally, we would like to add that we consider that the reliability of summative assessment can be increased when it involves a combination of the teacher's assessment with a student assessment obtained through peer feedback (Magin and Helmore 2001).

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PREDICTING STUDENTS' PERFORMANCE THROUGH DATA MINING TECHNIQUES

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Abstract

Higher education institutions are overwhelmed with huge amounts of information regarding student's enrollment, number of courses completed, achievement in each course, performance indicators and other data. This has led to an increasingly complex analysis process of the growing volume of data and to the incapability to take decisions regarding curricula reform and restructuring. On the other side, educational data mining is a growing field aiming at discovering knowledge from student's data in order to thoroughly understand the learning process and take appropriate actions to improve the student's performance and the quality of the courses delivery. This paper presents a thorough analysis process performed on student's data through some of the major machine learning techniques. Experiments performed on a large real-world dataset of students performance on all courses of a university, reveal interesting and important students profiles with clustering and surprising relationships among the courses performance with association rule mining. The prediction of student assessment is proved to be more effective in the experiments done with Decision Tree technique.

Key words: data mining, knowledge discovery, SVM, cluster, decision tree, student profile, machine learning

1. INTRODUCTION

Recently, a growing amount of data is being continuously gathered at universities regarding student's performance, their interactions with various actors and systems at the institution and other related indicators. The goal is analyzing data for decision making towards reform and restructuring of courses delivery improvement of teaching quality, and enhancement of learning capabilities of students. In this context, a growing field such as Educational Data Mining (EDM) aims at exploiting data coming from learning settings in educational environments in order to better understand the learning process and the student profile. In this research area, intensive efforts are being dedicated to using automatic methods to infer knowledge from the student's data. Methods already established in the machine learning and data mining field, successfully applied to many problems, have the potential to discover interesting patterns in the collected data regarding assessment components of courses and various interaction indicators related with the students life within a university.

Some successful applications of machine learning algorithms have produced interesting results. However, there is much open research due to the many challenges that arise for this kind of problem. First of all, data gathered at universities were not initially planned for decision making analysis and this gives rise to several different data formats or schemas which are hard to handle and process with existing mining techniques. Therefore, it is of critical importance to perform data engineering and preprocessing such that the data input is appropriate for machine learning methods. In addition,

operations such as data cleaning and missing values completion are essential in order to produce accurate and meaningful models of the student's performance.

The research presented in this paper is an ongoing effort at the Polytechnic University of Tirana (UPT) to exploit collected data about student's performance for the purpose of planning curricular revisions and restructuring the course delivery process. In particular, data analysis aims at the following: evaluating the quality of courses delivery; understanding and assessing strengths and weaknesses of students in particular subjects; discovering anomalies in the teaching and learning process; identifying potential improvements in the university infrastructure and other general interventions in the overall learning environment.

In this paper, we perform a deep analysis on the performance of students at UPT in three different bachelor programs at the Faculty of Information Technology: Informatics, Electronics and Telecommunications. We analyze a large dataset of student's results comprising their evaluations for all the subjects. With expectation-maximization clustering, we discover several important profiles that reveal some interesting patterns of students. This partitioning leads to important suggestions for improvement in the delivery of some courses. Furthermore, we perform association rule mining, with the goal of discovering patterns in the performance of students regarding different subjects. The discovered rules imply interesting relations among particular subjects where the performance of students is strongly related. This picture also leads to a better understanding of the student's strength or weakness in some groups of subjects. The overall results are compared with the results performed on the same database, using Decision Trees. Considering the fact that the outcomes are obtained with some quotient of error, it is crucial to perform a large number of experiments in order to obtain better accuracy.

This paper is structured as follows: Section 2 presents related work, Section 3 presents the preprocessing and input engineering steps, Section 4 presents experiments and discussion of results and we conclude in Section 5.

2. RELATED WORK

In this section we review some recent research works regarding the use of machine learning and data mining for analyzing educational data.

Hamalainen and Vinni present an approach for comparing several classification methods for the purpose of predicting the final outcome of a course. The datasets used in this work are relatively small, 125 and 88 rows respectively. They employ for numerical data, classifiers based on multiple linear regression and support vector machines and for categorical data three variations of Naïve Bayes classifier.

Another recent interesting approach was presented by Kovacic. In his work the author aimed at identifying up to what extent the enrolment data can be used to predict student's success. He applied decision tree algorithms to student enrollment data taken from an information system of a university and generated two decision trees to classify successful and unsuccessful students.

Another problem tackled by recent research is predicting which students are likely to continue their education with the postgraduate degree. Bresfelean analyzes the data collected through surveys from senior undergraduate students and apply decision tree algorithms in the Weka tool such as ID3. The reported results are very promising showing a classification accuracy of 88%.

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Kabra and Bichkar deal with the problem of predicting the performance of students in future courses given the performance in previous ones. The proposed approach is based on decision tree algorithms and is applied on engineering students' past performance data to generate the model and this model is then used to predict the students' performance. The goal of the authors is to identify in advance the students who are likely to fail in particular subjects and allow the teacher to handle appropriately these cases. The presented results are very positive and the authors show that the accuracy of the model may increase with more data coming for further results of the students.

One problem tightly related with the students profile is the analysis of interaction behaviors. Amershi and Conati present a modeling framework that uses both unsupervised and supervised classification to build student models for exploratory learning environments. They apply the framework to build student models for two different learning environments and using two different data sources (logged interface and eye-tracking data). Their dataset was rather limited but however, the authors managed to provide evidence that the framework can automatically identify meaningful student interaction behaviors and can be used to build user models for the online classification of new student behaviors. In addition, they show that the framework can be transferred across applications and data types.

One approach is exploiting data coming from learning management system such as Moodle. In their work Romero, Ventura, Vasilyeva and Pechenizkiy propose the use of a special type of association rules mining for discovering interesting relationships from the students' test data collected with Moodle. They apply Class Association Rule (CAR) mining to different data matrices such as the score-matrix, the relationship-matrix and the knowledge matrix. These matrices are constructed based on the data related to students' performance in the test and on the domain knowledge provided by the instructor. The authors show how to obtain the matrix and how to apply the CAR learning algorithm.

Another interesting work has been recently presented by Tsai, Tseng and Lin who propose a Two-Phase Fuzzy Mining and Learning Algorithm, integrating data mining algorithm, fuzzy set theory, and the look-ahead mechanism, to find the embedded information. They show how this approach can be provided to teachers for further analyzing, refining or reorganizing the teaching materials and tests, from historical learning records.

An important problem related with educational systems is e-learning. Agrawal and Ramakrishnan presented a work on the hybridization of artificial intelligence techniques and statistical tools to evaluate and adapt the e-learning systems including e-learners. In the e-learning process, the learner's profile plays a crucial role in the evaluation process and the recommendations to improve the overall process. The author in this work proposed a classification of learners into specific categories based on the learner's profiles; the learners' classes named as regular, workers, casual, bad, and absent. The approach exploits extracted statistical usage patterns that give a clear map describing the data and helping in constructing the e-learning system. One of the main goals of the work is to find out how to make the irregular students who are away back to be regular ones and also find a method to evaluate the e-learners as well as to adapt the content and structure of the e-learning system. From an algorithmic point of view, the work introduces the application of different fuzzy clustering techniques to find the learners profiles. The experimental results show that there is a match with a 78% with the real world behavior and that the fuzzy clustering reflects the learners' behavior perfectly.

Understanding transition of students towards a new domain of knowledge is also an interesting and challenging task. Jeong, Biswas, Johnson and Howard proposed an approach to study student's learning behaviors in a new domain by exploiting the power of hidden markov models for exploratory sequence analysis. The experimental results show that the high-performing students have more linear

learning behaviors, and that their behaviors remain consistent across different study modules. The authors also compare their approach to a process mining approach, and suggest how they may complement one another.

A student performance predictor is presented by Sembiring, Zarlis, Hartama, Ramliana and Wani in their work. They used the kernel method as a data mining technique, to analyze the relationships between students' behavioral and their success. The results of this study reported a model of student academic performance predictors by employing psychometric factors as variable predictors.

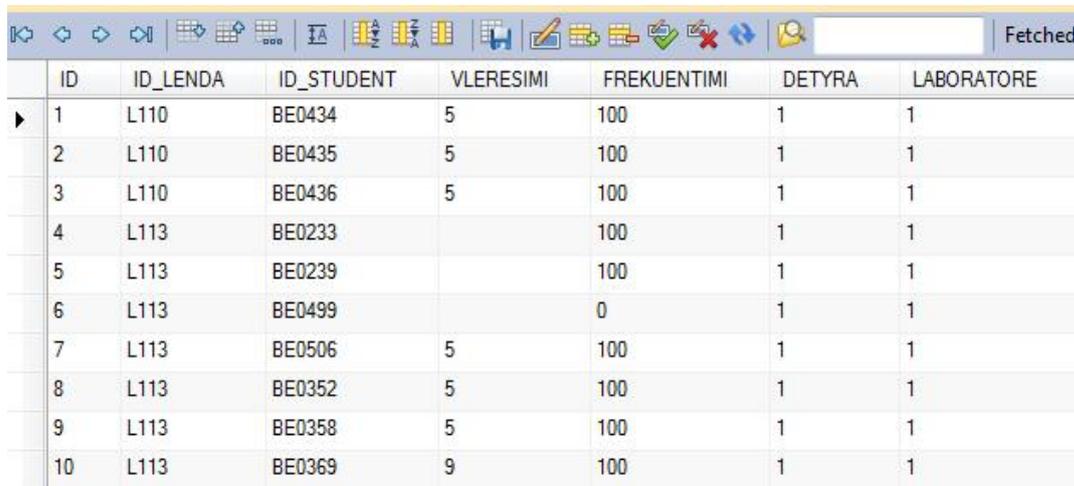
3. PREPROCESSING AND INPUT ENGINEERING

3.1 Input Format

The data was collected joining various tables of the student's database from the information system (Figure 1) of the Polytechnic University of Tirana (PUT) and exported into a MySQL database. In this table we have for every student all the subjects in which the student is enrolled and the relative evaluation. The data regard all students and all subjects for three engineering programs such as Informatics, Electronics and Telecommunication in the Faculty of Information Technology. Each row of the following .xlsx file summarizes the integral parts of one course for the specified student. This table initially has approximately 35 000 rows to be exported into MySQL database shown in Figure 2.

	A	B	C	D	E	F	G	H	I	J
1	ID	ID_Course	Course Name	ID_STUDENT	Name	Surname	Grade	Presence	Project	Lab
2	202	L110	C1	BE0001	Name here	Surname here	6	100	1	1
3	1032	L107	C2	BE0001	Name here	Surname here	5	100	1	1
4	1485	L101	C3	BE0001	Name here	Surname here	9	100	1	1
5	1714	L112	C4	BE0001	Name here	Surname here	9	100	1	1
6	1893	L103	C5	BE0001	Name here	Surname here	7	100	1	1
7	2792	L102	C6	BE0001	Name here	Surname here	6	100	1	1
8	2976	L108	C7	BE0001	Name here	Surname here	4	100	1	1
9	3227	L104	C8	BE0001	Name here	Surname here	8	100	1	1
10	3412	L111	C9	BE0001	Name here	Surname here	5	100	1	1
11	5201	L113	C10	BE0001	Name here	Surname here	6	100	1	1
12	5425	L105	C11	BE0001	Name here	Surname here	7	100	1	1
13	5660	L106	C12	BE0001	Name here	Surname here	5	100	1	1
14	7446	L109	C13	BE0001	Name here	Surname here	5	100	1	1
15	17580	L210	C14	BE0001	Name here	Surname here	7	100	1	1
16	19003	L201	C15	BE0001	Name here	Surname here	10	100	1	1
17	19666	L203	C16	BE0001	Name here	Surname here	6	100	1	1
18	21558	L207	C17	BE0001	Name here	Surname here	6	100	1	1
19	22648	L202	C18	BE0001	Name here	Surname here	6	100	1	1
20	26174	L206	C19	BE0001	Name here	Surname here	6	100	1	1
21	27933	L209	C20	BE0001	Name here	Surname here	5	88	1	1
22	28319	L213	C21	BE0001	Name here	Surname here	8	85	1	1
23	30912	L204	C22	BE0001	Name here	Surname here	5	100	1	1

Fig 1. The data collected from the information system of the university.



ID	ID_LENDA	ID_STUDENT	VLERESIMI	FREKUENTIMI	DETYRA	LABORATORE
1	L110	BE0434	5	100	1	1
2	L110	BE0435	5	100	1	1
3	L110	BE0436	5	100	1	1
4	L113	BE0233		100	1	1
5	L113	BE0239		100	1	1
6	L113	BE0499		0	1	1
7	L113	BE0506	5	100	1	1
8	L113	BE0352	5	100	1	1
9	L113	BE0358	5	100	1	1
10	L113	BE0369	9	100	1	1

Fig 2. The data exported into MySQL database

In Figure 2 we can easily notice some missing values. These values correspond to the students who have not participated in the final exam of this course for various reasons, (they have not succeeded in the lab, the final project or they have attended less than 75% of the course), therefore they do not have an assessment yet.

3.2 Data Transformation

In order to prepare the input for the Weka software, we need to generate a file with the extension .arff compatible with the requirements of the Weka program input. In this context we need one single record for each student, whose attributes are all the courses for that particular bachelor degree program. As we have to deal with three different programs, consequently with three different groups of attributes, we need to generate one .arff file for each program. For this reason we have developed a program in the Java language that translates the data into the required format of Weka according to the program where the student is enrolled.

It is crucial to notice here that the number of missing values has become greater, due to the fact that we had to join the syllabus of the program with the courses that the student has completed. So we expect to have missing values for example for the students frequenting the first year of studies and have not completed yet the courses of the second and third year of his studies.

The above transformation applied to the data stored in MySQL database, resulted in three .arff files, one for each program of study. Figure 3 shows a portion of the attributes listed in the .arff file of the Informatics program, which start with the student ID attribute followed by the assessment, attendance, project and laboratory attribute for each course. Here the attributes shown regard the course with the code L111. As a result, the real .arff file includes 1 attribute to identify the student and 148 attributes that correspond to the evaluations of 37 courses.

8 generated by the algorithm, are not real intervals that can contain meaningful values, according to the fact that the algorithm was applied to the assessment attribute which ranges through integer values between 4 and 10. This fact is reflected by the column Count in Figure 5, where Label 6 and 8 have 0 occurrences found in the dataset. Given Label 3 where this fact is not reflected, we can say that eventually the mean value replacing the missing values felled in this interval. Apparently, the 135 occurrences in this Label matches 100% the replaced missing values. In this way, we will not consider the experimental results referring to this interval.

No.	Label	Count
1	'(-inf-4.6]'	45
2	'(4.6-5.2]'	161
3	'(5.2-5.8]'	135
4	'(5.8-6.4]'	48
5	'(6.4-7]'	43
6	'(7-7.6]'	0
7	'(7.6-8.2]'	31
8	'(8.2-8.8]'	0
9	'(8.8-9.4]'	15
10	'(9.4-inf)'	7

Fig 5. The result of the discretization procedure

4. EXPERIMENTS

In this section we present the experiments with clustering and association rule mining on the three preprocessed datasets of the university, respectively the .arff file of the Informatics program, the .arff file of the Electronics program and the .arff file of the Telecommunication program. The experiments ran in Weka using all the attributes that express the final results of the courses, and setting aside the attributes of attendance, project and laboratory.

4.1 Models Generated

The clustering algorithm used is expectation-maximization (EM) clustering as implemented in Weka. We performed two experiments: one where the algorithm is left to find the number of clusters automatically and one other where the number of clusters is given as input parameter to the algorithm. In the second experiment we used as number of clusters $k=6$, while in the first case the algorithm run with default parameters and found the optimal $k=9$. Figure 6 shows the clusters generated in the first case and Figure 7 shows the clusters generated in the second experiment.

In Figures 6 and 7 is shown only the portion of the cluster result regarding one course. The output file repeats for each course, applying the overall clustering.

The other group of experiments focused on rules and relations between various courses of the programs where the students are enrolled. In Figure 8 is shown the result of the experiment ran on Informatics program preprocessed data. We used the Apriori algorithm with input parameters the number of best rules found. In the same way, the experiment was repeated for the three programs with different parameters for the best rules.

Number of clusters selected by cross validation: 9

Attribute	Cluster								
	0 (0)	1 (0.25)	2 (0.05)	3 (0.39)	4 (0.09)	5 (0)	6 (0.12)	7 (0.11)	8 (0)
=====									
L111_VLEPESIMI									
'(-inf-4.6]'	1	25.0152	1	20.9848	1	1	2	1	1
'(4.6-5.2]'	1	58.2034	7.981	21.7819	26.4068	1	42.6115	10.0154	1
'(5.2-5.8]'	1	23.0773	1	112.9214	1	1	1	2.0013	1
'(5.8-6.4]'	1	9.0034	6.9992	7.9999	10.9945	1	8.0063	10.9967	1
'(6.4-7]'	1	7.8483	2.9994	10.1536	8.9956	1	5.005	13.9981	1
'(7-7.6]'	1	1	1	1	1	1	1	1	1
'(7.6-8.2]'	1	4.0478	5.0003	9.9529	1.0581	1	4	12.9408	1
'(8.2-8.8]'	1	1	1	1	1	1	1	1	1
'(8.8-9.4]'	1	1.0137	3	8	2	1	1	5.9864	1
'(9.4-inf)'	1	1	2	3	2.111	1	1.889	3	1
[total]	10	131.2089	31.9799	196.7945	55.5661	10	67.5118	61.9387	10

Fig 6. The clusters found automatically

Number of clusters: 6

Attribute	Cluster					
	0 (0.11)	1 (0.34)	2 (0.25)	3 (0.19)	4 (0.07)	5 (0.05)
=====						
L111_VLEPESIMI						
'(-inf-4.6]'	1	21.038	24.9617	2	1	1.0002
'(4.6-5.2]'	10.0046	19.2039	57.7809	63.2966	12.7041	4.0098
'(5.2-5.8]'	2.0011	111.4242	22.5844	1	1	2.9903
'(5.8-6.4]'	10.9963	6.9799	9.0038	13.227	11.773	2.02
'(6.4-7]'	13.9844	6.4524	7.4677	11.9902	4.0098	5.0955
'(7-7.6]'	1	1	1	1	1	1
'(7.6-8.2]'	12.994	4.9599	4.0408	4.0002	5.0051	6
'(8.2-8.8]'	1	1	1	1	1	1
'(8.8-9.4]'	4.986	2.0001	1.0145	1.9994	3.0006	7.9994
'(9.4-inf)'	3	1	1	2.0047	2.9953	3
[total]	60.9663	175.0583	129.8539	101.5182	43.488	34.1153

Fig 7. The clusters found with input parameters

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1. L305_VLERESIMI=(6.4-7]' L311_VLERESIMI=(7.5-8]' 414 ==> L312_VLERESIMI=(7.4-7.8]' 410 conf:(0.99)
2. L311_VLERESIMI=(7.5-8]' L312_VLERESIMI=(7.4-7.8]' 418 ==> L305_VLERESIMI=(6.4-7]' 410 conf:(0.98)
3. L305_VLERESIMI=(6.4-7]' 433 ==> L312_VLERESIMI=(7.4-7.8]' 424 conf:(0.98)
4. L312_VLERESIMI=(7.4-7.8]' 438 ==> L305_VLERESIMI=(6.4-7]' 424 conf:(0.97)
5. L305_VLERESIMI=(6.4-7]' L312_VLERESIMI=(7.4-7.8]' 424 ==> L311_VLERESIMI=(7.5-8]' 410 conf:(0.97)
6. L311_VLERESIMI=(7.5-8]' 433 ==> L312_VLERESIMI=(7.4-7.8]' 418 conf:(0.97)
7. L311_VLERESIMI=(7.5-8]' 433 ==> L305_VLERESIMI=(6.4-7]' 414 conf:(0.96)
8. L305_VLERESIMI=(6.4-7]' 433 ==> L311_VLERESIMI=(7.5-8]' 414 conf:(0.96)
9. L312_VLERESIMI=(7.4-7.8]' 438 ==> L311_VLERESIMI=(7.5-8]' 418 conf:(0.95)
10. L311_VLERESIMI=(7.5-8]' 433 ==> L305_VLERESIMI=(6.4-7]' L312_VLERESIMI=(7.4-7.8]' 410 conf:(0.95)

Fig 8. Best rules found by Apriori algorithm

Another approach to evaluate students' performance and predict future course assessments is to build a prediction model based on the previous and current courses results. This gives the possibility to predict in advance for each student, the potential of failure in a certain course giving therefore the chance to handle this risk of failure appropriately before the examination period starts. In order to build such model, we need to exploit the grades of the student in the ongoing year in addition to the grades of the previous years.

One prediction model that has proven to be very successful is decision tree classification. This model is build from training data and has very good capability to predict classes with nominal attributes. In our example, we would like to exploit the previous results of the student, to predict whether she will fail or pass a certain course that is to be examined in the next coming examination session. In order to learn decision trees we first need to generate the dataset in an appropriate format. We have followed the same steps as per the previous experiments and the pre-processing tasks as explained in the previous section. Since decision trees need nominal attributes, we have considered every set of course evaluation as a discrete set of 7 values, i.e., 4 is the value for the fail grade and 10 the value for the maximum grade. In addition, we have also applied the replace missing values procedure as built in Weka software. We have performed two experiments with decision tree learning. In the first experiment we considered only the course evaluation of the third year, while in the second experiment we added also the course evaluations of the second year of studies.

In order to perform the experiments, we used the J48 algorithm implemented in Weka. The generated model for the first experiment is shown in Figure 9 and Figure 10. The decision tree is very large and we only show it partially. The tree has overall 61 leaves and 71 nodes.

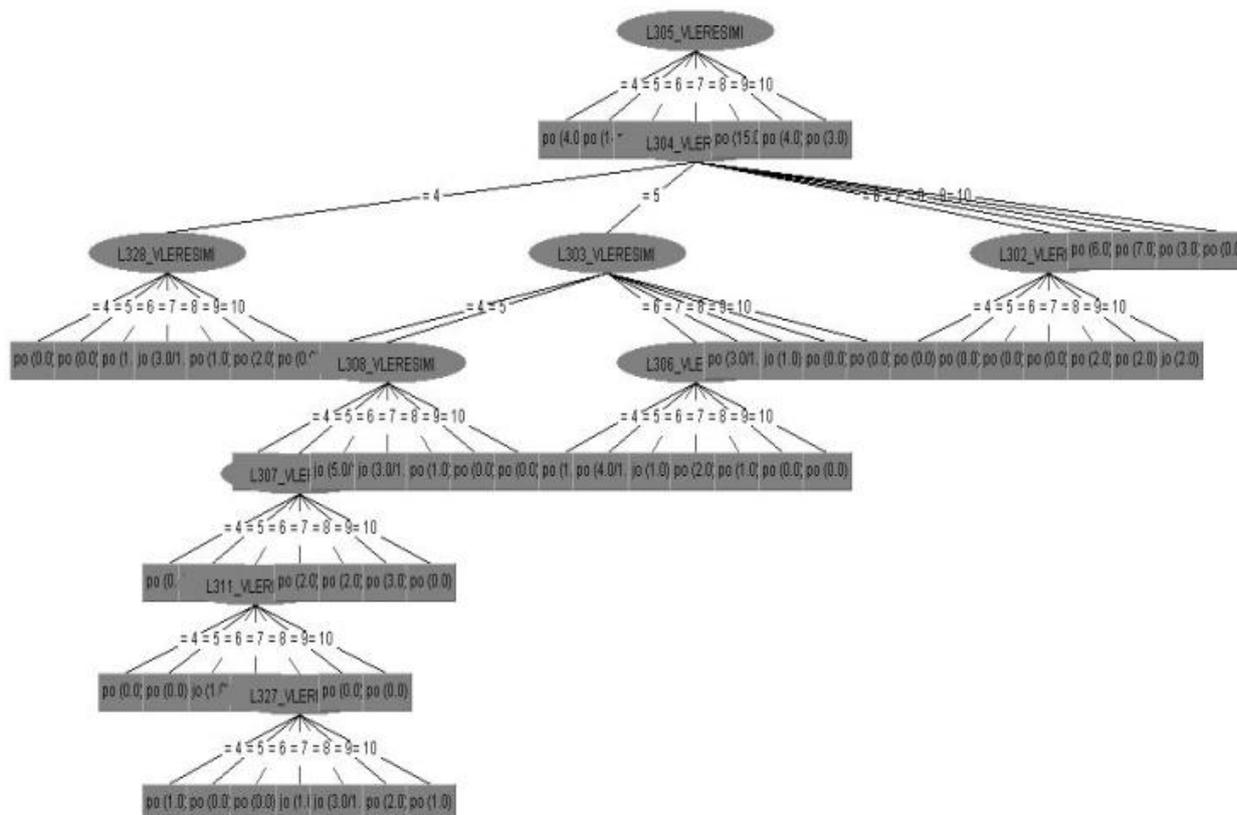


Fig 9. Decision tree with only third year courses

The decision tree in the second experiment is more compact having only 25 leaves and overall 29 nodes.

4.2 Evaluation of Results

Our qualitative investigation of the clusters, tried to group the big amount of student data into some logically significant categories. The first experiment of clustering that ran using expectation-maximization algorithm with automatic find of the number of clusters, resulted in 9 clusters. Analyzing the containing data into each cluster needs some background information about the preprocessing of that data. If we take into consideration the number of values that fall into the third label for each numbered cluster, we will be frustrated in analyzing some meaningless data. This point has to do with the issue discussed previously about replacing missing values with the mean value. In this way we can conclude that Label 3 of each cluster must be neglected during the process of analyzing the clusters. Furthermore the Labels 5 and 7 do not include any integer value in their interval, so they have also to be neglected. In Figure 6 we have shown some results of clustering with automatic number of clusters. It matches the clustering of the course L111. The same situation is obtained for all the courses of the program in evaluation. Clustering is applied in the overall data of the program, so the clusters identify various categories of student according to their enrollment in all the courses.

```

L305_VLERESIMI = 4: PASS (4.0)
L305_VLERESIMI = 5: PASS (14.0)
L305_VLERESIMI = 6: PASS (12.0/1.0)
L305_VLERESIMI = 7
| L304_VLERESIMI = 4
| | L328_VLERESIMI = 4: PASS (0.0)
| | L328_VLERESIMI = 5: PASS (0.0)
| | L328_VLERESIMI = 6: PASS (1.0)
| | L328_VLERESIMI = 7: FAIL (3.0/1.0)
| | L328_VLERESIMI = 8: PASS (1.0)
| | L328_VLERESIMI = 9: PASS (2.0)
| | L328_VLERESIMI = 10: PASS (0.0)
| L304_VLERESIMI = 5
| | L303_VLERESIMI = 4: FAIL (1.0)
| | L303_VLERESIMI = 5
| | | L308_VLERESIMI = 4: FAIL (2.0)
| | | L308_VLERESIMI = 5
| | | L307_VLERESIMI = 4: PASS (0.0)
| | | L307_VLERESIMI = 5: FAIL (6.0/1.0)
| | | L307_VLERESIMI = 6
| | | | L311_VLERESIMI = 4: PASS (0.0)
| | | | L311_VLERESIMI = 5: PASS (0.0)
| | | | L311_VLERESIMI = 6: FAIL (1.0)
| | | | L311_VLERESIMI = 7: PASS (3.0)
| | | | L311_VLERESIMI = 8
| | | | L327_VLERESIMI = 4: PASS (1.0)
| | | | L327_VLERESIMI = 5: PASS (0.0)
| | | | L327_VLERESIMI = 6: PASS (0.0)
| | | | L327_VLERESIMI = 7: FAIL (1.0)
| | | | L327_VLERESIMI = 8: FAIL (3.0/1.0)

```

Fig 10. Part of the decision tree generated with only third year courses

In the second experiment we consider also the second year course evaluations. The tree generated in this case is smaller and more compact as shown in Figure 11 and 12 where we show the whole tree.

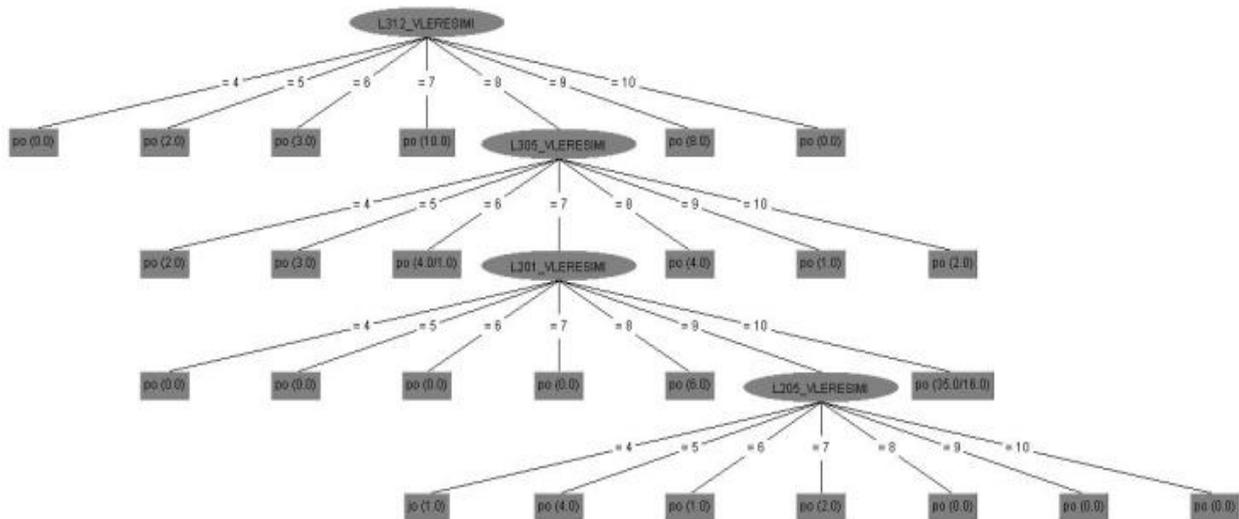


Fig 11. Decision tree generated with courses of second and third year

```
L312_VLERESIMI = 4: PASS (0.0)
L312_VLERESIMI = 5: PASS (2.0)
L312_VLERESIMI = 6: PASS (3.0)
L312_VLERESIMI = 7: PASS (10.0)
L312_VLERESIMI = 8
|   L305_VLERESIMI = 4: PASS (2.0)
|   L305_VLERESIMI = 5: PASS (3.0)
|   L305_VLERESIMI = 6: PASS (4.0/1.0)
|   L305_VLERESIMI = 7
|   |   L201_VLERESIMI = 4: PASS (0.0)
|   |   L201_VLERESIMI = 5: PASS (0.0)
|   |   L201_VLERESIMI = 6: PASS (0.0)
|   |   L201_VLERESIMI = 7: PASS (0.0)
|   |   L201_VLERESIMI = 8: PASS (6.0)
|   |   L201_VLERESIMI = 9
|   |   |   L205_VLERESIMI = 4: FAIL (1.0)
|   |   |   L205_VLERESIMI = 5: PASS (4.0)
|   |   |   L205_VLERESIMI = 6: PASS (1.0)
|   |   |   L205_VLERESIMI = 7: PASS (2.0)
|   |   |   L205_VLERESIMI = 8: PASS (0.0)
|   |   |   L205_VLERESIMI = 9: PASS (0.0)
|   |   |   L205_VLERESIMI = 10: PASS (0.0)
|   |   L201_VLERESIMI = 10: PASS (35.0/16.0)
|   L305_VLERESIMI = 8: PASS (4.0)
|   L305_VLERESIMI = 9: PASS (1.0)
|   L305_VLERESIMI = 10: PASS (2.0)
L312_VLERESIMI = 9: PASS (8.0)
L312_VLERESIMI = 10: PASS (0.0)
```

Fig 12. Decision tree with both the second and the third year courses, showing pass and fail results for the class attributes which is L301

The process of analyzing the results of 9 clusters turns to be difficult if any prior knowledge is applied. We can easily see that cluster 0, 5 and 8 do not give us any significant student group due to the values they contain. As a result the clusters that make sense are cluster 1, 2, 3, 4, 6 and 7. We also notice that the highest percentage of the students with high assessments belongs to cluster 3. The group of students with good assessments is clustered in cluster 7 and the group of students with low assessments is clustered in cluster 1. One interesting pattern to notice is the close value of cluster 3 (very good students) and cluster 1 (bad students) in relation to Label 0. This result can be explained with the fact that often, excellent students, deliberately get failed if they feel they can't get a good assessment during the final exam. In this way they have the right to take the exam during the next exam session.

Since the evaluation of automatic clusters resulted in 9 clusters out of which 6 meaningful clusters, we did the next experiment as shown in Figure 7, running EM algorithm with the number of result clusters set to 6. According to the results in Figure 7, we had 6 compressed clusters. With the analysis of significant Labels we proceed as in the previous experiment. The data here is easier to evaluate and to determine the meaning of clusters. The cluster with the excellent students is cluster 5 and the cluster with bad students is cluster 2. This observation is clearer if we explore all the result set with all the courses. As a conclusion of applying clustering over student's datasets, we determine that 25% of the students have problems with various courses and only 7% of the students manage to get satisfying results.

The next experiment used the Apriori algorithm. The output rules are shown in Figure 8. Rule number 2 shows us an interesting point explained as follows: the students getting 8 in the course L311 and also 8 in course L312, are likely to get 7 in the course L305. Following the same reasoning with the rule

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number 6, we can predict the assessment being 8 for the course L312 if we previously know that the assessment of the course L311 is also 8. At this point, it is interesting to mention that L311 is the code for the internship and the code L312 corresponds to the diploma thesis. This rule is noticed even within the three different programs where students are enrolled. In this context the university should try to integrate the diploma thesis with the internship, because of the relevant results obtained here which are based on an accuracy of 97% of the Apriori algorithm.

Another interesting rule is extracted from the experiment run with greater number of rules. The accuracy was slightly smaller but the big amount of input data favor the precise interpretation. The rule that got our attention was the following:

```
L305_VLERESIMI=(6.4-7]' L303_VLERESIMI=(5.5-6.4]' L311_VLERESIMI=(7.5-8]'  
L301_VLERESIMI=(5.8-6.4]' 367 ==> L312_VLERESIMI=(7.4-7.8]' 367  conf:(1)
```

Fig 13. The rule that explains the relationships with the diploma thesis

L312, as mentioned above, is the evaluation for the diploma thesis. This rule shows an interesting relationship with a group of courses matching the following: Operating Systems, Object Oriented Programming, Electronics and Internship.

Regarding the results obtained with decision trees, in the first experiment, the classification accuracy is 78.62% while in the second experiment, with courses from second and third year, the accuracy is 84.44%. This shows that using more information about the previous student performance, leads to better results in predicting whether a student will fail or pass in a certain course in the next examination session.

5. CONCLUSION

In this paper we have presented an approach for discovering student profiles from course evaluation data and for generating associations between subjects based on the student performance. We have employed expectation-maximization clustering to partition students in distinct profiles that show some interesting features when analyzed qualitatively. In addition, we have shown through association rule learning that it is possible to discover interesting relationships among the different subjects of a student. Experiments performed on a very large real-world dataset of a university demonstrate the effectiveness of the approach with the goal of improving the university curricula, course delivery and general teaching infrastructure and related services. We also used decision trees to predict in advance the risk of a student to fail in a certain course based on the performance of the student in the previous courses.

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**SOFTWARE APPLICATION FOR COMPUTER-AIDED DESIGN (CAD) AS A TOOL OF
LEARNING IN DESCRIPTIVE GEOMETRY E-LEARNING IN THE CLOUDS**

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Abstract

At present, technical college develop their practical contents through several computer programs which are specific for each subject. The use of software application for computer-aided design (CAD) as a tool to draw the corresponding surveying is common in the case of the subjects of architectural graphic expression. The use of this software, as well as the contents of the subjects that employ it, is based on the application of geometric concepts which are usually developed independently in subjects such as descriptive geometry. The present work shows the use of software application for computer-aided design (CAD) not as a tool for carrying out the practice of drawing but as a means for the learning of geometrical concepts will be applied both to make the different drawings of architecture and for a correct use of computer programs that generate them.

Key words: *computer-aided design (CAD), descriptive geometry, graphical representation.*

1. INTRODUCTION

The eminently practical kind of the graphic subjects requires a learning process based on making continuous exercises whose complexity see increased during the school period.

In the case of the Bachelor's Degree in Building Engineering, this learning is achieved through the graphical representation and analysis of several architectural elements, beginning with simple examples with an easy geometric interpretation and with whole buildings at the end of the course.

For these reasons, it is common in these subjects using application software for computer-aided design (CAD), as a tool to carry out the drawing plans proposed as current practices.

So, if we consider both, the use of such software and the contents of the subjects that employ them, are based on the application of geometric concepts usually developed independently by subjects as descriptive geometry, it seems right to associate learning of this subject with the application software for CAD.

Thus, the subject of descriptive geometry acquires the role of introduction to the architectural graphic expression, providing the theoretical training of matter in terms of geometric concepts refers, as well as the management of software that accompany the student not only in the degree, but throughout his career, because most drafters use CAD systems to prepare drawings. Drafters prepare drawings and plans which include technical details, dimensions, materials, and procedures.

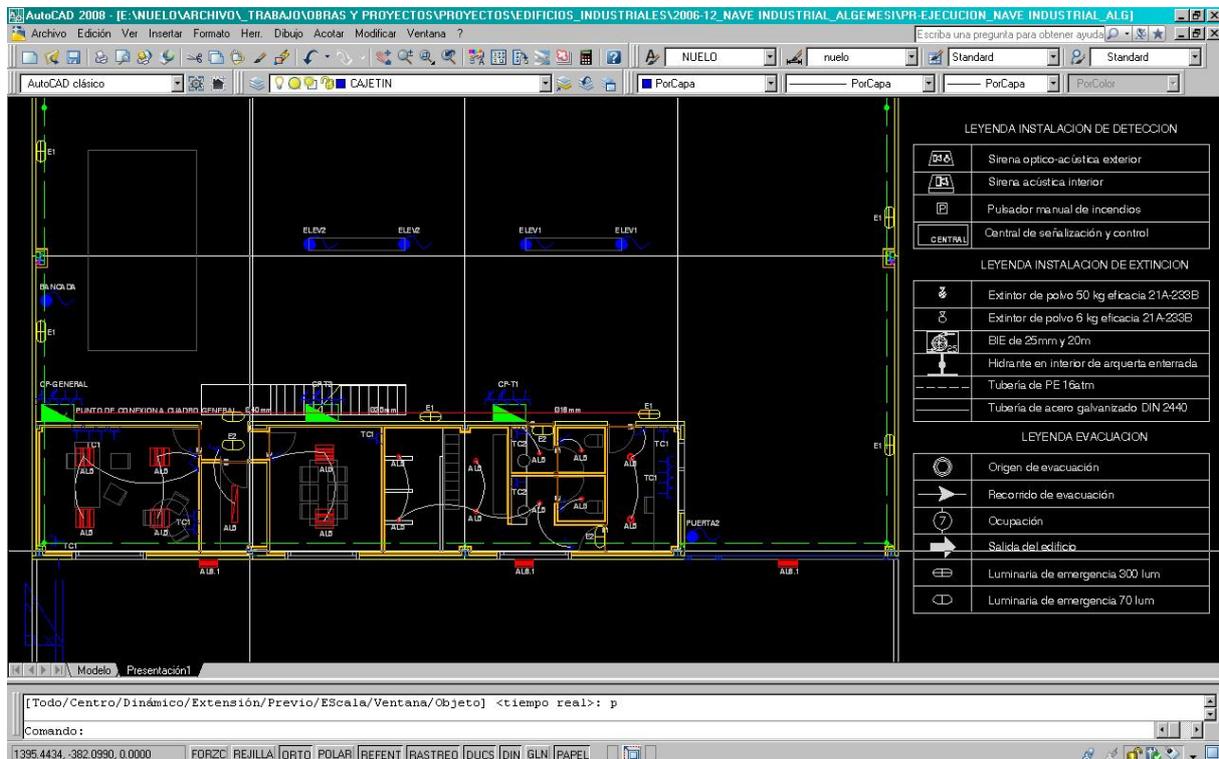


Fig 1. Architectural drawing made with CAD system.

2. MATERIALS AND METHODS

From the point of educational view, descriptive geometry performs an important role in the formation of the technical future in the field of architectural construction. This mission is based on the development of the space factor of intelligence that is known in colloquial terms for ability to "space vision", which is nothing more than the perfect understanding of the three spatial dimensions.

This goal is achieved through a process of geometric abstraction with which you can get to synthesize the reality built in their geometric ideal. In this way, it is possible to work in a rational way in obtaining data allowing us to visual understanding of the constructed reality, as well as develop geometric analysis to be able to do the intervention and modification of the studied element.

However, this abstract character is one of the main problems for the students in the learning of descriptive geometry, as many of its concepts can hardly be associated with any material reality. It is precisely on this point that the use of the CAD works as a means of transmission of geometric concepts, that facilitates the spatial vision as well as provide a reason to be useful for the student to the geometric theory such as the management of its future work tool.

At the same time, favouring the approach of the student to the subject thanks to a reorganization of the contents beginning with the more visually intuitive systems of representation to which the student is familiar, to finish with more abstract concepts

Therefore, for the implementation of this proposal has been necessary to work in two ways. On the one hand the choice of a computer program according to graphic titling requirements and with the

contents of descriptive geometry. On the other hand it has been necessary to revise and adapt the conceptual content of this subject in line with the new working environment.

AUTOCAD has been the application software for CAD that has been used, because it is one of the most 2D and 3D computer-aided drafting software architecture and application used in architecture and construction to assist in the preparation of blueprints .

In addition, it is not only a software to help students design buildings, products, or public spaces, without having to draw up plans by hand, but the own structure of operation is narrowly related to the geometry so that when the students use AutoCAD as computer software program to design a building, geometry is used in the program to figure out right dimensions. Moreover, AutoCAD allows the designer to use geometric formulas, assisting in creating the final drawing.

For a greater approach to the subject and independently of the version of the program utilized, is recommendable to configure the interface of the program in its WAY OF CLASSICAL WORK, forcing the student to work with the command line and the deployable menus. In this way they are eliminated most of the shortcuts that the program expands and brings up to date with each new version because, though they can facilitate the work of delineation, they hide or at least they do not allow to appreciate clearly the existing relation among the orders of the program and the geometric concepts that generate them.

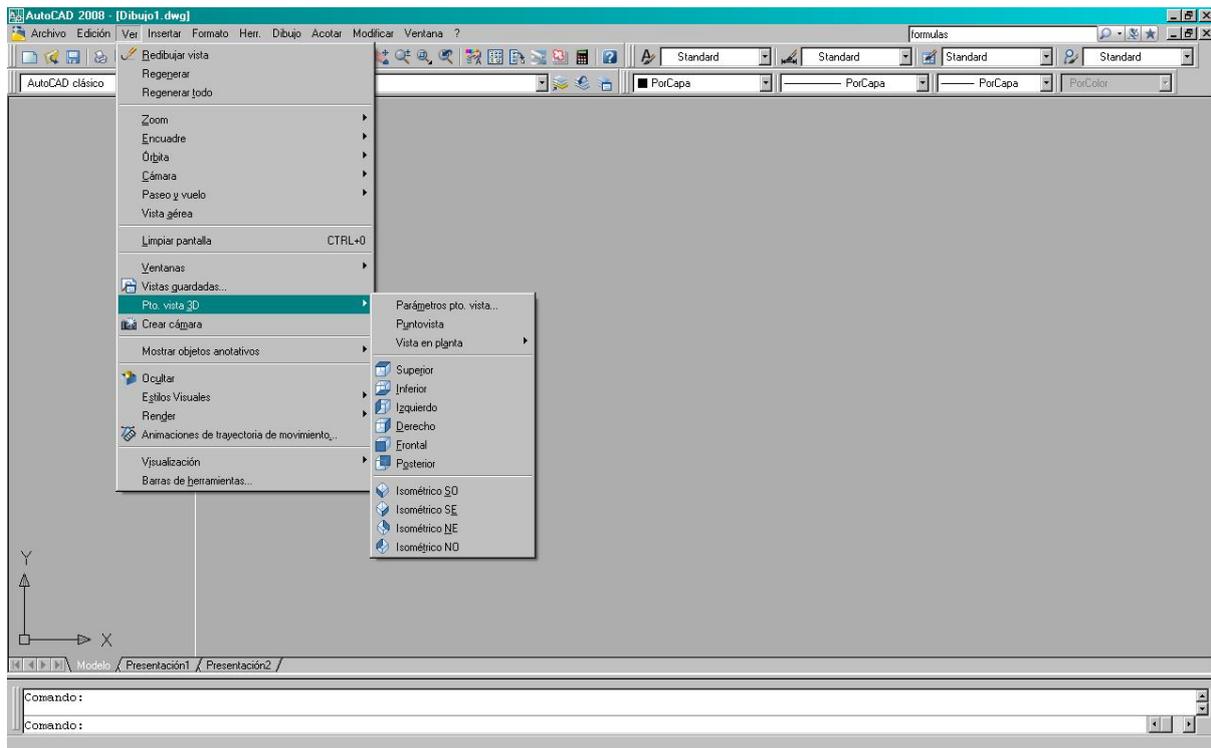
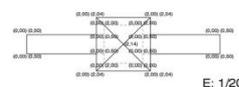
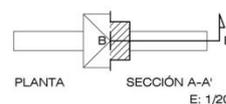
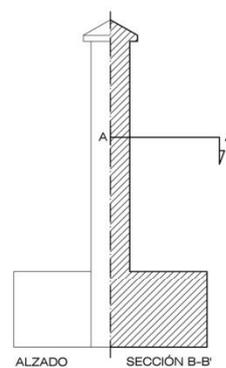
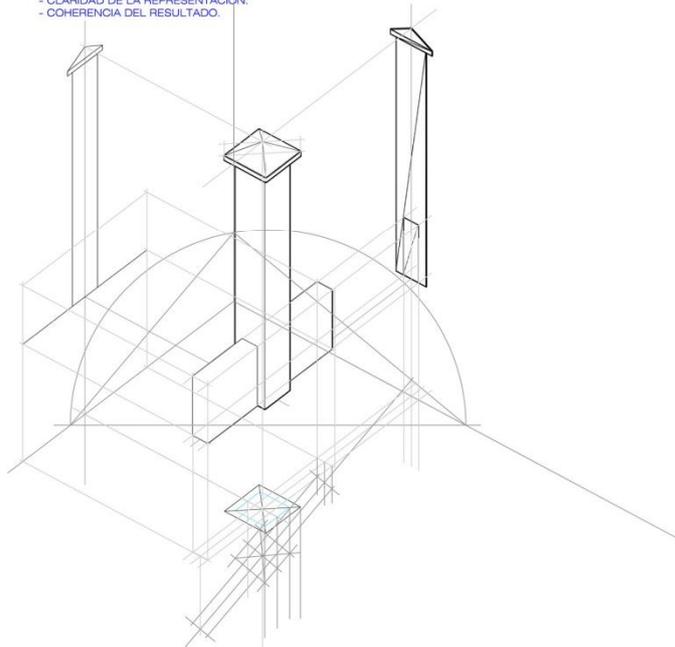


Fig. 2. Different points of view offered from the VIEW menu of AUTOCAD

PRÁCTICA 6. DADA A ESCALA 1/20 LA PERSPECTIVA AXONOMÉTRICA DEL ELEMENTO MACIZO DE LA VALLA DE CIERRE DE LA UJI, OBTENER LAS PROYECCIONES AXONOMÉTRICAS Y LAS DIEDRICAS NECESARIAS PARA SU ÓPTIMA DEFINICIÓN. ASÍ MISMO, REPRESENTARLO EN EL SISTEMA DE PLANOS ACOTADOS.

SE VALORARÁ:

- ENCAJE DE LAS VISTAS Y SU CORRESPONDENCIA.
- CLARIDAD DE LA REPRESENTACIÓN.
- COHERENCIA DEL RESULTADO.



NOMBRE:

Fig 3. Practical of graphic definition of an architectural object.

3. AUTOCAD IN DESCRIPTIVE GEOMETRY

3.1. Representation Systems

To avoid the instinctive refusal of the student to the theory of the descriptive geometry, the course begins for the representation systems in three dimensions, with the ones that the student recognizes easily the relation between reality and representation. In this way the attention of the student in the contents of the subject is assured and introducing him in the management of the program AUTOCAD, which are used only for orders of viewing.

With this procedure is obtained in a first session to review the basic concepts of the geometric space (polar and cartesian coordinates, World Coordinate System) and the different forms of graphic representation of the systems for orthogonal cylindrical projection (axonometric views). It carries out by means of the different default points of view that are found in the VIEW menu of AUTOCAD.

Subsequently it works dihedral representation of the views using again the default views that the program offers us, to finish with practical sessions in which is proposed the students to develop personalized presentations with different views of some architectural element. With these sessions, besides setting the concepts seen on the geometric space intends to show the student the need to relate

the different views represented each other, so much spatially as in size. The scale factor is introduced here that is worked with the ZOOM order of AUTOCAD.

Due to its complexity, the central projection systems are discussed last, through DVIEW order allowing us to introduce the relative parameters to the conical perspective in a clear and intuitive way.



Fig 4. Command line of the DVIEW order

3.2. Basic geometrical elements.

Once the student has understood the operation of geometric space, he begins to work on the analysis of its elements. For this we rely on the drawing commands of the program, beginning to be represented by different straight regular plane figures. Thus, we review fundamental concepts such as length, slope, and the main geometric features of the figures through the possibilities the software offers in terms of the representation of regular geometric figures.

At the same time and thanks to the use of geometric constraints, it is possible to show the student two of the most abstract entities, the point and the line, identifying the first one as an integral part of each of the line segments represented above, paying special attention to those that are more significant in the represented figures: Middle point, final point, circle center, quadrant...

The analysis of the fundamental elements is finalized with surface order, with the one that the diverse forms to create a plane are exercised until arriving at their unit, the triangle, as the surface with smaller number of entities.

3.3. Relationships between the elements in the space.

Actually, one of the more directed applications is geometric constraint. It is an association and restriction based on geometric principles which AutoCAD can apply to 2D geometry. With them is easy to understand and to utilize the relations of perpendicular and parallelism that the elements in the space keep.

For example, to draw a square, we can constrain its geometric aspects to ensure that the linework remains all four sides equal in length and each leg is perpendicular to another. Such exercises can deepen the fundamental characteristics of regular figures, particularly, the uniqueness of each.

The same exercise can be done using the COPY command or EQUIDIST and ROTATE, which allows us to enter EDITION orders of the program we use to complete the study of relationships between elements, working the intersection concept by TRIM and EXTEND commands.

3.4. Basic geometric transformations

Perhaps be here where more clearly we can appreciate the advantages of using software application for CAD in the learning of descriptive geometry because, though they are simple concepts, they need complex developments according to traditional geometry (on paper) that make them a right unknown for students.

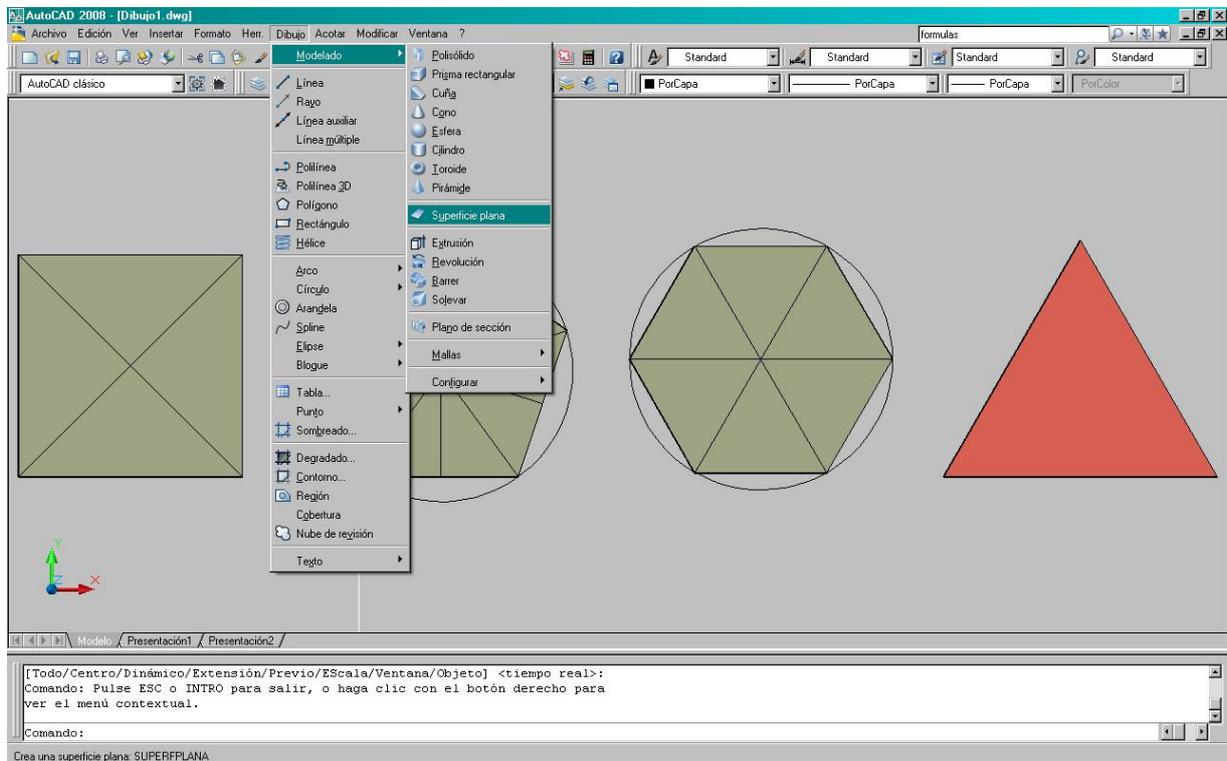


Fig 5. Drawing surfaces from regular polygons

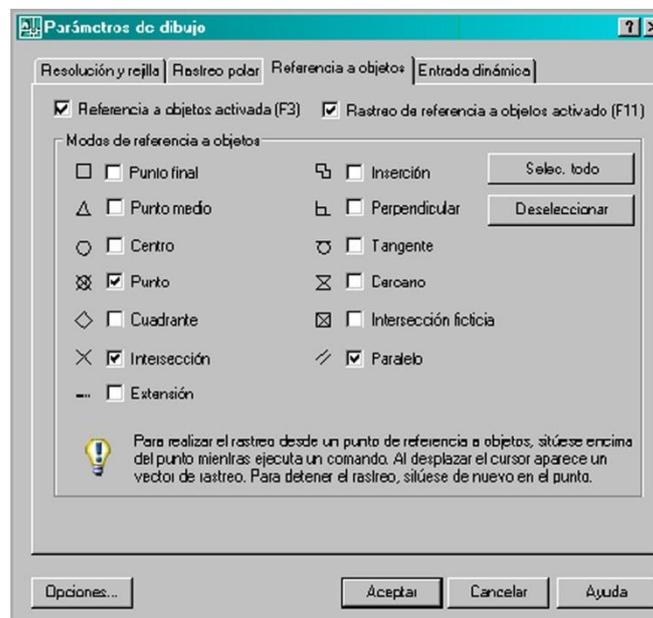


Fig 6. Context menu of geometric constraints

The basic geometric transformations, LOWERING, CHANGE OF PLAN AND ROTATE, aim the representation of an object or set of objects, from a perspective that facilitates the reading and work with them and usually identified with the true measures of the object.

This process involves a shift in the three-dimensional space for the visual rays are perpendicular to the object, an easily process done with software like AutoCAD which simulate three-dimensional reality, but a true effort involving spatial visualization when run on two dimensions of paper, where we have to assist in the relationships between different views of the objects to simulate the needed movement.

AUTOCAD accurately performs these operations due to the possibility that the program offers us to determine, modify and save the coordinates system (SCP), adapting it to the required points of view and store them for later editing. In this way, it is possible to perform these operations in a very immediate way as drawing a straight line.

4. LIMITATIONS AND ALTERNATIVES

However, it is currently not possible or advisable to work all the contents of the descriptive geometry with AUTOCAD, because as all tools, we must recognize certain limitations

One of these limitations comes from the inability to represent objects in cavalier or military perspective, widely used in architecture to graphically explain the workings of the buildings allowing to provide the spatial information of the proposals with the planarity dimensions in true magnitude.

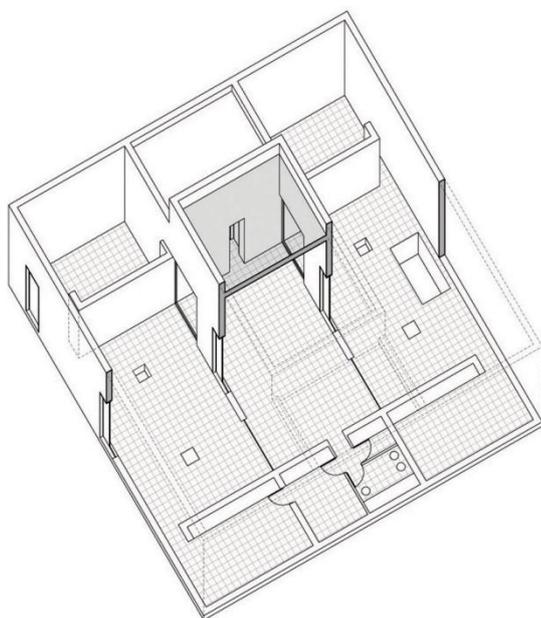


Fig. 9 Cavalier perspective of a building.

This is because this type of programs are designed to perform and view a virtual reality model, so for the calculation of the representations used a projection system that will ensure the distortion of

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the represented element, requirement that leaves out representation systems based on oblique cylindrical projections, because in these systems depending on the direction of the project rays and the orientation of the plane of representation, the dimensions obtained in one of the axes will be distorted, as well as offering infinite solutions to the same reality. To avoid this, AUTOCAD imposes the relationship of perpendicular between the project rays and level of representation, so the solution is unique to each selected point of view, but that means restricting the representation to the systems based on orthogonal cylindrical projections.

But from the educational point of view, the same limitation of the program be can now use as a resource that the student can perceive the differences between the different systems of graphic representation, prompting him to deepen the concepts of descriptive geometry to understand the possibilities of use offered by AUTOCAD.

In this way, the comparison of AUTOCAD with other design software and even the representation by manual procedures, help the student to understand the importance of geometric concepts in the development of their future profession, not by the need to acquire practice in spatial vision but by something more tangible as the tools of work.

Another limitation of the programme is to tackle the themes of intersections of surfaces and shadows, although they are procedures the programme solves, the lack of immediacy in achieving results in some cases and the complexity of application in another, making the less question its application in these paragraphs, so that, in addition, there are other programs such as SCKETCHUP or 3DMAX better prepared for it.

5. CONCLUSION

The use of software application for computer-aided design (CAD) has meant a change of attitude by the students of the course of descriptive geometry which is offered at the Bachelor's Degree in Building Engineering, showing a large receptive capacity of the theoretical contents. As a result, it is possible to develop the course as a continuous practice of the spatial vision, compliance with the main aim of the subject as well.

But the integration of the AUTOCAD software in the course of descriptive geometry offers advantages not only for the subject itself, but also to the whole of the subjects that configure graphic matter offered in the degree, that minimizes the teaching load that usually each one of them devoted to the management of the programme which affects the increase in hours that students can devote to contents of each subject.

In addition, to become the first of the graphic subjects that sees the student ensures coherence teaching on this subject, because the student first known geometric concepts and their practical application in a computer program for subsequent courses develop the graphic skills needed in the architectural rendering.

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INNOVATION AND ON-GOING LEARNING

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Abstract

Delivering high-quality instruction requires innovation in program development and delivery. The paper presents aspects of distance learning as on-going learning at the Faculty of Economics and Business Administration, analyzing merging technologies in the delivery of learner-based instruction and suggesting activities that would maximize the benefits and minimize the limitations of students and trainers that participate in this form of learning.

Key words: *distance learning, innovation, merging technologies*

1. INTRODUCTION

Our society has been under constant change lately. Due to the mobility of the work force, as well as to the linguistic and cultural diversity in the global space, learning a foreign language has become a very important professional factor in workforce placement and personal development for a career. Thus, linguistically and culturally skilled employees who are likely to successfully deal with the challenges of business communication may facilitate our openness towards European and international markets.

In the seminar *Teaching foreign languages in EU member states: balance and perspectives* held by the German Government in 2007, with reference to the ELAN (Effects on the European Economy of Shortages of Foreign Language Skills in Enterprises) survey carried out by the European Commission, the European Commissioner for Multilingualism, the Romanian Leonard Orban claimed that “...every year, thousands of European companies miss opportunities and do not sign deals because of the lack of language skills. Companies that invest in the development of language skills can value better business opportunities on the EU internal market and worldwide.” (Orban, 2007, p.3)

This is why the teaching of foreign languages in primary, secondary and tertiary education becomes extremely important in the present economic, social and political context of Romania. Many universities are challenged to provide greater access to educational opportunities and our university is among them.

In the present paper, we will refer to some aspects regarding the teaching of specialized languages, in our case Business English, within distance learning, at the Faculty of Economics and Business Administration from “Alexandru Ioan Cuza” University of Iași.

2. TEACHING BUSINESS ENGLISH TO DISTANCE STUDENTS AT THE FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

Distance learning at our faculty has known important developments during the past five years, both with respect to the quality of education and to the management of a greater and greater number of students (approximately 2500 students per year). Thus, adopting a new curriculum focused on the

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students' needs and implementing new teaching and evaluation methods and techniques (e.g. Blackboard platform) had positive effects on the students and teachers involved in distance learning. Since 2003, in their articles on distance learning, Sorenson and Reiner (2003) highlighted a series of benefits of teaching and evaluating students at this level, such as the flexibility attached to it and the substantial reductions of teaching and logistics costs. And all their findings can be confirmed today in most of the academic institutions that organize distance courses.

As traditional teaching and evaluating methods didn't succeed in coping with the new context of globalization, our faculty introduced online courses for foreign languages, as well as for other disciplines. We have thus embarked on a pilot program to develop a new-model for course design and delivery that was meant to facilitate the creation of better-quality teaching and learning environments through collaborative efforts among faculty content experts. Moreover, multiple choice tests (which are scanned and sent to the faculty database) were introduced as final exams, contributing to the maximization of benefits associated to data collection and processing and to the organization of courses and logistics. Not the same thing can be said about the development of some linguistic competences such as speaking, practically neglected in this system, although we are all aware how necessary they are in business communication.

Therefore, the use of an online alternative (i.e. the Blackboard platform) to the traditional method of teaching/ learning and evaluation gave rise to pros and cons from the part of students that we will list in the following section, as advantages vs. disadvantages.

2.1. Advantages of the online method of teaching Business English to distant students

We address a category of students that take part in the type of ongoing education (most of them already have a job as well as other commitments) and the online alternative to the traditional teaching system eliminates at least the problems related to course attendance. And more than that, related to that, students are free to access the online courses and the Blackboard Platform anytime and anywhere they can connect to the internet, reducing their transportation costs in this way.

2.2. Disadvantages of the online method of teaching Business English to distant students

An immediate disadvantage could be considered the lack of discipline that students working on these platforms may manifest, by not following a strict and coherent timetable. Another one is the difficulty with which some students access the necessary technology, as not all students enrolled in distance learning programs have access to a computer connected to the internet. Furthermore, the lack of face-to-face communication with the teacher could also be a disadvantage, as some students depend on an instant feedback from their teacher, not to mention that a series of disciplines, such as foreign languages, need to develop speaking skills, among others, for business communication.

Under these circumstances, it goes without saying that the content of the courses had to suffer changes, becoming more synthetic in its approach and adding evaluation formulas adapted to the online alternative of teaching/ learning.

2.3. Students' feedback

After adapting the content of our foreign language courses to the modern needs, we asked for the students' feedback, by applying the questionnaire below, so as to find out the extent to which they appreciated this new approach of blended learning (since we used a method of teaching that combined traditional forms with online courses) as an useful one for the study of foreign languages.

Questionnaire

General evaluation of courses and teachers of Business English for distance learners

Department

Course

Teacher

Academic year: 2010-2011

Semester: 2

The information will serve to improve the present courses in Business English.

You can choose more than one answer

1.The curriculum is:

- a. exciting
- b. difficult
- c. relevant
- d. irrelevant
- e. boring

2.How do you find the online component inserted in your course?

- a.It facilitates my learning and communication skills
- b.It does not bring any advantages because I do not have access to a computer and to an internet connection
- c.I prefer the traditional form of teaching/ learning

3.Did you find the course difficult to understand from a conceptual viewpoint?

- a. between 85 and 100%
- b. between 70 and 85%
- c. between 55 and 70%
- d. less than 55%

4.How do you find the bibliography and the materials recommended for study?

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- a. excellent
- b. adequate
- c. inadequate
- d. non-relevant

5. Was it hard for you to find the materials for the course?

- a. I found them easily
- b. It was difficult to find them.

6. How was the teacher prepared?

- a. very well prepared
- b. in a satisfactory way
- c. in an unsatisfactory way
- d. not interested

7. What type of course did you prefer?

- a. the online course
- b. the traditional course
- c. a combination of both

8. How did the teacher communicate with you?

- a. very well
- b. in a satisfactory way
- c. in an unsatisfactory way
- d. he/she was not interested

9. Did the teacher use interactive methods of teaching?

- a. yes
- b. sometimes
- c. no

10. If the answer is yes, which of the following methods were used?

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- a. encouraging students to ask questions
 - b. discussions/ debates in the classroom
 - c. discussions/ debates outside the classroom
 - d. individual discussions
11. How did you find the teacher's advisory activity?
- a. useful/ appropriate
 - b. inappropriate/ useless
12. Did you approach online counseling?
- a.yes
 - b.no
13. If the answer is yes, how do you consider it?
- a.more efficient than the traditional one
 - b.hard to approach/ I do not have access to a computer and an internet connection
 - c.less efficient than the traditional one
14. The teacher's attitude in the classroom was:
- a. appropriate/decent/courteous
 - b. impolite
 - c. indifferent
 - d. strict
 - e. tolerant
 - f. balanced
15. How relevant was the grading system?
- a. relevant
 - b. irrelevant
 - c. relevant enough
 - d. I do not know

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16. How did the teacher evaluate you?
- according to the criteria set at the beginning of the course, and on time
 - according to the established criteria, but not on time
 - not taking into account all the criteria set at the beginning of the course
 - evaluation was accompanied by feedback
 - evaluation was not accompanied by feedback
17. Did the course develop/ improve your linguistic competences?
- yes
 - up to a certain extent
 - no
18. If the answer is yes, in what ways? Give arguments.
.....
19. Did the course develop your intercultural competences?
- yes
 - up to a certain extent
 - no
20. If the answer is yes, in what ways? Give arguments.
21. Were the main lines and bibliography presented to you at the beginning of the course?
- yes
 - no
22. If the answer is yes, was that useful?
- yes
 - no
23. Did the course follow the guiding lines set at the beginning of the course?
- yes
 - no

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24. Did you have the possibility to interact with the teacher?
- yes
 - up to a certain extent
 - no
 - I do not know
25. Were you exposed to the teaching of other people (visiting professors) during your course, other than your regular teacher?
- yes
 - no
26. If you have other comments related to the courses taught and to your teacher, please mention them below.

Thank you

In what follows, we will present the results of our research concerning the students' perception on their teachers' efforts to develop those business and communication skills needed in business settings, through a mixture of traditional and e-learning methods. We considered 9 parameters listed below and 4 levels of fulfillment: very good (85-100%), good (70-85%), satisfactory (55-70) and unsatisfactory (less than 55%).

Levels of fulfillment perceived by the respondents

- Foreign language courses stimulated the students' intellectual curiosity - 85%
- Online courses raised students' interest in foreign languages – 60%
- Students understood better the content of a foreign language course by the help of e-learning – 50%
- The teacher introduced new notions/ information in a reasonable and coherent manner, using both traditional and online methods – 80%
- Students improved their linguistic and intercultural skills while using blended learning – 85%
- The teacher was cooperative and had a proper attitude towards students for the normal and efficient carrying out of the course – 80%
- ...The teacher proved his/her good professional skills through efficient blended teaching -99%
- ...Students were encouraged to interact during the Business English courses – 70%
- ...Foreign language courses within distance learning programs proved to be useful for business communication -85%

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Considering our own observations along the past years and analyzing the results of the study based on the comprehensive questionnaire mentioned above, applied on a number of 200 distant students, in the academic year 2010-2011, we found the following:

- ...Students considered that 99% of the teachers were well prepared and therefore they (the students) understood around 85% of the foreign language courses taught either traditionally or online. They were also content with the curriculum, with the way in which the courses were conceived, and they considered the courses were easy to find, that which facilitated the process of teaching/ learning.
- ...Nevertheless, there were pros and cons with respect to the course format: 40% of the students still preferred the traditional method of teaching for various reasons such as their dependence on the face-to-face method of teaching, or their limited access to computers and to the internet. But quite a large percentage (60%) admitted that online courses facilitated learning and communication within distance learning in Business English
- ...Although teachers used the interactive method of teaching and introduced online counseling; not very many students (50%) accessed this (online) formula
- ...Foreign language courses improved the linguistic and intercultural competences of our students by 85%. Nevertheless, it is important to mention that by using the same curriculum and evaluation formula for all students, some of them, namely the shier ones or the ones inclined to the traditional way of teaching/learning, might not have found the modernized courses very relevant.

3. CONCLUSIONS

Responding to the changing landscape of higher education, we have developed and delivered a new learning environment that encouraged discovery, integration and application in our students. Web course tools, such as the Blackboard platform that we have used, have built-in features that facilitate management of course materials, student access, and student achievement. Learners are thus able to access grades and determine their progress in the course; access and print course materials; and create an interactive online learning environment between and among students and teachers through email, online testing, and study guides. But as many advantages as the new methods of teaching/ learning may have had for distance learning students in our faculty, they still need to be adapted to the needs of each discipline to be truly efficient, because at present, not all the skills needed for Business Communication in a foreign language are being developed in the teaching/ learning/ and evaluation formula (for instance, oral communication skills for business are missing). This means that a reorganization of the courses so as to increase the number of hours allocated to develop such skills would certainly improve the teaching. Another observation attached to distance learning in Romania is the limited access to computers and to an internet connection for a part of the students attending the courses. This aspect, however, does not exclude the use of e-learning that we have discussed about and its advantages for communication within the courses of foreign languages. Therefore, an improved blended method -a combination of the traditional method of teaching with the new online one in an efficient proportion- should be the offer for the distance learners of Business English from our faculty.

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**IMPROVING THE QUALITY OF FOREIGN LANGUAGES TEACHING USING MODERN
COMMUNICATION AND INFORMATION TECHNOLOGIES AT SECONDARY SCHOOLS**

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Abstract

This project (implementation 01.03.2011-30.06.2012) is based on one of complex of teaching methods: computer-aided teaching. Modern teaching techniques, especially techniques using computers, enable students to take advantage of a richer sensory space for receiving and processing information. In the process of pedagogical interaction and communication, technology is becoming to a greater extent a mediator between a teacher and a student. E-learning and multimedia tools, which were the main aim of the project, enable more effective and attractive way of teaching at any educational level. Teaching, creativity, and individuality of teachers should lead to the fact that every teacher will be able to adapt the curriculum according to his needs and use it in his own way. Interactive curriculum holds, in the frames of e-learning, a role of a guidepost which will enable the students to enter into individual e-learning activities planned during the school year.

The main objective was to create supportive study materials for German, English and Russian languages for secondary school students of both economic and technical specialization (civil engineering and mechanical engineering). General language modules and mainly specialized language modules covering the mentioned fields have been created, all of them in three languages. The project's outcome is 12 electronic publications.

Key words: *e-learning, secondary school, teaching, teaching methods, learning tools, efficiency, innovation, multimedia systems, advanced communications and information technologies, interactive learning, language teaching*

1. INTRODUCTION

Computer literacy is considered one of the basic training requirements of modern man. It should enable him to comfortably handle the increasing amount of information. E-learning and online education, as a way of teaching vocational subjects and languages at a distance - via the internet, is to promote autonomous learning, mobilize and support the student in his self-directed learning and cooperation.

One of the complex education methods is computer supported learning. Student's functions in the education have changed in the direction of greater openness to technical innovation, and the student at the secondary education stage receives them as a commonplace and with obligingness. Modern teaching techniques, and especially computers, create a richer sensory space for receiving and processing information by students. In the process of pedagogical interaction and communication, the

technology is increasingly taking place of a mediator between the teacher and the student, but it should never replace human contact and weaken social bonds.

2. CLOUD COMPUTING IN EDUCATION

The main objective of the project, which have primarily dealt with professionally-oriented language teaching using IT, was to create a supportive learning material for the study of German, English and Russian languages for the secondary school students, both of economic and technical (civil engineering and mechanical engineering) specialisation. The already existing methods of education at both schools have been expanded and enriched by educational video and audio based materials. The teaching material were created using e-learning and multimedia tools of the school information system within the frames of the Operational Programme “Education for Competitiveness”, support area 1.1. - Promoting quality improvement in education, priority axis 1- Initial Education. Language modules were created using ROPOT (Revision, Opinion Poll and Testing), interactive outlines and other multimedia tools. Audio and video listenings have been integrated into questionnaires using Adobe Flash Player, as well as questions containing images created by the Questomat tool. Another tool used was an audio presentation in all the three languages. Nine (six) core professional topics were presented by native speakers, with addition to the test questions with a key. Animated text was designed to simplify the creation of complex questions in the Questionnaires. Another tool used was a XML Mind editor for creating web linguistic specialized publications and grammar publications according to descriptors of the Common European Framework of Reference for Languages (B1).

The entire interactive outline of the specialized language courses was divided by languages (English, German, Russian). It consists of 3 blocks of 3 topics in economic fields, and 2 blocks of 3 topics in technical fields. The outline of the general language modules always includes 2 blocks of 13 lessons. The structure of each unit follows the sum of knowledge prescribed by the School educational programme (SEP is a learning document created by every high school in the Czech Republic to implement the requirements of the Framework Educational Programme (FEP) for the education field given. It is legislatively enshrined in Act No. 561/2004 Coll. -ACT, 2008) and the Framework Educational Programme (FEP), which specifies the general mandatory requirements for the individual stages and fields of education, ie. particularly the learning outcomes which the student should achieve at the end of his study. The curricula content is defined by so called “frames” for designing the curricula and formulation of rules for creating the above mentioned SEP. The framework educational programme for both secondary schools (project partners) replaces the existing documents and the central teaching curricula. The schools have more room to profile and thus distinguish themselves from other schools, to formulate their own ideas about the form of education at their schools, to better cooperate in interdisciplinary education, to adapt to the needs of employers. Education is seen as a preparation of students for real life. Instead of encyclopaedic knowledge, it is focused on the key competencies of students, such as the ability to solve problems, to work actively and efficiently with the computer, and especially to communicate in foreign languages and cooperate in foreign language environment. The concept of training is based on the principles of a democratic society, on the needs of the present day and students with an aim to ensure wider career opportunities for graduates in a globalizing world. Foreign languages have always been significant in terms of communication of nations and dissemination of limited horizons of both nations and individuals. In the context of European integration treaties the languages take on new importance and become a centrally-supported education field within the national educational and cultural policies, especially the common European educational policy.

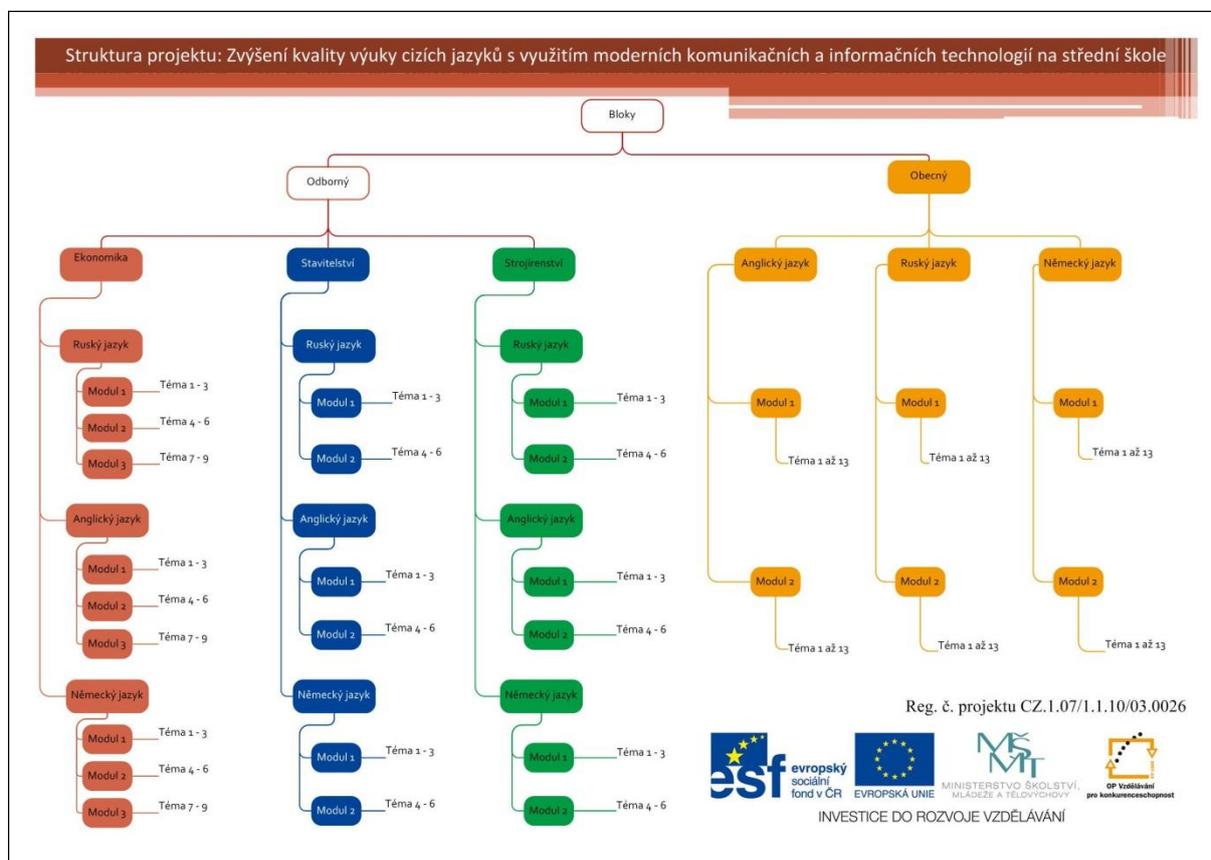


Fig. 1. Project's structure. Improving the quality of foreign languages education using modern information and communication technologies in high schools. Legend: Bloky – Blocks, Odborný – Specialized, Obecný – General, Ekonomika – Economy, Stavitelství – Civil Engineering, Strojírenství – Mechanical Engineering, Ruský jazyk – Russian, Anglický jazyk – English, Německý jazyk – German, Téma – Theme.

Foreign languages have been among the educational priorities of the EU for several years (cf. e.g. Foreign language learning: a European priority 2005). To be able to use a foreign language fairly well, not only English but also Russian, German, Spanish, Italian, among other key competencies, is a fundamental requirement of the contemporary labor market and of general education (literacy) of all high school graduates and, as the case may be, of all individuals. Therefore, both high schools (Secondary School of Mechanical Engineering and Civil Engineering in Tábor and the Business Academy in České Budějovice) place great emphasis on language education. The students' knowledge is evaluated in the common part of two-level school leaving examinations at the choice of the student (the obligatory testing offers two levels of difficulty: basic level (descriptor B1) and higher level (descriptor B2 of the Common European framework of Reference for Languages). The whole project was based on these requirements and was subsequently realized on the basis of the following eleven sub-activities:

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1.	<i>System installation and staff training: Information System (IS) and its tools: Web Portals, interactive outline, animated text, audio presentation, XML mina editor, Questomat, Adobe Flash Player</i>	<i>The output was the training of some workers who have participated in the preparation of project activities and modules. They have acquired the skills needed to work with all the multimedia tools</i>
2.	<i>Creation of language modules in German (general and specialized): preparation of general and specialized thematic blocks for language modules at B1 descriptor in German</i>	<i>The output were two modules: general and specialized. The general one comprised two blocks; the technically specialized one contained two blocks each (mechanical engineering and civil engineering) economically specialized one consisted of three blocks</i>
3.	<i>Creation of language modules in English (general and specialized): preparation of general and specialized thematic blocks for language modules at B1 descriptor in English</i>	<i>The output were two modules: general and specialized. The general one comprised two blocks; the technically specialized one contained two blocks each (mechanical engineering and civil engineering) economically specialized one consisted of three blocks</i>
4.	<i>Creation of language modules in English (general and specialized): preparation of general and specialized thematic blocks for language modules at B1 descriptor in Russian</i>	<i>The output were two modules: general and specialized. The general one comprised two blocks; the technically specialized one contained two blocks each (mechanical engineering and civil engineering) economically specialized one consisted of three blocks</i>
5.	<i>Implementation of language modules into the system using e-learning and multimedia tools: implementation of the various language modules into the Information System (IS) their adjustment</i>	<i>The result were comprehensive e-learning modules (of general and specialized language), already being used to support foreign languages (English, German, Russian), distributed in the blocks</i>
6.	<i>Creation of audio presentations with the help of native speakers</i>	<i>The output are specialized audio presentations (economy, civil engineering, mechanical engineering) recorded by native speakers in the three languages given, each consisting of nine or six topics</i>
7.	<i>Creation of web publications in all the three languages</i>	<i>Several web publications were created using the XML mina editor, with focus on general language (grammar exercises etc.) and vocationally-oriented language (specialized topics), for all the three languages</i>
8.	<i>Pilot testing consisted in verification of all parts of the system and detection of any deficiencies and additions. The workers of The Institute of Technology and Businesses (VŠTE), secondary schools 'workers and selected groups of high</i>	<i>A well functioning system to support the teaching of foreign languages (English, German, Russian) in the secondary education sector</i>

	<i>school students from the partner schools have participated in the pilot testing</i>	
9.	<i>Initial PC course module for users for secondary school students, including also a short training (during a several hours long course) on e-learning and multimedia tools (how to work with them, their benefits)</i>	<i>The output will be the acquisition of basic knowledge and skills of computer technology by high school students</i>
10.	<i>Launching a computer aided learning of foreign languages in high schools: It was about access activation to secondary school students enabling them to use the modules and a parallel explanation of the reason why to learn foreign languages</i>	<i>The output are complet e-learning modules designed for secondary school students. The modules generate an increased interest in foreign language teaching on both a general and vocationally oriented platform</i>
11.	<i>Evaluation of empirical measurement, processing outputs from each module</i>	<i>The output was a feedback control of the whole foreign language process in secondary schools, which should confirm the eligibility of long-term use of vocationally-oriented foreign-language e-learning modules</i>

Table 1. Key activities

The target group were the above-mentioned secondary school students of the economic and technological specializations (civil engineering and mechanical engineering). The adolescents were aged approximately from 15 to 20 years. Most secondary students feel themselves rather adolescent than adult during the course of their studies, especially because they do not want to surrender the “advantages” of adolescence. These “benefits” include exuberance, freedom, choice and exemption from stereotypes and banality of everyday life. A student in the secondary sector of education is a person who studies at a higher level of expertise and intellectual performance than a pupil at the primary level of education. He should become gradually (especially at the end of the fourth year of study) and relatively independent of the teacher. He is expected to have a certain degree of autonomy and personal responsibility in obtaining knowledge and skills. Another typical characteristic of the adolescents is a developed abstract thinking, its speed, flexibility and non-attachment to the old information and experience producing a high bonus in the connection with the flood of information of the Internet, virtual reality, online education and e-learning and teaching.

3. NECESSITY OF THE PROJECT

Modern media technology, most notably represented by computers, multimedia systems and the Internet, occupy an increasingly important place in the instrumentarium of the teacher's educational methods. It is therefore essential that the modern school teacher is able to handle these resources and incorporate them thoughtfully into other strategies, methods, techniques and resources. In the process of pedagogical interaction and communication, the technology is increasingly playing a role of a mediator between the teacher and the student. Most secondary schools therefore firmly introduce multimedia systems, including e-learning, in their curricular education - in different ways and using different technologies.

Project called IMPROVING THE QUALITY OF FOREIGN LANGUAGES TEACHING USING MODERN COMMUNICATION AND INFORMATION TECHNOLOGIES AT SECONDARY SCHOOLS is based on the so-called asynchronous e-learning, i.e. a kind of online e-learning communication when the learners (students) are not connected in real time.

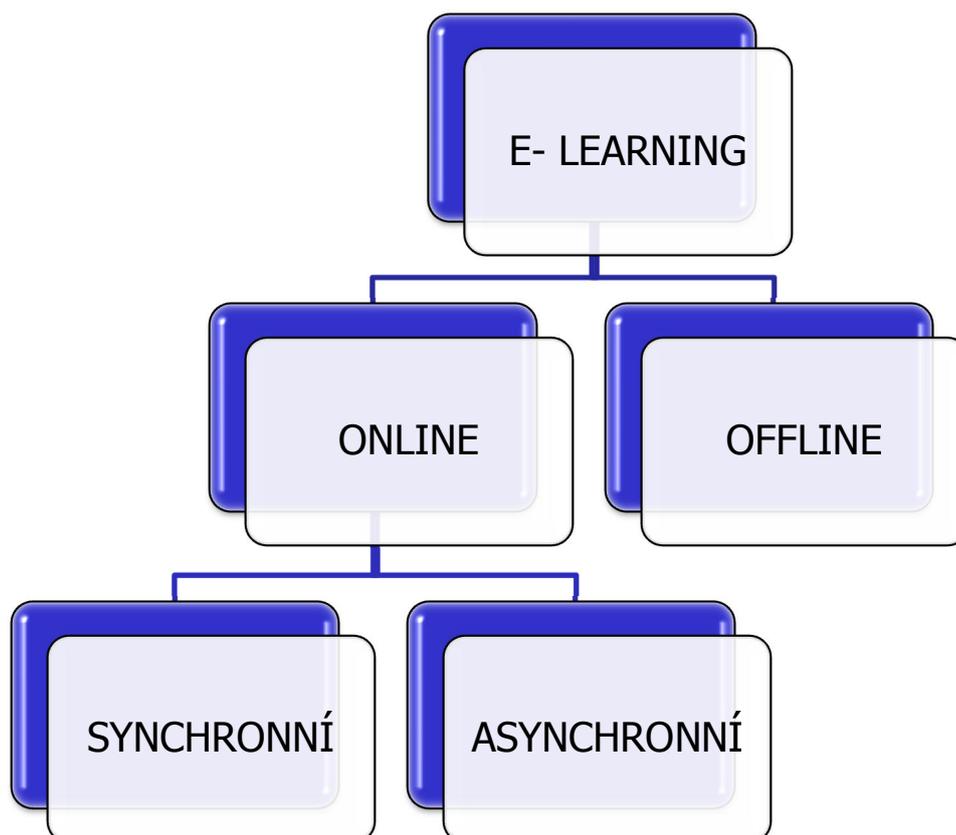


Fig. 2. E-learning communication. Basic form of E-learning (Kopecký, 2006, p. 9). The Project is based on the asynchronous e-learning communication. Legend: Synchronní – Synchronous, Asynchronní – Asynchronous.

It really is a professional language training anywhere and anytime. A student can learn at home using asynchronous communication to repeat lecture material, practise it, check his written and oral outputs using a key, practise phonetics and comprehension of the written and spoken text by native speakers. A characteristic feature of the asynchronous learning in this project is the fact that the teaching material has been already prepared for the teacher (the creators of the project have prepared materials for the teachers and they also arranged for external book examination and reviews), and he selects for his lessons only what he needs to discuss with his students. The student has the opportunity to work with all the material both at school during the lesson and also during self-studying at home. The submitted projects can also be used as Blended learning. It is a form of education that combines e-learning with traditional teaching methods. According to Zounka, it is an integration of electronic

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resources and tools into education in order to fully exploit the potential of ICT in synergy with proven methods and means already used in the traditional education (Zounek, 2009). The aim is to maximize the effectiveness of the education of students at secondary schools using appropriate technologies corresponding with appropriate learning styles of students (see e.g. Lojová & Vlčková, 2011). Since each student would vote for a different style and technology of his education, it is the teacher, with his strategies, who selects the method of teaching for Blended learning.

Further, Pejša subdivides Blended learning into the synchronous and asynchronous categories. This division is very similar to the e-learning division. The synchronous Blended learning is based on the fact that the participants are in touch in real time and are able to respond immediately to the theme. The classic classroom education using ICT or virtual classes may serve as examples. On the other hand, the asynchronous learning, as the term itself suggests, takes place at different times and thus the participants cannot communicate in real time. Educational programs available via the Internet, e-books (see our project), CD - ROMs, DVD-ROMs and printed manuals are used as learning tools.

The peculiarities and advantages of computer-aided instruction (multimedia programs, simulation programs, testing and training programs, information resources) of this project are presented to the students by language professionals, so called facilitators, who facilitate the vocational language training for the students of high schools. They ensure access for all students and help them to coordinate activities. The students actively perform various language activities involving reception, production, interaction or mediation, work with electronic language textbooks and other simulation programmes, and with programmes aimed at practising of foreign language curriculum. Multimedia tools allow students to become active players in this education and the learning becomes autonomous and even, at the same time, autoregulated. The autoregulated learning is an ideal conception of individual's own decision from the point of view of goals, time, place, contents, methods and even partners, while strengthening the ability of self-assessment of one's own success in learning and as a response to increased demands for employability and competitiveness. The foreign language education in the final years of vocational secondary education should focus on professionally oriented (specialized) language training, which is closely related to the preparation of graduates for their professional life in a given field. The need for a general language education, and chiefly the necessity of effective communication in a foreign language in a work environment for a specific target group, with linguistic materials adapted so that they are able to pass over the closest practical use in the work sphere, come currently clearly to the fore and thus emphasize the principles of modern foreign language education in secondary schools. The project based on the e-learning of foreign languages on a professional basis reflects several principles simultaneously:

- the requirement of authenticity extended to all aspects of the learning process
- the learning of a language as a means of obtaining information and professionally-oriented foreign language teaching gets to the forefront
- acquisition of language in its communicative form
- the boundaries between learning and acquiring of a foreign language. This is helped by the audio-lingual and audio-visual methods that reflect the process of learning more fully
- the changes in approaches to language acquisition are significant manifested in organizational forms, the electronic media playing a significant role

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- the emphasis is placed on the development of multilingual communicative and polycultural competences; support of the development of student's personality and the capacity to learn learning
- the project is focused on three world languages (German, English and Russian) for the reason of developing multilingual competences of European citizens. This multilingualism has become increasingly important for a number of reasons: 1. growing mobility within the European Union and globally (student exchange support based on e.g. the final document of the conference: "Die Zukunft der Europäischen Mehrsprachigkeit in einer erweiterten Europäischen Union", Vienna, 22.-24. 11. 2001), 2. the possibility to use knowledge of one language for another language learning; multilingual curriculum development, creating curricula for the second and third language education, 3. intercultural learning based on international cooperation in the neighbouring regions, partner schools or the Internet (see AT & Bausch 2000); multimedia language learning support, including e-learning
- A new approach to work with an error, that, in new concepts, is seen as feedback to both the student and teacher (cf. Raddatz, 2002)

The language materials are presented to students in the so-called modules (see Fig.3), that are well arranged and thus quickly absorbable. They are relatively small parts logically linked to the contents of the given themes that were discussed with experts from the secondary and tertiary sphere and the application sector. Nine themes were set for the Economic modules and six themes were set for the Technical modules; the themes being identical in all three languages.

Economic themes:

1. ECONOMIC SYSTEMS
2. NATIONAL ECONOMY
3. ECONOMIC CYCLE, UNEMPLOYMENT
4. LEGAL FORMS OF BUSINESS IN THE CZECH REPUBLIC
5. BANKING SECTOR IN THE CZECH REPUBLIC
6. MONEY
7. PAYMENT SYSTEM
8. LABOUR AND WAGES
9. MARKETING

Technical modules: A – Mechanical Engineering

1. HOW SEQUENTIAL GEARBOXES WORK
2. CAM: COMPUTER AIDED MANUFACTURING
3. HOW DOES A DC TO AC POWER CONVERTER WORK?
4. THE LIFE CYCLE MANAGEMENT OF A NUCLEAR POWER PLANT
5. LG 32-INCH LCD HDTV
6. HOW TO USE A FIRE EXTINGUISHER

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B – Civil Engineering

1. CIVIL ENGINEERING AND ITS BRANCHES
2. BUILDING MATERIALS AND THEIR PROPERTIES
3. ARCHITECTURE
4. BUILDING MANGEMENT
5. ENERGY- EFFICIENT HOUSES
6. BUILDING SITE – CONSTRUCTION

Odborný blok			Obecný blok
Ekonomika	Stavitelství	Strojírenství	
<p>Anglický jazyk</p> <ul style="list-style-type: none"> Economic Systems National Economy Economic Cycle, Unemployment Legal Forms of Business in the Czech Republic Banking Sector in the Czech Republic Money Payment System Labour and Wages Marketing <p>Publikace: Ekonomická angličtina</p>	<p>Anglický jazyk</p> <ul style="list-style-type: none"> Civil Engineering and its Bratches Building Materials and their Properties Architecture Building Management Energy- Efficient Houses Building Site – Construction <p>Publikace: Stavitelská angličtina</p>	<p>Anglický jazyk</p> <ul style="list-style-type: none"> How Sequential Gearboxes Work CAM: Computer Aided Manufacturing How Does a DC to AC Power Converter Work? The Life Cycle Management of a Nuclear Power Plant LG 32-Inch LCD HDTV How to Use a Fire Extinguisher <p>Publikace: Strojírenská angličtina</p>	<p>Anglický jazyk</p> <ol style="list-style-type: none"> Gramatika <ul style="list-style-type: none"> Modul 1 Modul 2 Testy k procvičování <ul style="list-style-type: none"> Modul 1 Modul 2 <p>Publikace: Obecná angličtina</p>
<p>Německý jazyk</p> <ul style="list-style-type: none"> Inflation brems Wachstumsmotor Konsum Inflation steigt schneller als erwartet Stimmung in Unternehmen auf Rekordhoch Unternehmer haben gutes Image Euro-Retter schmieden neue Wirtschaftsordnung Utah erklärt Gold zum offiziellen Zahlungsmittel Smartphone statt Kreditkarte Dax-Top-Verdiener - Ackermann rutscht ab Sparkasse sortiert Kunden in Psycho-Kategorien <p>Publikace: Ekonomická němčina</p>	<p>Německý jazyk</p> <ul style="list-style-type: none"> Teilgebiete des Bauwesens Baustoffe Architektur Baumanagement Passivhaus, Niedrigenergiehaus Baustelle <p>Publikace: Stavitelská němčina</p>	<p>Německý jazyk</p> <ul style="list-style-type: none"> Konstruktionsmerkmale der Maschinen Handwerkzeuge und stationäre Werkzeuge im Maschinenbau Elektrotechnik und EDV Industriemanagement Technische Kommunikation, technische Dokumentation Arbeitsschutz <p>Publikace: Strojírenská němčina</p>	<p>Německý jazyk</p> <ol style="list-style-type: none"> Gramatika <ul style="list-style-type: none"> Modul 1 Modul 2 Testy k procvičování <ul style="list-style-type: none"> Modul 1 Modul 2 <p>Publikace: Obecná němčina</p>
<p>Ruský jazyk</p> <ul style="list-style-type: none"> Экономические системы, теория потребностей <p>Publikace: Ekonomická němčina</p>	<p>Ruský jazyk</p> <ul style="list-style-type: none"> Строительная инженерия Строительные материалы и их <p>Publikace: Stavitelská němčina</p>	<p>Ruský jazyk</p> <ul style="list-style-type: none"> Конструктивные особенности двигателей и станков <p>Publikace: Strojírenská němčina</p>	<p>Ruský jazyk</p> <ol style="list-style-type: none"> Gramatika <ul style="list-style-type: none"> Modul 1 <p>Publikace: Obecná němčina</p>

Fig. 3. Introductory page of the project's web portal.

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ITC helped language education. Legend: Odborný blok – Specialized block, Obecný blok – General block, Ekonomika – Economy, Stavitelství – Civil engineering, Strojírenství – Mechanical Engineering, Anglický jazyk – English, Německý jazyk – German, Ruský jazyk – Russian.

An important advantage of all the modules is that they can be easily updated and expanded by new modules and themes. Therefore, they can be seen as certain “packages” of clearly defined knowledge and language skills that are presented to secondary sphere students in an acceptable and attractive form. When working with e-learning modules, several senses are involved at once. Moreover, it is psychologically proven that the more senses a learner employs in the learning process, the more facts he is able to remember (Barešová, 2011, p. 42):

10% of	what we read
20% of	what we hear
30% of	what we see
50% of	what we see and hear
70% of	what we discuss with others
80% of	what we try ourselves
95% of	what we teach somebody else

4. CONCLUSION

The e-learning is differently perceived by the European Union, whose definition says that it is a European programme based on Information and Communication Technologies (ICT) concerning the teaching and training that support the integration of ICT into all learning systems and environments (formal, informal at secondary schools, universities and in training). The European definition of the e-learning is very broad and it is its main weakness. It specifies very little of what ICT offers in education (Kenneth, 2009). The American Society for Training and Development (ASTD), having more than 70,000 members in approximately 100 countries, claims, on the contrary, that e-learning covers a wide range of applications and processes such as web-based learning, computer-based learning, virtual classrooms, digital collaboration etc. It also includes the delivery of contents via internet, intranet / extranet (LAN / WAN), satellite broadcast, interactive TV and multimedia carriers. According to the author of Delivering E-Learning, Kenneth Fee, the best definition of e-learning should be clear, it should say something more than a plain description of a phenomenon, which the e-learning undoubtedly is, and it should cover all technological applications without unnecessary detail. In his opinion, all these requirements are met by the following definition: **“E-learning is an approach to learning and development: a collection of learning methods using digital technologies, which enable, distribute and enhance learning”** (Fee, 2009, p.16). We, too, we identify with this, relatively broad, definition, and the project IMPROVING THE QUALITY OF FOREIGN LANGUAGES TEACHING USING MODERN COMMUNICATION AND INFORMATION TECHNOLOGIES AT SECONDARY SCHOOLS was developed, implemented and tested on its basis. And because we perceive computer-assisted instruction as one of the complex teaching methods, which occupies, together with frontal, group, individual and project teaching, a unique place in the educational process

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not only in the secondary education sector, but is more and more penetrating to the primary level as well. The reason is simple: computer literacy of children in primary and secondary schools is increasing, especially in connection with the development of the Internet (using blogs, wiki or sharing services of various sources) and is very closely related to the development and evolution of e-learning. „In the process of pedagogical interaction and communication, the technology is increasingly playing a role of a mediator between the teacher and the student, but it should never replace human contact, and impoverish and weaken social bonds "(Hrušková, 2009).

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EFFECTIVENESS OF TEACHING STRATEGIES IN PRIMARY EDUCATION

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Abstract

In this paper I proceed from the assumption that the education of young learners is significantly influenced by the teacher and his way of teaching and leading his students, and the way the students are encouraged to prepare their assignments and tasks. The research is therefore primarily concerned with differences on the level of foreign language skills of pupils at primary level, who were taught with the help of competitive, cooperative and individualized teaching strategies during their previous English language education. The research is based mainly on a quantitative methodological approach to research problems of teaching strategies and complex teaching methods, and it is also complemented by qualitative approaches. Educational environment of various primary schools is described and evaluated on the basis of the questionnaire method, on the interview method, discussions, and using free response techniques (discussions with teachers of English at primary schools, structured interviews with directors of elementary schools (audio recorded)).

The conclusions were reached by empirical comparison of all data obtained from all the quantitative and qualitative methods.

Key words: *teaching in the primary sector, cooperative strategies, competitive strategies, teaching strategies, individualized strategies in teaching, effectivity*

1. INTRODUCTION

Mutual understanding is a prerequisite of harmonious coexistence. In order to achieve the dream of a continent without borders, Europe needs citizens who can communicate in some of the many languages it uses. Even in a united Europe, however, wide range of foreign languages will be preserved. The more languages a Czech citizen master, the easier it will be for him to find an employment in the contemporary society and on the International Labour Market.

The ability to master several foreign languages requires to begin to learn least one of them at an early age. Primary education sector and FL (Foreign Languages) Didactics are ideally equipped to function as a reform catalyst in the field of language education. To develop strategies and procedures to promote linguistic diversity and multilingualism belong to the main tasks of didactics FL in the first stage of education at schools. FL Didactics also works with instruments of this policy, particularly with the Common European Framework of Reference for Languages (CEFR) and the European Language Portfolio.

I would like to point out already in the introductory part of my work that opinions on what is an effective teaching of languages or what is an effective education vary significantly. This is due to the fact that they see the various theories of teaching effectiveness differently. I believe that the theories of

efficiency of FL education can be seen from at least from two perspectives. „The first perspective is focused on which subject matter should pupils at school deal with, the second one is focused on which methods, resources, activities, procedures and strategies should be used to introduce the pupils into the foreign language schoolwork (Hrušková, 2010, s). "

Although this work will predominantly focus on the second perspective, the questions of education content cannot be completely overlooked.

The primary language teaching is very important because the majority of pupils (except those from bilingual families) begin the 3rd grade, respectively already the first grade, with a foreign language education for the first time in their lives. What we mean by primary education? Primary education is a comprehensive and clearly defined stage comprising the years of age from 6 to 12. It is seen as an open system, a process of laying the foundations for lifelong learning, literacy acquisition, mediation of basic cultural skills, creation of one's initial view of the world showing the basic relationships and connections that enable a child to be versed in the surrounding world, **the process of developing vocabulary as a child's tool for its success in the following stages of education**, introduction to the national culture and the creation of national consciousness, the general cultivation of the child's personality - the formation of attitudes, value orientations, interests, etc. (Kolláriková, Pupala, 2001, pp. 141-155). At the early school age, the above mentioned process of child's foreign language vocabulary acquisition and development is slower than, for example, during the secondary education phase. Well mastered basics of the first foreign language and especially a positive motivation for teaching will enable the child to move on faster later on in another foreign language

2. TEACHING STRATEGY

The process of teaching is affected by teaching strategies and tactics - the two basic concepts which are today among the most frequent linguodidactic terms. Both concepts have their origins in the military field. Over the time, however, they began to live independently in other disciplines, including psychology, pedagogy and didactics. The term "tactics" is narrower, the term "strategy" is broader. Strategies are seen as hierarchically higher processes such as sequences of negotiations which have a goal to be achieved, often represented as flexible plans appropriate to the situation.

Not all experts, however, distinguish between the strategies and the techniques (eg. Mayer, Weinsteinová, 1986, pp. 315-327). Those who use this distinction, however, point out the different hierarchical levels of the processes and subprocesses (Kasíková 2001, Vašutová 2004, Švec 1998, Mareš 1998 etc.). „The disunity of experts is probably related to the fact that each expert employs his own view of the process and distinguishes between strategies and techniques so that definition line is not fixed and depends on the fineness of distinction of a personal perspective "(Vlčková, 2006).

Strategies may have both a holistic and individual character. In the latter case they usually relate to different stages of teaching (Solfronk, 1990). The development of teaching strategies depends on theories, on concepts accepted for education and on other contexts and conditions. **Teaching strategy emphasizes the role of the teacher in the classroom**. Recently, it was defined this way by, for example, J. Maňák and V. Švec in their book Teaching methods (Maňák and Švec, 2003). In conformity with the authors, I am inclined to use the term "teaching strategies". „Teaching style arises from the teachers' qualification for pedagogical activity and is developed by joint influence of external and internal factors. It leads to results of a certain type, but prevents the achievement of other results. It is relatively stable, difficult to change" (Průcha, Walterová, Mareš, 2001, p. 226). „Teaching

style, as a comprehensive teacher's characteristic way of thinking and his behavior in educational situations, is reflected in his teaching strategies and his teaching. "(Mareš, Švec, 2003, p. 39).

Methodical behavior of a teacher stems from a certain conception of teaching, it participates in the organization of the learning process and ensures optimal relationship among all active agents. Teaching strategies are understood similarly widely, and are usually defined as teaching methods. This may include specific activities such as students' notes in their workbooks, homeworks or more general approaches such as cooperative learning, identifying similarities and differences in subject matter, etc. Although the teaching strategies are formulated on general „sub-subject" level, their realization is determined by the curriculum and varies according to subject in which it is used. The following diagram shows the relationship of basic teaching relations as used by me:

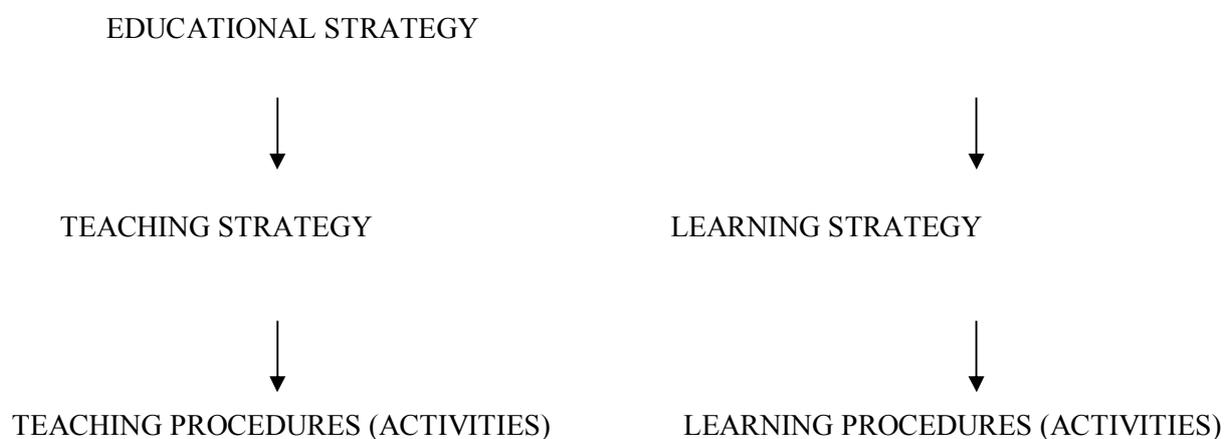


Fig. 1. Hrušková, 2010.

3. METHODOLOGY

My work is based on the assumption that the education of young learners is significantly influenced by what the pupils learn, especially how the teacher teaches and leads, on how the pupils are guided to prepare assignments and tasks. The paper therefore deals primarily with the differences in levels of foreign language competencies of pupils at the primary level, who were previously educated by competitive, cooperative and individualized teaching strategies in their EFL lessons. The research is based predominantly on a quantitative methodological approach. Up to now, the effectiveness of language education in the fourth and fifth grades of primary schools in relation to the instalment of the Common European Framework for Languages and the introduction of new state school leaving examinations in the Czech education system has been only scarcely addressed by Czech pedagogical research. The project is therefore aimed to carry out an empirical study that attempts to contribute to the pursued issue. Attention is paid to the comparison of teaching strategies that are based primarily on educational programmes of particular elementary schools. The aim was to determine the efficiency of examined particular empirical strategies in regard to:

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- a) the overall efficiency of education, defined as the ratio of knowledge of foreign language skills at a particular school, expressed by results of a standardized test
- b) the development of partial language skills (reading, writing, speaking, listening comprehension)

In defining our goals, I proceeded from hypotheses forming together a coherent whole. The basic hypothesis is formulated as follows:

H0: All teaching strategies are equally effective.

H1: Some teaching strategies are more effective than others.

H1a): Competitive strategies in foreign language education do not attain, seen from a perspective of efficiency rate (the difference between effects taking into account the applied means, “costs”), a higher level of foreign language skills among pupils (in comparison with cooperative strategies).

H1b): An individual approach to pupils, individualized education based on pupils’ activity promotes a better formation of language skills in some pupils only (compared to the competitive arrangement of learning situations).

In this research, which served to validate hypotheses, the complex of conditions was ascertained by defining the population of pupils aged 9-11 (primary school), i.e. pupils of 4th and 5th primary school grades. Basic research sample consisted of 258 pupils from seven primary schools from the regions of the Czech Republic. The schools involved received a set of English language tests. The level of the standardized tests matched the level descriptor A1 according to the Common European Framework of Reference for Languages. The survey was carried out in parallel in the 4th and 5th grades of primary schools using the same standardized test for two reasons: 1. because of language skills comparison in all classes of 4th grade (or 5th grade); 2. because it enabled the comparison between 4th and 5th grades.

Name of primary school	Test submission date	Number of tests	Test collection date	Number of tests	4th grade filled in/empty	5th grade filled in/empty
PS Sezimovo Ústí	5.10.2010	50	9.11.2010	50	0/23	27/0
PS Strakonice	5.10.2010	95	9.11.2010	82	41/0	41/0
PS Tábor	5.10.2010	30	9.11.2010	30	14	14
PS Sokolov	5.10.2010	30	20.12.2010	20	X	9/0
PS Vyšší Brod	6.10.2010	35	5.11.2010	35	19/0	16/0
PS Malonty	6.10.2010	30	29.10.2010	29	0/0	13/16
PS Rudolfov	6.10.2010	64	8.11.2010	64 k	32/0	32/0

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Submission and collection of tests						
Name of primary school	Test collection date	P Number of tests	Test collection date	Number of tests	4th grade filled in/empty	4th grade filled in/empty
PS Sezimovo Ústí	18.3.2011	50	20.6.2011	50	0/23	27/0
PS Strakonice	X	x	X	X	X	X
PS Tábor	18.3.2011	30	20.6.2011	30	14/1	15/0
PS Sokolov	18.3.2011	10	23.5.2011	10	X	9/1
PS Vyšší Brod	X	x	X	X	X	X
PS Malonty	18.3.2011	30	1.4.2011	30	0/0	14/16
PS Rudolfov	18.3.2011	64	20.6.2011	64	32/0	32/0

Table 1. Submission and collection of tests

Research methods result from the methodological approach to research of issues of education strategies and complex teaching methods. Evaluation of education effectiveness using competitive, cooperative (or collaborative) and individualized strategies and techniques is based on standardized tests – means of systematic measuring of the results of teaching. In all primary schools, the following standardized test of English language was used: Cambridge Young Learners corresponding to A1 descriptor according to the Common European Framework of Reference for languages. The test was focused on four foreign language skills: the work with foreign language text (from the grammatical and lexical view), writing, speaking and listening comprehension. The test takes about 45 minutes to complete and it consists of 3 parts:

1. Listening
2. Reading and writing
3. Speaking

Testing the pupils in this foreign language speaking skills has not been held on any of the primary school because of the high time consumption. The test is 15 pages long (page size A4). Evaluation of the tests was conducted solely by the author.

	Length of exercise	Number of parts	Points
Listening	about 20 min	4	20
Reading and writing	about 20 min	5	25
Speaking	about 5 min	5	at the discretion of teacher

Table 2. Standardized test, level A1

Data from standardized tests were rewritten into tables in Excel. Immediately from the beginning it was clear that the basic descriptive statistics and hypothesis testing cannot be tested by the most widely used test for testing hypotheses about mean values, a so-called “t-test”, also chi square and dispersion due to multiple variables we wanted to take into account. After consulting with Mr. Stuchlý, associate professor from the Department of Natural Sciences, The Institute of Technology and Businesses in České Budějovice, we reached a consensus that it is necessary to refine the method of analysis, so that we can take into account all factors (or most of the factors) involved and influencing the learning process. During qualitative data processing the analysis of variance with repetition (ANOVA) was used, Tukey’s method to refine the analysis of variance, regression mode “Normal Q-Q Plot” was used among other statistical methods that work with more than two variables. The use of different teaching strategies is considered in the analyses as the independent variable. To determine the significance of the hypothesis the significance level was used, defined by default in compliance with the usage in pedagogical methodology always for $p < 0.05$ or $p = 0.05$.

Basic Education Strategy		
Cooperation	Competition	Individual Approach
PS Sezimovo Ústí (large school)	PS Rudolfov (midsized school)	PS Mánesova Sokolov
PS Orbis Pictus, Tábor		
	PS Vyšší Brod (midsized school)	PS Vyšší Brod (midsized school)
	PS Malonty (small school)	PS Malonty (small school)
	PS Poděbradova Strakonice (large school)	

Table 3. Preferred educational strategies. Legend: PS – Primary School

4. CONCLUSION – STATISTICAL DATA RENDERING

This chapter answers the research questions. The leading hypothesis will be tested (simultaneously, the subhypotheses will also be tested). Measurements will be documented using tables and graphs to clarify the issue.

H1: Some educational strategies are more effective than other

Scoring by the type of school, by teaching strategies (excluding factors like gender, test and grade):

The basic numerical characteristics (according to schools, i.e. according to various educational strategies):

```
> numSummary(testy[, "hodnoceni"], groups=testy$skola, statistics=c("mean",
+ "sd", "quantiles"), quantiles=c(0,.25,.5,.75,1))
      mean      sd 0% 25% 50% 75% 100%  n
```

```
MAL 32.55556 7.239493 16 29.5 35.0 37.50 45 27
```

```
RUD 37.34921 7.704874 16 32.0 39.0 45.00 45 126
```

S.U. 35.42593 4.372305 21 33.0 36.5 38.75 42 54
 SOK 43.64286 1.645841 39 43.0 44.0 45.00 45 14
 STR 30.57317 6.986814 9 26.0 31.0 36.00 43 82
 TAB 30.24561 8.246819 12 24.0 30.0 37.00 45 57
 VBR 22.22857 8.250083 10 16.0 21.0 26.00 42 35

Graphs:

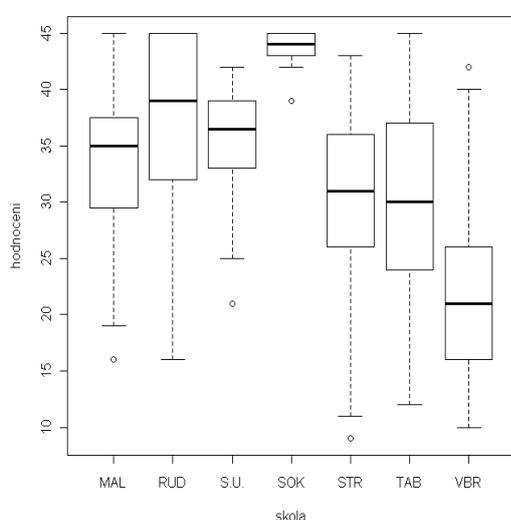


Fig. 2. Distribution of scores by school

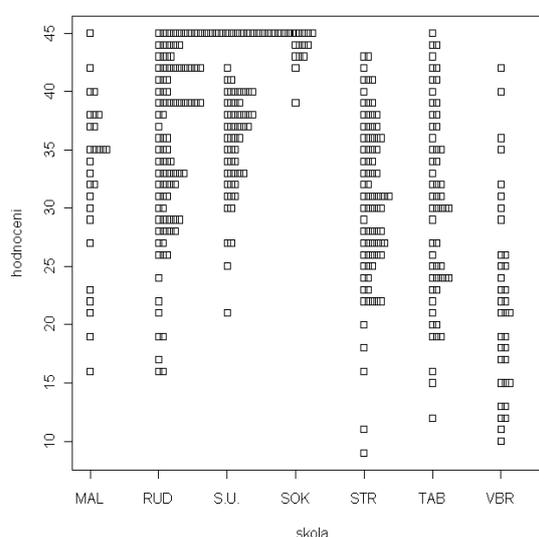


Fig. 3. Frequency distribution of scores by schools

Best average score was reached in the primary school in Sokolov: 43.6 points, but since there was very low variability ($s = 1.65$ points), it could lead to the suspicion that only 14 best pupils were selected, or the pupils were given a help with the test. However, this is a class consisting of pupils with above average intelligence (IQ above 130), who learn and are taught according to individual personal plans. In comparison with pupils who are taught using competitive strategies they showed significantly better results. If we compare the time spent teaching the pupils in Sokolov (number of lessons of language education - 2 hours per week from the 3rd grade on) with other primary schools with prevailing use of competitive strategies (PSs in Rudofově, Vyšší Brod, Malonty and Strakonice, three lessons a week from 3rd grade on) we can confirm that in the case of the primary school in Sokolov the individual teaching strategies are effective. In contrast, the weakest average score was reached in the primary school in Vyšší Brod, mean value = 22.2 points, $s = 8.3$, $n = 35$ pupils, with prevailing competition in foreign language education, but where there is a small number of pupils in the classroom (18, comparable to the number of pupils in Sokolově - 14) which enables partly individualized education. Second place, following the above average pupils from Sokolov, was taken by the primary school in

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Rudolfov with average 37.3 points (overall average 33.2 points), $s = 7.70$, and the number of pupils was 126. In this school, where the pupils learn English language compulsorily from the 3rd grade, three lessons a week, the prevailing foreign language education is based on strategies that promote competition among pupils.

Residuals:

Min	1Q	Median	3Q	Max
-21.5732	-4.5732	0.7544	5.4268	19.7714

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	32.556	1.379	23.616	< 2e-16 ***
skola[T.RUD]	4.794	1.519	3.156	0.00173 **
skola[T.S.U.]	2.870	1.688	1.700	0.08992 .
skola[T.SOK]	11.087	2.359	4.700	3.62e-06 ***
skola[T.STR]	-1.982	1.589	-1.247	0.21305
skola[T.TAB]	-2.310	1.673	-1.380	0.16829
skola[T.VBR]	-10.327	1.835	-5.628	3.49e-08 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.163 on 388 degrees of freedom

Multiple R-squared: 0.3173, Adjusted R-squared: 0.3067

F-statistic: 30.05 on 6 and 388 DF, p-value: < 2.2e-16

From the analysis of variance, we can see that the school factor dramatically affects the assessment of the test. In the output for TMP there are graphically shown intervals of confidence for differences between the average scoring of schools. Statistically insignificant differences are those that include zero (S.U.-MAL, STR-MAL etc). As the last part of the output is the model estimation the method of least squares. The estimated coefficients have significance of the effects on the factor's level. Only the coefficients the artificial variables STR and TAB are insignificant. JAR model explained 31.7% rating changes. Compliance with following conditions is required for the correctness of usage of JAR methods: normality of residues, homoscedasticity and independence residues. We verified the normality by Shapiro-Wilk test (SWT) applied to the residue. Homoscedasticity was verified by e.g. Levene's test (LT) and serial independence of the Durbin-Watson test (DWT).

PC output JAR:

> summary(AnovaModel.1)

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
skola	6	9251	1541.84	30.049	< 2.2e-16 ***

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Residuals 388 19909 51.31

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
> numSummary(testyd$hodnoceni , groups=testyd$skola, statistics=c("mean",  
+ "sd"))
```

	mean	sd	n
MAL	32.55556	7.239493	27
RUD	37.34921	7.704874	126
S.U.	35.42593	4.372305	54
SOK	43.64286	1.645841	14
STR	30.57317	6.986814	82
TAB	30.24561	8.246819	57
VBR	22.22857	8.250083	35

Simultaneous Confidence Intervals

Multiple Comparisons of Means: Tukey Contrasts

Fit: aov(formula = hodnoceni ~ skola, data = testyd)

Quantile = 2.9343

95% family-wise confidence level

Linear Hypotheses:

	Estimate	lwr	upr
RUD - MAL == 0	4.7937	0.3361	9.2512
S.U. - MAL == 0	2.8704	-2.0839	7.8246
SOK - MAL == 0	11.0873	4.1649	18.0098
STR - MAL == 0	-1.9824	-6.6462	2.6814
TAB - MAL == 0	-2.3099	-7.2205	2.6007
VBR - MAL == 0	-10.3270	-15.7108	-4.9431
S.U. - RUD == 0	-1.9233	-5.3420	1.4955
SOK - RUD == 0	6.2937	0.3722	12.2151
STR - RUD == 0	-6.7760	-9.7583	-3.7937
TAB - RUD == 0	-7.1036	-10.4588	-3.7484

$VBR - RUD == 0$ -15.1206 -19.1368 -11.1045

$SOK - S.U. == 0$ 8.2169 1.9131 14.5208

$STR - S.U. == 0$ -4.8528 -8.5364 -1.1691

$TAB - S.U. == 0$ -5.1803 -9.1719 -1.1888

$VBR - S.U. == 0$ -13.1974 -17.7585 -8.6362

$STR - SOK == 0$ -13.0697 -19.1479 -6.9914

$TAB - SOK == 0$ -13.3972 -19.6669 -7.1276

$VBR - SOK == 0$ -21.4143 -28.0611 -14.7675

$TAB - STR == 0$ -0.3276 -3.9523 3.2972

$VBR - STR == 0$ -8.3446 -12.5885 -4.1007

$VBR - TAB == 0$ -8.0170 -12.5308 -3.5033

95% family-wise confidence level

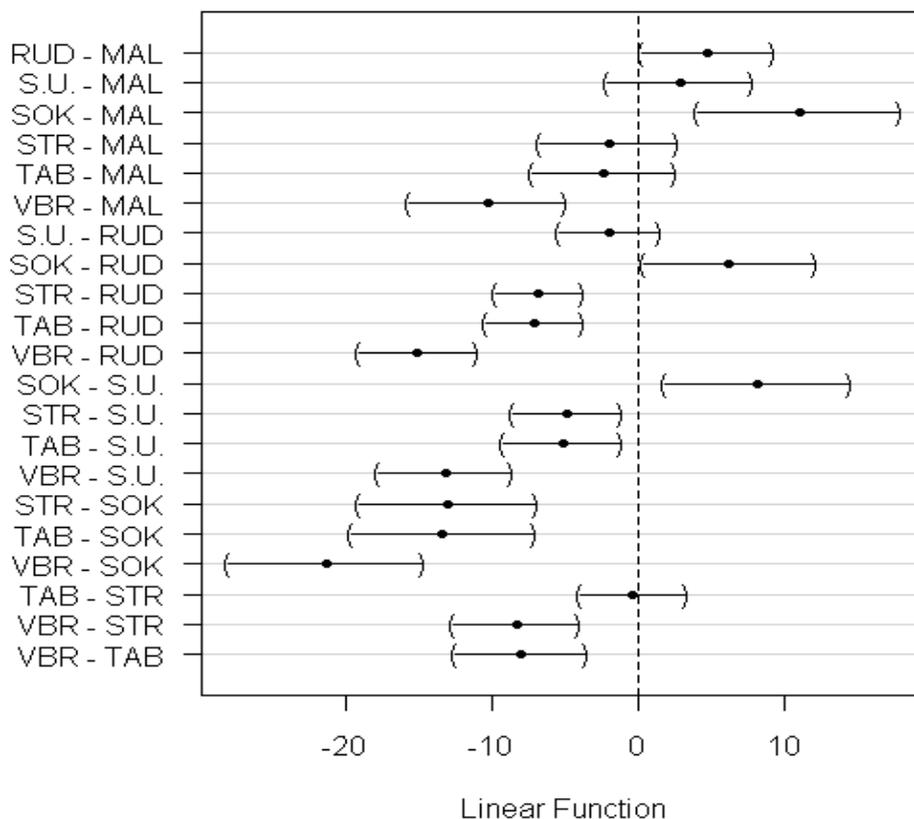


Fig. 4. Linear Function.

Kruskal-Wallis rank sum test

data: evaluation by school

Kruskal-Wallis chi-squared = 120.9756, df = 6, p-value < 2.2e-16

Based on the nonparametric version of the JAR, the KWT can significantly confirm that the assessment depends significantly on the school factor, thereby concurrently also on the teaching strategies. This way, the claim of the hypothesis H1 was confirmed, namely that some teaching strategies are more effective than others.

PivotCharts (group chart and three-dimensional histogram):

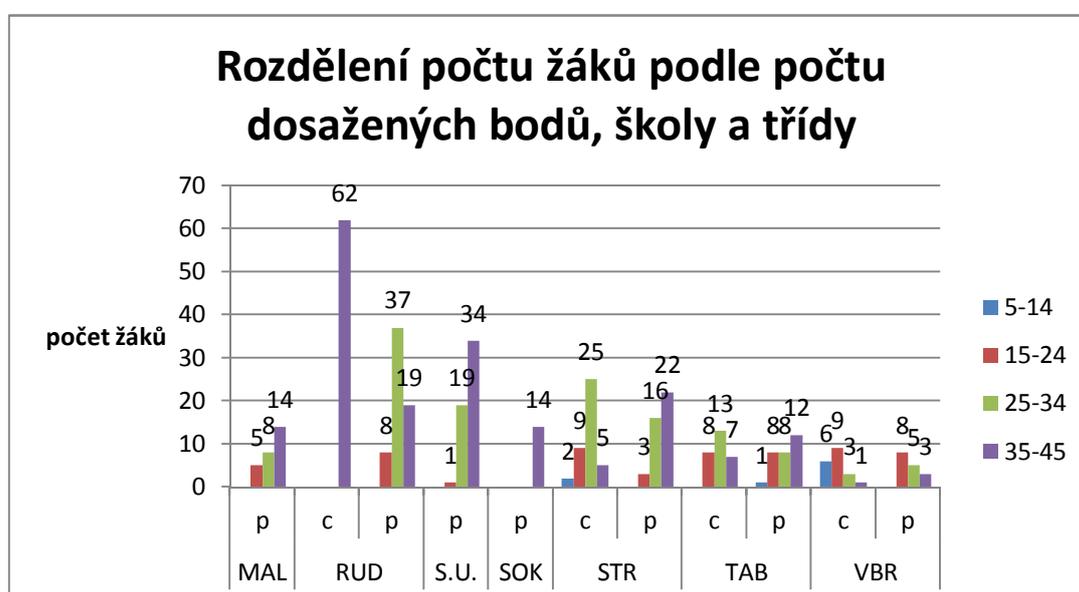


Fig. 5. Group chart. Distribution of pupils by the number of attained points, school and grade
Legend: počet žáků – number of pupils.

Subhypothesis, which claims that the competitive teaching strategy for foreign language education do not reach, seen from the point of effectivity rate, high level of effectiveness of foreign language competencies of pupils (in comparison with group and individual instruction) **was not significantly verified**. In schools, in classes, where the teaching took place mainly by competition, various results were achieved; in summary, it was stated that the written output of the fourth and fifth grade pupils of all schools that have participated in the testing, complies with with level A1 of Common European Framework for Languages. Significantly different results can be observed in schools in Vyšší Brod and Rudolfov; also, a significant difference was between primary schools in Rudolfov and Malonty. Primary schools in Rudolfov, Vyšší Brod, Strakonice and in Malonty have their foreign language education based primarily on frontal teaching. Nevertheless, the results from all classes are vastly different: the fourth and fifth grade pupils from classes in Rudolfov achieved above-average results, and generally moved to the second place at worst on the imaginary axis. On the contrast, the results of

pupils from primary schools from the Vyšší Brod and Malonty are at the opposite end of the evaluation. Pupils from Strakonice (participating in one testing only, likewise in Malonty)m as for their results, also belonged to the inferiors.

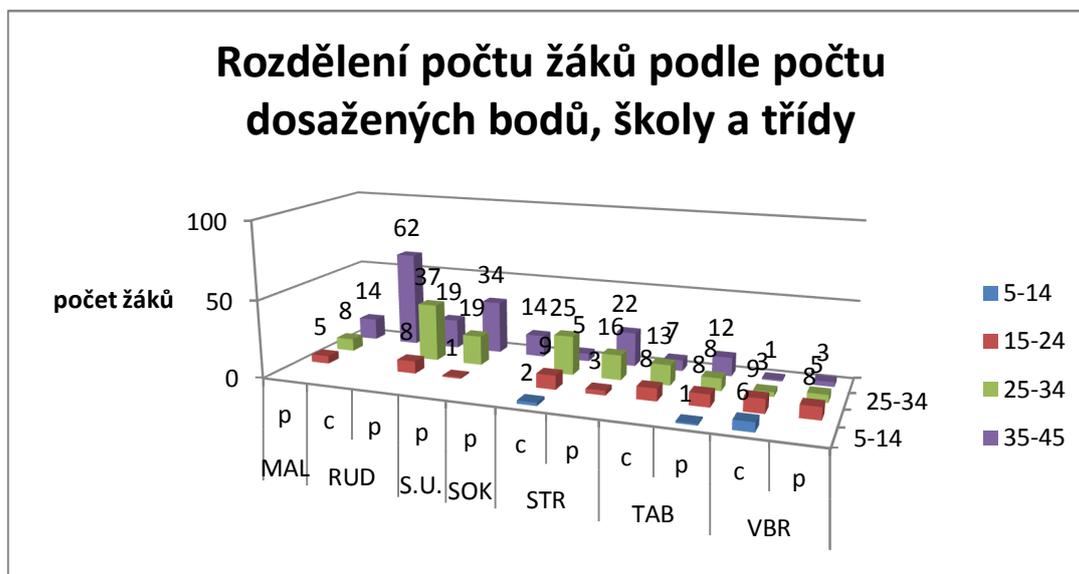


Fig. 5. Three-dimensional histogram. Distribution of pupils by the number of attained points, school and grade. Legend: počet žáků – number of pupils.

Overall, however, it was noted that the mere concept of competitive strategy is not the “guarantee” of the worst results. It was clearly proved by primary school in Rudolfovo. Other variables that are named in the measurement (sex, teacher, his strategies and methods, technics, teacher’s education, experience), but also not named (education of parents and the overall family social background, the opportunity to travel abroad...), enter the educational process and affect the entire educational process and its effectiveness.

Primary school in Sezimovo Ústí II and primary school Orbis Pictus in Tábor, from the schools that have taken part in this research testing, use educational strategies based on cooperation. Historically, the older school and also the larger in the number of pupils is the school in Sezimovo Ústí II. Their foreign language education is based primarily on project learning and cooperative group learning based on cooperation and permeability between subjects, which allows an active work of pupils (open education). Alternatively aimed school in Tábor tries to use, in the frames of their individual approach to the pupil, the elements of project learning in different organizational forms: either the pupils work in small groups or the teaching process is realized as an individual assignment or a combination of both is used. The school has its own curriculum, called “We teach each other”, that employs in the teaching of foreign languages not only a key principle of the educational activities of Montessori pedagogics - respect for the child, in accordance with the child’s individuality, but also encourages pupils to work in cooperation and collaboration.

Box plots:

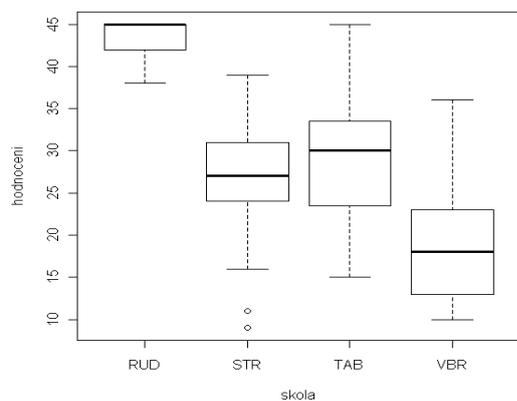


Fig. 7. Distribution of test assessment of 4th graders

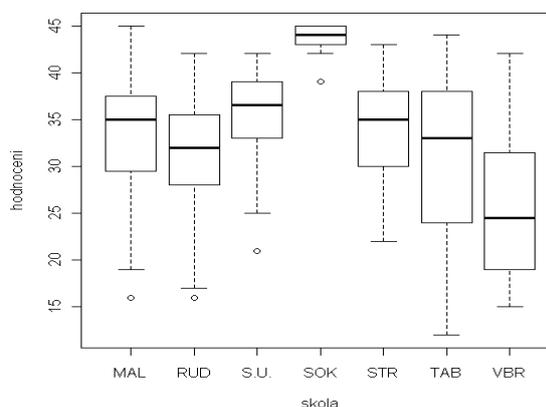


Fig. 8. Distribution of test assessment of 5th graders

Number from school		Assessed				Grand total
School	Class	5-14	15-24	25-34	35-45	
MAL	P		5	8	14	27
Total MAL			5	8	14	27
RUD	C				62	62
	P		8	37	19	64
Total RUD			8	37	81	126
S.U.	P		1	19	34	54
Total S.U.			1	19	34	54
SOK	P				14	14
Total SOK					14	14
STR	C	2	9	25	5	41
	P		3	16	22	41
Total STR		2	12	41	27	82
TAB	C		8	13	7	28
	P	1	8	8	12	29
Total TAB		1	16	21	19	57
VBR	C	6	9	3	1	19
	P		8	5	3	16
Total VBR		6	17	8	4	35
Grand total		9	59	134	193	395

Table 4. Contingency table (distribution of the number of pupils in relation to assessment, school and class). Legend: C = 4th grade, P = 5th grade

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Test scores of the pupils from Sezimovo Ústí and Tábor are diametrically different. The results in alternatively oriented foreign language education in Tábor were below average (in relation to the median, which was 34 and the average number of points was 33, 21; standard deviation of 8, 60), the average score was 30, 25 (rounded to hundredths) compared to the results of pupils from Sezimovo Ústí II: 35, 43 (rounded to hundredths). Variability is relatively high because both the schools are comparable in the number of tested pupils and this number was sufficient (Tábor: $n = 57$; S.Ú.: $n = 54$). In the comparison of points in the first test the school in Sezimovo Ústí II was better: the average score was 35, 22 ($n = 27$ students) compared to the average number of points in Tábor: 30, 25 ($n = 28$ pupils). In second testing the results of the Orbis Pictus primary school in Tábor were significantly the weakest of all measured schools (average was 30.24 points, 29 pupils tested), cf. pupils ($n = 27$) from the school in Sezimovo Ústí II received an average of 35.63 points, which was above the average (together with the primary school in Sokolov where the teaching strategies are individual and individualized, and the primary school in Rudolfov, where is predominant the traditional frontal teaching and competitive teaching strategies). The research brought up an interesting finding in this direction. Schools that base their teaching primarily only on the cooperative group education (including project education) have not been even able to participate in the testing for the following reason – even their fifth grade pupils have not the knowledge and foreign language skills at the level of the descriptor A1 (according to the testimony of teachers). The schools are predominantly alternatively focused and on their web pages they assert a broadened language education to the public (the output level of the individual levels of education is not mentioned). Examples of such schools:

- Primary school Waldorfská, České Budějovice
- Primary school Bernarda Bolzana, Tábor
- Primary school Magic Hill, Praha

Some primary schools, mostly focusing alternatively, combine cooperative learning with individual teaching strategies thanks to the small number of children in the classroom (see Orbis Pictus primary school). The subhypothesis H1b) was based on the individual and individualized approach to the subject taught and claimed that an individual approach to pupils and individualized instruction based on pupils' activity promotes the formation of better language skills only for some pupils (compared to competitive arrangement of learning situations) **was significantly verified**. Individual and individualized teaching strategies are appropriate, but they show results better results only for a particular group of children - for example, children who are talented, have a higher IQ than their peers (see primary school in Sokolov). This confirms the assumption that only the personal goals of individuals are met. In contrast, these types of education could effective in schools with a small number of pupils (Orbis Pictus church primary school in Tábor, Primary and Nursery School in Malonty in Vyšší Brod), but the results achieved were not above the average results, quite the contrary. All the three primary schools mentioned showed some of the weakest results. In their defense, it should be noted that their pupils are able to prove results corresponding to the level of descriptor A1 of CEFR. This level, however, was not possible to reach for other schools that built their education primarily on the individual and individualized teaching strategies (alternative Waldorf school in České Budějovice, primary school Bernard Bolzano's in Tábor). The tests have not been completed by these schools, because, according to the teachers, they were very difficult for the pupils.

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EDUCATION, CONSUMPTION AND ECONOMIC GROWTH OF A COUNTRY

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Abstract

The impact of education, as a qualitative side of human capital, on wages, consumption and, consequently, on the economic growth and development was largely debated during time. This is the reason why we intend to analyze, in the present paper, the relationship that exists between education, consumption habits and the economic growth, considering the direct and indirect effects (externalities) of the first one on the income levels. To reach this objective, we have collected and interpreted the data included in various statistical reports or in studies conducted by different analysts.

Key words: *education, human capital, income, consumption, economic growth*

1. INTRODUCTION

The influence of education on behavior has been recognized, for a long time, that it is pervasive. Even through casual observation, many aspects of the behavior of the individuals are considered to be closely associated with the level of schooling. The choice of occupation, the geographical mobility, the consumption expenditures, the leisure-time activities or the lifestyle seem to be relatively strong correlated to the level of education. Meanwhile, very closely correlated to the level of education and to its influence on the consumption decisions is the level of the income. This is the reason why in the present paper we will focus our attention first of all on the relationship that exist between education, as a qualitative side of human capital, and the economic growth rate of a country.

In the 1960s, growth theory consisted mainly of the neoclassical model, which considered that the differences among countries, from the point of view of the real incomes per capita and of the economic growth rates, could be explained through the differences in the population growth rate and in the savings: the lower is the population growth rate and the higher is the savings rate, the faster develops the economy.

In contrast to the neoclassical theories, “The New Growth Theories” emphasize the endogenous determination of the growth rates, underlying the importance of human capital that results from the fact that:

- human capital is explicitly incorporated as an input factor in the production function;
- the factors leading to the endogenous growth are related to the stock of human capital. This may be either because human capital is assumed to directly produce new technology/knowledge, or because it is an essential input into a research sector that generates new knowledge/technology.

The concept of human capital refers to knowledge, abilities and skills of the individuals that can be used in the activities that stimulate economic growth and development (Coleman, 1988). This is the definition most frequently used, which puts the accent, in analyzing the factors of production, not necessary on the factor *work*, but more on what it actually means the individual contribution to production. Therefore, it was considered that education is one of the most important qualitative sides of human capital, with a strong impact on economic growth.

The present paper is structured in three parts: in the next section we present the influence that education has on the economic growth and development, then we talk about the correlation that exists between education, the level of the incomes and the consumption and, in the end of the paper, we will summarize the results and conclusions.

2. THE IMPACT OF EDUCATION, AS A QUALITATIVE SIDE OF HUMAN CAPITAL, ON THE ECONOMIC GROWTH

There are various approaches concerning the direct and indirect effects of education, at micro and macroeconomic level. World Employment Report (1998-99) shows the fact that “increasing the regional capacity for human capital generation and utilization may be some of the most important regional development policies for success in the future high technology economy”, because, as Gilmore (1999) underlined, human capital is the foundation of learning institutions, which are in turn the building block of learning regional economies.

The positive effects of education can be noted when the human and physical capital are complementary factors in production, meaning that firms will tend to invest in the sectors where the labor force is more educated; the low-skilled employees that work in regions with a high level of education, will do their job more with physical capital than the low-skilled ones from regions with a low level of education (Acemoglu, 1996). Yet, it was argued that educated workers may raise the productivity of their less educated co-workers, or there may be spill-over effects from technical progress/knowledge accumulation which in turn arise from investments in human capital (Sianesi, Van Reenen 2000). The same opinion is to be found at Lange and Topel (2005); they consider that the human capital of an individual is more productive when the other members of the society are more skilled. But the benefits of such complementarities will be internalized when occur within firms, but not if they are produced by social and other interactions that are external to firms. This aspect was argued early before, in 1890, when Marshall noted that the social interaction among individuals that work in the same industry and in the same place develops new opportunities to learn, fact that increases the productivity.

Considering that the impact of the human capital on the economic performances does not solely depend on the quantity, quality and type of human resources, but also upon a great number of other factors such as “matching of educational supply to labor demand”, “the level of job satisfaction”, “the capacity of any society to attract skills from outside” (Rogriguez-Pose, Vilalta-Bufi, 2004), some analysts tried to identify which variable of human capital has the greatest impact on the economic growth. While Judson (1998) proposed an estimation of the efficiency of the allocation of educational spending between primary, secondary and tertiary education, Hanushek and Kim (1995) considered that the quality of education has an important positive impact on economic growth. In the same time, Murphy, Shleifer and Vishny (1991) showed that the allocation of talent to engineering has a positive effect on growth, while its allocation to law has the opposite effect. The new theory of the economic growth demonstrates that the education contributes to development in two ways. First of all, the

human capital is an input factor in the production, explaining in this way the options for the investments in education, and secondly, the factors that involves the endogenous growth – and especially the technological progress – are correlated to the stock of human capital either because it is assumed that these directly generate new knowledge/technologies, or due to the fact that it is an essential aspect for research that generates technology or knowledge. For example, from Romer's point of view, the human capital leads to new products or ideas able to foster the technological progress (Romer, 1990). Nelson and Phelps (1966) refer to the fact that the human capital is able to adopt the new technologies: "a larger stock of human capital makes it easier for a country to absorb the new products and ideas that have been discovered elsewhere"; consequently, a country that has a higher level of human capital is growing faster than others because it is the one that catches up more rapidly to the technological leader. The same idea is to be found at Harmon, Oosterbeek and Walker (2000) that argue that more educated countries grow faster because the education gives the opportunity to create new technologies and adapt the existing ones to local production. Consequently, the opportunities to grow may be greater for economies that are inside the technological frontiers (Barro, Sala-i-Martin, 1995). Yet, paradoxically, states with low schooling rates may benefit of adopting the technologies developed in a foreign country. On the contrary, Howitt (2005) considers that the technologies developed in one country cannot be adopted by another country without changing them first, because much of the technological knowledge are tacit (Polanyi, 1958) and cannot be codified. Therefore, those who want to adopt it have to spend time, financial and material resources learning and experiencing, in order to master what has been implemented in another part of the world. This is necessary due to the "circumstantial sensitiveness" (Evenson, Westphal, 1995). In other words, the existing differences in climate, availability of raw materials, skills, customs, consumers' preferences and political regulations involves changes in products and technologies from one country to another.

It was found that only the accumulation of human capital is not always a decisive factor for the economic performance. The contribution of human capital depends on the efficiency of its accumulation: those countries that inefficiently allocated their educational resources have low benefits of their human capital investments, in terms of economic growth (Sianesi, Van Reenen, 2000). The effects of various educational levels on a country's performances were analyzed by Sianesi and Van Reenen (2000). They noted that a 1 percent increase in primary school enrolment rates is estimated to lead to a 2 percentage point increase in the per capita GDP growth rate, for the poorest developing countries, while for the OECD countries this effect was not considered. A one percentage point increase in secondary school enrolment rates is shown to lead to a 2,5 - 3 percentage points increase for the developing countries, and up to 1,5% for OECD states. Considering this data, we can argue that the impact of the educational growth rate, on different levels, varies from country to country, depending on the level of economic growth: while the primary and secondary skills seem to be correlated to growth in the poorest states and in some developing ones, the tertiary education is important for OECD countries. This idea is also underlined by Blanchflower, Oswald (1998) and Cowling (2000), which consider that the factors specific for each country shape the nature of the entrepreneurial talent and the impact that education has on performance. Moreover, the individuals' initiatives to acquire and allocate the knowledge on various jobs are influenced by the way in which firms generate or not the demand for labor force which includes that skills/knowledge.

3. THE RELATIONSHIP BETWEEN EDUCATION, INCOMES AND CONSUMPTION

There were many approaches related to the connection between the human capital, determined through the level of education, consumption and the level of the incomes. At the beginning of the XXIst

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century, the importance of human capital and its impact on the consumption patterns is argued especially because there are huge differences between the poorest and the richest states, considering the living standard.

The problem of the economic convergence between countries raised two questions: is there a tendency for the poorer countries to grow more rapidly than the richer ones, and, consequently, to converge in living standards, or, instead, the rich tend to get richer and the poor to get poorer, so that the gap between rich and poor nations widens over the time? Many authors, such as Dowrick and Nguyen (1989) noted that the convergence seemed to hold among the richest countries alone, especially among those from the Organization for Economic Cooperation and Development. This is true if we consider that the ratio between the GDP per capita in the richest countries and the GDP per capita in the poorest one increased from 11, in 1950, to 19 in 1998 (Maddison, 2001). Thus, the challenge for the economists is to find solutions that reduce the differences among states, increasing the growth rate in the poor states. A first attempt was made by Baumol, Nelson and Wolf (1994) that suggested that there may be a “convergence club”, meaning a subset of countries for which convergence applies: “it seems clear that convergence does not apply to the poorest of the world’s economies, though the line separating those eligible for membership in the convergence club and those foreclosed from membership has not been determined definitively”. They argue that only the countries with an adequate initial level of human capital endowments can take advantages of modern technology and enjoy the possibility of convergent growth. Moreover, they note that while the developing countries, with middle incomes, may overpass the technological gap, borrowing it from abroad, the poorest ones are unable to bridge the gap in technology and knowledge.

At a nation’s level, the periods of sustained growth in the labor productivity were correlated not only to the raise of the educational level, but also to the improvements in health, nutrition and increase of consumption (Schultz, 1961; Kuznets, 1966; Denison, 1967; Barro, Sala-i-Martin, 1995). At individual level, statistics demonstrate that there is a strong positive correlation between the salaries, on one hand, and health and nutrition, on the other hand, analyzed on age and sex category (Strauss, Thomas, 1995). These correlations may give an explanation for the low rate of economic growth in the poor countries, where, often, the people do not have the daily calories, essential for doing various activities and for raising the immunity (Schultz, 2003). This is why the medium mortality rate, in the case of children up to 5 years old, from the developing countries, is about 84 at a thousand inhabitants (Howitt, 2005).

In the context of globalization, it is considered that a higher level of education leads to a better participation in the global economy and, consequently, to more rational consumption decisions. This is a consequence of the fact that, in an environment with frequent changes/developments, the highly skilled individuals may better evaluate the new opportunities because they can easily distinguish between the random and the systematic elements of the economic changes (Sturm, 1993). Information technology reduces the distances between consumers and producers and it permits the customers to take part in designing the product they purchase. Consequently, consumers will increase the amount of the value added by them to products they consume. In the context of global markets, flexible specialization networks are organized to ensure that consumers, as part of production, put more human capital into the product. Therefore, states or regions that want to take part into the new knowledge economy will have to provide not only the appropriate infrastructure for innovation, but also qualitative human capital. Moreover, Gilmore (1999) argues that if the new economy truly empowers individuals and remove many of the confines of the traditional economy, perhaps there will be a decreasing need for firms as labor units in the traditional economy. In the new global economy, individuals could easily become producers, separated of their associations with others in firms, owners

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of their own output. There would be the benefit of being able to get the best price on any task, without having to be saddled with the costs that come along with an internal labor market (Gilmore, 1999). Freeing individuals as production units from the firm would be possible only for those with high human capital stocks, skills and education, those who are creative and dynamic. Moreover, global workers in the knowledge economy will need to be self-motivated, flexible, problem solving, adaptable, creative and reflective. In the new economy, work will consist of “shorter, flatter, career ladders” (Kerka, 1993). In the case of the developed countries, with high levels of incomes, a larger incidence of the service sector and of the modern, high-tech production sectors will require a better educated labor force. In this context, Sianesi and Van Reenen (2000) ask if the upgrading process is sparked and made possible by an increasingly available educated workforce (impact of human capital accumulation on growth) or if the structural change induces larger fractions of the population to achieve higher educational standards (impact of economic growth on human capital accumulation). They conclude that both influences are simultaneously at work, so that there is a bi-directional causality between human capital accumulation and economic growth. They also note that the individual results of education lead to considerable biases not only among countries, but also among the regions of a state.

An eloquent example for this is given by Moretti (1998). He analyzes the statistical data from 1980 - 1990 regarding the variation of the average level of education in 282 metropolitan areas from USA, in order to establish the impact of education on the wages. His conclusion is that a one year increase in the level of education in urban areas generated a raise of the incomes with 5,8% in 1980 and with 10,9% in 1990. Moreover, he considers that if the number of educated persons from one town increases, than their incomes will decrease and the wages of the low skilled workers will rise. The first ones could migrate to other cities where the salaries are higher, but, in this case, would raise the living cost, fact that suggests that the real wages are equal among cities. Dividing the 282 metropolitan areas in 4 groups – those who haven't finished the high-school, high-school graduates, those who started the university but did not finish it, university graduates – Moretti shows that a 1% increase in the number of university graduates will generate a 1,3% increase in the incomes of the high-school graduates, a 1,1% increase in the incomes of the university graduates and a 2,2% increase in the salaries of those who haven't finished the high-school. Consequently, a rise of the number of highly-skilled persons has a strong positive impact especially on the low-skilled people. Yet, on long term, we note a positive trend of the educational level in USA, fact that is also obvious in the present: the young employees are better prepared than the older ones (Moretti, 1998). The high level of education, and, implicitly, of experience, generates an increase in the level of incomes. Therefore, in 1993, the average earnings of the American men, aged between 25 and 34 years old, college graduates, were about 33.000 dollars per year, amount that was double than the sum earned by those who abandoned the college, and with 50% higher than the sum earned by the high-school graduates (Gilmore, 1999). This fact demonstrates that the low-skilled ones are less valuable because they are replaced by machines. Moreover, the high-school graduates earn with about 26 to 36% more than those that have not finished the high-school, but they are 51-75% more productive. Consequently, the highly-skilled persons are just partially remunerated for the increase of productivity, by raising the incomes. Yet, Gilmore (1999) concludes that the highly-skilled persons have the chance to earn higher wages, to have a lower unemployment rate, a higher mobility and a better employment opportunity during their active lives.

Considering the effects of education on wages, some analysts (Rauch, 1993; Acemoglu, Angrist, 2000) have given an explanation for the decision of the production's location. The effects that education has on the production generate the increase of the individuals' marginal product and, by extension, the increase of the incomes; so, a higher skilled labor force increase the local productivity,

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fact that induces a raise of the land price. It was argued that an additional medium school year increases the rents with almost 13%; a higher level of human capital raises the global productivity, fact that is obvious not only in the value of the land, but also in the wages (Rauch, 1993). Consequently, the firms will locate their production where the land is cheaper and the wages lower. If the education will generate positive effects for consumption, then the individuals will be willing to pay more to live in cities with a higher level of education. If the incomes decrease, the firms are able to maintain the unitary costs and, therefore, they can be competitive. In the ideal equilibrium situation there is a positive relation between the rents and the average level of education and a negative one between the wages and the average level of education, due to the consumption externalities of education (Lange, Topel, 2005).

The influence of education on the productivity was analyzed considering various periods of time. So, Topel (1999) notes that on a large period of time (15-20 years) the estimated impact of education on the productivity is higher than on a shorter period of time (5 years).

The education may foster the welfare state not only by widening the economic opportunities, but also by having some indirect consequences, improving the health and nutrition level, increasing the consumption, offering opportunities for personal fulfillment and developing some individual abilities (Haveman, Wolfe, 1984). Next to these indirect effects, Sianesi and Van Reenen (2000) note the fact that a higher level of education may be correlated to a friendly environment, with a better political and community implication, with a higher social cohesion, with a lower criminality rate, all these influencing the economic growth.

4. CONCLUSION

Considering all the aspects mentioned above, we may conclude that the education's externalities are seen, by the majority of the analysts, as an engine of the economic growth and development. Yet, the magnitude of the positive impact of education on progress varies from one country to another, according to the presence and the intensity of the factors that influence the education. So, since the human capital is an input factor in the production and the quality of education determines the quality of the results, it is very important to have an efficient allocation of educational spending between primary, secondary and tertiary education.

At individual level, it was demonstrated that there is a strong positive correlation between the salaries, education and consumption. The high level of education, and, implicitly, of experience, generates an increase in the level of incomes. This could be explained through the fact that the effects that education has on the production generate the increase of the individuals' marginal product and, by extension, the increase of the incomes; so, a higher skilled labor force increase the local productivity, fact that induces an augmentation of the consumption. In this case we can also find the reciprocal effect: if the education will have positive results for consumption, then the individuals will be willing to pay more to live in cities with a higher level of education.

In the context of globalization, it is considered that a higher level of education leads to a better participation in the global economy. So, the flexible specialization networks are organized to ensure that consumers, as part of production, put more human capital into the product. Therefore, in the case of the developed countries, with high levels of incomes, a larger incidence of the service sector and of the modern, high-tech production sectors will require a better educated labor force.

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CHANGES OF ATTITUDES TOWARDS MATHEMATICS

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Abstract

Mathematical competence is the ability to develop and use mathematical thinking for solving various problems in everyday situations. The process of acquiring mathematical competence is strongly determined by attitudes to mathematics. In this contribution, we therefore examine the attitudes of students towards mathematics during their transition to post-secondary institutions.

Key words: *mathematical competence, the education statistics research, examines the attitudes of students towards mathematics.*

1. INTRODUCTION

Mathematics is a part of human culture. Its pieces of knowledge, methods and procedures are transferred to all parts of human activity. One of those parts is obviously education. Mathematical education is not an independent part of education. Mathematics undoubtedly develops cognition of every student and with its methods and devices it is predetermined to become an instrument for the development of ability for constructing knowledge.

Attitudes are the variables that play an important role the teaching of mathematics. They represent an assumption about an educational and learning process, about students and their knowledge. Thus attitudes function as cognitive and emotional filters through which we are able to explain and judge our knowledge and experience. For this reason we consider attitudes and their development to be a key variable in the continuing education process. It has to be taken into consideration that students of the teaching of mathematics programme are coming with attitudes towards mathematics and its teaching. However, many studies have confirmed the fact that teachers eventually use the teaching methods, which are used in their own educational process. Attitudes of students are continuously changing and developing. This change of attitudes and the way of thinking are reflected in the way they learn.

2. SURVEY OF STUDENTS' ATTITUDES TOWARDS MATHEMATICS

In the process of grant project realization we carried out the survey of students' attitudes towards mathematics during an initial phase of their studying. For the survey, the students of three out of seven faculties of the University of Zilina were selected. The faculties differ not only in their field of study and practical orientation but also in entrance exam requirements.

- The first faculty orientation is technical and students are being accepted without maths entrance test.
- The second faculty focuses on economic-safety sectors and students have to write an entrance test with relatively low math requirements.

- Specialised areas of study of the third faculty are economics of transport and communications and students have to write an entrance test with higher math requirements in comparison with the second faculty.

Out of two hundred survey respondents, seventy were from the first faculty, seventy from the second faculty and sixty respondents from the third faculty. Multidimensional conception of attitudes, which recognizes 3 components – emotional reactions, confidence connected with an object and behaviour towards an object, had been used as a theoretical basis of a questionnaire (Hart, 1989). The test consisted of 15 questions and students could choose one out of five or six answers. The offered answers were scaled so that it could be possible to sort out positive and negative attitudes towards the teaching of mathematics, self-evaluation of individual mathematical abilities, student's ideas of a good way of teaching secondary school mathematics and changes in attitudes towards mathematics after entering the university.

In this paper we present some of the results of our survey. One of them is the answer to the question concerning students applying for entry to particular faculties and their secondary school results. It is reasonable to assume that the faculties which require entrance exams in the form of tests (also tests from mathematics) accept more students with higher preconditions for study success, i.e. with better results. The results of our survey, which confirm this fact, are presented in Table 1 and Figure 1.

Table 1. Secondary school study results.

Evaluation of results from secondary school mathematics	Faculty I	Faculty II	Faculty III
a) excellent	10,00%	10,00%	15,00%
b) excellent or very good	15,71%	42,86%	33,33%
c) very good or good	37,14%	20,00%	36,67%
d) good	28,57%	20,00%	13,33%
e) fair/sufficient	8,57%	7,14%	1,67%

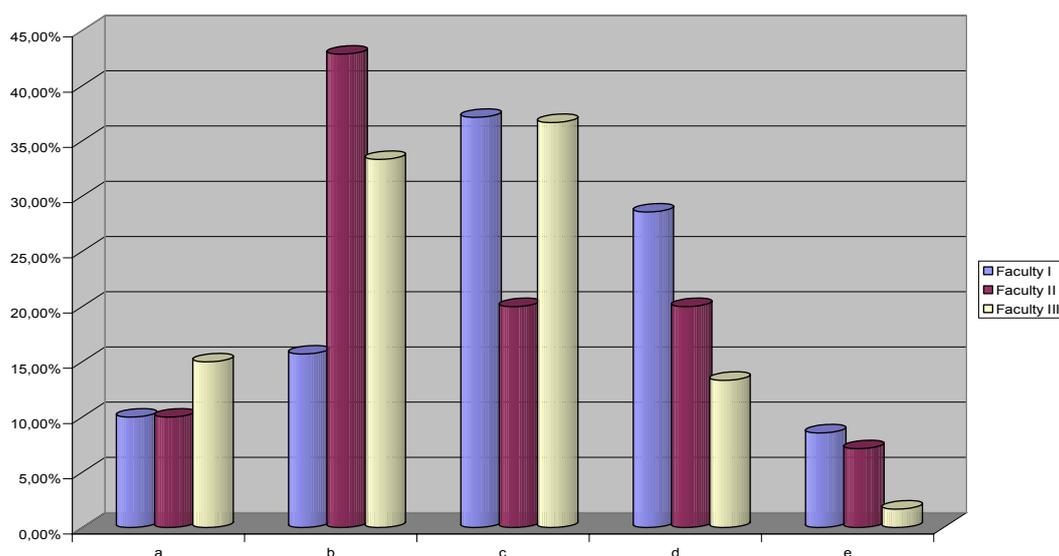


Fig. 1. Secondary school study results.

Positive and negative self-evaluation of attitudes of students is analysed by another test item, results of which are presented in Table 2 and Figure 2. It can be seen from the results that regardless of the entrance exams, mathematics is a difficult subject for applicants and they are not able to learn it with ease.

Table 2. Difficultness of maths learning.

Mathematics is among	Faculty I	Faculty II	Faculty III
a) the most difficult subjects	25,71%	27,14%	30,00%
b) difficult subjects	42,86%	48,57%	43,33%
c) semi-difficult subjects	28,57%	20,00%	23,33%
d) easy subjects	0,00%	4,29%	3,33%
e) the easiest subjects	2,86%	0,00%	0,00%

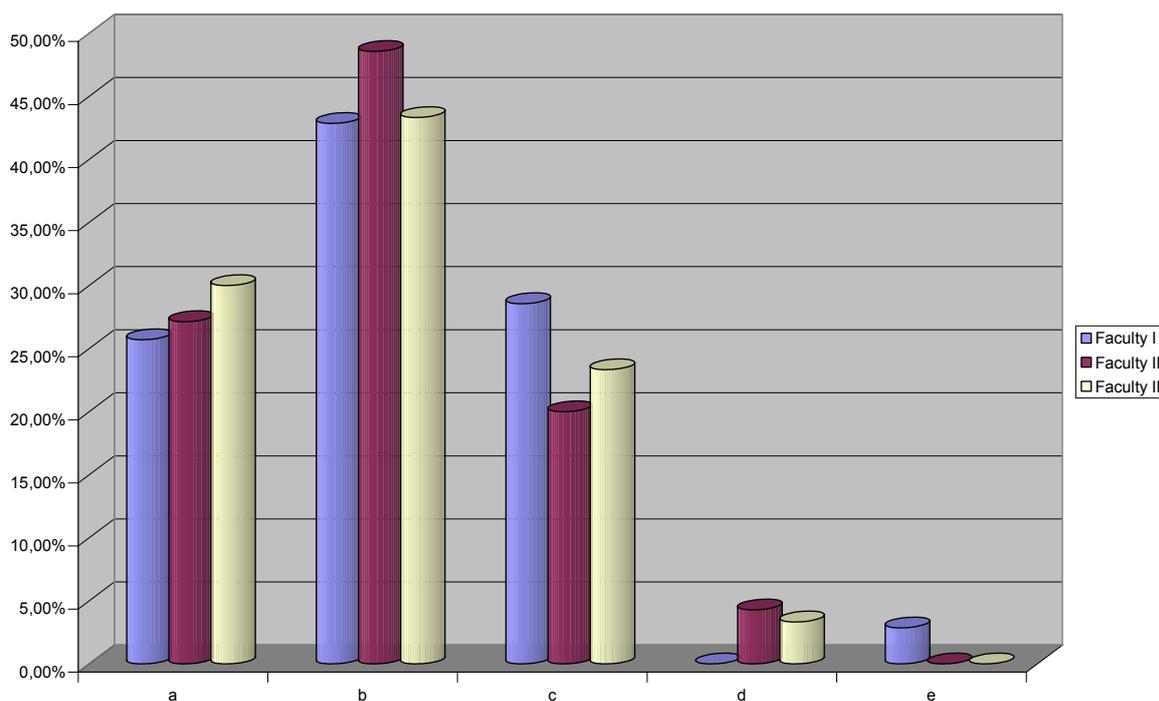


Fig. 2. Difficultness of maths learning.

The problems in learning mathematics are closely related to its popularity. For this reason we included question in the survey designed to analyse the popularity of mathematics among students. The results are summarized in Table 3 and Figure 3.

Table 3. Popularity of Mathematics.

What is your relationship to mathematics?	Faculty I	Faculty II	Faculty III
a) I really do not like mathematics	12,86%	2,86%	3,33%
b) I do not like mathematics because I often do not understand it	14,29%	14,29%	16,67%
c) It depends on a current topic.	40,00%	45,71%	35,00%
d) I enjoy mathematics if I understand the current topic	28,57%	34,29%	45,00%
e) Mathematics lessons belong to my most favourite ones	4,29%	2,86%	0,00%

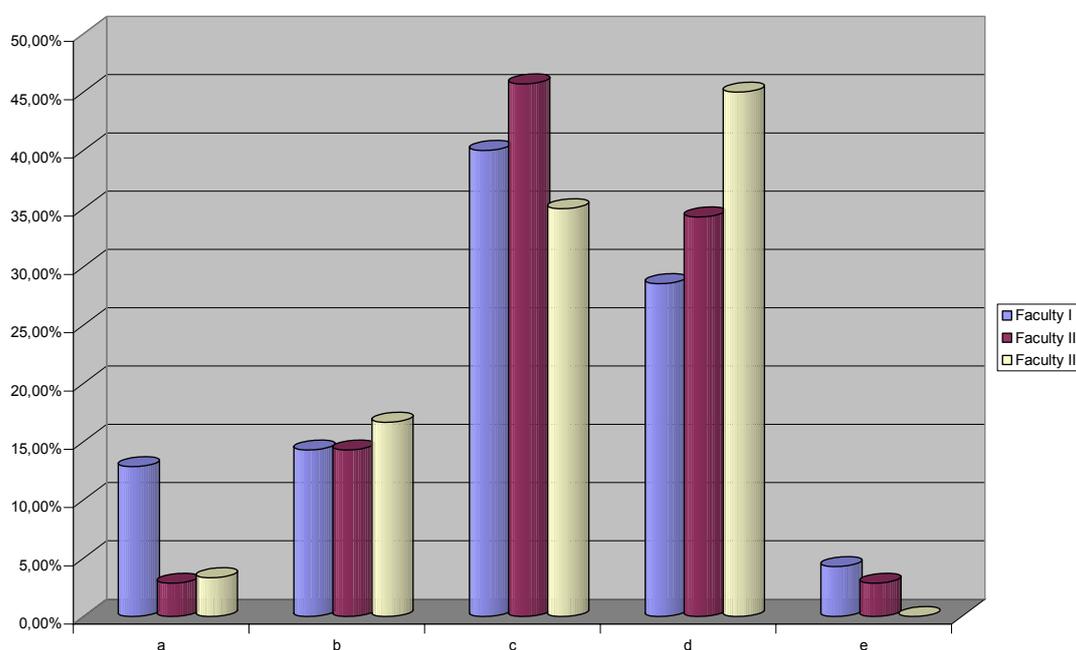


Fig. 3. Popularity of Mathematics.

It has been shown by our survey that the negative attitudes are predominantly observed among the students who did not have to deal intensively with mathematics during their senior year at a secondary school. Very surprising is the fact that also positive attitudes towards mathematics prevail among students in this group.

Table 4. The necessity of Mathematics.

Views of importance of mathematics in future career	Faculty I	Faculty II	Faculty III
a) Mathematics is very important for my future career	15,71%	8,57%	11,67%
b) I will certainly need mathematics from time to time	45,71%	40%	36,67%
c) I will use mathematics only marginally	20%	35,71%	16,67%
d) I do not think I will need mathematics in my future career	12,86%	8,57%	13,33%
e) I hope I will not need mathematics in my future career	5,71%	7,14%	21,67%

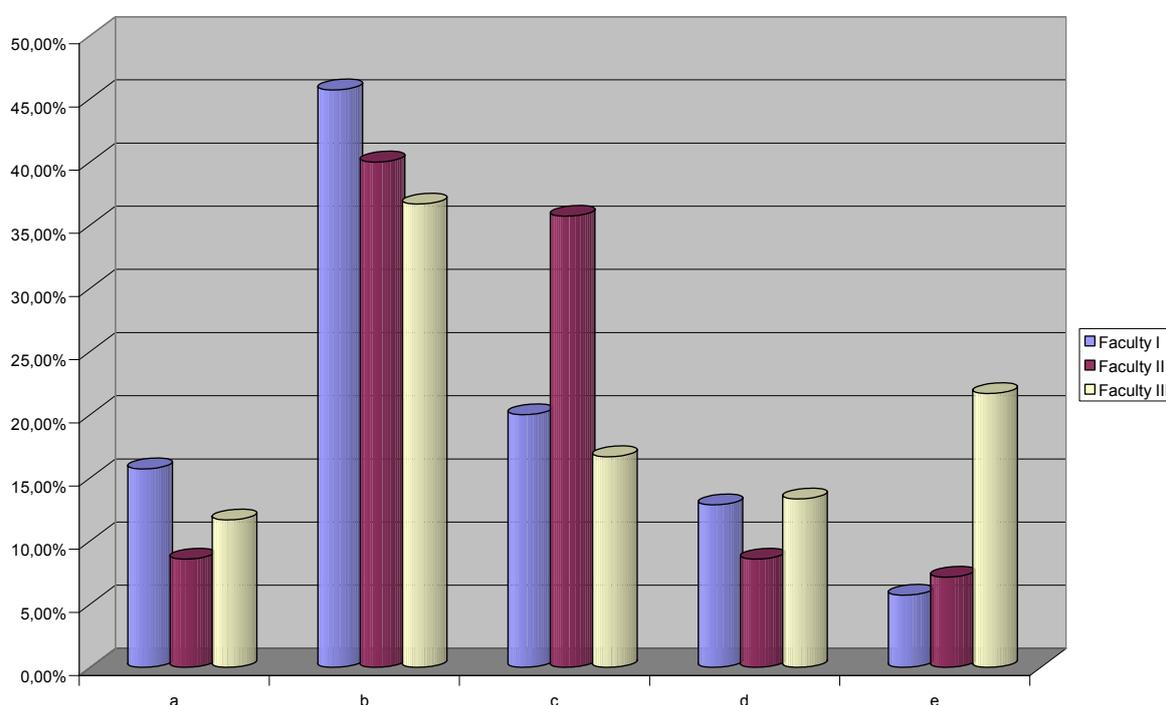


Fig. 4. The necessity of Mathematics.

The question of importance of mathematics in the student's perspective job is presented by Table 4 and Figure 4. According to the presented results, positive attitudes of Faculty I and Faculty II students and negatives attitudes of students of Faculty III prevail in the survey. We did not expect this conclusion.

In the introduction we mentioned that the attitudes of students are in the continuing development and change during their study. Thus we also analyzed which period of their studies they consider to be the point when their attitudes changed. This is presented in Table 5 and subsequently by Figure 5.

Table 5. The period of changes of attitudes towards Mathematics.

When did the change happen?	Faculty I	Faculty II	Faculty III
a) During the first four years of basic school.	1,43%	1,43%	1,67%
b) During the second four/five years of basic school.	12,86%	4,29%	3,33%
c) At secondary school.	50,00%	45,71%	41,67%
d) It did not happen.	24,29%	25,71%	41,67%
e) I am no table to decide when it happened.	11,43%	22,86%	11,67%

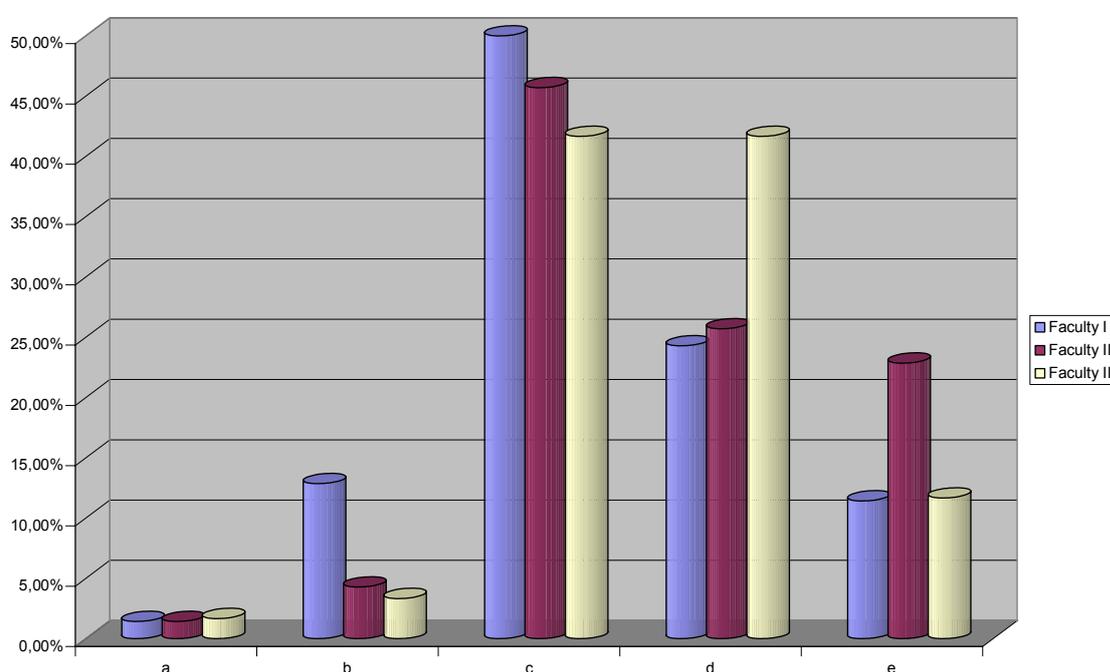


Fig. 5. The period of changes of attitudes towards Mathematics.

As we tested the opinions of students at the very beginning of their university studies, only the periods of primary and secondary schools were included. The survey shows that the changes of attitudes towards mathematics (or no changes thereof) are characteristic for students of all three types of faculties.

3. ANALYSIS OF THE QUALITATIVE CHARACTERS

In another part of the article we present some additional results that emerged from the qualitative analysis of this obtained data. Our main target was to identify the factors which have positive impact of understanding of mathematics and study results of students in this subject.

We used χ^2 - test for contingency table $k \times m$ to verify dependence of each pair of the qualitative characters A and B . The character A was acquiring k categories and the character B was acquiring m categories.

We tested the null hypothesis:

H_0 : the characters A and B are independent, versus

H_1 : the characters A and B are dependent.

The test statistics is

$$\chi^2 = \sum_{i=1}^k \sum_{j=1}^m \frac{(f_{ij} - o_{ij})^2}{o_{ij}}, \quad (1)$$

Where f_{ij} are observed frequencies, $o_{ij} = \frac{f_i^A f_j^B}{n}$, $i = 1, 2, \dots, k$; $j = 1, 2, \dots, m$. The rejection region is

$\chi^2 > \chi_{\alpha}^2((k-1)(m-1))$, where $\chi_{\alpha}^2((k-1)(m-1))$ is the critical value of χ^2 - distribution with $(k-1)(m-1)$ degrees of freedom.

The degree statistical dependence between the observed qualitative characters A and B is assessed using the contingency coefficient C and the Cramer coefficient V which are defined as

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}}, \quad V = \sqrt{\frac{\chi^2}{n(h-1)}}$$

where n is a sample size and $h = \min(k, m)$.

Table 6. The contingency table of the observed frequencies.

$A \setminus B$	B_1	B_2	...	B_m	f_i^A
A_1	$f_{11}(o_{11})$	$f_{12}(o_{12})$...	$f_{1m}(o_{1m})$	f_1^A
A_2	$f_{21}(o_{21})$	$f_{22}(o_{22})$...	$f_{2m}(o_{2m})$	f_2^A
\vdots	\vdots	\vdots	...	\vdots	\vdots
A_k	$f_{k1}(o_{k1})$	$f_{k2}(o_{k2})$...	$f_{km}(o_{km})$	f_k^A
f_j^B	f_1^B	f_2^B	...	f_m^B	n

4. VERIFICATION OF FORMULATED HYPOTHESES

We formulated 3 hypotheses.

1. The style of teaching of mathematics significantly affects the level of understanding of mathematics.
2. Time devoted to training for lessons significantly affects the level of understanding of mathematics.
3. Positive attitude to mathematics significantly affects the level of understanding of mathematics.

Hypothesis 1. The style of teaching mathematics determines the level of its understanding.

To determine where or not the style of teaching mathematics and the level its understanding by students are independent we use the χ^2 -test of independence. We use $\alpha = 0.05$. We tested the null hypothesis:

H_0 : the style of teaching mathematics and level of its understanding are independent, versus

H_1 : the style of teaching mathematics and level of its understanding are dependent.

The test statistics is $\chi^2 = 5.5089$. The critical value with $(k - 1)(m - 1) = 4$ degree of freedom is $\chi_{0.05}^2(4) = 9.49$. The rejection region is $\chi^2 > 9.49$. Since $\chi^2 = 5.5089 \leq 9.49$, the hypothesis H_0 is **not rejection**. It is evident that the style of teaching and the level of its understanding are independent (Figure 6). The value of contingency coefficient is $C = 0.1638$ and the value of Cramer coefficient is $V = 0.1174$. The value of these coefficients indicate that between the analyzed qualitative characters there exist the small degree of connection.

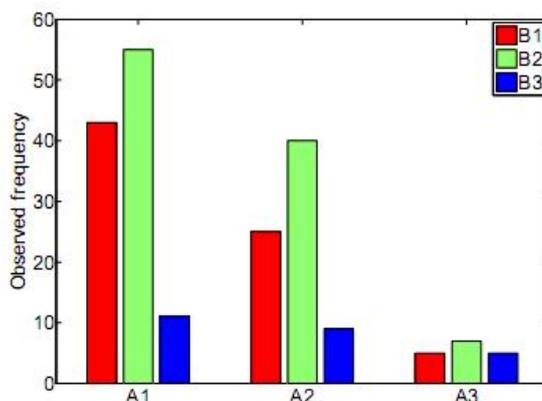


Fig. 6. The bar chart of observed frequencies of characters A and B (Hyp.1).

Hypothesis 2. Time devoted to training for lessons significantly affects the level of understanding of mathematics.

We tested the null hypothesis:

H_0 : the time spent for training for the mathematics lessons and the level of understanding mathematics are independent, versus

H_1 : the time spent for training for the mathematics lessons and the level of understanding mathematics are dependent .

We used again the test statistics χ^2 and we obtain these results:

The test statistics is $\chi^2 = 9.6552$. The critical value with $(k - 1)(m - 1) = 4$ degree of freedom is $\chi_{0.05}^2(4) = 9.49$. The rejection region is $\chi^2 > 9.49$. Since $\chi^2 = 9.6552 \geq 9.49$, the hypothesis H_0 is **rejection**. It is evident that the time spent for training for the mathematics lessons and levels of understanding mathematics are dependent (Figure 7).

The value of contingency coefficient is $C = 0.2146$ and the value of Cramer coefficient is $V = 0.1554$. The value of these coefficients indicates that between the analyzed qualitative characters there exists the small degree of connection.

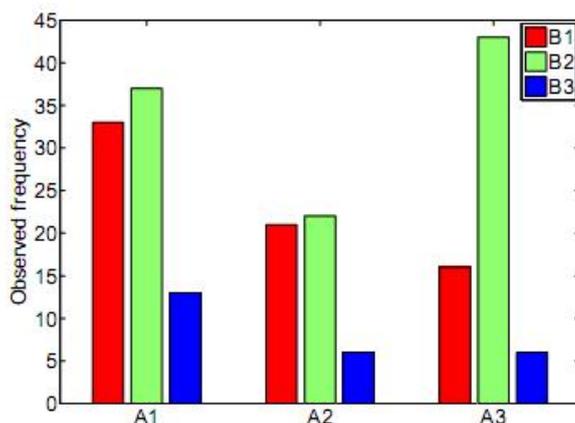


Fig. 7. The bar chart of observed frequencies of characters A and B (Hyp.2).

Hypothesis 3. Positive attitude to mathematics significantly affects the level of understanding of mathematics.

We tested the null hypothesis:

H_0 : Positive attitude to mathematics and the level of understanding mathematics are independent, versus

H_1 : Positive attitude to mathematics and the level of understanding mathematics are dependent.

The test statistics is $\chi^2 = 16.89$. The critical value with $(k - 1)(m - 1) = 4$ degree of freedom is $\chi_{0.05}^2(4) = 9.49$. The rejection region is $\chi^2 > 9.49$. Since $\chi^2 = 16.89 \geq 9.49$, the hypothesis H_0 is **rejection**. It is evident that the positive attitude to mathematics lessons and levels of understanding mathematics are dependent (Figure 8).

The value of contingency coefficient is $C = 0.2792$ and the value of Cramer coefficient is $V = 0.2055$. The value of these coefficients indicates that between the analyzed qualitative characters there exists the mild degree of connection.

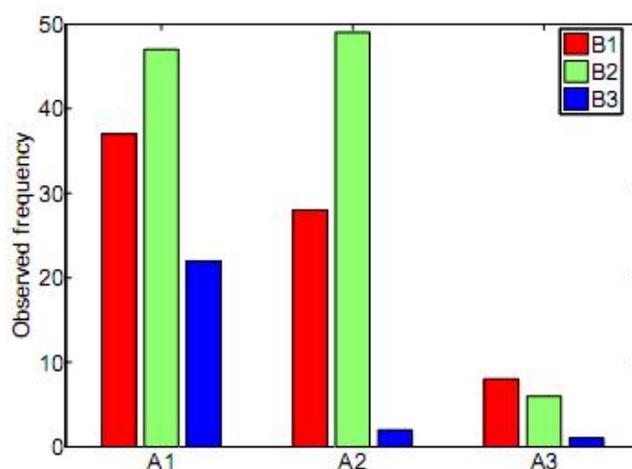


Fig. 8. The bar chart of observed frequencies of characters A and B (Hyp.3).

5. CONCLUSION

In this paper not all the results and conclusions of all tested items are presented. In spite of this fact, the presented selection indicates that study results of university students are strongly determined by their prior schooling, during which their attitudes towards mathematics usually worsen. It has been shown that too demanding tasks, incorrectly chosen rate of teaching, the choice of inadequate language and negative attitudes of the teachers of mathematics have a bad impact on students. But it is the periods of primary and secondary school that are key periods for the formation of students' attitudes towards mathematics.

Our research brings two interesting results. Especially, we have verified the generally – known fact: the intrinsic motivation of students to carry out any activity is necessary. For mathematics teachers this means to focus their efforts on creating and applying the chosen teaching method in such a way that students can understand the importance of mathematics for everyday practice and they will be more motivated intrinsically. The time spent for preparing for the mathematics lessons is an important factor for understanding mathematics. It was proving that not only the time spent by students for preparing for lessons, but also their accessibility is important.

The second results proved that in mathematics education the motivation is more important than the teaching method itself.

We note that the results presented in this paper are to some degree influenced by the comparatively small number of respondents of the survey. But in spite of this fact, they represent an incentive for further study of students' attitudes towards mathematics and its teaching during the secondary-tertiary transition, and for the research of methods positively influencing these attitudes. This includes, for instance activating methods developing motivation and creativity of students during the process of

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mathematical education (Fulier, 2001) and positive attitudes of the teachers of mathematics at the universities.

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SUCCESS VERSUS SUCCESS IN SCIENCE

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Abstract

The article is a trial of finding the true/pure meaning of the phenomenon of success, being free of present-day stigmata. The text also reveals the characteristics of success in science, especially the humanities and social sciences, as a particular area of human activity.

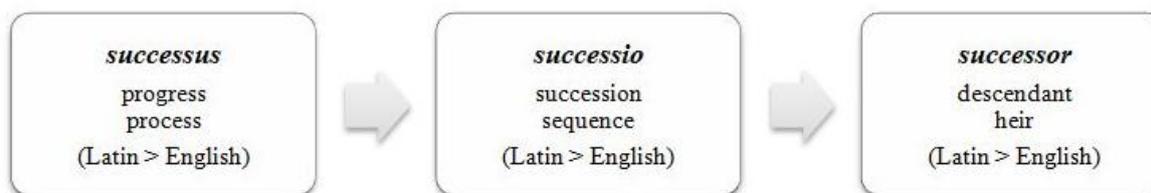
Key words: *success, success in science, science, humanities and social sciences*

1. THE MEANING OF SUCCESS

Success is a phenomenon which has various tones and implications, more often the unflattering ones, because of popular nowadays improper practices of achieving the success in all spheres of human activities. In light of the above it seems to be required to face with the dark connotations and the ambiguity of the concept of success, and to find its true meaning stripped of present-day stigmata. The procedure is even more essential if it is about success in science since the mankind puts great hopes in scientific findings as a cure for all evil of this world. Therefore let us return to the beginning.

The etymology of the word *success* points to its Latin origin (see: Schema 1). But currently, this term occurs in every living language and refers to all areas of human activity.

Schema 1: The etymology of the word *success*



Source: own elaboration (based on Kopaliński 2007, p. 547)

People used to talk about their private successes, brag about some professional ones. They count on a success in business and watch carefully politicians who succeed. They also admire successful sportsmen and artists, often with a hint of jealousy, and read about successes of scientists seeing in them a chance for better tomorrow. Therefore, it may be considered the wisdom of an old proverb which says that human can succeed in almost everything to what approaches with unlimited enthusiasm. The omnipresence of the word *success* makes a serious problem with its definition.

Joanna Michalak indicates two ways of understanding the term *success*: 1) success understood statically as a product or result of human activity, 2) success understood dynamically as a human action or advancement (Michalak, 2007, p. 22). However the researcher intuition prompts that the double-optic of success – which on the one hand is assimilated with the state and on the other hand with process – can't be reduced to the first understanding by rejecting the other, or vice versa. Edmund Husserl convinces that some phenomena have really complex nature because they are not only what they are, but appear to be in such a way how they are for a human here and now (Sikorski, 2008, p. 348).

There are many ways of interpretation of the success meaning. Sometimes this phenomenon is associated with a negative value and another time with a positive one. Cyprian Kamil Norwid – a nationally esteemed Polish poet, dramatist, painter and sculptor – wrote in one of his poems: “Success is an idol of today – it has spread its witchery as the globe card (...)” (Norwid, 1996, p. 120) and this way he assigned the success very commanding cause surrounding the whole world strength, unfortunately the strength which is sinister and fatal for human beings. Equally, Andrzej Staruszkiewicz looks for negative connotations of success declaring that even the word *success* evokes in him ambivalent feelings, and what is more it also raises his deep concerns. He explains his repulsive statement to success by quoting the fact that these days the term of success is overused. People call almost every achievement by the name of success, often too rashly with the public permission, thereby approving such human actions which harm their own and other people welfare and sense of dignity. Staruszkiewicz proves that the view of success created by modern mass-media, which warp its primary sense, unfortunately show the dominative prospect of this phenomenon. (Staruszkiewicz, 2006, p. 44) In turn, Lech Szczucki notes “that historically speaking the word *success* is neutral”. While he emphasizes that success was not indifferent for such nobles like Livy, Ovid or even Virgil who wrote a lot about the successes of ancient Romans having in mind the civilization progress associated with the cultural, political and economic development of the past societies. (Szczucki, 2006, p. 5) While Barry J. Moltz, referring to the tradition of Ancient Greece, recalls the myth of king Midas. The ruler as a reward for helping Silenus – the faithful companion in many expeditions of Dionysus – received from the god of wild nature and vine an amazing gift of changing everything he touched into the gold. It needs to be added that Midas chose his reward on his own. At the beginning the unusual ability brought him an incredible richness and gave him a sense of limitless power. He was really satisfied. But with time, the divine gift became a curse because unintentionally he transformed what he loved the most – his beloved daughter – into the gold petrified statue. (Moltz, 2008, p. 13) Moltz by recalling the myth of king Midas tries to warn against the pernicious thinking that money (the mythological gold) can bring success and give personal happiness. He claims that there is nothing more dangerous as trust placed in the formula: “Money = Success = Happiness” (ibidem, p. 14). Moltz advises also not to follow the three baneful archetypes of success:

A1: “success comes from nothing” – Moltz criticizes the mass media that they feed their audience with the stories about people whose careers exercised in accordance to the pattern named *American dream*, which means from rags to riches. In his opinion the stories are fake because are devoid of the most important element of the success puzzle – there is no mention of any human effort, dedication or determination in pursuit of set goals. Furthermore, he claims it is not preferred that success is usually limited to the professional area, namely the business. Moltz is right by saying that success permeates all spheres of human activity and it rarely refers to possessing material goods. (ibidem, pp. 16-18)

A2: “first success brings with itself another one” – Moltz convinces that it is not possible to flow on so-called *wave of success*, which means that you cannot stop yourself after reaching mean-goal but you have to keep on trying to succeed fully. He believes that every achievement needs even more

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work after it obtaining than before. What is more, success motivates its beneficiaries to work harder and it does not allow them to fall into stagnation. (ibidem, pp. 19-21) According to the results of research on the sense of happiness over winning the main lottery sum, it can be said that achieving the success provides only a temporary feeling of euphoria ‘cause with time an emotional level is reduced to a normal state because of the very short period of adaptation. On average, it takes only eight weeks of being a millionaire to feel the same like it was before the winning. (ibidem, p. 15)

A3: “every failure can be changed into success” – Moltz claims that when a man life goal is not striving to success but a success in itself (in other words: not a process of transgression but an effect of it) then often it becomes destructive for a beneficent of such success as the king Midas example showed. A person who cannot learn oneself on her/his mistakes or mistakes of others is not able to transform any defeat into triumph. That is why Moltz warns against acting according to the principle: “Try and try once more” (ibidem, p. 23). He thinks that the cited rule was to support capitalism and it does not serve anyone else but the governing group (called the untouchables). In his opinion it is better to try and try but every time using different techniques and making the way to success more pure and perfect (ibidem, pp. 21-23).

Barry J. Moltz explains that human life does not go linearly but it consists of many ups and downs, downtimes, sentimental returns to the past and trials of playing the future. However, the most important issue of human existence is an ability of thinking over things which gone and a capability of seeking new meanings of success, because something that one side seems to be a failure looking from the other side can be considered as a success. (ibidem, p. 30)

It is worth to pay attention to the views of Sandra Ann Taylor – an American psychologist – who, in order to capture the phenomenon of success, used the quantum physics distinguishing and describing the seven laws of success, namely (Taylor, 2009, p. 13):

§1: The law of manifestation – refers to the statement that a success or a lack of it comes from the human consciousness. This law sets that every man creates her/his own reality thanks to the personal will, hence the conclusion that people are the authors of their potential successes and failures. Taylor explains that a man can experience satisfaction which is brought by success, only if in her/his thoughts occurs the picture of “I-reaching success” – in other words, when in a human mind arises the intention to achieve success¹⁰. (ibidem, pp. 15-17)

§2: The law of magnetism – in contrast to the first law it does not refer to what people create, but it appeals to what people attract. This law sets that every man can magnetize only such a kind of energy as she/he produces erenow and later spreads to the world. The process of emitting and absorbing energy is called a resonance. According to Taylor’s views, a man can direct own resonance via her/his conscious supervision of three types of energies: 1. emotional energy (a vibration of feelings); 2. cognitive energy (a vibration of thoughts); 3. physical energy (a vibration of substance). (ibidem, pp. 21-23)

§3: The law of pure wish – refers to the statement that, to experience success in any area of life (also in science), it is not enough to be determinate to reach it but there is a need to have a pure intention.

¹⁰ In the same tone speaks H. Hazalitt who claims that the strength of will can be define as “a capability to visualize a very distant aim – the mental picture which is so clear and intent – that any needs or cravings, which could interfere with the aim, are not able to displace it” (2009, p. 53); See also: Vaknin, S. *Wielka księga NLP. 210 wzorców, metod i strategii programowania neurolingwistycznego* (2010) & Grzesiak, M. *Wyjątkowy nauczyciel* (2009).

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Taylor adds that only a distinguished man whose motivation to act is based on ethical foundation – and what is more, “who is free from the devotion to material goods” (ibidem, p. 37) – can achieve the success. (ibidem, pp. 29-30)

§4: The law of intention paradox – tells about the fact that if a man wants something too hard then her/his intention can be changed into obsession which in result converts initially positive energy into negative one and this, according to the law of magnetism, results in coming back the bad luck. This law is based on the method of little steps – in other words, on gradual and persistent aiming for the defined goals – where patience and diligence are the best allies of a man. (ibidem, pp. 37-39) Taylor believes that each person can achieve what she/he wants but only if the aiming goal is not a sine qua non condition of her/his happiness (ibidem, p. 43).

§5: The law of harmony – refers to the finding of John Stewart Bell about the non-locality theorem which “describes the phenomenon of bilateral interaction between two far from each other molecule but existed as elements of the common system” (Pabjan, 2009, pp. 8-12). The author of the book entitled *Fizyka sukcesu* explains the fifth law in following words: “The key of harmony with oneself is to obtain the equilibrium in the spheres of thoughts, feelings and acts, and which can be achieved by making daily decisions. It is thanks to your life style – from a theoretically trivial act of thinking to the most serious solving problems – the energy more or less adapts itself to the universe” (Taylor, 2009, p. 48). What is more, “everything is in the right place and happens at the right moment: on our way there are people to help us, the answers come when we need them, the inspiration flows on us unexpectedly” (ibidem, pp. 47-48).

§6: The law of good deeds – works in a strict relation with the law of magnetism and it refers like the second law to the rule of conversion energies between a human and the universe, but with one subtle difference that the sixth law focuses on the fact how people treat others (not themselves). According to the Bell’s theorem, good and bad deeds are accumulated in different, often much distanced places in order to come back later as good or bad deeds of other people towards us. Taylor says that the most positive – which means the best – type of energy, that a man can emit to others, is the energy of respect. (ibidem, pp. 55-56)

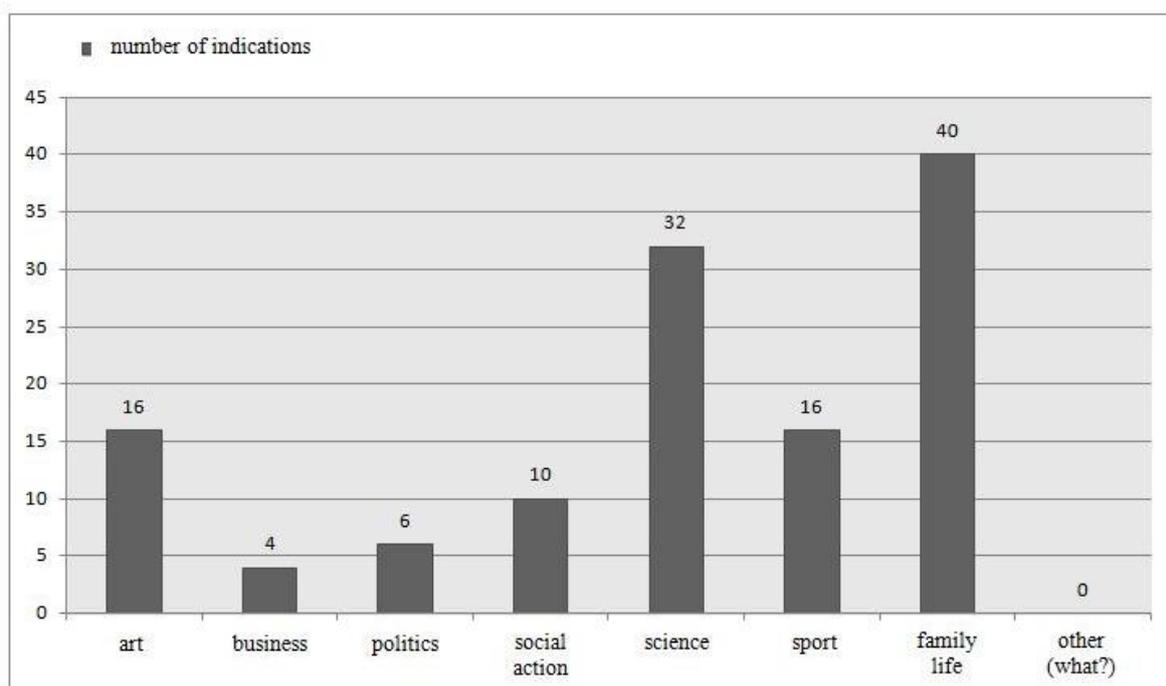
§7: The law of effecting – is the last one from the list of seven laws of success, which tells about the fact that human energy spreads into the universe in a multi-direction way. That is why, it is not possible to guess from where the feedback comes (which person gives the energy response). However, it can be expected the type of energy – supporting or weakening human pursuits to set goals – about what treated the six previous laws. Moreover, Taylor points out to the fact that “in the world of nature molecules move to each other and move away, but when osculating one another they intercept mutually parts of themselves” (ibidem, p. 63). The described process is called the phase transition which has also its application in the social world. (ibidem, pp. 63-64)

Without doubts the statement of Sandra Ann Taylor can be considered as an interesting and original one. The author of the book entitled *Fizyka sukcesu* puts a lot of hope in a man, believing that the laws which govern the universe also govern the social life. According to Taylor’s views, everyman is an initiator and a creator of her/his own success, and the only one barrier on the way to success is the human nature with all strengths and weaknesses.

2. THE SURVEY ABOUT SUCCESS

Taking into the account the complex character of the phenomenon of success, there is a need to be aware of doubts and difficulties which are correlated with a theoretical side of success. Being conscious the prior fact, I decided to do a diagnostic survey to become more familiar with social opinions on success in Poland. I did the research on May 2010 in Bydgoszcz (the eighth largest city in Poland where Kazimierz Wielki University is located). It had the street survey form in which took part 124 respondents selected from the members of the public by using the lottery technique of gathering a sample. In the survey group were 84 women and 40 men at the age between 18 and 64 of whom 16 were pupils, 36 – students, 28 were working, 32 were working and studying and 12 – unemployed. The biggest amount of respondents (almost 76%) were the citizens of Bydgoszcz, about 19% were the residents of the other cities inside the Kujawsko-Pomorskie region and nearly 5 % were the representatives of the other regions of Poland. Persons who agreed to take part in the survey were asked to complete two following sentences: 1) *what? ... can be called a success*, 2) *what? ... cannot be called success*, and to identify only one sphere of human activities from a few given¹¹ where achieving success is the most difficult one. The graph 1 illustrates how the respondents answered.

Graph 1: The respondents' answers about the sphere of human activities where achieving success is the most difficult one – based on surveys 2010



Source: own elaboration

¹¹ the given spheres of human activities: art business politics social action science sport family life other.....

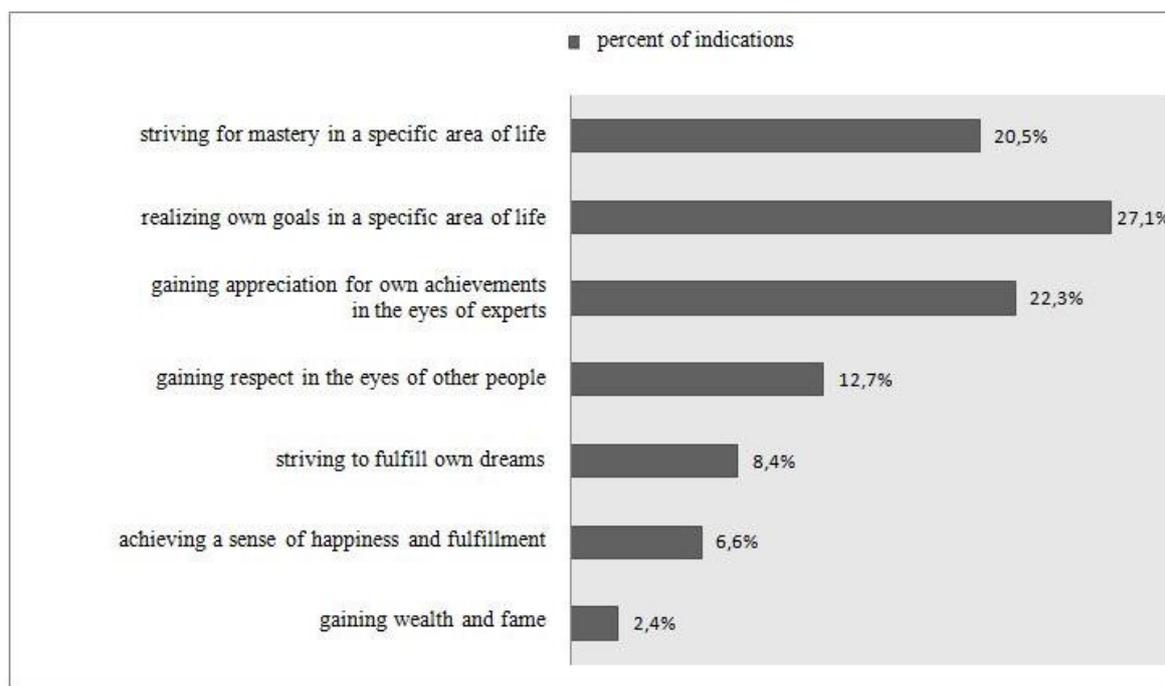
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Basing on the previous graph it can be said that the sphere, where the most difficult to achieve success, is family life which represents 32.3% of all responses. This variant often was chosen by people over the age of 30, regardless of gender, so those who already have some experience of being in a formal or an informal relationship and/or some experience of upbringing children. This result is a great evidence of significant impact the other spheres of human activities on family life. Success in a role of wife/husband or parent, in the opinions of respondents, occurred as the hardest type of success. In turn, the second most frequent indication is science with 25.8% of votes. This category of activity was considered to be ungrateful to succeed in particular for those interviewees who hold the highest and the lowest education. The described structure of votes spurs to the reflection that science seems to be a tough matter mainly for those people who have experienced the lights and shades of studying, and also for those people to whom it was not given to study. Further outcome show that the same place is taken by art and sport – each with a score of 12.9% of all responses. Regards to the art, the difficulty in achieving success can be correlated with the multiplicity of art forms and subjective criteria for evaluating art. Whereas if it is about sport – there are no problems with estimating sportsmen results because the assessment criteria are definitely objective, which means that they are expressed in units of time, distance, speed and so on – it has to be considered the great psycho-physical effort and thousands of training hours before any success in sport will be attained. It is worth to mention that art was more often indicated by people between 18 and 25 years old, while sport was more likely indicated by people at the age of 40plus. There can be seen some kind of regularity in the fact that for the group of young adults art is something closer – due to the unlimited ability to express themselves through painting, sculpture, photography, music, film or theater – than sport where not only a talent but mostly heavy training plays the main role – which in turn more attracts the middle-aged people who identify sport with such values as: beauty, health and fair play competition. The lowest amount of responses were recorded for business and political activities which may be caused by too much increased mass-media's attention on persons, who are involved in authority or making money, and in this way showing the fake view of success in those two areas (politics and business) that it does not require any dedication and effort. Perhaps such a conviction is the result of the low flights policy and strong politicians' connotations with the business world – as confirmed by TNS OBOP in the survey made on 1001 random respondents who were asked about “the main source of success among Polish successful people occupying high positions, becoming rich and famous” (The TNS OBOP Survey 2010). Surveyed people acknowledged that, to achieve success in the Polish reality, first of all it is needed to have connections (38% of all responses); secondly, a hard work is indicated (22%); the third place is taken by luck (13%); the next indication is reserved for talent and abilities (9%); the last one is, unfortunately, an unfair acting (8%). But it is worth to add that the more educated are respondents, the greater is their trust into the human self-efficacy and when the education is lower, the stronger is their belief in the power of illegitimate practices. (ibidem; Grzesiak, 2011)

As it was already mentioned, the interviewees of the Bydgoszcz survey were also asked to say what can be and what cannot be named as success. Here are the results:

Graph 2: *What... can be called a success?* The respondents' proposal of definitional approach to success – based on surveys 2010



Source: own elaboration

Analyzing the above graph, it can be noticed that the interviewees define success in a static way (a success = an effect of human actions) and alike in a dynamic way (a success = a process of human actions). The most often success is associated with the implementation of aims for some human acting sphere. Equally often success is linked with obtaining the approval in the eyes of the experts for the results of own actions. Merely, every fifteenth person relates success with the sense of happiness and fulfillment. Only a few people define success as being a rich and popular man. It is worth to mention that respondents do not agree to call immoral and ignoble actions by the name of success – especially those actions which violate the human dignity. In their opinion, success won at the cost of other people is not really a success but the failure.

The presented above results of May 2010 research correlate well with the views of Barbara Jedlewska who differentiates two kinds of success. First, she says about so-called “healthy success” (also known as a joyful and sweet one) which is worked out in a fair and noble way on the road to self-development. Second, she mentions about so-called “toxic success” which is reached in an offensive way or in an improper moment of life, and which with the time becomes a curse for its author leading him/her to a sense of disappointment or even despair. (Jedlewska, 2005, pp. 132-133) While Krystyna Janicka and Kazimierz M. Słomczyński in their studies proved that “in the colloquial thinking about the success factors are present two dimensions of conditions: meritocratic and family-social ones” (Słomczyński, 2007, p. 11). The meritocratic dimension refers to the success source perceived in a man interior, specifying, it is hidden in a person profile (intelligence, temperament,

sensitivity and so on) but also it depends on the man potential of possible achievements (creativity, perseverance or passion). If it is about the family-social dimension, it promotes the conviction that the driving forces of success are located in the external world, which means that they are independent of human actions because they determine strengths and weaknesses, and these pluses and minuses in turn are dependent on the individual position in a society (broadly defined origins, family traditions and other objective factors situated in a culture). So people positioned in the upper structures of society, enjoying the social prestige, are less prone to assign the success of their own and others to the influence of outside world, thus placing greater trust in the power of the triad: intelligence, character and hard work. (ibidem) A perfect illustration for the presented views might be the opinion, recorded by Jolanta Gładys-Jakóbiak during the interview with the opera soloist – Mr. R, who said: “Success based on honesty is primarily the work, work and once more work (...). Success is an ability to look into the mirror with a pure conscience, knowing that our achievements are the results of our own dedication and efforts, and no deceptions.” (Słomczyński, 2007, p. 16)

3. THE CONCEPT OF SUCCESS

The omnipresence of success in social life, heterogeneous defining and as well mentioned before complexity of understanding of success, led to create the theoretical concept of success which the schema below exemplifies.

Schema 2: The theoretical concept of success

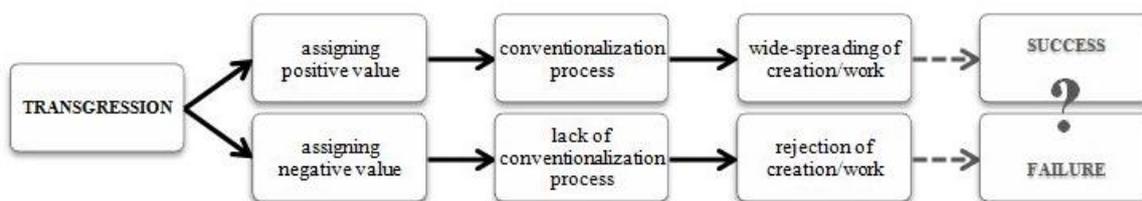


Source: own elaboration

There is a need to be mentioned that showed above graphic presentation of success does not aspire to the denomination of *universum* – which means that it is an open for critic and changes formula illustrating one of many possible approaches of the term of success.

Every success has its own author who can be a particular person or a group of people. Sometimes the origin of success might be difficult to define, especially when specific success penetrates many life spheres and takes the form of spectacular victory, which is proved by a well known proverb in words: “Success has many fathers but failure is an orphan”. That is why people easier assign themselves someone achievements then admit their own breakdown. Way or another, success requires a certain labor input which is aptly described by Philip Gordon Wylie – an American novelist: “Success is a ladder which is impossible to climb with hands in pockets” (Wylie, 2011). The given effort can be adequate to received results or some surpluses or shortages might occur. If an author of success toiled disproportionately, which means that she/he worked longer and harder to achieve success, then it is often well reflected in the high social recognition of such accomplishments – hence are the manifested positive emotions towards the author of success and her/his great work (so-called *propulsiveness*). In the opposite case, which means when success comes to easy, then spectators of such success performance demonstrate the propensity to doubt the validity of the name of “successful man”. What is more, the viewers show their whole range of negative emotions like: contempt and disgust (so-called *repulsiveness*). Moreover, when the message about someone amoral way of achieving success reaches the public, the emotional attitude towards an author of such success can be changed dramatically, because as Zbigniew Waydyk – a Polish poet – convinces: “Cheap success costs the most” (Waydyk, 2011). In a similar vein speaks Anna Batko: “Acceptance of the belief that it is worth to choose an easier way, because it requires less effort, carries within it some seeds of destruction” (Batko, 1998, p. 139). In addition, such a fake success is associated with fear of being discovered – the fear which can become destructive for a man (ibidem, pp. 138-139). It also cannot be forgotten the axiological aspect of success, in other words, values which a particular success brings with itself and represents. According to Józef Koziński, to be able to succeed – especially on a ground of science – a man needs to possess a creative and inventive way of thinking and acting which “(...) are probably the most specific sort of transgression” (Koziński, 2007, p. 44). Thanks to creativeness and innovations it is possible to broaden “(...) the current boundaries of knowledge and to open new spaces which no one before could remark” (ibidem, p. 45), hence every human creation can be read as a positive or negative value and this in turn can be translated into success or failure, as shown on the third schema.

Schema 3: Transgression versus achieving success (or failure)

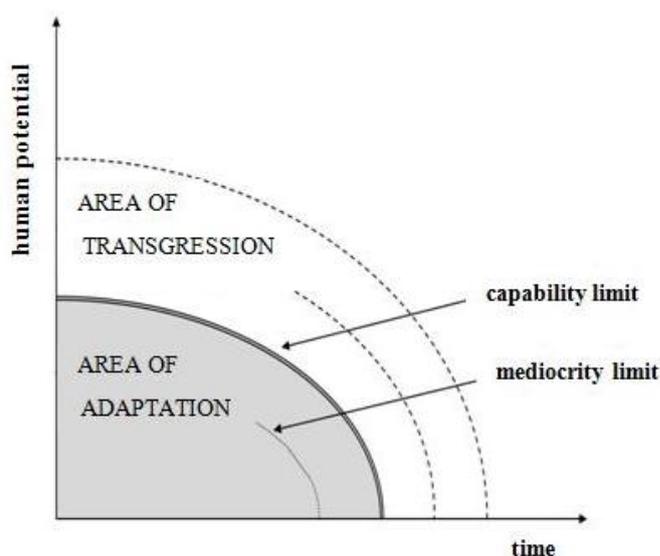


Source: own elaboration (based on Kopaliński 2007, p. 49)

As for the process of conventionalization which refers only to an author of creation, success (or relatively failure) has the subjectively perceived status. But if the conventionalization process goes further and refers to an author's surroundings then success (or optionally – failure) has the objectively perceived status. While speaking of the nature of success, it must be considered its resistance on the temporal factor. Referring once again to the transgression theory of Józef Koźielecki, it can be distinguished permanent and impermanent success. The first one has its foundations in the historical transgression, which involves crossing the material and symbolical boundaries of modern civilization. The second type of success bases on the psychological transgression, which is named also as private or usual transgression, and which involves wide-spreading of own life space by overcoming interior limitations, constantly self-developing and improving the quality of own existence. (Koźielecki, 2002, pp. 52-54) Close to the issue of stability and instability of success is the issue of its range. Success in a micro scale refers to the individual and family sphere of human life, the effect of which comes to the personal development of man. In the medium scale, it touches the matter of local communities and national affairs, and this way has an impact on cultural and social progress of whole country. Whereas in the macro scale, success corresponds with the international affairs and interests, and it is not indifferent to the global problems contributing to the world advancement. (ibidem, p. 52) The phenomenon of transgression described by Józef Koźielecki is further explored in a graphic way (see: Schema 4).

Transgression is the transition from the area of adaptation to the area of exceeding actions, thus passing the limits of mediocrity (going beyond the social settled norms which are appropriate to each activity for each cultural circle), which occurs as crossing internal-limitations (psychological transgression; brief: PT) and/or as crossing external-limitations (historical transgression; brief: HT). During transgressing almost automatically comes to the redrawing boundaries of human capabilities and also to the redefining of the category of *social norm*. Every transgression has its own temporary dimension and it is dependent on the mental and physical potential of human being.

Schema 4: The phenomenon of transgression



Transgression is the transition from the area of adaptation to the area of exceeding actions, thus passing the limits of mediocrity (going beyond the social settled norms which are appropriate to each activity for each cultural circle), which occurs as crossing internal-limitations (psychological transgression; in brief: PT) and/or as crossing external-limitations (historical transgression; in brief: HT). During transgressing almost automatically comes to the re-drawing boundaries of human capabilities and also to the redefining of the category of *social norm*. Every transgression has its own temporary dimension and it is dependent on the mental and physical potential of human being.

Source: own elaboration (based on Kopaliński 2002, pp. 52-53)

Indicated in the text complex components of success, which can take different variances, give enormous number of possible combinations (see: Schema 2). Comparing merely three components of success, namely: authorship, status and scope, can be obtained several characteristics of the phenomenon of success being only a small fragment of the incredibly rich kaleidoscope of success (example 1: an individual, subjectively perceived success of a micro scale; example 2: a group, objectively occurring success of a medium scale; example 3: an individual, objectively occurring success of a macro scale; and so on). Even if a certain particularly interesting area of human activity will be specified (for instance: the area of scientific activity), the multiplicity of emergent compounds of success concerns before a trial of its precise conceptualization. However, the significant level of difficulty of the problem should not write it to the cognitive loss.

4. THE MATTER OF SUCCESS IN SCIENCE

One of the most fascinating areas of human activity, in which people can achieve success, is science. There is a need to clarify that *science* consists of a few elements. The most important ones can be classified as following: 1) the didactic element – learning oneself and teaching others; 2) the institutional element – subjects of study in higher education or scientific disciplines dedicated to specific fields of human knowledge; 3) the element of contents – where science is a coherent system of terms, theorems and theories ensuring the legitimacy of the existence of each of the scientific disciplines; 4) the functional element – where science refers to the aggregate of procedures leading to a better understanding of some fragment of the reality in order to enrich the knowledge of a certain discipline. (Kupisiewicz, 2009, p. 114; Okoń, 2007, p. 269) For the further considerations only two from the presented four elements will be incorporated into reflection on success in science, namely the first and the last ones. The didactic element correlates with roles of an academic teacher and a student/a doctoral student, whereas the functional element refers to a role of a scientist/a researcher.

The crucial voice in the discussion on success in science has Jan Woleński who claims that in a scientific activity, different than in art and sport, “not every success is an achievement and not every achievement can be called success” (Woleński, 2006, p. 25), justifying that success has to be considered in the light of sociological indicators – while achievement according to the methodological criteria (ibidem, p. 31). Thus, in the opinion of Woleński success in some measure is a positive note of some achievement often taking a form of a material award (example: the Nobel Prize) and/or symbolical gratification (like: respect among other scientists). Therefore, success is the culmination of dedication and hard work of someone who managed to bring the mankind closer to the truth about the world and oneself. Edward Nęcka is right in saying that “there is no real success in science without a significant and inventive contribution into the development of a specific discipline, which results in growth of knowledge and as consequence – more profound understanding of a certain fragment of the reality” (Nęcka, 2006, p. 10).

Another extremely important matter is to answer the question: Does any discipline of science is based on the same indicators of sociological and methodological criteria if it is about the ability to predicate on success or lack of success? Both Jan Woleński and Zdzisław Krasnodębski are of the opinion that specific disciplines are characterized by divergent specificities. They claim that more strict gauges accompany the natural and life sciences than the humanities and social sciences. (Woleński, 2006, p. 41) In consequence, it is more complicated to recognize success in the field of pedagogy, sociology or psychology than in the field of mathematics, physics or chemistry. Evidence to support this thesis may be the statement of Albert Einstein to Jean Piaget, who after becoming more familiar with the research

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in development psychology, said that he always recognized humanities and social sciences as more complex than the natural and life sciences (quoted: Einstein, *ibidem*).

Within the humanities and social sciences are four types of success, namely:

1. Sociological success – which is based on gaining the respect among the scholars of the same or other disciplines and which may be expressed by the fact that some scientist is awarded in material and/or symbolic way (example: she/he will obtain some financial gratification and/or will be given some title of honor); (Staruszkiewicz, 2006, p. 44)
2. Success of a theoretician – which is concentrated on constructing compelling theory based on the original theoretical language, and in this way to outlive in the history of science; (Krasnodębski, 2006, p. 75)
3. Institutional success – which means to reach some really high position in the academic hierarchy, in other words: to be the formally sanctioned authority; (*ibidem*, p. 76)
4. Success of intellectualist – which means to occupy some significant medial position as an expert and in the same time a commentator of social life; (*ibidem*, p. 77)

It is obvious that achieving one type of success in science does not eliminate a possibility to attain others. However it is worth to remember that each of successes require different personal properties and aspirations, referring to various scientific roles which can be played in society by scholar.

It is no secret that sometimes science is possessive to those people who do science, and requires more from them than it is able to offer. Stories about the people who sacrificed almost their all life to study, do research, who resigned from fulfilling themselves in other spheres of human activity, are absent in the social discourse about success in science. And though their devotion to science may be called as complete one, it often happens that their long-lasting efforts are simply misfired. Sometimes they lose a sense of passing time because they are too much focus on searching answers to their questions. It also happens that people of science, protecting results of their explorations in fear of usurpation by others, alienate themselves in shelter of their study stations. In Poland, it seems to be still accepted the general opinion about scientists who are eccentric, sometimes weird, which of course does not help to find understanding for such scientific passion – even if the truth is that most of them work for the benefit of others, dreaming about the better world than they found at the beginning.¹²

There is a need to highlight that a scientist's work is rarely transferred into financial benefits, especially when we mean humanities and social sciences. That is why it is hard to find the examples of wealthy people who are doctors or professors of pedagogy/education.¹³ Hence the question: What then is the reason for taking a scientific path of life – the path which requires many years of studying, permanent involvement, having many talents as well as determination and persistence in achieving goals, and also belief in self-efficacy? In the opinion of experts in human resource management, the most important motive of such life decision is the conviction that science gives an opportunity to

¹² In Finland, where I was studying during my doctorate, a scientist is not a self-sufficient institution but a part of a finely woven, global network of scientific interconnections where the progress of science is a multiplayer's task doing by a team of enlightened minds. This rule is applied to all high developed countries, the group of which Poland aspires. (see: Castells, M. *Spółeczeństwo sieci*, 2010)

¹³ Of course, we can multiply examples of psychologists or sociologists who are even millionaires (mainly in USA), but they did not earn their fortunes on doing research but on writing popular guide-books – which, in my opinion, has nothing in common with the true science.

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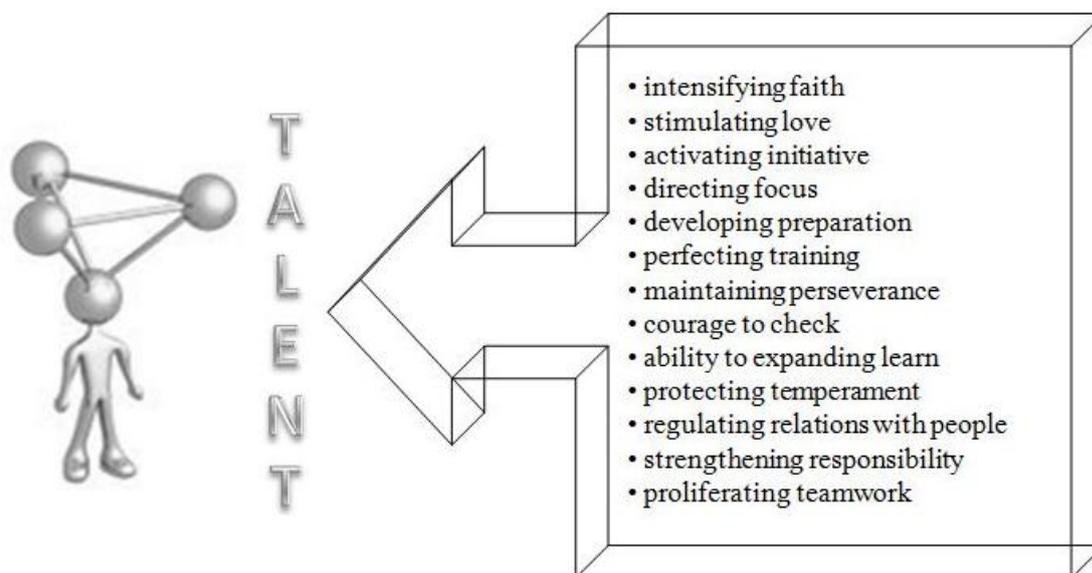
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become a member of the intellectual and influential elite of society. What is more, there is no amount of money able to compensate the prestige which has an academic teacher who shares her/his time on: educating, having an office time, doing own research, writing articles/essays/reports, organizing or participating in conferences. Also, there is no price for the gratitude which might be given by a successful young adult to her/his teacher from the period of higher education. (Synergia, 2007, chap. 2) This all leads us to the reflection that a career in science does not progress like in other branches of the labor market. In science, “success not always results in promotion or a better salary” (ibidem, chap. 14). It is commonly known that “the great scientific achievements, even on the global scale, do not bring such fame as can get some football player or pop-music star” (ibidem). Success in science brings appreciation only among an exclusive group of specialists of a common discipline, but for many scholars such approval is hundred times more worthy than a temporary glory – because it is the appreciation of the scientific elites. For people of science counts more an ennobling and satisfying work – “the work which feeds their innate hunger for knowledge” (ibidem).

A scientist is a person from whom we expect to fulfill important from the society existence point of view tasks, namely: 1) doing research which as a result gives the knowledge never recognized before about the world we live in; 2) sharing the knowledge with other scientists via scientific publications and active participation in conferences; 3) conducting classes in universities/polytechnics/academies and promoting the next generation, also future scientists; 4) popularization of knowledge via open festivals of sciences and publishing popular-science books which are understandable for everyone (ibidem, chap. 3). The multiple expectations prove that every scientist should have a specific set of features, that is: open-minded, independent judgments and persistence in pursuit of her/his goals. To that canon of personal characteristics it can be add also an extraordinary intellectual ability, mastery of logical inferences and an outstanding productivity. (Nęcka, 2006, p. 11) Following the views of Brian Tracy – one of the world's experts on success – it can be said that professional knowledge represents only 15% of the component of success in science, while Nikolaus B. Enkelmann – an expert in NLP – recognizes that professional knowledge determinates more than other identified components (like: hardworking and innate talents) because it constitutes 35% of success in science. (Enkelmann, 2000, pp. 36-37) Both authors agree to the fact, that “(...) the most significant role plays a personality of scientist and an impression which she/he makes on others” (ibidem, p. 36). Without the charisma it is unreal to be successful in science. When those all is supported by talent, understood as inborn unique gifts (see: Schema 5), then achieving success in science is probable. But, according to John C. Maxwell, to succeed people need to take right *key-decisions*.

Ralph Waldo Emerson – one of the most eminent American poet of the nineteenth century – claimed that: “Talent for itself is only a decoration or a mean to show off. But talent joyfully engaged in work for the truth (...) lifts the one who possessed it, and gives the new strengths to go on” (quoted: Emerson, ibidem, p. 16). This statement proves the validity of Maxwell's arguments that “effective achievements are the result of unattractive preparations” (ibidem, p. 117). So talent is not enough, to succeed you need to earn it, and this rule refers to all areas of human activity – the area of science it touches in a very special way because of its ancillary function to the public life (ibidem, p. 119).

Schema 5: The components of talent



Source: own elaboration (based on Maxwell 2008, p. 19)

5. THE BRIEF REFLECTION INSTEAD OF THE END

The examination of success in science can proceed in two ways: quantitatively or qualitatively. It depends, if the subject of research is an objectively existed success or maybe subjectively experienced one. The decision is primarily contingent on the level of methodological skills which a researcher represents. One way or another, measuring the success in science occurs to be in the same way challenging as fascinating.

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INTELLIGENT SYSTEM OF KNOWLEDGE CONTROL FOR E-LEARNING

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Abstract

This paper proposes a framework for the design and development of an intellectual information system of knowledge control. Traditional tests application is supposed to choose the answers on the basis of two-positional logic. It is supposed to use them adequately only in terms of strictly formally asked questions. It leads to absolutely simple questions. But knowledge appropriation includes not only (and not so much) memorizing a priori veritable facts but the capability to understanding general phenomena, tendencies. To control this knowledge “open” (without answer variants) test tasks are more effective. In this paper we have presented an ontology- based text mining approach for the automatic evaluation of the student’s answers on the Natural Language (Kazakh language). The use of intelligent algorithms can also dynamically change the system of evaluation and the test circuit, which significantly improves the quality and speed of testing.

Key words: *intellectual system, ontology, text mining, control of knowledge, testing systems*

1 INTRODUCTION

Successful e-learning takes place in an integrated system that combines a environment tools for creation of electronic educational materials, subsystems for control of knowledge and subsystems for support of the training process. Also practicing credit-module system of the learning process organization makes working out effective means of students' knowledge control important. The research analysis of this problem shows the tendency of enlarging tests usage as an instrument of the studied material quality evaluation [1]. The main advantage of computer tests is the opportunity to ask all the students within the assignment in equal conditions and according to the equal grades scale. It increases the objectivity of knowledge control in comparison with the traditional methods.

Currently, there are many testing systems in various fields of knowledge, for example OLAT [2], Moodle [3], Sakai [4] and AuthorWare [5]. Most of these tools provide the ability to create multimedia tests, testing for traditional learning and e-learning, saving and transfer of results to the teacher for administration of users and educational groups.

On the other hand, using traditional tests suggests choosing answers (and their evaluation correspondingly) on the basis of two-positional logic [1]. It leads to absolutely simple question formulations which “lie on the surface”. To control knowledge “open” questions (without suggested variants of answers) are more effective. However, the adequate automatic verification of answers to the questions of this type is a difficult task. Patterns of the answers in the form of regular expressions are not able to take into account the diversity inherent in the native language. Also the automatic detection of random errors (misprints, typographical errors), and spelling is required.

In order to alleviate this disadvantage of test control of knowledge in this paper we suggest an application of artificial intelligence methods and tools, in particular, ontological engineering. Description of domain knowledge Planimetry ontology is presented in the paper. Classes of concepts, their structure and properties are defined. List of used relations and characteristics of output procedures are considered.

For texts of the geometric tasks solution ontological descriptions of the situations presented as a result of the transformation and evaluation of the concept's structures. It is shown that the use of ontology-based text mining can open the "anatomy" of the correct answer preparation that can be used in the analysis of a student's answer and the search for precisely that moment, which caused difficulties in their reasoning.

Results of research can be used at creation of intellectual testing systems on the base processing of the Kazakh language. The proposed concept testing system enables the use of intellectual evaluation results of the user level and provides a set of tests, tailored to the level of preparation of the test. The system distributes the issues in terms of complexity, based on data obtained during testing. This enables the construction of adaptive tests, which are self-correcting to the level of users.

The paper is organized as follows. Section 2 outlines related work. In section 3 we carry out Planimetry ontology. Section 4 defines the proposed concept testing system based on ontology-based text mining. We finish with some conclusions and future work in section 5.

2 RELATED WORK

2.1 *The computer-aided testing of knowledge*

For many countries, e-learning is valued and utilized as a driving force to speed up the technical, industrial and economic development of the society. As a research subject, e-learning is both multidisciplinary and interdisciplinary and covers a wide range of research topics, with scholars from different disciplines conducting e-learning related research ranging from content design to associated policy. Longitudinal trends of e-learning research using text mining techniques are described in [6]. The authors analyze a significant number of research works and provide useful insights into that e-learning research is at the early majority stage and focus has shifted from issues of the effectiveness of e-learning to teaching and learning practices.

Current e-learning theories stress the importance of situated cognition and personalized learning [6]. Control of knowledge is an intellectual problem, demanding a high-quality solution that will help to reach a new stage in the methodology of teaching, since it could give the opportunity to realize the idea of individual approach to training on a massive scale. The computer-aided testing of knowledge becomes very popular nowadays, firstly, because it saves the working time of a teacher, relieves him from routine work and allows to provide impartial evaluation of knowledge, the results of which do not depend on the subjective opinion of different teachers.

In [7] the newly developed computerized constructive multiple-choice testing system is introduced. The system combines short answer (SA) and multiple-choice (MC) formats by asking examinees to respond to the same question twice, first in the SA format, and then in the MC format.

The authors of [8] have developed the software tool that allows to prepare test questions and conduct testing using any of the suggested types of questions below. Description of this software tool and the intellectual algorithms for evaluation of knowledge is presented in the previous paper of the authors

[9].

The papers [10, 11] describe methods of implementation of a control mechanism of student knowledge with the help of fuzzy set theory combined with neural network technology. The papers apply some serious improvements in the logic of evaluation of knowledge, and methodologies of data interpretation of student responses. The presented architecture is typical of the configuration of hardware and software in an intranet environment of educational institutions.

Analysis of the aforementioned work shows that ordinary linear tests with simple forms of the answer do not quite meet the requirements of comprehensive control of students' knowledge. Most of all it concerns natural and mathematical sciences, a feature which is the close relationship of concepts, themes and sections of the course, as the main criterion for learning - the ability to solve tasks of different nature and level of complexity. Therefore development of the adaptive, nonlinear, and intellectual testing methods with more different types of tasks and answers' forms are needed. At the same time, new testing systems should incorporate all the achievements of previous generations of the knowledge control tools.

2.2 Ontologies

In order to build ontology of Planimetry, it is beneficial to understand the need of ontology and some works concerned of the ontology-based text mining.

An ontology is an explicit formal specification of the terms in explicit specification the domain and relations among them [12]. Ontologies are useful as means to support sharing and reutilization of knowledge [13]. This reusability approach is based on the assumption that if a modeling scheme, i.e., ontology, is explicitly specified and mutually agreed upon by the parties involved, and then it is possible to share, reutilize and extend knowledge. Many disciplines now develop standardized ontologies that domain experts can use to share and annotate information in their fields. Problem-solving methods, domain-independent applications, and software agents use ontologies and knowledge bases built on ontologies as data [14].

Reusing existing ontologies may be a requirement if our system needs to interact with other applications that have already committed to particular ontologies or controlled vocabularies [14]. There are libraries of reusable ontologies on the Web and in the literature, for example, the Ontolingua ontology library [15], or the DAML ontology library [16].

The need of ontologies is connected with the inability of the existing methods to adequately automatically process native-language texts. For high-quality word processing, you must have a detailed description of the problem area with a lot of logical links that show the relationships between the terms field. The use of ontologies can provide a native language text in such a way that when it becomes available-for-automatic processing [17].

In this paper we develop the Planimetry ontology and this ontology is used as a basis for the automatic verification of geometric task solution. The authors of [18] have developed the similar ontology for automatic synthesis of structural images of the planimetric figures. We use some concepts of the ontology, obtained the authors consent.

3 PLANIMETRY ONTOLOGY

An ontology is a formal explicit description of concepts in a domain of discourse (*classes* (sometimes called *concepts*)), properties of each concept describing various features and attributes of the concept

(*slots* (sometimes called *roles* or *properties*)), and restrictions on slots (*facets* (sometimes called *role restrictions*)) [14]. Ontology together with a set of individual instances of classes constitutes a knowledge base.

Development of an ontology includes [14]:

- defining classes in the ontology,
- arranging the classes in a taxonomic (subclass– superclass) hierarchy,
- defining slots and describing allowed values for these slots,
- filling in the values for slots for instances.

Our ontology is structured in three levels. The first level contains classes whose instances cannot be derived from other classes. Class Plane Shape represents all objects of planimetric shapes. Specific Plane Shapes - instances of this class.

The next levels are generated through a reasoning process, that is, using the ontology reasoner or through the different modules called by the Reasoning Manager. The higher the level the more detailed the information is, e.g., in the second level polygons are classified in pentagons or triangles or quadrangles and in the third level the triangle are further classified in rectangular, equilateral and isosceles triangle (if the classification by sides will be considered, see Figure 1).

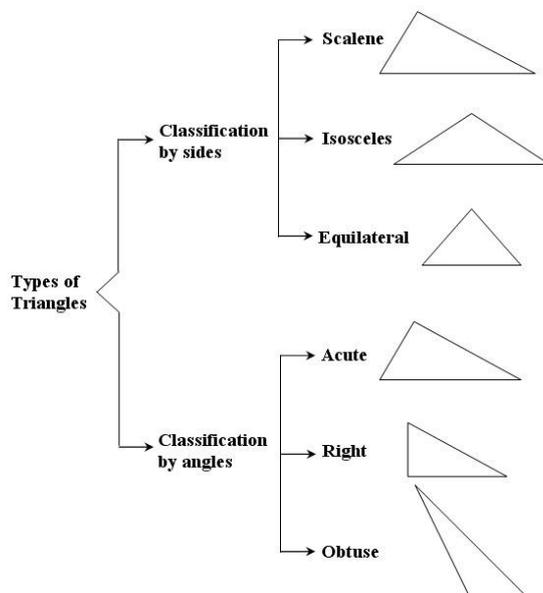


Fig. 1. Types of triangles. Classification by sides and classification by angles.

We organize the classes into a hierarchical taxonomy by asking if by being an instance of one class, the object will necessarily (i.e., by definition) be an instance of some other class.

If a class A is a superclass of class B , then every instance of B is also an instance of A

In other words, the class B represents a concept that is a “kind of” A [14]. For example, every equilateral triangle is necessarily a isosceles triangle. Every isosceles triangle is necessarily a triangle. Therefore the equilateral triangle class is a subclass of the equilateral triangle class.

Slots describe properties of classes and instances. Each property can be set to a specific value or a formula to calculate this value of the property: for example, a triangle has sides, has angles, sides have lengths, angles have a degree measure. All subclasses of a class inherit the slot of that class. On the other hand, subclasses can have their own properties. For example, an isosceles triangle has sides that have a length, with those two sides (legs) are congruent, and the third party has a special name - base (see Fig.2 and Fig 3).

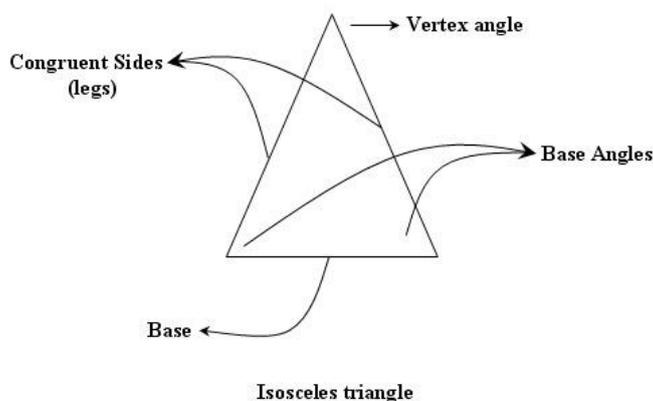


Fig. 2. Isosceles triangles. The angles opposite the two congruent sides are called base angles and the base angles. The angles opposite the base is called vertex angle.

Fragments of the ontology, including the structure and properties of concepts are the basis for description of the situation, which is determined by the input data to solve a geometrical task. The concepts and relationships defined by the input conditions (the geometrical task's text) are introduced in addition to these ontology fragments.

4 PROPOSED CONCEPT TESTING SYSTEM BASED ON ONTOLOGY-BASED TEXT MINING

Compared to traditional forms of learning, e-learning has several advantages: adapting to the individual characteristics of students, the freedom to choose the time, place and level of education, use of new teaching methods, modern means of communication and information transfer between a student and a teacher. However, control of knowledge is particularly important because of the lack of direct contact between student and teacher.

Organization of control of knowledge is closely connected with the problem of selecting the type of questions, mode of the testing trajectory formation and methods of the answers verification.

To solve these problems we propose the concept of intellectual testing system on the base of the domain knowledge ontology. Planimetry ontology is used as the domain knowledge ontology.

The following types of questions are offered for the control of knowledge quality:

- test questions of closed form, i.e., when several variants of the answer are suggested, one of which is correct and should be selected;
- test questions of open form, i.e., questions without suggested variants of answers (such questions are useful for evaluation of knowledge of terms, definitions, notions, etc);

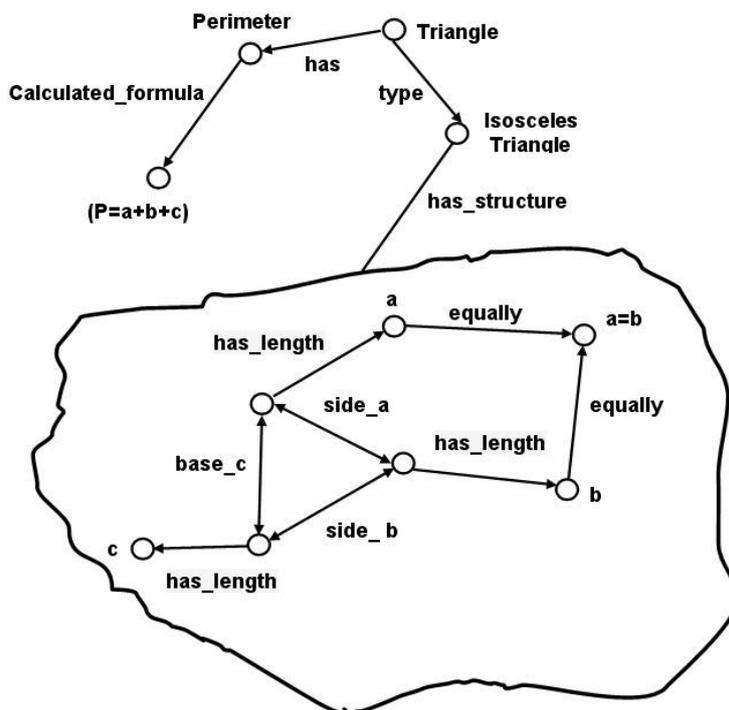


Fig. 3. Structure of the isosceles triangle concept to parse of the solution of the geometric tasks.

- situation tests, i.e., set of test assignments designed for solution of problematic situations (a geometrical task).

A special method of selection of a testing trajectory mode is proposed. Test set is not formed by random sample from tests database. Questions selection is based on the analysis of answers to previous questions. This algorithm is based on the original method of choosing questions according to the system, corresponding to the current level of student knowledge [11].

For analysis and verification of student's answers to test questions of open form ontology-based text mining is proposed. Description of domain knowledge ontology of Planimetry was presented in Section 3. Semantic analysis of the native language texts is the following stage.

1. Pre-linguistic processing of the source text (morphological and syntactic analysis of sentences) is needed to separate terms (classes, subclasses, properties and relations).

2. A formal understanding of the text as result of constructing an ontological graph.

In paper [19] the formalized syntactic rules, analysis and synthesis algorithms of word-combinations and sentences of the Kazakh language were constructed. The results of research can be used at creation of intellectual human-machine systems with interaction possibility in the Kazakh language.

Let us describe in brief the proposed method of verification of the geometric task solution on the basis of ontology. Texts of geometrical task are a set of connected sentences [18]. These include simple and complex sentences, incomplete sentences (with an anaphora and an ellipsis). A formal understanding of the text of geometrical problems is their representation in the language of domain knowledge ontology of Planimetry. This representation must be connected and extended with filling in the values for slots for instances from the description of the situation presented by the text.

Consider the whole process of analysis with geometric problems in this paper is not possible. Therefore, let us consider the situation's structure which should be obtained as a result of ontology-based linguistic analysis for one geometric task.

Text of task: determine the type of triangle that has sides of length which is equal to 5, 6, 6.

Pre- linguistic processing of the source text will give the following concepts and combinations of concepts that are comparable to the ontology presented in Figure 3, for example: type (of triangle); has sides (from triangle class); has length, is equal.

For the formal description of Planimetry ontology Prolog (a logic programming language) is used [20]. Prolog's inference engine used to build an ontological graph. A formal description of the ontology (see Fig. 3) uses the following data types with using alternative functors.

domains

poligon = triangle;

 pentagon;

 quadrangle

triangle=triangle1(classification_by_sides);

 triangle2(classification_by_angles);

classification_by_sides=scalene;

 isosceles_triangle;

 equilateral_triangle

scalene=sc(sides)

isosceles_triangle=is_tr(sides)

equilateral_triangle=eq_tr(sides)

sides=sides(side_a, side_b, side_c)

side_a, side_b, side_c =real

classification_by_angles=acute_triangle;

```
right_triangle;  
obtuse_triangle  
acute_triangle=ac_tr(angles)  
right_triangle=r_tr(angles)  
obtuse_triangle=o_tr(angles)  
angles=angles(angleA, angleB, angleC)  
angleA, angleB, angleC =real  
predicates  
nondeterm treangle_tip(treangle,symbol)
```

Hence, an inference rule describing that the triangle is isosceles can be given by

```
treangle_tip(treangle(sides(Side_a,Side_b,Side_c),  
  angles(Angle_A,Angle_B,Angle_C)),Y):-Side_a=Side_b, Angle_A=Angle_B,Y=isosceles;  
  Side_b=Side_c,Angle_B=Angle_C,Y=isosceles;  
  Side_a=Side_c,Angle_A=Angle_C,Y=isosceles,!.  
treangle_tip(treangle(sides(Side_a,Side_b,Side_c),  
  angles(Angle_A,Angle_B,Angle_C)),Y):-  
  Side_a<>Side_b,Side_b<>Side_c,  
  Angle_A+Angle_B+Angle_C=3.14,Y=scalene,!.  
treangle_tip(treangle(sides(Side_a,Side_b,Side_c),  
  angles(Angle_A,Angle_B,Angle_C)),Y):-  
  Side_a=Side_b, Side_b=Side_c,Y=equilateral;  
  Angle_A=3.14/3,Angle_B=3.14/3,  
  Angle_C=3.14/3, Y=equilateral.  
treangle_tip(treangle(sides(Side_a,Side_b,Side_c),  
  angles(Angle_A,Angle_B,Angle_C)),Y):-  
  Angle_A<1.57,Angle_B<1.57, Angle_C<1.57,  
  Angle_A+Angle_B+Angle_C=3.14,Y=acute.
```

```
triangle_tip(triangle(sides(Side_a,Side_b,Side_c),
  angles(Angle_A,Angle_B,Angle_C)),Y):-
  Angle_A=1.57, Angle_A+Angle_B+Angle_C=3.14,
  Y=right; Angle_B=1.57,
  Angle_A+Angle_B+Angle_C=3.14,
  Y=right;Angle_C=1.57,
  Angle_A+Angle_B+Angle_C=3.14,Y=right.
```

```
triangle_tip(triangle(sides(Side_a,Side_b,Side_c),
  angles(Angle_A,Angle_B,Angle_C)),Y):-
  Angle_A>1.57,Angle_A+Angle_B+Angle_C=3.14,
  Y=obtuse; Angle_B>1.57,
  Angle_A+Angle_B+Angle_C=3.14,Y=obtuse;
  Angle_C>1.57,Angle_A+Angle_B+Angle_C=3.14,
  Y=obtuse.
```

5 CONCLUSIONS AND FUTURE WORK

This paper presents an ontology-based approach that addresses the problem of ontology-based text mining. We have developed Planimetry ontology for automatic verification of answers to the questions of “open” questions (without options). Results of the research can be used in creation of intellectual testing systems on the base of the Kazakh language processing.

Our conception of the testing system uses intellectual evaluation results of level of the user and provides a set of tests, tailored to the level of preparation of the student. The control knowledge system distributes the issues in terms of complexity, based on the data obtained during testing. This enables the construction of adaptive tests, which are self-correcting to the level of users.

Future research in the frame of methodological aspects of computer -aided control knowledge will be concern to development of the test questions databases of different types and different levels of complexity. Also in the technical aspects frame researches will continue development software that implements of all the stages of semantic analysis of texts on the basis of the ontological engineering and native languages processing.

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**THE POSSIBILITIES OF PROJECTS FUNDING IN
SLOVAK UNIVERSITIES ENVIRONMENT**

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Abstract

The paper deals with possibilities of projects financing of Slovak universities. It characterizes different possibilities of financing of universities projects, both domestic and foreign. The emphasis is mainly in identifying the specific focus of organizations providing grants. In the paper there is also an analysis that deals with identification of using of different sources for projects funding within particular university. There are also analysed potential opportunities of financing projects depending on specific targeting of university. In conclusion, there is a comparison of analysed university with other Slovak universities, based on various parameters

Key words: *projects financing, grants, management, VEGA, KEGA, ESF*

1. INTRODUCTION

Educated nation is one of the key aspects of the functioning of our modern society. The basic condition for creating and maintaining a high educational level is the existence of educational system, especially higher education, which is developed and capable of providing quality education. With university development is closely related the financing and funding not only basic activities but also the funding of scientific, research and other work taking place within higher education projects. The aim of the research was to map the ways how universities can finance their projects, regardless of public, private, national or international character of the organization providing funds and analyse of using the funding opportunities in the Slovak Republic.

2. THE ENVIRONMENT OF UNIVERSITY EDUCATION

Under the Act universities in Slovakia are defined as legal entities and institutions dealing with the highest educational, scientific and artistic activities. Their mission is to develop the personality of an individual its knowledge and intelligence, awakening of creative potential and promote individual thinking in the spirit of harmony and common good. Fulfilling of this mission provides on the one hand individual growth of the person receiving university education, on the other hand contributes to the educational, cultural and scientific development of society.

There are four types of universities in Slovakia:

- the public universities,
- the state universities,

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- the private universities,
- the foreign universities.

Financing of **public universities** is carried out in several ways. Crucially is the activity of the public universities provided through the state budget through the Ministry of Education, Science, Research and Sport SR (MSVVaS SR), or other ministries of SR. Funding takes the form of dotation which is provided under a contract between the parties. Other possible sources of funding of public universities are:

- tuition fees,
- the related fees with study,
- incomes from tangible assets of university,
- incomes from intangible assets of university,
- incomes from universities funds,
- other incomes of the primary activities of universities.

Public university may also conduct the business activities. The received funds are used for filling the tasks for which it was established.

3. FINANCING OF PROJECTS IN THE AREA OF UNIVERSITY EDUCATION

One of the basic conditions to realize a quality project is to secure its financing. For the projects financing in an environment of university education is possible to use many agencies and organizations whose mission is subsidizing such projects.

The main organizations which cover universities of the Slovak Republic is the Ministry of Education, Science and Sport Research. To assist universities in implementing the projects there have been established within the ministry the agencies whose task is to collect the projects under the thematic classification and under the evaluation of projects the selection of specific projects and providing subsidies.

- **VEGA** serves as an advisory body to the Minister of Education and a subsidiary body of Academy of Sciences to identify research project.
- The focus of **KEGA** agency is mainly to support projects in development field in education and to finance projects in the creative arts.
- **APVV** agency's mission is to promote research and development by providing financial grants to solve specific projects in research and development and projects oriented in infrastructure development for future research and development.
- According to delegation of tasks by ministry of education is **ASFEU** an directional element for operational programs - Education and Research and development.
 - OP Education is a reference document for the period 2007 to 2013. On its basis will be available the support to human capital development with using the European Social Fund grants and subsidies of the Slovak Republic.

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- OP Research and development represents a strategy for the Slovak Republic in order to create balanced development of research in Slovakia regions.
- **AV** projects come from the initial results of research carried out for example by agency VEGA. The evaluation criterion serves the benefit for commercial practice, which is the output from primary project.
- International scientific-technical cooperation – **MVTS** - is an intra-departmental system for financial assistance of the projects in the field of international scientific and technological cooperation.

One of the other options of financing university education projects is the use of grant agencies existing **within** specific **universities**. These agencies provide funds for basic and applied scientific research projects by tenders which run with limitation to a particular university, where the grant agency operates.

The **European Union** represents a foreign source, which helps to finance the projects. Due to its economic stability and cohesion it is the largest international organization through which it is possible to obtain grant funds. There is:

- European Social Fund. Represents the oldest existing structural funds.
- The main tool of the European Union to subsidize technic and science are the framework programs for research, technological development and demonstration activities. 7th framework program consists of four specific programs, namely Cooperation, Ideas, People and Capacities.

NATO - North Atlantic Treaty Organization was established as an organization bringing together the needs of its member states in security matters. Even though it is not the primary mission of the alliance, NATO is involved in various projects undertaken by staff from member and partner countries. Through the grant program, Science for Peace are supported applied research projects and development projects. The condition of obtaining a grant project is focusing on safety.

The International **Visegrad Fund** is an organization created by the governments of the Visegrad Group (V-4) - Slovak Republic, Czech Republic, Poland and Hungary. The purpose of the Fund is to promote cooperation among the countries of the group through scientific, educational and cultural projects. The grant may also apply for individual artists and students.

Norwegian Financial Mechanism (**EEA**) is a support system, whose role is to help to get to minimize the social and economic disparities in the European Economic Area by providing grants for development and investment projects.

Another option for funding university projects is the use of **Swiss** financial **mechanism**. It is a mechanism to provide financial support for the new European Union member states. Financial contributions are compensations for the benefit of Switzerland's approach to the extended European Union market.

Slovak Academic Association for International Cooperation, known under the name **SAAIC** is an association of persons and entities, whose mission is to coordinate and assist in implementation of international programs of cooperation between the Slovak universities and other organizations in the educational programs. Among these programs belong for example the student mobility support

program Erasmus, or by now completed program Leonardo da Vinci, which became part of the Lifelong Learning Programme.

Besides the aforementioned, there are **other financing options** that can use project leaders. Universities can apply for grants in a variety of domestic and foreign organizations, public and private. Selection of a particular organization depends on the specific focus of school or part of school applying for grants.

4. GRANTS AT UNIVERSITIES

Universities are trying to obtain grants to the extent possible. In the following section there is a comparison of the received grants for Slovak universities projects. For an objective comparison is necessary to identify the size of a particular university. While there are several criteria that can be taken into account when comparing:

- comparison of the number of students,
- define the number of employees, namely the number of teachers and number of researchers.

Data of universities are listed in Figure 1. The data shown in Figure 1 are from the year 2009 as comprehensive information from the 2010 are not currently available. Blue colour represents teachers and red researchers.

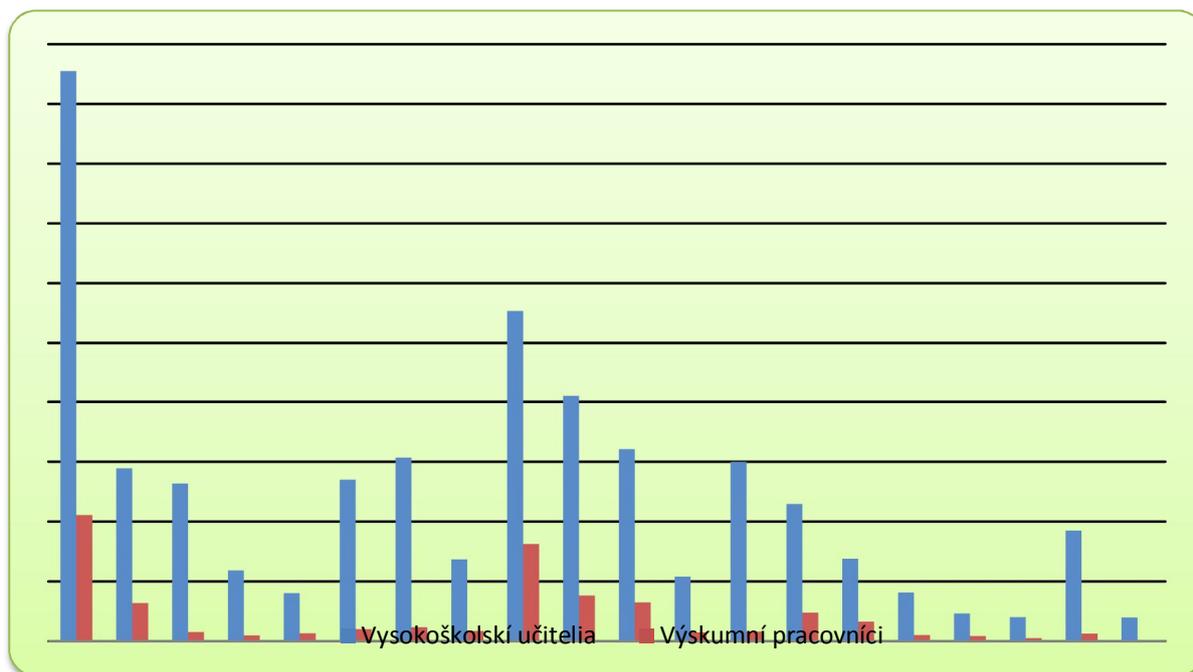


Figure 1. The number of university teachers and researchers at various universities in 2009. (Source: Own processing by: <http://www.minedu.sk/index.php?lang=sk&rootId=529>)

The rate of utilization of domestic grants for the years 2008 to 2010 can be expressed in the following graph (Fig. 2).

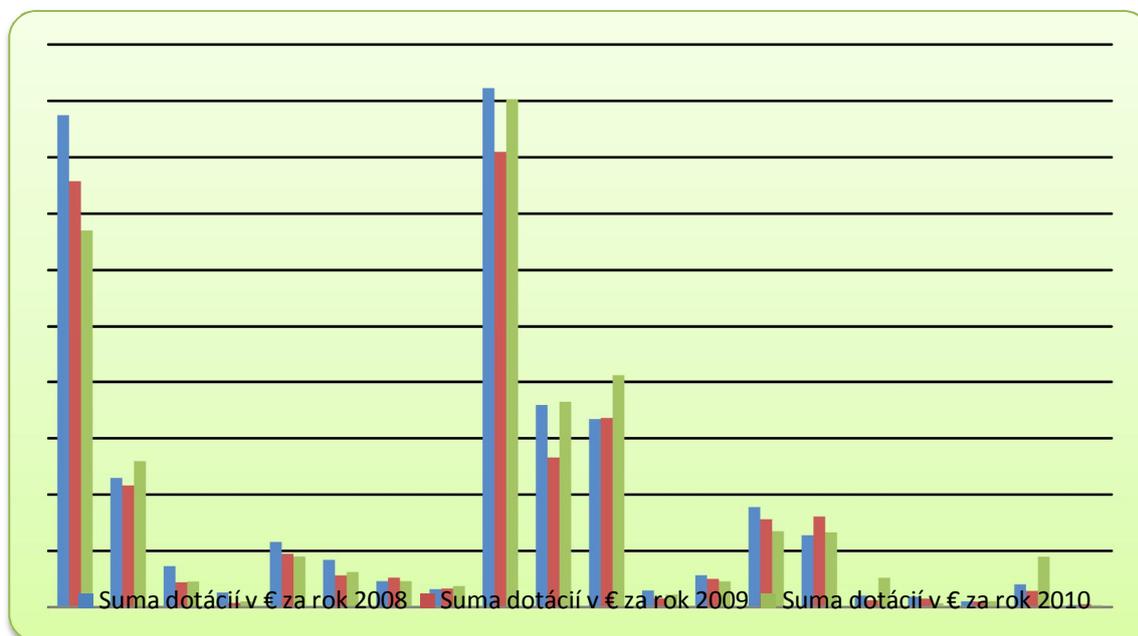


Figure 2. Domestic grants awarded to universities from 2008 to 2010. (Source: Own processing)

The rate of utilization of foreign research grants for the years 2008 to 2009 is captured in Figure 3.

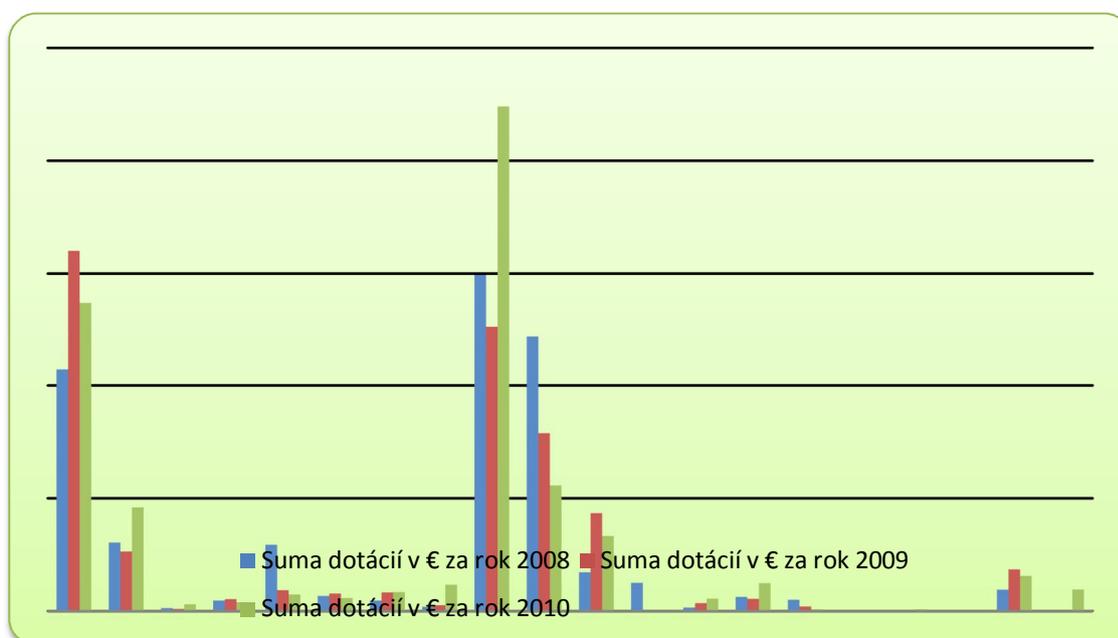


Figure 3. External research grants awarded to universities from 2008 to 2010. (Source: Own processing)

The graph shows that the majority of Slovak universities use external grants for research only minimally. The highest activity can be observed as in the previous comparison, at Comenius University in Bratislava and Slovak University of Technology in Bratislava. The extent of use of other foreign grants in the years 2008 to 2010 can be expressed in the following chart.

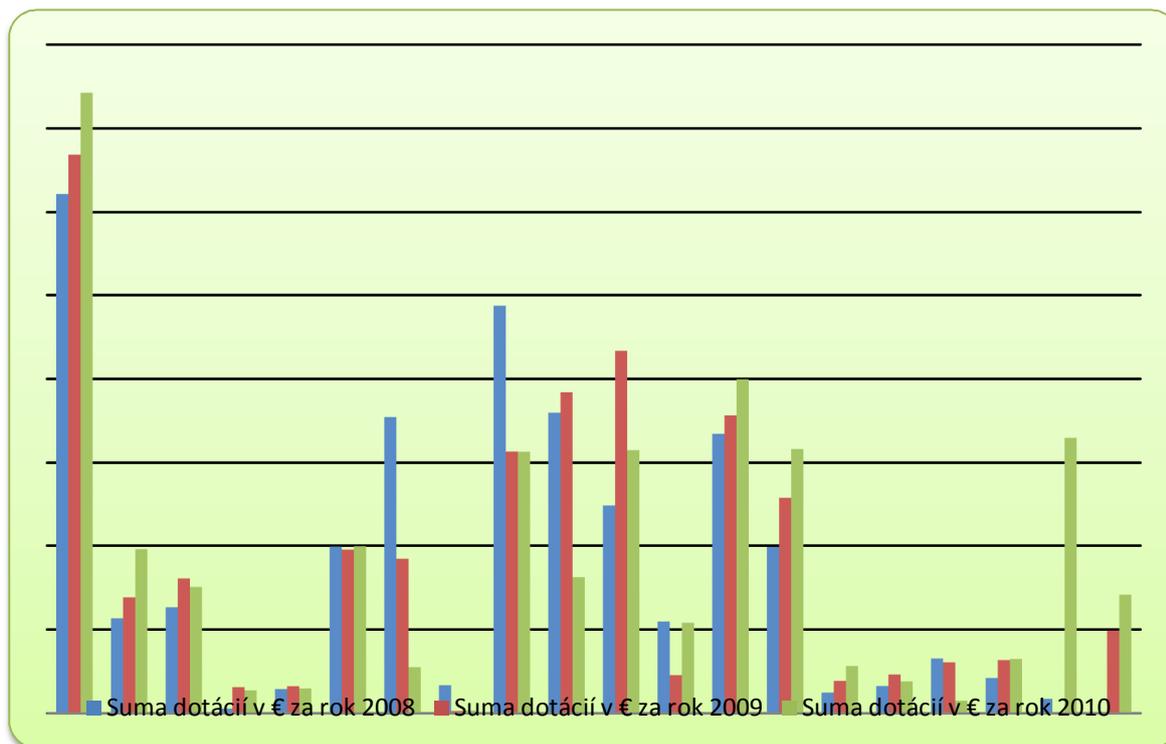


Figure 4. Other external grants awarded to universities from 2008 to 2010. (Source: Own processing)

The graph in Figure 4 shows that in the area of acquisition of foreign grants, which are intended for other than research activities is the success of Slovak universities more balanced than in previous cases.

5. CLOSURE/SUMMARY

To finance a university education projects is possible to use a number of organizations involved in this activity, whether primary or within their secondary activities. The largest number of organizations is hosted by the Ministry of Education, Science, Research and Sport of the Slovak Republic, which manages grants in science, research, cultural and educational activities. It participates also in the implementation of structural funds. Except national there exists also foreign systems of helps to universities, it is primarily the European Union, North Atlantic Treaty Organization and European Union countries providing assistance within its own financial arrangements. Identification of the specific organization, its focus and requirements is crucial in the implementation of the projects.

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ERASMUS ON-LINE – PILOT PHASE

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Abstract

Paper deals with research project www.studyabroad.sk – an on-line system for electronic administration of outgoing students from Slovak Republic. In the introduction we deal with initial phases of the project, namely analysis and design phase. We define system requirements and reasons of on-line administration implementation of Erasmus mobility in Slovak Republic. We also identify the procedures and timetable for developing and implementation for Erasmus mobility management. The main part of this paper deals with the description of the system, its basic modules and functionalities. In the end, we indicate the plans for the future of the project.

Key words: *on-line system, study abroad, management, administration, Erasmus*

1. INTRODUCTION

To be able to define adequate conditions about access to information about study abroad at universities through ICT, we have carried out analysis of universities' needs in Slovakia. We asked particular universities to send us information about services and information they provide, what systems they use, which specification in process they assert.

Later in the paper we also describe complex information system proposal, that creates appropriate conditions for providing informational needs to access information about abroad study at universities through internet in Slovak republic. In the pilot solution we have focused on Erasmus module, because through it travels to abroad almost 80 percent of the total amount of university students from foreign exchanging programs.

2. STUDY ABROAD PROGRAMS IN SLOVAK REPUBLIC

Institutions administrating Erasmus study abroad programs in Slovak Republic are:

- Ministry of Education, Science, Research and Sport of the Slovak republic.
- SAAIC
- Universities

Ministry of Education, Science, Research and Sport of the Slovak republic co-ordinates Slovak candidates' selection process for scholarship placements at Erasmus and United World College (high school scholarships), university teachers and research workers within the exchanging program DAAD (German Academic Exchange Service) and foreigner students, who can study in Slovak Republic

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Slovak academic association for international cooperation (SAAIC) is a voluntary association of personal and corporate entities, whose goal is to support and coordinate programs of international cooperation of Slovak universities with other institutions, mainly within countries of European community educational and other programs.

Association in its actions mainly:

- creates an information system about realized programs and about other international activities,
- provides information and consultation services about international training and other programs,
- organizes national and international seminars and conferences,
- promotes Slovak educational system in abroad and publishes information materials.

SAAIC programs:

- Comenius
- Erasmus
- Leonardo
- Grundtvig
- Sectional program
- Program Jean Monnet

3. SYSTEMS FOR ADMINISTRATION OF ERASMUS PROGRAM

In Europe, there are currently available systems creating software support for study abroad management. Existing software are:

- **MoveOn** - System consists of two modules MoveOn – International Relations Management, and MoveIn – Applications and Admissions Management. It is possible to use MoveOn for management of international cooperation and abroad study. MoveIn is used in the applications and admissions process. Primarily, it is dedicated for international universities' offices. It is an application based on Microsoft Access database module and every licence has to be installed on user's computer.
- **Mobility-Online** (Budget-Online) - System consists of two mutual integrated modules - Mobility-online and Budget-online. Mobility-online enables to direct, administrate and evaluate all processes connected with international cooperation and mobility of teachers and students. Being integrated with Budget-online, system enables to realize budget management and financial operations, too. This system operates as an internet portal.
- **SocratesManager** - Program is technically and contextually similar to MoveOn. It serves mainly for universities and it is oriented for exchanging students within Socrates program.
- **LLP link** - serves for statistical evidence of data about abroad studies in LLP programs (mainly Erasmus). It enables coordination of financial budgets and cost statements of particular countries.

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- **www.stipendia.sk** – It serves to process the processes in the National scholarship program.

4. ERASMUS

There are currently **four types of Erasmus** mobility programs – students study mobility, students internship mobility, teachers mobility at university institutions and mobility–training of workers from university institutions and workers. Erasmus is a part of operational program of European committee LLP (Lifelong learning program) focused on university education. Its aim is to increase the quality of education and support European dimension of university education through international university cooperation.

The aim of our research was to find out the needs of universities and to find the requirements for student selection, as they create essential part of applicants; selection of workers is carried out usually by chief employee. Discovered state is negative. There is not an university, where it has not happened, that the chosen student, because of different reasons, has not taken part in study abroad. Three universities even declared that more than a half of chosen candidates have given up the possibility to travel.

According to our survey at universities, these limitations and requirements for using ICT were found:

- Criteria for financing the placement in a particular country are not exactly defined - it would be adequate to design a key for dividing finances according to the costingness of the particular country for Slovak Republic citizens.
- It is not possible to gain historic and actual data about outgoing students by the means of an easy method - it is necessary to automate these processes, not on the central level only, but mainly on an university level.
- Students are not able to choose neither university, nor a country appropriately, because they have not enough information about that place of mobility and they choose by chance, consequently. This is the reason why the selection of participants is sometimes noticeably unsuccessful.

5. INFORMATION SYSTEM FOR ERASMUS IN SLOVAK REPUBLIC

From the analysis and expert dialogues arises the need to process mainly the program Erasmus (it creates 80 percent from all mobilities carried out in the SR) in the best possible way. The aim of an on-line Erasmus mobility portal is to define and create adequate conditions for securing information needs in access to information about mobility at universities through internet. It will deal with the development and setting of an on-line solution for administration of international cooperation of educational institutions and exchanging Erasmus programs. Associated aim is the creation and realization of new, successful web pages and setting of a publication system for content administration.

Solution will proceed in these basic phases:

- analysis of needs for a study-abroad on-line portal solution,
- analysis of current state and the needs of University in relation to Ministry of Education of the SR and SAAIC,

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- specification of software requirements and hardware securing,
- development of the portal.

Basic function of the portal is to mediate given data in an adequate form and by an adequate user. Erasmus on-line deals with the most complex study abroad module used in Slovak Republic. As it resulted from the analysis, after the proposal of informational structure fulfilling requirements of Erasmus program will be another parameterisation for other modules possible by achievable process.

Figure number 1 imagines block structure of the proposed portal. Particular users of portal are displayed around. It is an abstract view, therefore particular ties among users or systems are not defined. Accurate ties description comes from the realization of the project and specification of the conditions from the claimer and upon the proposal of informational architecture by the creator of the system. Public can utilize the data and on the contrary, universities, Ministry of Education, Science, Research and Sport of the Slovak republic and agencies have the authorization to enter the data. Specified users are applicants – preferred group (predominantly made by students). Applicants utilize data from the portal (about study-abroad possibilities, information about universities etc.) and they enter data as well – personal details, documents necessary to travel abroad and many others.

The content of portal (figure number 2) will be divided into several units – informational character for all kind of study abroad, processes character for study abroad (possible to process on Slovak site) and statistical character for abroad study (not possible to process in Slovakia, but possible to keep data about them).

Particular functional blocks itemized for concrete functions, as accurate description of algorithms particular functions, or actions done by users, will be accurately specified in the realized project. We mentioned here basic classification of functional units with its brief description only:

- **Basic functions** – basic function of portal will be to mediate given data by adequate form and adequate user. Modules, which will not be solved complexly yet, will be registered with basic data about the placement (how many people and how long were on particular study abroad placement) and by complexes informational data (through CMS).
- **CMS** – important element which provide whole administration of data in databases and their intervention into application layers. Also it is concerned with providing parameterisation of particular modules without the need of programmer to intercede. It is concerned with management of various kinds of registers, statistics, users, documents, functions and content as such.
- **Core** – core of application, which provides process in particular modules. It is concerned with reporting services, monitoring of the processes, exchanging data between modules and between various systems, personal details administration, setting deadlines, generation of documents, notifying service etc.
- **Erasmus** – basic module of portal in the first year of building. Debug mistakes, find possible shortcomings. Deal with the most complex module for study abroad used in Slovak republic. As it came from analysis, after the proposal of informational structure fulfilling requirements of Erasmus program will be another parameterisation for other modules possible by achievable process.
- **Further modules** – in the pilot year of solution it is supposed that together with module Erasmus will be solved also another modules – projects in the basic version and National

scholarship program, which is processed on-line recently, so it will be probably an interconnection of data. Not less important part will be the automatization of producing Europe mobility confirmations.

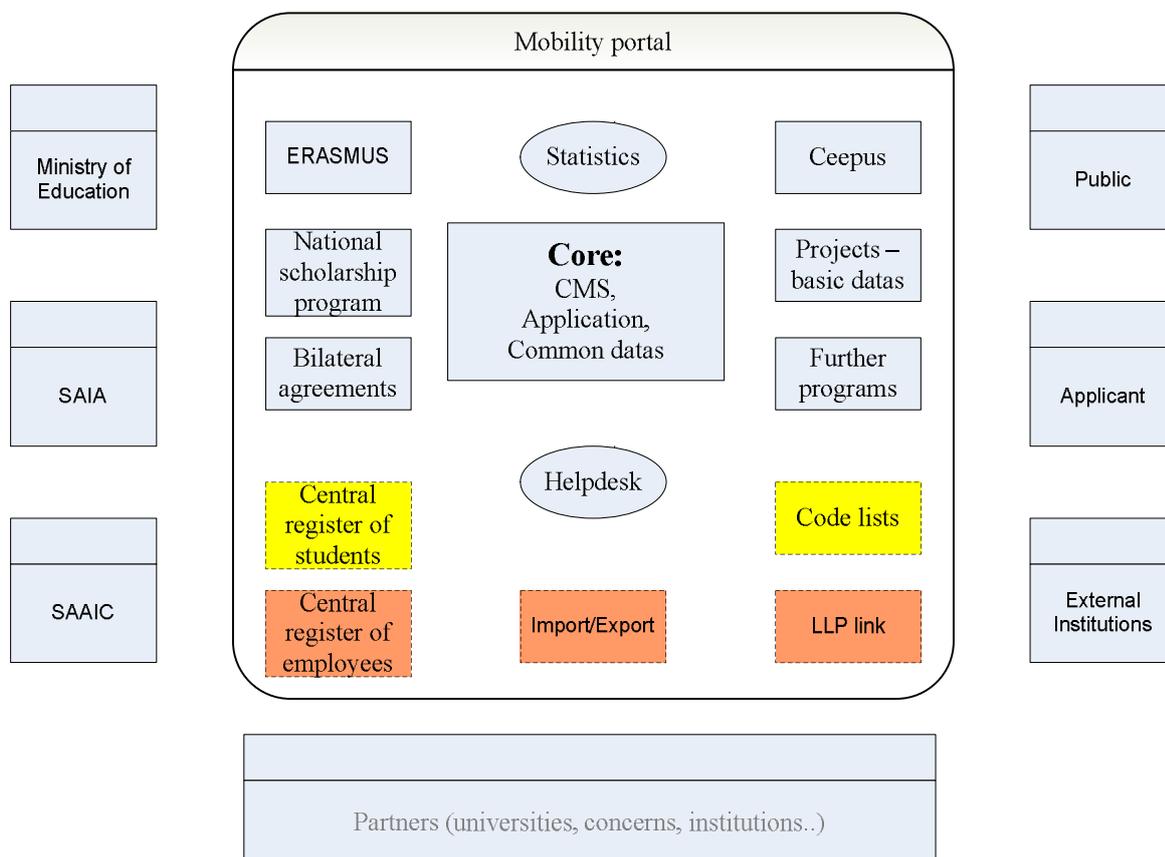


Figure 1 – Block structure of study-abroad portal

Reasons for implementation:

- administration of the large amounts of data,
- increasing the number of mobilities,
- the need of detailed statistics and analysis,
- standardization of documents and processes in individual mobilities,
- transparent electronic approval procedure.

Erasmus – reasons for fully processing:

- a large number of monitored data,
- global standardized process,

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- fully administrated on the Slovak side,
- there is no electronic system for the administration at the universities at the time.

Erasmus – goals

- historical and current data,
- nominations of candidates (standardization and parameterization),
- suitable choice of university by applicants,
- ECTS and Europass,
- the criteria of funding in each country.



Figure 2: Homepage of StudyAbroad portal

6. BRIEF DESCRIPTION OF THE SYSTEM

The system distinguishes between different roles:

- administrator,
- coordinator,
- applicant,
- the Ministry/SAIIC.

The administrator sets the classifiers, the basic information about each program and has available all the functionality as other roles.

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The applicant fills the forms, attaches required documents and submits application for desired stays. Also follows the entire process of Erasmus mobility – acceptance, completion of documents, placement and the report from the placement.

The main role is the university or faculty coordinator with five main categories to administrate:

- Settings (Bilateral Agreement, Organisations for placement, Number of students, Calendar, Documentation, Grants, Newsletter).
- Applications (Deadlines, Overview, Students Exports, Teachers Exports).
- Stays (Overview, Selection of students – study, placement, Selection of teachers – teaching, training).
- Finance.
- Statistics.

General Programmes - Social competence		zmaza
Fakulta:	Fakulta prevádzky a ekonomiky dopravy a spojov	?
Stupeň štúdia:	<input checked="" type="checkbox"/> I. stupeň <input type="checkbox"/> II. stupeň <input type="checkbox"/> III. stupeň	?
Schvaľuje:	univerzitný koordinátor	?
Platnosť do:	2012/2013	?
Plánovaný počet vyslaných študentov:	2	?
Plánovaný počet prijatých študentov:	2	
Plánovaný počet vyslaných študento-mesiakov:	10	
Plánovaný počet prijatých študento-mesiakov:	0	
Obmedzenie na:	<input type="checkbox"/> Univerzitní študenti (mimo fakúlt) <input type="checkbox"/> Elektrotechnická fakulta <input checked="" type="checkbox"/> Fakulta prevádzky a ekonomiky dopravy a spojov <input type="checkbox"/> Fakulta prírodných vied <input type="checkbox"/> Fakulta riadenia a informatiky <input type="checkbox"/> Fakulta špeciálneho inžinierstva <input type="checkbox"/> Stavebná fakulta <input type="checkbox"/> Strojnícka fakulta	?

Figure 3: Bilateral agreement - detail

The main module of the application is **bilateral agreements**. The list of existing bilateral agreements is shown in the structure – country, foreign university, date of the last change (from coordinator) and further possibilities of work with bilateral agreement – to edit or remove. The bilateral agreements will be automatically displayed on the website www.studyabroad.sk in the section partners' universities

and also through the guide students will be able to find the university at which they will be able to study desired specialization. At the moments of filling the application are shown only those schools, specializations, which corresponds to input data, for example degree, faculty limitation, etc. Detail of bilateral agreement is shown in figure 3.

Another important part is **documents setting**. There is available a university setting or settings for individual faculty. The process is displayed in four phases, distinguished by colour. Coordinator assigned documents to phases in which the applicant should send required documents (figure 4):

- **Application** – applicant has to send required documents in the phase of applying, before selection.
- **Selection** – documents have to be sent after the selection, acceptance of applicant.
- **Placement** – documents that applicant has to send after arrival or during the placement abroad.
- **Return** – documents have to be sent when applicant returns from the mobility.

Document Name	Phase	Status
Application Form	(formulár) prihláška	Required (Orange)
Application Form (slovenská verzia)	(nahrávanie súboru) - nevyžadované -	Not Required
Learning Agreement	(formulár) výber	Required (Green)
Learning Agreement - changes (upload)	(nahrávanie súboru) - nevyžadované -	Not Required
Transcript of records	(nahrávanie súboru) návrat	Required (Grey)
Poistenie	(nahrávanie súboru) - nevyžadované -	Not Required
Akceptačný list	(nahrávanie súboru) výber	Required (Green)
Životopis v slovenskom jazyku	(nahrávanie súboru) prihláška	Required (Orange)
Životopis v anglickom jazyku	(nahrávanie súboru) - nevyžadované -	Not Required
Jazykové znalosti - certifikáty	(nahrávanie súboru) - nevyžadované -	Not Required

Figure 4: Document settings

After the settings are prepared students can fill and send application. The coordinator can view details of sent application (figure 5) with following information: student's name, photo, the status of the application and the home faculty. Holding the cursor on the student's folder will arise further possibilities – „View the application“, „Change status“, „Set up contract“ (only when the application is approved is possible to make a contract).

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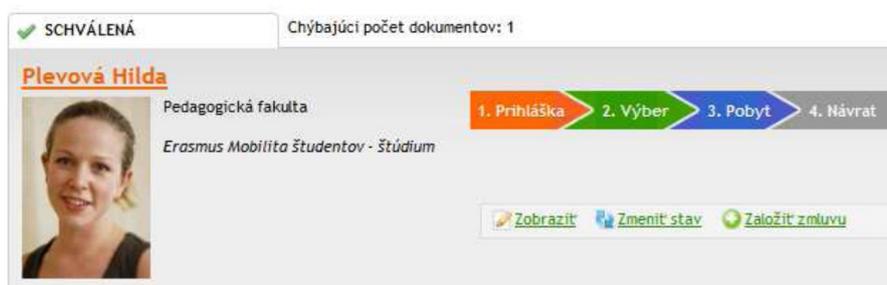


Figure 4: Student's folder

The application contains a large number of functionalities, which according to the extent of the contribution we do not provide. Among the most important belongs a selection of applicants. It consists of two steps:

- order of applicants (usually made by faculty coordinators),
- final selection of applicants (three-dimensional selection matrix).

7. FUTURE PLANS

The aim of the system is to achieve the following functionalities:

- The comprehensive informational system of data about mobilities at universities also with other mobility options.
- The possibility of a fully electronic applying on mobility (use of electronic signatures).
- The electronic data exchange with foreign universities systems and European commission.
- The effective communication channel between government and universities.

In 2011 was system completed for outgoing Erasmus students. Here is a brief statistics about involved universities:

- 31 universities participating in the Erasmus mobility,
- 12 universities were involved in testing,
- 8 universities participated in the project and will use the system,
- 1 university is a pilot user.

8. CONCLUSION

One of the key problems of the effective communication, coordination and verification development in the knowledge society belongs to quick and effective providing of guaranteed information, to possibility of its quick and flexible searching and to mediating and exchanging of valid experiences and knowledge as well. To ensure these processes in desired quality and extension can be real

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nowadays only with the help of the information and communication technology. They require the fulfilment of the basic conditions – technological equipments and informational literacy of the people.

Advantages of system:

- Detailed „map“ of procedure that applicant has to undertake.
- Comprehensive administration, information and statistics.
- Documents „on-line“.
- Advanced Search.
- E-forms.
- Multilingual mutations.
- Electronic communication of institutions.
- Full adaptation to the requirements of the client.
- Operation 24/7.
- Training, helpdesk.
- Responds to Slovak needs.

ACKNOWLEDGEMENTS:

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www.erasmus.sk

**TEACHING AND EXCHANGING OF THE EXPERIENCES
IN THE MEDICINE**

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Abstract

In medical education, more than in other areas are used practices simply characterized as: “learning by doing” and “learning through examples”. CESNET collaborates with several leading hospitals and clinic in the country helping them to enter into the world of telemedicine, preparing together with them special videoconferencing sessions and on-line video transmissions of interesting surgeries. Learning through examples is an important approach to comprehend new level of knowledge in any fields. Video and videoconferencing methods are effective tools which can play important role in this. In several examples we will show our results, experiments, in national or global internet context.

Key words: *HD video, telemedicine, internet, network, Geant, ORIENTplus, videoconferencing, robot daVinci*

1. INTRODUCTION

In medical education, more than in other areas are used practices simply characterized as: “learning by doing” and “learning through examples”. Video recordings and on-line transmissions of real surgeries executed by famous specialists fully correspond to this category. These practices are not new. In the past medical students and assistants always watched the surgeries carry out by distinguish professors from the galleries. The IT technology only open new possibilities, the students can see work from the close distance, they can see more details from inside of the patient body in high quality pictures and they can be miles away. CESNET has the research teams which are focusing on different form of video transmission and its effective usage in different fields. During last couple of years we tested several publicly available video systems and analyze their suitability for different medicine disciplines. Our research departments also developed several hardware and software platforms for transport the newest video formats (2K, 4K) in high-speed networks.

2. TECHNICAL ASPECTS OF VIDEO DELIVERY

The key factor for modern medicine is resolution (image height and width in pixels) and quality of these images. Most videos are original stored at either 720x480 (standard definition - SD) or 1920x1080 (high definition - HD) each pixel with 30 bit deep colour scheme (RGB or YUV). In the last couple of years we have seen a big progress in this field and most of modern medicine devices start to use digital camera and screens with HD resolution. The reality in the hospitals is a little bit different, there are still many old devices working with analogue TV standards as PAL, NTSC or digital technology with standard definition (SD). When these video signals should be stored into files

or transmitted to remote partner's side they are sometimes sampled down to smaller resolutions (640x480) to decrease the number of pixels in the video files or due to insufficient bandwidth for transport. If we want to transmit video, we can do it in several ways. The simplest way is to send it directly from site A to site B as uncompressed data under RTP protocol. In this cases we will need bandwidth somewhere in the range between 30 Mbps to 1,5 Gbps depending on resolution, colour scheme, frequency of framing, network protocols, etc. The other form is to use streaming technology (RTSP) that will deliver video from special video server. These servers using streaming codecs, technology with an encoder to compress source video and a decoder to decode the received signal when played by the viewer. This technology can significantly reduce needed bandwidth. However, most of the streaming codecs use what is called "lossy" compression, which means that the more you compress, the more quality you lose. Compression takes time and so in real time video transports this element called latency also plays important role. The users can usually select the video quality as compromise corresponding to the requested resolution and the available bandwidth.

3. EXAMPLES OF DIFFERENT TECHNIQUES AND SCENARIOS

In following paragraphs we will show more about individual techniques, used scenarios and configurations.

3.1. *Electro-optical convertors*

The simplest type of devices for video transport are electro-optical convertors or extenders. They transfer the video signals over a dedicated fiber without packetization. It is clear that such transmissions can be done only locally inside the buildings or in short distances in hospitals, small university campuses, etc. Nevertheless, they represents very economical form of transmission video signals. They have different form of interfaces (HDMI, HD-SDI or analog). That features are very useful even in more complex configuration as universal conversion units. Some of them can also work synchronously with two-channels to enable stereoscopic mode.

3.2. *H323 videoconferencing tools*

The second type of devices are commercial videoconferencing units. They work with codecs and sometimes with very deep compression of video. Due to compression they can reduce requested bandwidth into the range from 128Kbps to 6Mbps. However, the low bandwidth and high compression determines the quality of the signal. Specially degrades colour and gray spectrum and it is a weak point for special medical applications which are working in conditions very different from the standard well illuminated videoconferencing rooms. They are primarily dedicated to the classical videoconferencing purposes (remote interpersonal communication) but we used them also for transporting video from medical devices which work with mini cameras with limited illumination inside the human body. The big advantage of this solution is that all videoconferencing devices works with H323 protocol which enabled full compatibility between all of them and it allows to create very flexible user networks and communities. CESNET tested many H323 videoconferencing systems in different medical environments with quite positive results. It is necessary to say that in all cases we used fast network with 100/1000 Mbps capacity where the available bandwidth was usually on the level of 80-90% link capacity and low compression factor. This eliminates many of the negative factors described above.

As an example of using videoconferencing technology we selected the annual "Surgery day". It is a national level meeting organized by the Ophthalmology Clinic of the CMH (Central Military

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Hospital) in Prague with the live transfers of eye surgeries from different clinics. The videoconferencing units which enabled HDTV transfers were deployed into participating sites and multipoint videoconference was created via MCU – Multi Connection Unit located in CESNET HQ. The video signals from all clinics were transported into the congress hall of Military hospital where projected on big screen. This video and the voice of all surgeon's comments were accessible also in all remote sites. Video switching from one site to another was managed by the organizers. During “surgery days” is usually at least 20 different patients from several clinics located in different cities presented to the auditorium where more than two hundreds of ophthalmologists watched this event, as shown in Figure 1.



Fig.1. “Surgery day with H323 units”

3.3. DVTS video

Opposite to the H323 systems and other systems working with compressions we tested several tools which work with uncompressed video. One of the first such tools was DVTS (Digital Video Transport System). It is free downloadable software to be installed on any personal computer or notebook. DVTS allowed that digital image from image sources (as digital camcorders, surgical instruments, etc.) can be transmitted via IEEE1394 interface to a personal computer and from it into LAN and to the Internet. The necessary bandwidth for this digital video transmission is 30-35 Mbps per channel including audio.

DVTS came into wider utilization in medicine in the period 2004-2005 thanks to the prof. S.Shimizu from Kyushu University which formed community of medical users in Asia (Shimizu et all., 2006). DVTS has many advantages: It can completely preserve the quality of original motion images by avoiding compression processes. It means that it keeps original image quality provided by the source camera and also minimizes the latency in transmission between network stations as encoding and decoding of pictures.

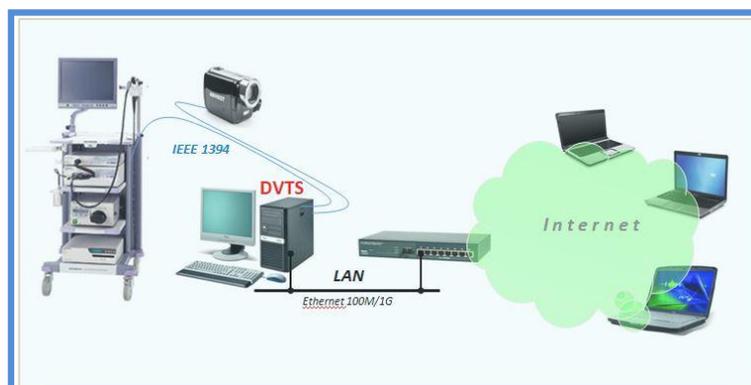


Fig.2. General scheme for DVTS applications

CESNET started to use this technology since 2008 after visit of prof. Shimizu in Prague and the lesson from the Kyoto university about the new endoscopic technology which help to detect malignant diseases in their early stages. Method based on using special optical filters can radically improve the visibility of capillaries, veins and other subtle tissue structures, by optimizing the absorbance and scattering characteristics of light. During session our doctors connected to this session from several clinics could appreciate clean and sharp images transmitted from Japan. CESNET since that time used DVTS in many similar cases in national and international context, especially with collaboration with Asian partners (Shimizu et al., 2008). In 2010 researchers from CERNET (China Education and Research Network) developed DVTSplus. It is an extension of DVTS to support multipoint videoconferencing mode. It works on client server principles. The server works as MCU which commute video signals from all clients connected into the videoconference. The system is still under development and currently there still just one active server located in Beijing.

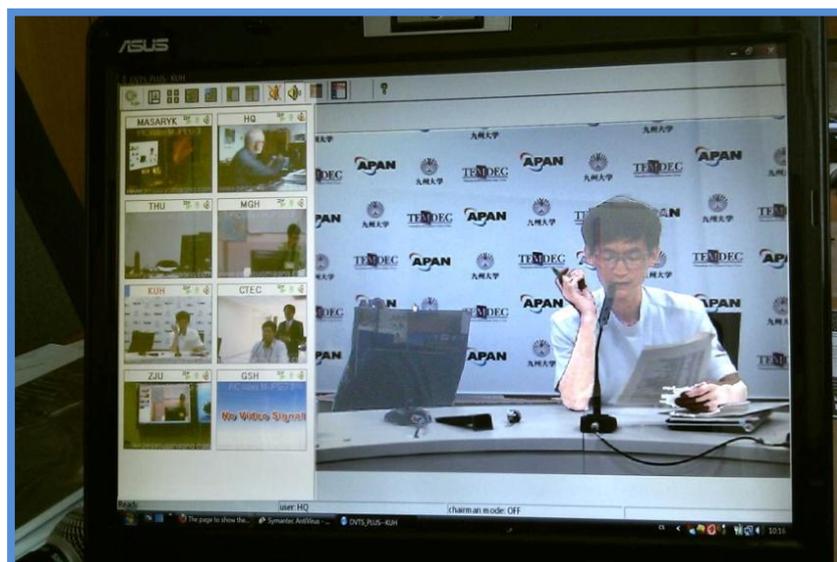


Fig. 3. VC on DVTSplus

The system offers a choice to be an active or passive client. An active client sends video signal from his camera or video signal from medical devices to the server. The passive client participate on the session and it has not to be connected with video camera. The passive clients just receive the signal from the server which has form of multi window. As usual, in main window is displayed video signal of speaker or it is dedicated for signals from medical devices, (see Fig. 3). The content for main window is selected automatically or by the VC manager in cases of presentation surgeries. One of the DVTSplus modes allow to use full screen as it is visible on the Fig.5. More about DVTSplus is possible find in DVTSplus manual (see user_manual in references). CESNET and our medical users evaluated DVTSplus as very valuable tool. We used it in several cases. The first of them was when CESNET hosted APAN medical section meeting in frame of the international conference TNC2011 held in Prague. In that case special server was installed in Prague and more than 10 external participants connected to it as it is shown on the Fig. 4. and attended the meeting.

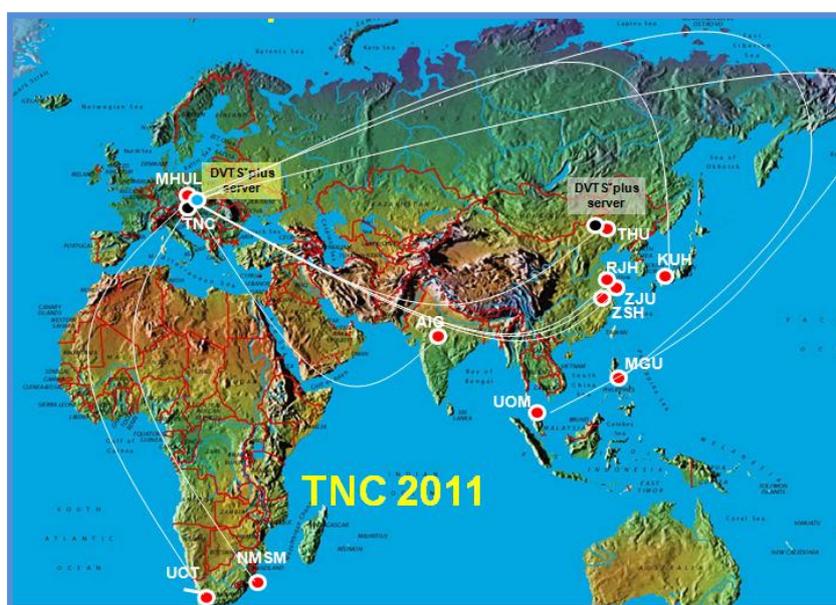


Fig. 4. Map of multipoint session DVTSplus on TNC2011

The second example using DVTSplus was transmission of neurosurgery executed famous neurosurgeon prof. Takanori Fukushima (*Carolina Neuroscience Institute, Raleigh, North Carolina, US*) during his visit Masaryk Hospital in Usti nad Labem (Czech Republic) in September 2008 to many foreign partners mostly from Asian countries, see Fig.5. The server in China was used for distribution of video signals to all participants which were mostly from Asian countries. The fast connection between CESNET and CERNET (Beijing) was thanks to the project ORIENTplus which connects academic network for EU countries “Geant” and China.

3.4. HD video in 3D

In 2010 CESNET started intensive collaboration with the Robotic centre of Masaryk Hospital in Usti nad Labem. This is one of the eight hospitals in Czech Republic equipped with modern robots daVinci Surgical System. After couple of weeks we succeeded to connect robot’s video unit with our new

device MVTP-4K developed in CESNET for video transport (see reference to MVTP-4K). MVTP-4K was originally designed for transport of 2K and 4K video used in movie industry. It allows transmitting up to 8 full HD parallel video channels to the network on 10-Gbps line. Due to utilization of FPGA technology it works with minimal delay in the box, which is on the level of 1 ms. The implementation for medical application appeared as a secondary effect but during time gets more attractive and useful.

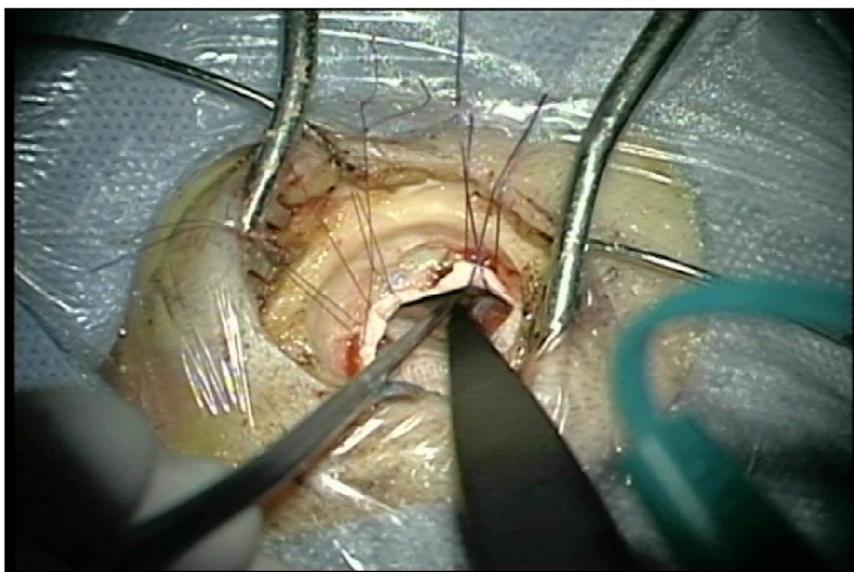


Fig. 5. Neurosurgery image via DVTS – full screen mode

The first experiment with stereo signals from robot daVinci was run in June 2010 and because it succeeded we repeated it several times between Prague and Usti nad Labem and finally demonstrated this 3D functionality in October 2010 on the 5th International Congress of Mini invasive and Robotic Surgery (KMRCH) in Brno. In that case MD Jan Schraml, the head of the Department of Urology presented the robot assisted surgery of radical prostatectomy. Typical transmission scenario for this event and most of others is illustrated in Fig. 6.

The network between Usti nad Labem and Brno was formed by links of the CESNET network infrastructure with the 10 Gbps capacity. Used bandwidth was approximately 2.5 Gbps. The original stereoscopic HD signal in 1080i format (1920x1080 pixels, interlaced rendering) and 59.94 frames per second was transferred over the network uncompressed. Therefore with ultimate quality and very low latency of approximately 2ms including the network propagation delay. For stereo projection was used a Projection Design F10 AS3D projector. The picture quality was subjectively approved by invited medical experts as well suitable for highly illustrative student training and presentations of surgical procedures on symposia. A parallel HD videoconference (H323) was used by the audience to ask questions, which were responded by the surgeon.

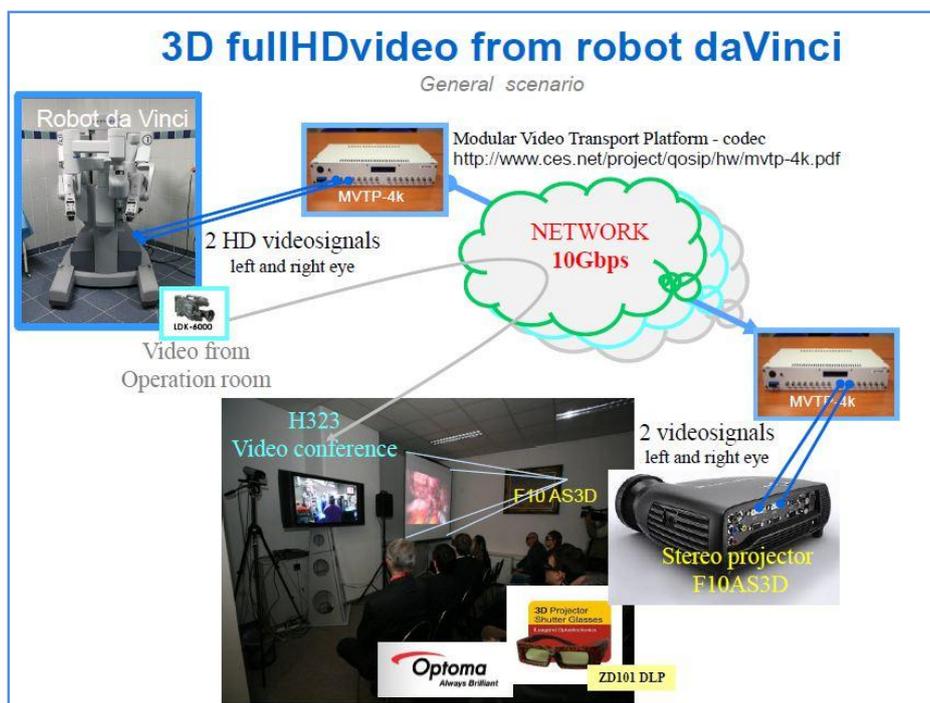


Fig.6. General Scenario of 3D video transmission

4. PRESENTATION ON A LARGE INTERNATIONAL SCENE

Our next demonstration of using MVTP-4K for medical e-learning was a long-distance transmission from Czech Republic to Japan. We used our contacts to KEK-High energy physics research centre in Tsukuba which is connected to SINET3 (Japan advanced academic network) and invited medical doctors from Medical faculty of Tsukuba University to this session. In that case we tried to test possibilities to transmit 3D video signal in shared academic Internet.

In 2011 we were invited to demonstrate our skills with Internet transmission of robotic surgical operations at the largest international Asian conference dedicated to Internet, APRICOT/APAN in Hong Kong (more details available on www.apricot-apan.asia). Because of a big time difference and limited time for presentation we used pre-recorded 3D video. The transmission carried shortened surgery footage with sections that were interesting from the medical point of view and from the perspective of the 3D view of the patient's internal area. The broadcast was dedicated to the medical section of the APAN conference in Hong Kong, where it was viewed by about 70 participants. Complementing the surgery transmission there was also a bidirectional H323 video conference available for viewing of operational room from which MD Jan Schraml commented on-line of his operation and at the end of session it was used for discussion with participants of APAN. In this time the network for transport of 3D video was constructed as E2E link.



Fig.7. E2E path for 3D video for APRICOT/APAN medical section

It means it was created from the segments of individual academic network on the path. It led from the Czech Republic via Amsterdam to Chicago, through Canada to the West Coast of the USA, and then to South Korea (Daejeon) and finally to Hong Kong. Six academic partners participated in the construction of this 10 Gbps line: national research networks CESNET (Czech Republic), SurfNET (Netherlands), CANARIE (Canada) and KREONet2 (South Korea), StarLight interconnection centre (USA, Chicago), and the Chinese University of Hong Kong network.

During of all described sessions in two first years of our activity we used projector which expect special „active“ stereo glasses which are quite expensive and it in many cases limited number of viewers. The illustration of such events are shown on Fig.8.



Fig.8. Robot assisted operation in 3D on APRICOT/APAN in Honk Kong

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In October 2011 we prepared together with Slovak academic network SANET and Slovak Medical Chamber large tutorial session called Telebridge. The connection linked Masaryk hospital in Usti nad Labem (Czech Republic) and D.Roosevelt hospital in Banska Bystrica (Slovakia). We presented two robot assisted operations carried in Masaryk hospital. The first one from the urology (radical prostatectomy) and the second from the laryngology (carcinoma supraglotis). The scenario was nearly similar like in previous cases. The new on this event was that we used new type of 3D projectors which allow to use cheap „passive“ 3D glasses and to make a 3D video session on large screens for more than 200 people.



Fig. 9. Educational telebridge Czech –Slovakia with “passive” 3D glasses

5. CONCLUSIONS

There are more and more medical devices enabling 3D. We believe that we have original and universal solution which allow us to connect them and enabled to transport its video signals to remote sites. All works described in previous text was done with the goal to build up new transport device MVTP-4K and during time to create the medical education centre with an archive of videos with interesting medical surgeries in high resolution. According to the reaction seems us that this form of exchanging experiences is getting more and more popular and interesting for wide part of medical community. For 2012 we are preparing several similar transmissions as part of the program of national level medical congresses.

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CHILD'S LIVING SPACE AS A RESEARCH CATEGORY IN THE PEDAGOGY

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Abstract

Today's child lives and grows at the intersection (border) of different spaces - in the real and the created (virtual) world. Life in "many worlds" is the source of child's subjective (individual) experiences and knowledge. Child's experiences placed in different space-time dimensions can be a source of inspiration, challenge and development. This makes it necessary to know the conditions of supporting the child in those worlds cognition - in the discovery, familiarizing and transforming subsequent realities. Pedagogy is the science of knowing the intentionally organized conditions for a person's development and social change. For the analysis and interpretation of these conditions, it is suitable to adopt a category of "living space" as a world experienced every day in a multidimensional perspective. The task and challenge of the pedagogy is to reveal and understand the essence of life and the multiplicity of spaces.

Key words: *living space, world of life, reality, experience*

1. THE WORLD OF CHILD'S LIFE – DILEMMA OF REALITY AND EXPERIENCED SPACES

Dynamics, variability and dialogue of today's world make describing the reality problematic. It is necessary to use concepts and categories highlighting the transgressive, transformative, uncertain and indefinite in its nature of variation character of the surrounding world. The term "reality" in terms of vocabulary is sometimes approached in varied ways - as a reference to the surrounding world, or the current situation, or experience of data, facts and events (Dąbrówka et al. 1997, p.133). It is emphasized that this is a world in which a human lives, works, which is experienced and in which he interacts and acquires certain dispositions.

The world of the child's life consists of objective and subjective, real and created reality. Child's world understood as a holistic life and development environment, as a specific, high-capacity construct, in which different forms of child communication with nature, culture, society and other people operate, can be specified as the space of its life (Prokopiuk 2009, p. 161). The reality of the world of child's life consists of various processed images that are natural basis for the perception and understanding of the facts, things and phenomena. The reality of the world of life can be perceived and described in a multidimensional and multifaceted manner. Its learning is connected with adapting various criteria to extract situations and conditions that create a context for development. In the social sciences, perspectives that could provide the basis for research into the world of the child's life (living space) are: psychological, sociological, economic, historical, ethnology - ethnographic, urban and architectural. Each of them refers to a particular dimension of the child's life area (placed in the objective, subjective, real and created reality), revealing a meaning assigned to it by the child.

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It turns out that children find themselves perfectly in the multiplicity of living space; they also accept its specifics of the meanings shift. In this way they receive a new area of experience and a new level of development and formation of meanings and sense. Natural inability to separate the real reality from the abstract one enables the children's active operation among various codes. Many elements of an artificial simulated space can be an extension of what really exists; and, conversely, what can be physically experimented may be an extension of forming images in the children's minds. In their activities, they form, design, and also simulate fragments of the reality. The whole that rises from the above combines a multiplicity of meanings, metaphors spiral, image banality and behaviour stagginess. In this respect, the children's imagination and willingness to find meaning are being expressed. Immersion in the multiple realities of the life's world (living space) deprives children of permanent structures and the dividing line between reality and what is abstract or created becomes blurred. In this perspective children form weak in terms of crossing, mixing forms and distinguishing features identity, a new area of symbolic actions, behaviour and speech. The reality itself becomes a field forming the surrounding space out of fragments. This puzzle can be constructed in any way, while creating new connotations, each time discovering something unusual, new, mysterious and fascinating. Building an identity in such perspective stimulates the subjective development of both space and reality. The loss of permanent structures by the world of life can be seen as a release from the reign of "the hard existence," and consequently - the release of ordering that what used to be obvious.

The observed life dynamics opens up new possibilities for shaping the identity. The child, as an entity endowed with an internal activity, possesses huge deposits of creativity. He or she builds his or her own vision of the world based on his or her specific experience, a source to which may be any of the living space perspectives mentioned. The essence of the psychological perspective is the sphere of personal identity formation, and that is the degree of personal identification with the world we live in. In this case the child is the subject of his or her life world, which is located in a subjective reality. It is characterized by subjective experiencing the childhood saturated with individual meanings and symbols, styles of behaviour and types of world views (Prokopiuk 2009, p. 161). The sociological perspective focuses on the collective consciousness and falls within the scope of social identity formation. It reveals an objective reality engaging its representations of its properties that arise in the mind of a child by the sensory way and during activities in various spheres. Objective and subjective reality is examined on the basis of symbolic interactionism, which makes the identity accounted for as a result of the interaction between expectations and social pressure from the interaction partners considered significant by the entity as well as their own personal characteristics being the result of their own biography. In this context, the world of child's life is seen as a reflection of the degree of the child's internalization of the social role, but also as the identification of people's real social expectations to fulfil this role and the real meanings (Klus-Stańska 2004, pp. 22 - 24). The economic perspective allows an insight into the extent of the entity references to issues related to the market economy, the mechanisms of supply and demand and the formation of identity in a world of consumption culture and its extremes in the form of logo culture, culture of extreme metamorphosis or kindermarketing (Samborska 2009, pp. 41 - 58). Historical perspective takes into account an individual and social contribution to the world of life development. It is characterized by the dynamics within the structure, and thus elements and relationships between them. This variation relates to the position of a person in a structure and is associated with an understanding of the entity's own historical situation. The subject is aware of being located in space of the life's world, sense of causation related to it, the possibility of carrying out his own preferences and the responsibility for what he or she does. The ethnology – ethnographical perspective focuses on the analysis of artefacts, symbols

material culture, its correlates, and language. In this perspective, either to "assign to a territory" or awareness of space is important. Urban - architectural perspective focuses on the analysis of life space of construction forms and characteristic urban solutions. In these approaches, an emphasis is placed on human and social factors, and therefore the analysis of living space may also be taken in the pedagogical context. In this regard, the child's life space can be recognized in the micro and macro perspective. Analysis and development of life space helps to understand the educational environment in which the child lives and grows (Przeclawska 1999, p. 75). The living space is associated with openness, material - fabric which builds the educational environment of a more closed nature. It provides all the items of the structure surrounding the individual, which form a system of incentives and cause specific reactions and psychological experiences (Wroczyński 1985).

It should be noted that the spectrum of children's experience in life space is continually expanding, and emerging activities expand the development potential in the individual and collective scope. The multitude of research perspectives within the world of life widens the field knowledge. I should be pointed that the image of the contemporary child's world of life consists of a multiplicity of realities: the real, virtual and expanded reality, which gives a chance to go beyond the realm of experience. This facilitates the emergence of new fields of subjective experience and expansion of cognitive space. The specifics of expanded reality lies in the fact that the child exhibited activity is systematically increased by extracting the following areas of its development potential in individual and collective scope. Expanded reality is created by applying elements of the virtual space onto real space in such a way that a human being in expanded space leaves him or her in a real dimension of the spatial size and real-time dimension. As a result, the real space becomes expanded with new unique features of audio and visual space (as parts of the virtual space) and it is not replaced by virtual space.

In the context of the consideration, an attention should be paid to the fact that placing the child's experience in the real or created world (space); some ontological and cognitive differences arise for this. In real space, which is the natural, physical environment for a human, the space is a prerequisite, the basis of representation. It is a space of living, and so of gestures, body, memory, symbols, meanings, and in such interpretation "the space is the condition of experience," and its determinant. A created space is each time individually modelled, formalized, and is constantly and without restriction a subject to redefining. It is a space of vision geometry. In this case, the "experience determines the space" (Kita 2003, pp. 125 - 126).

2. CHILD'S LIVING SPACE – ACCESS PROBLEM

Child's life in the plurality of spaces requires developing a new method enabling learning. In relation to contemporary reality neither multidisciplinary nor interdisciplinary specimens, leading to being saved in one area which covers the rest, are enough. In this situation there is a need for the knowledge that would be placed "between" disciplines, that would penetrate them, and yet that would remain beyond each of them individually. Transdisciplinarity is believed to provide a chance to learn the surrounding reality. Language of transdisciplinarity always includes the "third" (tiers inclu), which is continually in between. It is open to the unknown, unforeseen and unexpected. Thanks to this the knowledge as such is both internal and external, and a type of knowledge achieved in this way corresponds to maintaining the necessary for a human balance between his or her external space and his or her interior. Transdisciplinarity, as a method for understanding the cultural reality, shows how various aspects of life and culture, including education, can be created and modified.

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Such understanding is possible beyond the classical reasoning, where studies of a single discipline concern one level of reality. It is not about one-dimensional reality, but the knowledge "in cross section." Multi-level structure of reality and a broken structure of space should be considered. In this case a different meaning is attributed to the perception, because each level of the reality corresponds to a specific type of perception. According to the dynamic approach, development of the motor skills disposition, perception and cognition are closely interrelated and interdependent in the course of the whole child's development. This position refers to the modern theories of perception, and especially to one of the dominant in this area concepts: the theory of seeing as an action, known as an ecological approach inspired by James Gibson's theory. The ecological model describes the concept of adaptive and direct nature of perception. According to this concept "perceptual learning" is about achieving better skills of reading visual stimuli falling within the field of perception (Dodwell 2002, pp. 25 - 38).

Experiencing the world by a child occurs via both technicised and traditional forms of perception. The subject is in a certain reality and simultaneously "passes" to many other worlds. All this means that the basic categories of being in the world - time and space, must be considered in each of all the possible worlds separately. The reality, which becomes the child's place of operation, consists of a variety of space and time dimensions, and they are not parallel in the sense of the Euclidean geometry. This reality is created from a variety of spatio-temporal variations, which intersect and complement each other, or even become a source of contradicting information and meanings.

The basis of analyses of the child's contemporary experiences in a world of life determined by dimensions - space and time, could be the classification proposed by Hans Ramo (Ramo 1999, pp. 309 - 328). It concerns the diversity of views of human experience in terms of realism and abstraction in the context of time and space. H. Ramo refers to the Aristotelian classification of space and time, but in relation to contemporary experiences. He proposes four options for possible links in this area: *chronochora*, *chronotopos*, *kairochora*, *kairotopos*. These spatio-temporal variations become a place to locate the child's experiences.

Chronochora is a world of infinite time and space. With regard to the child's experience, this formula indicates an abstract time understood as a measure, change, serial order, as a quantifiable time in relation to the activity "before" and "after;" and an abstract space which is not a place or concrete. In this regard, it is usually identified with the space of creation. *Chronotopos* stands for reading the abstract time in relation to a particular place. Today's life of a human (especially in Western culture) in the time space is subjected to the economic calculus; people are affected by time pressure ("time is money"). The specifics of this spatio-temporal formula, in relation to children's experiences, can be seen in the subordination of activity and all activities taking place at a particular location, to the context of time ("everything done on time"). In this perspective, time is an instrument to organize, but it also becomes some merchandise in economic terms. For children it is identification of time and speed that becomes the measure of their actions value. The specifics of *chronotopos* also provide other forms of time in relation to a place. In children's experiences, it is waiting for something, a break from something or a change of the form of activity. *Kairochora*, as a synthesis of a specific time and abstract space, is a relatively new quality generated due to advanced information techniques combining systems. At the specified time there is a virtual communication of network participants who come from different parts of the world. Timeliness is then treated as purely instrumental - as an action at a particular time. An example may be provided by online players who, at a specific time and in different parts of the world, join the game, participate in auctions, contests, etc. *Kairochora* is a formula of temporary immersion in a global virtual network. Children at a certain point of time become users of artificial space generated by electronic media and information technologies. The

effect of such operation is a continually expanding increase in communication opportunities and a transformation of the communication behaviour from traditional into new, spontaneous, intuitive and improvisational (Samborska 2007, p. 264). *Kairotopos* is a specific time (understood as the best time for the existence of something) and a specific space (as a proper place for the existence of something). In other words - the right time and place. With regard to children, it is an area of activity in the physical world, but also the area of volitional action - evaluations, decisions and choices. *Kairotopos* is an activity in terms of skills that go beyond a habit or automatism. The space-time variants understood in this way become a benchmark for the distinguished research category of the world of life. Identification of a child's experiences placed among them reveals a source of inspiration, provocation and development (Dolata et al. 2004, pp. 39 - 40).

3. CHILD'S EXPERIENCE OF REALITY

Experiencing something is a form of knowledge, exploration, which is a thorough examination and taking a closer look at something. Child and space relationships are described in the literature in terms of variously understood experience (Tuan 1987). There are two essential aspects of a child being in the space (or with the space): one is associated with movement (faster) and mobility with respect thereto, the other with penetrating it with eyes (with the possibility of intense improvement by optical prosthesis - glasses, cameras, camcorders). In addition to motion and perception, as the main factors of space exploration, also the body, which is one of the first means of overcoming the space, should be mentioned. It should be noted that today the nature of these three factors is changing; all of them are subject to constant upgrades, and each of the elements impacts others in terms of the transductive relation (Kita 2003, p. 58). The nature of these changes likewise the child-space relations caused by them are so different, when compared to those established for centuries, that we can call it a change in the paradigm within it, a mutation of the mode and way of the child being in the world (Kita 2003, p. 59). There is a shift from mobility and attitudes related to it to non-mobility, to placing as if "beside" the space which the child is with (sometimes) rather than being in it.

When placing the child in the space, an attention is also drawn to the biological and social experiencing the space by the child in question. The contemporary space is not subject to simple categorization; it is rather placed "between" many parameters of the cultural reality, without being clearly assigned to any of them. This demonstrates both its variability and vitality. Its hybrid character entitles to mention "the transition" space, spatial interface, non-place or being less in the world than outside the world (Kita 2003, pp. 91 - 92). Created artificial space is defined as the simulation space or hyperspace (Baudrillard 2005, p. 7). While participating within it, subject is placed in the "ecstasy of communication" that does not allow to experience the reality in the traditional manner, that is personal, but always through the simulacrum. With respect to the multidimensional media coverage processes taking place "between spaces," in fact, the classical space of reality changes, media-covered space is formed, which becomes of the mental nature, because it is associated with sensors, with being specifically felt by the entity. It is a new spatial quality manifesting itself under influence of the medium, which is a creator of new values, a place for transformation and transfer of various orders: technical, cultural and mental (Kita 2003, p. 43). Multiplying the overlapping spaces creates a variation of this system, and the basis of its dynamic whole is said to be interactions taking place in the very system. But we still consider it an experience, though not treated in terms of empirics. It is rather an experience that comes within the sphere of mentality. The child is immersed in a created space, taking its meanings of shift specifics. In this way he or she receives a new area of experience, and a new level of the development and formation of meanings and sense.

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We can witness a change in the relationship of the child and space. It mainly concerns the area of "settling," being rooted in the space and moving from place to place. It is experiencing the space that is being transformed: physical, sensory and intellectual (Zeidler-Janiszewska 1999, pp. 313 - 320). Children, when remaining stationary, move in the space through technological inventions and they do it by "jumps;" they do not maintain the continuity between one place and another, between the starting and destination point in the space travel. They are led by curiosity to know the world and what is hidden in another place, and by the novelty of all that is there. In this respect, the perceiving the space as a place, and not as an extension, becomes very characteristic. Thus, various forms of experiencing allow to identify ways of being in space with space. They make it possible to determine its media – covered substitute, paying the role of the lens, which shows the overall transformation of space and relationships that the child falls in with it. Children's experiences indicate moving away from the way of being with space and in space - in motion, towards its perception, vision. The changes are moving in the direction from the physical space to media – covered overview, from the extension to the place, from moving in the space to thinking about it (Kita 2003, pp. 74 - 81). We also see changes in the parameters of experiencing the space (motion, overview, thinking), where the movement loses justification. This experience of reality (the new, disembodied, mediated) points to the tangential contiguity of near and far, internal and external, subject and object (Chyła 1998, p. 67).

Experiencing multiple realities, what is natural and artificial, is not made in the simple accumulation of previously acquired skills of experiencing, of being in them. As a result of the on-going convergence of media and emerging successive "extension" in this area, there are changes within the known practices to learn about the world (Samborska 2009, pp. 55 - 64). In the new socio-cultural reality, which arises mainly due to the rapid development of information technology (electronics, information technology, telecommunications) there is a change in the nature of communication between people and culture spaces, creating new quality within this area. The resulting new "form" is not the result of a merger, but is similar to the combination of technology, and thus a transformation of existing forms and creating new ones. Formed in this way media communication systems are characterized by enormous complexity and unpredictability. They also imply a permanent and unlimited novelty of situations within which the child can be found. The researchers stress their particular impact on the imagination that becomes the basis for building identities in a globalizing world (Appadurai 2005, pp. 12 - 22).

Assuming that anything within the limits of reasonable understanding and biological adaptation is "natural," it can be also assumed that new technologies are another step in the evolution of the human capacity to adapt to technical inventions. With the dissemination of innovations and inventions, the new skills that will allow the use of these inventions and their potential possibilities must be developed and disseminated. Thus, the impact of innovation on the human mind becomes a very important issue. What is the impact of the dissemination of new systems of representation or symbols on the functioning of mind? According to J. Bruner's concept and the research of cognitive psychology, a child does not really learn what his mental activity refers to, but rather intellectual way of dealing with the subject of cognition. In the relation with the real and artificial world, a cognitive change will be "saved" in the scheme activated in the context of searching that is self - initiated. This means that the meanings will be constructed by the child on their own. A seemingly passive behaviour of children (as consumers and media users) stands for an inside activity, reflection, consideration, comparison and evaluation. In the terminology of J. Piaget, in this moment we are dealing with "internal action" - a constructive and productive activity. It is closely related to the "external action". In the language of the social interactions theory children have their own intentions, the subject of their interest. They

guide them in the process of thinking, language and action, with the use of symbols and symbolic forms of expression. They need to understand and use the language, its general principles, forms of expression, and to understand codification. In contact with the content offered by new media, they need to understand what appears as a text and image, that is to read for themselves, and partly also to decode their meaning. In this situation, they are doing an interpretation. They are - to put it in the classic anthropological perspective – in a hermeneutic situation, likewise the text interpreter or translator. In this sense, today's children are independent personalities; they are the carriers of culture and those who have some knowledge in this field. In this context, they bring an added value into life - this is a new situation for all participants of inculturation processes, socialization and education. These phenomena put a childhood in a new light.

4. CHILD'S LIVING SPACE VERSUS PEDAGOGY

The categories of "living space" and "learning space" are very important in the pedagogy. Child's experience of the world in a dynamic area of life can be an invaluable source of knowledge about himself, his living space and learning space. The learning process is regarded as the most important factor in child's development. In this context the term "learning" shall be understood as the acquisition and restructure of cognitive, social and practical experiences, and consequently constructing or deconstructing the knowledge about himself and his relations with the world (Uszyńska-Jarmoc 2009, p. 123.) The aspects of learning as: being, contexts, conditions, mechanisms and indicators examined from the child's perspective, are part of the knowledge which comes directly from the same source and allow to go beyond the information obtained in clinical psychology (Uszyńska-Jarmoc 2009, pp. 123 - 124). This kind of knowledge allows to complete the functioning image of the child and childhood and it can be helpful in establishing the teacher's own educational philosophy, and in improving the quality of educational offers. Such knowledge should be the basis for the design of educational situations and teaching. It is knowledge about how children perceive and understand their own living space, which is the source of their experiences that are learning materials to know themselves and the world. This research approach recognizes the reality of the child's world as a result of interpretation processes. The research placed within the category of living space conceived as a space for development as a whole, reveal new methodological possibilities expanding the field of recognition and the range of understanding the child's space of life and development. The term "development space" should be associated with the concept of dynamic systems. Kurt Lewin introduced the concept of human's space life to the psychology and described it as the whole of dynamic relationships between the forces acting in and outside the unit, in the environment to which it is included in an active way (Izdebska 2009, p. 139). In the space of development, according to Lev S. Vygotsky's concept and formulated by him law of developing from the "exteriorization" to the "interiorization" (Schaffer 2005, p. 227), special significance should be assigned to people remaining in immediate environment of the child. These persons fall into a variety of interactions with the child, they become mediators between him and the environment. From the child's perspective, his living space (development space) is essentially a combination (fusion) of physical space - the one where the child lives and grows, with a social space. On one hand, it is arranged and filled with objects, on the other - it is accessed and "equipped" with the meanings attached to it by other people. A child going into a physical space - the material part of the environment, also enters the mental space shaped by awareness of people from the immediate surrounding (significant people) - their thoughts, experiences, relationships, behaviour and symbolic values they believe in. In other words, when going into the physical world, he also enters the mental reality of significant people (parents, tutors) and mixes with

the configurations of their energy - beliefs, principles, prejudices and ways of expressing themselves. These are the foundations of his new experiences.

Child's living space, including states of affairs, objectives, goals, aspirations and behaviour, must therefore be regarded as a "development space," which includes two subsystems: the physical environment which is the child's contact with objects, and the social environment which is the child's contact with people, especially those significant for him. From an early age, he learns the characteristics of different spaces - discovers their dimensions, specifics, properties; he learns how to navigate in them. He, actually, lives and grows at the intersection of the various spaces of diverse nature; social, moral and emotional meaning. Joint spaces of his life are characterized by great diversity and complexity. Their dynamics reveals within the structure variability, but also within the saturation of stimuli, influences and interactions that lead to a steady expansion of the daily space of child's life. This space is constantly determined by emerging, within it, new sources of experience and by the type of social interactions (Izdebska. 2009, p 9). Involving a few-year-old in the multiplicity and diversity of the living space (Samborska 2010, p. 19) (physical, social, temporal, symbolic, psychological, moral, transcendental, IT) implies a cognitive change. It makes the analysis and interpretation of perception, evaluation and interpretation of the surrounding world, to consider the child's point of view – to look from the child's perspective on the surrounding reality (the real and the created one). This kind of knowledge must be built with the participation of children who are the only true experts in terms of revealing the importance of the world.

Changes within the child's space of life, dictated by the enormous transformations on a global scale, include all specific joint spaces. Networking of the modern world (information, transport) causes the penetration of cultural patterns at the global level. As a result, each of the cultures is characterized by openness to novelty and mixing the lack of borders on a global level. This is mainly due to new technologies that help to lose the ability to distinguish what is known and strange. Most of things are determined transculturally, and the changes are visible at the social and collective level, and are related to an individual identity. Transculture in this sense means opening of the entity towards proposed diversity, instead of bringing cultural diversity to the phenomenon of global homogenization. This is possible by building a new type of diversity of the cross-cultural networks, which always have both common and different features (Kita 2003, p. 118).

4. CONCLUSION

In conclusion, it should be noted that under the influence of new technologies, the characteristics of time and space is changing. The parameters related to them constantly change and transform. Close space and being located in it are abandoned in favour of the transit environment that is characterized by a lot of constantly travelled trajectory. As a result of shrinking space and loss of distance, the presence of "here and now" becomes questionable as opposed to "being there" here and now. Thus, new-media contexts of fulfilling the relations between people, do not allow a classical understanding of contemporary space as a human natural physical environment (Kita 2003, p. 27). Such a significant change in experiencing time and spatial quality (more mentally and less physically) and representation created on their basis, has an impact on the child's behaviour. The change involves multi-level transformations and creates a new type of arrangement, in which there is a possibility of coexistence of different forms and levels among one reality, which is the multiplicity of worlds the child lives in. In such conditions, the "space of transition" the child has to deal with at the magic moment of being simultaneously here and there, appears important. Inter-space becomes a border shared between two systems, it is a place of information exchange between systems and it

provides a sort of bridge between the child and the medium. Therefore, it places the child in a new quality of space - non-places formed at the time of application and mixing of different spatial forms. The whole – due to interactions – becomes dynamic, but located "between" many beings, phenomena, and finally, the worlds.

The complexity and multidimensionality of experiencing the situation in the world of life also determines the educational potential. Understanding education as an intentional process of shaping the personality implies clear understanding of an education reality. It shall be a natural consequence of education understood in such way, and simultaneously implicated in the relationship of the subjective world of life with personal and collective identity. As indicated above, the contemporary child's world of life extends to the plurality of space - real, virtual and extended. For education science, it shall be particularly important to discover the conditions for transforming the structure and dynamics of the space where a today's child lives. Discovering joint space of life is related to exploring the relation of the subjective world of life with personal and collective identity. Transformation of the space is in fact a movement of the location of person / people in the material and social dimension being in the relationship of coexistence from the entity's perspective. This living space understood as a kind of join spaces of being in the world is experienced by the subject located in it "here" and "now." Intentional process of personality shaping does not take place in a vacuum. It is connected to creating the conditions of meeting specific educational objectives. This must be preceded by discovering and verifying the conditions of transforming the structure and dynamics of space, where the processes of development and social change take place.

Research in the category of a child's "living space" open up new perspectives on methods of working with a child, learning about how children understand themselves; allow to know the child's tendency to go beyond what he or she has, knows, understands, who he or she is, and also shows the complexity of motivation of child's targeted actions. This kind of knowledge showing the sources of the task motivation, deriving from the recognition of children's preferences, power, the scope of responsibility for themselves (if they want to work, with whom, on what, where and why) will contribute to a better selection of educational contents (Waloszek 2005, pp. 100 -101; Uszyńska-Jarmoc 2009, p. 125) and more broadly - to build a learning space.

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**MOTIVATIONAL AND PERSONALITY STRUCTURES REQUIRED
BY AN EFFICIENT DIDACTIC ACTIVITY**

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Abstract

The dynamics of personality are variously conceived but, in the end, the most important theories concentrate on the nature of human motivation, considered to be the force that energizes and directs the human behavior. In this context, the work motivation is very likely the most important aspect in having an occupation that allows for economic autonomy. But work has different meanings and values for different people, and the individual's self-concept about work and work attributes will influence his/her selection of a vocation.

The paper presents an applied analysis of concordance between the fulfillment of the work-related expectations and the level of motivation, as a support of teaching proficiency. The study, including 150 secondary-school teachers, explores the essence of work values involved in a successful or unsuccessful didactic career, and relates them to some personality traits. The analysis of this motivational structure and identification of personality characteristics associated to high levels of it represent an aid to clarifying individual's goals and to determining the psychological appropriateness of a type of future training or employment.

Key words: *motivation in teaching career, work values, didactical career-related expectations, personality trait*

1. INTRODUCTION

Ones of the fundamental requirements for establishing maturity during the adult years are achieving independence and responsibility, that's equivalent to being able to economically sustain one's own life, and accepting the support and care of others, such as family and friends. Work is the most common factor in the lives of adults, its social meaning identifying a person as an adult, and thus because through work individuals are recognized in that they are needed by others and are a part of society. Work is the element that holds the pieces of life together and if for most of the 20th century it was judged successful if it brought material things, in present the benchmark of success was gradually evaluated by criteria involving quality of work, the effect of the work on self-fulfillment, and freedom relating to the job. Professional satisfaction is associated with opportunity to share in decision making, to use your own judgments, to be allowed to accept problem-solving challenges independently. Having a sense of self-respect, opportunity to perform in challenging significant work and achieve personal growth, is basic to satisfaction (Jones, Garrison & Morgan, 1985).

In relationship with the personality structure, although not only, work has different meanings and values for different people. It may be a source of prestige and recognition, an opportunity for service, a basis for a sense of usefulness or worth, a source of creative expression, a means of satisfying a need

for achievement, or a way of earning a living. Beyond economic functions, work structures time, provides a context for relating to other people, and offers an escape from boredom. The individual's self-concept will influence his selection of a profession, vocational values being extremely important not only in this option, but also its stability. As a particular case of motivation, the vocational choice is the result of an entire crystallization period of personality, when the formulation of ideas about work is related to self-concept. E.g. Greenhaus's studies (in Jones, Garrison & Morgan, 1985) showed that high self-esteem individuals tend to consider their own needs and relevant aspects in their satisfaction with their occupational choice, while those with low self-esteem tend to look toward external cues (hours, pay, conditions. Kohn (1980), writing about job complexity and adult personality, suggests that among 50 dimensions of occupation, the complexity of work is the single most pervasive and important element for individuals' psychological functioning.

In the field of various professions, the teaching career is and will be a very special one, education being one of the greatest social services provided by teachers. Teacher plays a vital role in the development of human being because what children learn and experience during their school years can shape their views of themselves and the world, and affect later success or failure in their personal lives.

2. THEORETICAL FRAMEWORK

2.1. Motivational structure and work values

Campbell and Pritchard (in Locke & Latham, 1990) define motivation as a set of independent / dependent variable relationships that explain the direction, amplitude, and persistence of an individual's behavior, holding constant the effects of aptitude, skill, and understanding of the task, and the constraints operating in the environment. The motivational explanatory assumptions of the most influential theories of personality fall within three main types: tension-reduction, effectiveness, force-for-growth.

Two of the most significant characteristics of personality are its dynamic, that explain how it works, and its determinants, that refers to the forces that shape it. Consequently, two characteristics can be distinguished in the individuals' observable actions:

- "goal-oriented", which refers to the orientation of action to purposes, to achieving results, and which communicates something about a person's motives, intentions, and interests;
- "style", that reflects mainly the characteristic manner in which the action is carried out, every intentional act being performed in a variety of ways without altering its efficiency in achieving the intended goal; styles are considered as expression of the inner motivational state, Allport and Vernon discovering that action styles could represent actual personality traits, stable across time and situation.

The dynamics of personality are variously conceived but, in the end, the most important theories concentrate on the nature of human motivation considered to be: the force that energizes and directs the human behavior, the distribution of this force within the individual, and the manner in which this force is set in motion and controlled. Motivation can be expressed directly in a person's actions, or also (whether because of internal conflict or external constraints) in the blocking of such behavioral expression and the consequent selection of substitute activities which conceal the fundamental motive or goal. In conclusion, motivation can be seen as an inner force that drives individuals to attain personal and organizational goals.

In the motivational structure, work motivation refers at the sets of attitudes determined by personal characteristics - intelligence, needs, aptitudes, skills, expectations and interests in work values, but it is also determined by social factors - educational resources, job opportunities, cultural patterns. Work motivation gives employees the initiative to want to perform well, keeps them interested in their work, and make them feel valuable. A strong and well defined motivation is supported by traits related to personality stability. A. Maslow explained work motivation focusing on the needs of workers (The Hierarchy of Needs Theory); F. Herzberg considered it to be determined by the fulfillment of needs or, contrary, by the avoidance of negative factors (The Dual-Factor Theory of Motivation); D. McClelland referred to this motivation as a need for achievement and /or need for affiliation and power (The Achievement Theory); V. Vroom saw work motivation as a set of secondary goals that people expect to realize, a goal may being a means toward achieving another goal, rather than an end in itself (The Expectancy Theory).

Work values are occupational characteristics /attributes that people may seek or avoid, like or dislike, prefer or not: interesting work, opportunity to use your mind, work results that you can see, opportunities to develop skills, good pay, friendly / helpful coworkers etc. Eccles and Wigfield (1992) realized a more subtle analysis of work values, sharing them in some categories:

- intrinsic values that refer to the interest and enjoyment one gets from carrying out a given task;
- utility values that refer to how a task will be useful to an individual in the future;
- attainment values that refer to the subjective importance of doing well on the task;
- costs that refer to what the individual must sacrifice for his achievements and the efforts required to do this.

Work values are believed to play a vital role in career decision-making, helping the individual to select a satisfying occupational goal and to chart a career path, and to account for a significant portion of job satisfaction. Related to interests, but different in being the qualities sought, rather than the activities or objects which embody them, they are thus more fundamental. The identification of work values and their hierarchy, significantly helps with the clarifying of the occupational goals and interests, and determines the choice of a type of future training or employment.

2.1. Personality structure and work satisfaction

Personality is the assembly of the stable psychological structures and processes that organize human experience, and shape a person's actions and reactions to his environment. The stimuli in the environment represent powerful determinants of thoughts, feelings, and actions, but the reference to only environmental influences is insufficient to fully explain the behavior. This because there is another major class of determinants, one which resides within the human being. Personality psychology gives much attention to the inner stable attributes, as traits or dispositions, that guide one's actions, each person developing a unique psychological structure that will make him/her react somewhat differently from every other person in the same situation. Psychological processes cannot be observed directly, so that they can be deduced by observing behavioral reactions, and by logically conceiving what might be the underlying system (of structures and processes) which would explain the behavior.

Human personality develops during the life in relation to the statuses and roles which one performs, and this development engenders sets of general competences that are abilities that guarantee the

performance of all activities. The teacher's personality develops throughout entire didactical career by acquiring and enhancing series of specific traits that underlie his specific competences, his abilities that guarantee the proficiency of the didactical activity: scientific / professional, pedagogical, methodological, psychological, social, communicational, managerial, and intercultural competences. All of them were formed on the basis of the complex aggregates of personality traits, and in turn they influence the whole structure of the personality. But there is also a permanent training process of teaching personnel, and it aims a continuous development of all the components of his personality:

- mental processes: cognitive, affective, volitive;
- mental activities: language / communication, learning, work, creativity;
- general psychic characteristics: temper, aptitudes, character;
- mental conditions that stimulate and facilitate the development of mental processes, mental activities and general psychic characteristics: motivation; skills; attentiveness.

In a large numbers of studies, teacher's personality is analyzed in terms of Self, understood as the unifying core of it and including profound and subtle subcomponents: Self-assertion, self-government, Self-determination, Self-esteem, Self-denial, Self-control. All these characteristics express a complex and potent personality, a personality able to influence others and to serve a model for them.

There are also numerous researches that suggest an association between personality, satisfaction and professional effectiveness, speaking about the role of positive affectivity, and negative affectivity. Differences in affectivity likely impact how individuals will perceive the actual content of work and some objective job circumstances like pay and working conditions, thus affecting their satisfaction in that job (Mount, Ilies & Johnson, 2006). Individuals high in positive affectivity are more prone to be satisfied in most dimensions of their life, including their job. Those high in negative affectivity are more prone to experience less job satisfaction. The Dispositional Theory suggests that people have innate dispositions that cause them to have tendencies toward a certain level of satisfaction, regardless of one's job, offering an explanation for the tendencies of work satisfaction to be stable over time and across careers. According with this theory, Core Self-evaluations Model (Judge, Locke & Durham, 1997) proposes four core self-evaluations that determine one's disposition towards job satisfaction:

- self-esteem, as the value one places on his/her self;
- general self-efficacy, as the belief in one's own competence;
- locus of control, as believing one has control over her\his own life, as opposed to outside forces having control;
- neuroticism, as an internal tendency to experience negative emotional states.

Core Self-evaluations Model states that higher levels of self-esteem and general self-efficacy and an internal locus of control, concomitant with lower levels of neuroticism lead to higher work satisfaction. The work satisfaction is an indicator of professional efficiency, but also of life satisfaction.

3. SPECIFIC RESEARCH

3.1. Motivational structure as a support for an efficient didactic activity

The first part of applied exploration is based on the evidence of connection between the fulfillment of the work attributes valorized by teachers in didactic activity, and the level and quality of their motivation. According to this reality, three instrumental objectives were formulated:

- analysis of the work-related values as a hierarchically arranged set of values;
- analysis of relations between the significance of the work values, and the level and quality of motivation ;
- analysis of concordance between the fulfillment of the work-related expectations and a positive motivation, as a support of teaching proficiency.

The research sample included 150 secondary school teachers, age 30 to 45, and the subjects were evaluated with:

- “Work Values Inventory”, author Super (1973), test that measures the relative importance of 15 work values thought to be most important in career choice and development: altruism, esthetics, creativity, intellectual stimulation, professional achievement, independence, prestige, management, income, professional security, surroundings, supervisory relations, co-workers, lifestyle, and variety. Each of the 15 scales is composed of three items, with answers on a five-point scale from “unimportant” (0 points) to “very important” (5 points):
- Job satisfaction questionnaire, author Iosif (1996), a test with 15 items, each rated on a five-point scale from “unimportant” (0 p.) to “very important” (5 p.). The items correspond to the 15 work values, and estimate the level of satisfaction for each of them.

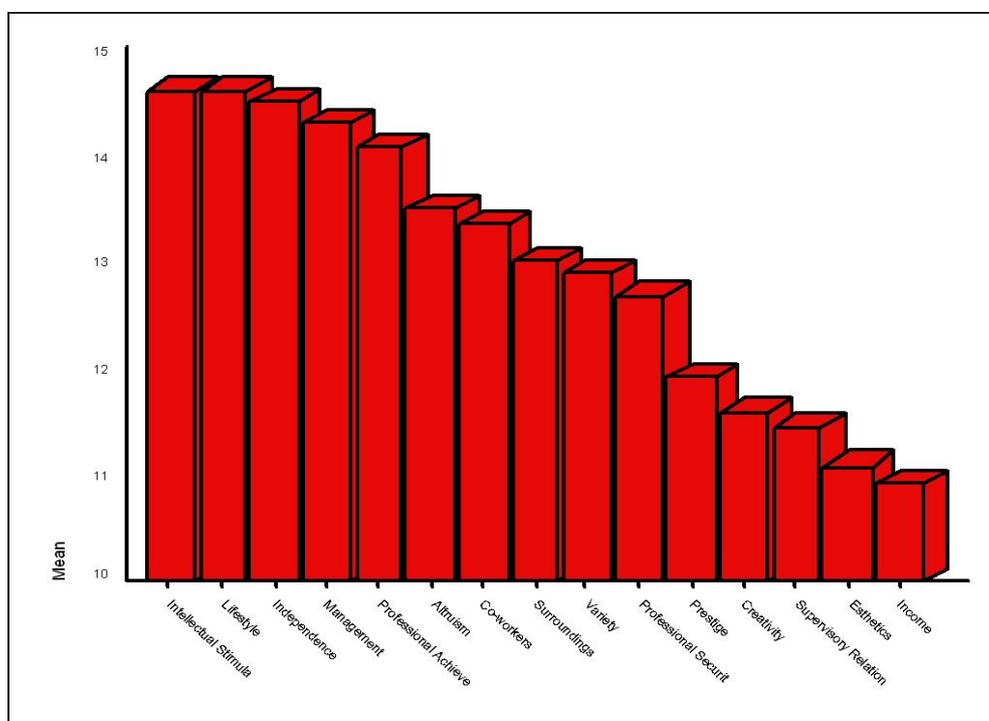


Diagram 1. Hierarchy of teachers' work-related expectations (150 subjects)

According with individuals' expectances, among the most important values implied in teaching career are included intellectual stimulation and lifestyle, followed by independence, management, and professional achievement. The lowest level is reached by income, esthetics (aspects of work), supervisory relations, creativity, and prestige.

An estimate of the general motivation in the practiced career indicates, as expected, that among the 150 subjects there are intense motivated teachers for their activity, but also less motivated ones.

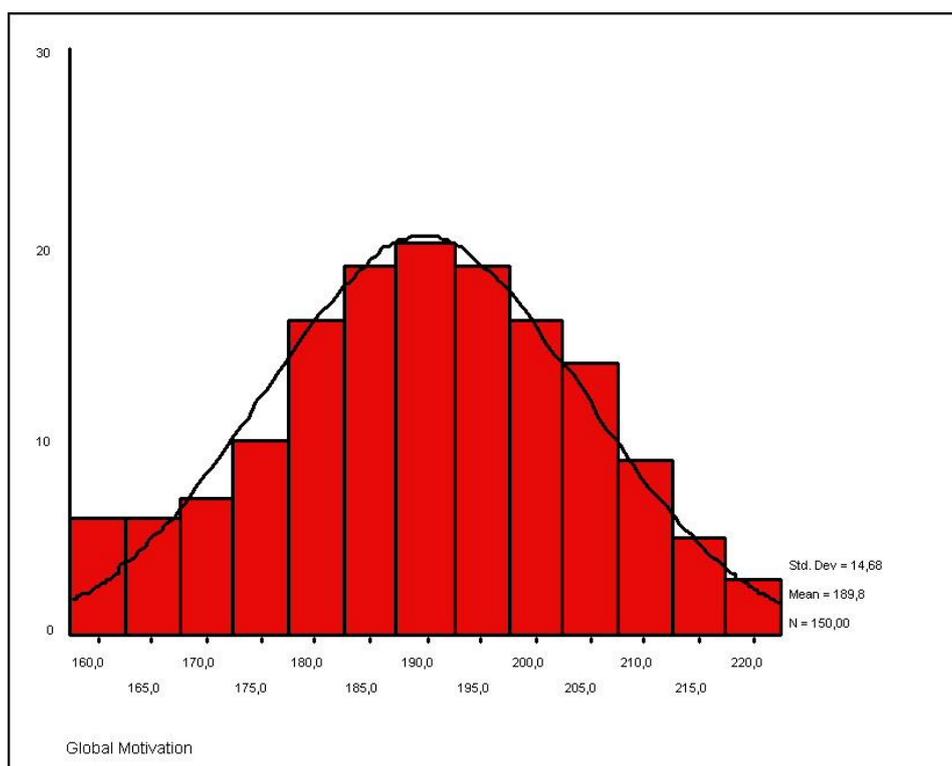


Diagram 2. General level of motivation for teaching career (150 subjects)

For a more elaborate analysis of motivation, were determined the connections between its level and quality, and job satisfaction based on the fulfillment of valued aspects in didactical career, all these in relation with teaching proficiency. To study all these aspects, from the initial group of 150 teachers were selected, for a comparative analysis, the highly motivated 50 teachers and the lowermost motivated 50 teachers.

Statistical processing of data indicates that there are significant differences between the intensity of motivations in the two groups (points out by the Independent Samples t-Test). First of all these differences emphasize the degree of involvement in work, but equally they show the level of satisfaction felt in daily teaching activity and, finally, the effectiveness of the whole teacher's didactic activity.

Table 1. Means of global motivation for own career in the two groups of teachers

	Motivational level	N	Mean	Std. Deviation	Std. Error Mean
Global motivation	high motivation	50	180,28	9,47	1,34
	low motivation	50	204,50	3,03	0,43

Table 2. Comparison between means – significance of difference (Independent Samples t-Test)

Global Motivation	t-test for Equality of Means						
	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Eq. Var. assumed	-17,234	98	0,000	-24,22	1,41	-27,01	-21,43
	-17,234	58,908	0,000	-24,22	1,41	-27,03	-21,41
Eq. v. not assume							

A comparative analysis between the most important personal values of didactic career for highly motivated teachers and unmotivated ones, points out not only the differences in aspirations and wishes, but also the degree of their fulfillment and the measure of professional satisfaction, implicitly.

Table 3. The hierarchy of work attributes valorized by teachers in their jobs - comparison between highly and lowermost motivated teachers

Rank Order	Highly motivated teachers	Lowly motivated teachers
1	Intellectual stimulation	Lifestyle
2	Professional achievement	Income
3	Independence	Intellectual stimulation
4	Management	Professional security
5	Lifestyle	Surroundings
6	Variety	Co-workers
7	Altruism	Independence
8	Prestige	Variety
9	Surroundings	Prestige
10	Creativity	Management
11	Professional security	Professional achievement

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12	Co-workers	Altruism
13	Income	Supervisory relations
14	Supervisory relations	Creativity
15	Esthetics	Esthetics

The results show that highly motivated teachers consider as very important, and also fulfilled, aspects belonging to an intrinsic motivation, five of the first six chosen values being the internal ones: intellectual stimulation, professional achievement, independence, management, and variety. The subjects in this category believe that teaching career offers them:

- a continuous improvement and enrichment of previously acquired knowledge, according to a work that is not routine and keeps them learning and mentally sharp (Intellectual stimulation);
- possibility to know by own results when they've done good things and to have feelings of success and accomplishment in their work (Professional achievement);
- possibility to be their own boss and to decide themselves how to get their tasks done without having to report this to someone on a regular basis (Independence);
- capacity to give directions and instructions to others being obeyed by them (Management);
- a not routine activity and which allows various and lack of monotony tasks (Variety);
- possibility to have enough time for family, friends and for leisure activities (Lifestyle).

Concomitantly with these options, motivated teachers declare themselves satisfied with their daily activity and with career choice. It is obvious that their intrinsic motivation supports work satisfaction, because when individuals are intrinsically motivated they engage in an activity being interested in and enjoying it.

The lowermost motivated teachers consider partial or total unfulfilled their professional expectances, and they declare themselves unsatisfied with didactical career. Especially, they appreciate some external characteristics of work, five of the first six chosen values belonging to an extrinsic motivation: lifestyle, income, professional security, surroundings, and co-workers. The subjects associate their job with:

- insufficient time for personal life, family, friends and leisure activities (Lifestyle);
- total insufficient payment to live really well, in comfort or even to cover the daily needs (Income);
- just a relative professional security because of fear about getting fired (Professional security);
- enough comfortable work conditions that allow working in a clean and comfortable setting (Surroundings);
- workmates that are not so friendly, helpful, trustworthy, and enjoyable to work with (Co-workers);
- satisfactory opportunities for improvement of previously acquired knowledge and personnel progress (Intellectual stimulation).

The lowermost motivated teachers engage in activities for instrumental or other reasons, such as receiving a reward. But the gratification of these reasons is beyond their control, depending on others, and this is the source of their dissatisfaction.

3.2. Personality characteristics associated to types of motivation for didactic career

The second part of the research is based on theoretical assumptions that different levels of career motivation are closely related to specific personality traits, individuals' satisfaction or dissatisfaction in work being a result of external factors, but also of the personality traits.

The instrumental objective was to identify the personality traits associated to high/low levels of motivation for didactic activity, as recommended or non-recommended traits to choose teaching career.

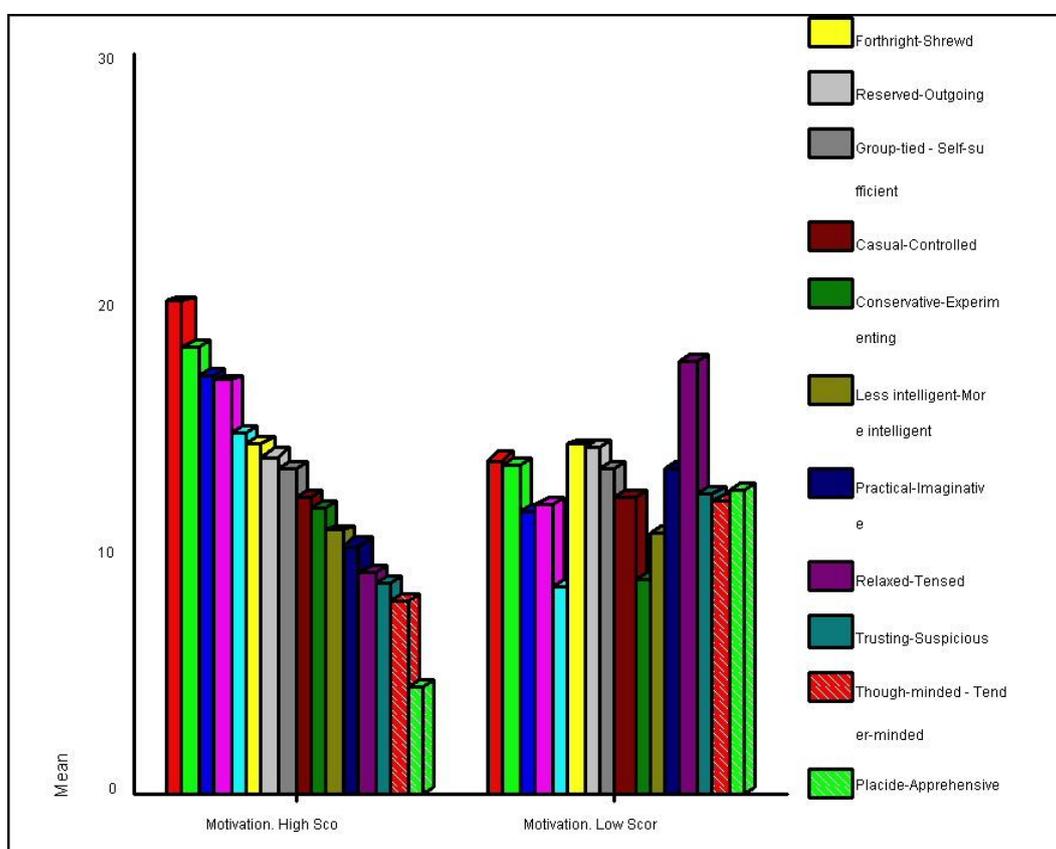


Diagram 3. Hierarchy of personality traits. Comparison higher - lowermost motivated teachers

The research samples are the same two groups - one of the highly motivated 50 teachers and another of the lowermost motivated 50 teachers.

The instrument used for evaluation was “Cattell’s 16 Personality Factors Questionnaire”, form adapted by Conn and Riecke (1994), which aims to measure 16 primary personality traits: Factor A (Warmth), Factor B (Intelligence), Factor C (Emotional stability), Factor E (Dominance), Factor F (Liveliness),

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Factor G (Conscientiousness), Factor H (Introversion/Extraversion), Factor I (Sensitivity), Factor L (Vigilance), Factor M (Abstractedness), Factor N (Privateness), Factor O (Neuroticism), Factor Q1 (Neophilia), Factor Q2 (Self-sufficiency), Factor Q3 (Perfectionism), Factor Q4 (Stress). The personality profile in these primary personality factors is not just a descriptive account of the surface traits but an analysis in terms of the underlying personality structures. Such a profile tells how a person is adjusting, in terms of the personality processes which are common to all men.

As expected, statistical data analysis points out significant differences regarding the dominant personality traits between the two groups, generated by intensity level of some personality traits.

Independent Samples t-Test indicated traits with an equal level of manifestation in both groups, and traits between there are statistical significance differences.

Table 4. Comparison between means – significance of difference by Independent Samples t-Test
(SPSS.doc - Selection)

Trait		Mean	t-test for Equality of Means			
			Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Warmth	Group 1	13,74	,111	-,34	-,76	7,92E-02
	Group 2	14,08	,111	-,34	-,76	7,98E-02
Intelligence	Group 1	10,64	,936	2,00E-02	-,48	,52
	Group 2	10,62	,936	2,00E-02	-,48	,52
Emotion.stability	Group 1	18,12	,000	4,66	4,07	5,25
	Group 2	13,46	,000	4,66	4,07	5,25
Dominance	Group 1	14,60	,000	6,10	5,52	6,68
	Group 2	8,50	,000	6,10	5,52	6,68
Liveliness	Group 1	17,04	,000	5,58	5,00	6,16
	Group 2	11,46	,000	5,58	5,00	6,16
Concientiousness	Group 1	16,82	,000	5,10	4,18	6,02
	Group 2	11,72	,000	5,10	4,18	6,02
Introv./Extrav.	Group 1	19,98	,000	6,36	4,90	7,82
	Group 2	13,62	,000	6,36	4,90	7,82
Sensitivity	Group 1	7,90	,000	-4,04	-4,73	-3,35
	Group 2	11,94	,000	-4,04	-4,74	-3,34
Vigilance	Group 1	8,64	,000	-3,52	-4,03	-3,01

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	Group 2	12,16	,000	-3,52	-4,03	-3,01
Abstractedness	Group 1	10,08	,000	-3,22	-4,17	-2,27
	Group 2	13,30	,000	-3,22	-4,17	-2,27
Privateness	Group 1	14,14	,897	4,00E-02	-,57	,65
	Group 2	14,10	,897	4,00E-02	-,58	,65
Neuroticism	Group 1	4,36	,000	-7,98	-9,33	-6,63
	Group 2	12,34	,000	-7,98	-9,34	-6,62
Neophilia	Group 1	11,60	,000	2,86	2,10	3,62
	Group 2	8,74	,000	2,86	2,09	3,63
Self-sufficiency	Group 1	9,26	,002	-2,24	-,78	,78
	Group 2	13,34	,002	-2,24	-,78	,78
Perfectionism	Group 1	12,10	,787	1,00E-01	-,63	,83
	Group 2	11,02	,787	1,00E-01	-,64	,84
Stress	Group 1	9,06	,000	,000	-8,96	-7,88
	Group 2	17,48	,000	,000	-8,96	-7,88

Legend: Group 1=highly motivated teachers; Group 2=lowermost motivated teachers

Both categories of subjects have a few personality traits comparable in intensity of expression, all of the teachers showing about equally: general mental capacities and abstract-thinking (Factor: Intelligence); participation, attention to other, kindness (F: Warmth); a shrewd and lucid behavior, discretion on personal life (F: Privateness): control, self-discipline, organizational capacity, social-adequate behavior (F: Perfectionism).

In psychological structure of the two groups there are numerous differences that can be used to describe two distinct personality profiles, one for the highly motivated teachers, and another for the lowermost motivated teacher.

A highly motivated teacher is: socially bold, uninhibited, with a responsive behavior (F: Extraversion); adaptive, mature, emotionally calm and stable, realistic, attentive to people (F: Emotional stability); enthusiastic, spontaneous, expressive (F: Liveliness); conscientious, responsible, persevering, moralistic, staid (F: Conscientiousness); forceful, assertive, competitive, stubborn (F: Dominance); independent, autonomous, resourceful, with a strong Ego-feeling (F: Self-sufficiency); flexible and open to change, analytic, experimental and innovative (F: Neophilia); practical, solution oriented, steady (F: Abstractedness); tranquil, patient, calm, satisfied (F: Stress); trusting, unsuspecting, participative, adaptable (F: Vigilance); emotionally mature, independent minded, realistic, intuitive (F: Sensitivity); Self-assured, unworried, secure, calm, stress-resistant (F: Neuroticism). The factors are described in descending order of scores, and the general image is that of a balanced personality.

A low motivated teacher is: high-tensioned, over-active, frustrated (F: Stress); withdrawn, quite distant, hesitant, intimidated (F: Introversion); emotionally less stable, easily upset, sensitive,

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changeable (F: Emotional stability); practical, prosaic, less imaginative (F: Abstractedness); apprehensive, worried, anxious, insecure (F: Neuroticism); serious, suspicious, prudent, oppositional (F: Vigilance); impatient, dependent, sentimental (F: Sensitivity); expedient, self indulgent, apathetic, indolent (F: Conscientiousness); taciturn, reticent (F: Liveliness); conservative, conventional (F: Neophilia); compromising (F: Dominance); in search of social approval (F: Self-sufficiency). The factors are also described in descending order of scores, and the general image indicates a personality with some stressed/ unbalanced components.

Based on connection between the level of motivation for didactical career and professional effectiveness, on the hand, and on connection between motivation and personality structure, on the other hand, can say that the personality of highly motivated teacher contains desirable traits for those who want to pursue a teaching career. Similarly, some traits of unmotivated teachers are predictable for an unsatisfied didactical career, being inadequate for it.

CONCLUSIONS

There is a double connection between work value that are important for different individuals and their motivation for a professional activity or other: a quantitative connection which expresses itself into the intensity level of motivation, and a qualitative one which expresses in the prevailing type of motivation, intrinsic or extrinsic. Certainly, present psychological theories traits more nuanced the extrinsic motivation differentiating into it some subcomponents such as utility values, and emphasizing its role in supporting intrinsic motivation. At the same time, a theory as Vroom's Expectancy Theory convince as about the importance of secondary goals in determining individual's actions. However, in relation to job satisfaction, an essential factor associated to professional effectiveness, the distinction between intrinsic - extrinsic motivation is a fundamentally one. Related to internal values and innate dispositions, intrinsic motivation is under a greater control of individual himself, who engages in an activity being interested in it, enjoying it, and feeling satisfaction to do it. Extrinsic motivation finds satisfaction in relation to external values, whose fulfillment depends on others, being less controlled by individual. Their non-fulfillment beyond the control of individual influences the level of satisfaction and reduces the efficiency of his/her activity. Without minimize the importance of extrinsic motivation, this is a pleading for an intrinsic motivation in choosing a profession, a pleading for the concordance between the individual's inner values and the profession needs, especially when is chosen a teaching career.

Professional efficiency in teaching career is determined by external factors of the entire social context, but equally depends on internal factors that belong to the personality system and which may or may not harmonize with the requirements of the didactical activity. The role of personality system in achieving professional efficiency points not only towards the necessity of the psychological selection for the candidates in a didactical career, but also impose a continuous personal development of teachers through regular training sessions. Didactic career must be positioned between individual's real capacities and social demands.

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**EFFICIENT USE OF THE FINANCING OF THE EUROPEAN SOCIAL FUND
FOR THE REGIONAL DEVELOPMENT IN LATVIA**

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Abstract

Financing of the EU funds ensures regional development but the distribution of funding among the regions is uneven. The funding of ESF to the welfare sector used in Latvia and its regions from 2004-2012 differs, as a result of which the economically strongest regions have been able to use the largest part of ESF funding, which has facilitated its development and created rather large development differences with the other regions of Latvia. The currently developed system of introducing the EU funds does not enhance the efficient use of ESF financing, nor does it provide the possibility to allocate a particular part of the EU funds financing to solving regional social and economic problems. To reduce the development differences in the planning regions, it is necessary to improve the present system of the use of the EU funds financing observing the priorities of the planning regions. Applying the hierarchical analysis method, the experts' opinion about the factors affecting the efficient use of ESF financing and the need for improving this use and the most efficient model were clarified. The potential model for the efficient use of ESF financing is the author's offered model – allocation and acquisition of ESF financing according to the regions' developed model, where ESF financing is allocated and acquired at the regional level and its comprising municipalities, based on particular criteria – the number of employed and unemployed, the level of unemployment, the number of enterprises and other selected socio-economic indicators.

Key words: *Structural Funds, European Social Fund, financing, hierarchical analysis, efficient use, region*

1. INTRODUCTION

From 2004 till mid-2007 the economy of Latvia experienced fast development, which to some extent was affected by accessing the European Union (EU), which provided access to the EU funds, thus significant investment in the development of the country that has also affected the issues of social security and employment. In 2008-2009 the world went through the largest recession since World War II, which had an impact on all the countries of the world. Due to it, the EU has also experienced an economic downfall which hardly hit Latvia and its regions causing a significant reduction in the economic activity, increase of the unemployment level and the risk of social stratification. In the second half of 2008 when the rates of the economic downfall increased, the sufficient amount of income for covering the basic needs becomes the main issue in Latvia along with providing an appropriate state support for the inhabitants who are facing a disadvantageous life situation.

EU funds are the main financial EU instrument that supports less favourable regions and unsecured groups to reduce social and economic differences between the Member States and their regions. Thus, Latvia receives financing as a country not as separate its regions, which is practised in most of the EU Member States.

In Latvia, already at the beginning of the 2004-2006 planning period different opinions about the efficient use of ESF financing were expressed. As J.Brizga (2005) indicates, this funding undoubtedly is a big contribution and can significantly facilitate the development of our country. It enhances hope that Latvia will be approaching the welfare level of Western European countries faster than it has up to now. The only EU funds related concerns can be expressed with two questions: first, will Latvia be able and manage to acquire the financial support allocated to it? Or, the skills and capacity of the responsible authorities and project applicants to ensure timely receiving of the funds into the hands of project implementers is doubted. Second, will the distribution of the EU funds financing be open and fair? In other words, there is suspicion about the potential corruption and non-transparent redistribution of financing, and it is grounded in the recent history of Latvia when foreign funding was wasted. These are very essential questions. However, they stay within one paradigm – with the statement that financing of the EU funds is a positive contribution to Latvia. Should the leading motif of the acquisition of Structural Funds be “faster and more”? (Brizga J., 2007).

Current research reveals that the capability and interest of the regions of Latvia to acquire the EU funds financing are not equal. The “response” of the regional economy to the efficiency of the invested resources is not identical either because there are different economic advantages and interests of economic development between the regions (Saktiņa, 2008). Territories that have attracted larger financing of the EU funds have developed faster, whereas the improvement of the social and economic indicators of other regions is slow, their differences continue to increase.

Statistical data of different institutions approve that sources of the EU funds have satisfied the needs of the capital Riga and the territories included in its surroundings. However, S.Keišs and a group of authors question the view that the largest emphasis in the EU funds distribution is placed on the fact that Riga, its surroundings and the large development centres will ensure high growth rates of the gross domestic product (GDP) also in the future, which will enhance the consistent increase of the welfare level of the population of entire Latvia up to the level of average prosperous inhabitants of the EU Member States. The group of researchers continue to test this hypothesis also in 2008 performing monitoring observations and carrying out research about the unused opportunities in the regional development of the country (Keišs, Tīlta, Zariņa, Jesemčika, Medne, Kazinovskis, Balode, 2008).

In the research of the Latvian State Institute of Agrarian Economics and the World Bank, Riga region and Zemgale were marked as the largest beneficiaries of the funding from the EU and state support programmes for agriculture and rural development (Saktiņa, Meyers, 2005). Slightly later, it was also concluded by “PKC” Ltd. (2005), indicating that the distribution of the EU funds between the various territorial parts of the country and the regions is not even. A significantly smaller amount of funding reaches those territories of the country where the indicators of the economic activity, employment and welfare level are the worst, e.g. in Latgale region or in territories that are further from the capital or the main transport highways.

In her work professor V.Bikse (2009) notes that resources of the EU funds are used inefficiently in Latvia, that the use of the EU funds resources lacks clear vision what the significant national problems to which the EU funds resources should be allocated are. Often resources are not allocated for solving issues important for Latvia but are fragmented between different ministries for funding implementation of similar or very close activities. There is no business-like cooperation between ministries to commonly allocate resources for solving problems important for Latvia. The funding is distributed between different state institutions to implement similar measures, but the problem solution at the ministry level is missing.

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The need for attracting the EU funds, the effectiveness of the acquisition of the available financing in Latvia has been researched by E.Dubra (2006, 2009), I.Slavinska (2005), R.Zvirgzdiņa (2007), I.Pilvere (2007), V.Tetere, I.Pilvere (2007), V.Tetere (2009), I.Vaidere (2006), S.Blumberga (2010), I.Haite (2010), A.Vītola, M.Šenfelde (2010) a.o. The issues related with attracting and introducing the EU funds are researched also in other EU Member States, e.g. in Poland - P.Mickiewicz (2007), J. Sienkiewicz (2009), A.Zawojcka (2009), M.Marciniak (2009) A. Mickiewicz, B. Mickiewicz (2010) a.o., in Lithuania - W.H.Meyers, N.Kazlauskienė, R.Naujokienė, I.Kriščiukaitienė (2006), E.Ribašauskienė, E.Kairyte, W.H.Meyers (2007), in Hungary - T.Mizik (2007), in Ireland - P.Clinch, F.Convery, B.Walsh (2002), P.Sweeney (2008).

When evaluating the significance of funds in stimulating economics, the common opinion of researchers is positive. However, the analysis of the research and data about the acquisition of the EU funds does not reveal a distinct correlation between the welfare and development indicators of particular territories and the respective allocation of funds. Researchers admit that acquisition of the EU funds has not significantly effectively affected economic growth and ensured its sustainability, they recommend balancing the distribution of the EU funds financing between regions, as well as indicate that it were necessary to perform significant changes in the EU funds management system introducing regional operation programmes of the EU funds.

For Latvia to start acquiring the resources of the EU funds from May 1, 2004, an institutional system for the EU funds management, monitoring and control was developed. The EU funds management is preparation, harmonization and approval of all the necessary planning documents, development of the EU funds management system, selection and approval of the EU funds projects, implementation, control, audit, monitoring and assessment of the EU funds projects. In the planning period of 2007-2013 in Latvia the concentrated model was selected for managing the EU Structural Funds and Cohesion Fund. The institutional framework of this model includes succession elements that have been successful in introducing the EU Structural Funds and also elaborates the most significant drawbacks of the management system of the planning period 2004-2006. It anticipates the succession of the Structural Funds management system of the planning period 2004-2006, maintaining one leading authority, one payment authority, one steering committee.

In difference from the planning period 2004-2006, in the planning period of 2007-2013 in total in Latvia the number of intermediary institutions and their status were optimised refusing from two-level intermediary institutions but in the case of European Social Fund (ESF), based on the increase of the number of ESF measures to be introduced, the number of ESF administrating institutions has increased (from 9 to 12), which to some extent makes the work of project implementers and the reporting process more difficult because different requirements in project implementation are possible in every of the administering institutions. The potential solutions could be: to establish one ESF administering authority or the EU funds management system should be delegated to one institution that would work based on one-stop agency principle. In the result of joining administering institutions, the time spent on signing agreements, considering payment orders, control and declaration preparation would be reduced, as well as duplication of functions between the responsible authority and the cooperation institution would be reduced, thus ministries would not deal with untypical functions. Likewise, the administrative apparatus would be reduced, which would give the opportunity to use the capacity of human resources involved in administration more efficiently and to ensure more effective coordination of the administration process. In the result of joining the risk of double financing when project implementers simultaneously submit the EU funds project applications to different institutions about one and the same performed work, received services and deliveries would be precluded.

The fact that the present number of institutions administering the EU funds has to be decreased is admitted also by other EU Member States. For example, in Estonia, where at present 11 introduction agencies administer the EU funds and five more ministries are involved in the EU funds management system, the possibility to absolutely refuse from involving industry ministries in the EU funds management system and keep 6 introduction agencies concentrating management functions in the leading authority – Ministry of Finance is being evaluated. Whereas in France, where there are 26 regions and respectively 26 programs the introduction of which in each region is ensured by several agencies, it is suggested to establish a one-stop agency for the beneficiaries of the EU funds financing.

Therefore the **research goal** has been defined – to evaluate the effectiveness of ESF administration in Latvia and its regions. To attain the goal, the **objectives** that were set are:

1. to find out experts' opinion about the factors affecting the efficient use (allocation and acquisition) of ESF financing;
2. to assess the effectiveness of ESF administration and to offer solutions for improving the effectiveness of introducing ESF measures in Latvia and its regions.

1.1. Materials and Methods

The normative documents regulating the use of the EU funds, laws of the Republic of Latvia, regulations of the CM, strategic and planning documents, research of Latvian and foreign scientists, information published by the Central Statistics Bureau (CSB) and State Employment Agency (SEA), information of the ministries of the Republic of Latvia and institutions involved in ESF funds administration, outcome data on ESF introduction at the EU, national and regional level were used to study the theme.

The main research methods applied: monographic descriptive method, method of checking content correspondence between documents of different levels, analysis and synthesis methods to research problem elements and to synthesize interconnections or to define regularities, obtaining and storing facts, statistics a.o. data, specific information about the measures implemented by the EU Structural Funds. To elaborate the efficient use of ESF financing a survey of experts was performed, applying the hierarchical analysis method.

2. ESF ADMINISTRATION EFFECTIVENESS IN LATVIA AND ITS REGIONS

The ESF financing acquired in the period from 2004 till 2010 in the welfare sector is LVL 113.4 ths., the largest part of which has been attracted by economically strongest Riga region – LVL 37.7 ths. or 33% of the total acquired ESF financing in the welfare sector. The second largest ESF financing is attracted in Latgale, where the ESF financing invested in regional development is LVL 28.4 ths. or 25%, which approves that part of the allocated resources is used according to the general aim of the EU funds – to prevent regional and social inequality, and in this case the largest part is received by one of the economically weakest regions in Latvia – Latgale. However, fast improvement of socio-economic indicators cannot be observed in Latgale and it is still in the last place among regions according to socio-economic indicators.

The most important areas of investing ESF financing are developing and encouraging active labour market policy; facilitating equal opportunities in the labour market; improvement of the training, education and consultation system to facilitate lifelong learning; development of qualified, educated and capable to adapt labour force; enhancing creativity and the ability to adapt; facilitating favourable

environment for entrepreneurship and new work places, as well as increasing employee competitiveness.

To evaluate the most effective type of allocating and acquisition of ESF financing, eight experts were selected. In their daily professional activities they are or are not related with the EU funds, including ESF:

- two of the experts are employees of the EU funds administering authorities,
- one expert is a specialist in the planning region information centre, manages and coordinates projects and the use of the EU funds financing for regional development;
- one expert is a municipality employee whose daily work is related with introducing the municipality implemented EU fund, including the ESF supported projects, and the attainment of project goals;
- two experts are entrepreneurs, one of whom actively got involved in the use of the EU financing already from 2009 but the other has not been related with the use of the EU funds financing yet, nor plans to attract the EU funds financing for business development in the nearest future;
- two experts are inhabitants of Latvia, one of whom is directly related with project implementers who purchase agricultural technique with ERDF support, but the other has been unemployed since July 2011 and, to increase the qualification level, has expressed the wish to participate in ESF financed training for the unemployed and the job seekers.

To organise and process experts' evaluations, the hierarchical analysis method of American economist T. Saaty (1980) is used. With the help of this method problem elements have been grouped, splitting the problem in simple parts. The experts compared the simplified parts in pairs and determined the significance degree of the problem elements based on the hierarchy principle.

To obtain the coordinate of the priority vector, the clusters of eigenvector have been calculated and coordinates of priority vectors have been obtained. According to Saaty (Saaty, 1980), geometrical average has been used for normalization, which is calculated by multiplying the elements of each row and finding the n-degree root, where 'n' is the number of elements. The obtained clusters of figures are normalized by dividing each figure with the total of all figures. The algorithms for calculating the elements of 3x3 matrix will be used as an example.

Table 1. Stages in the calculation of priority vectors

Given matrix	$A_1 \begin{matrix} \frac{W_1}{W_1} & \frac{W_1}{W_2} & \frac{W_1}{W_3} \\ \frac{W_1}{W_1} & \frac{W_2}{W_2} & \frac{W_3}{W_3} \end{matrix}$	$A_2 \begin{matrix} \frac{W_2}{W_1} & \frac{W_2}{W_2} & \frac{W_2}{W_3} \\ \frac{W_1}{W_1} & \frac{W_2}{W_2} & \frac{W_3}{W_3} \end{matrix}$	$A_3 \begin{matrix} \frac{W_3}{W_1} & \frac{W_3}{W_2} & \frac{W_3}{W_3} \\ \frac{W_1}{W_1} & \frac{W_2}{W_2} & \frac{W_3}{W_3} \end{matrix}$
Calculation eigenvector of	$\sqrt[3]{\frac{W_1}{W_1} \times \frac{W_1}{W_2} \times \frac{W_1}{W_3}} = a_1$	$\sqrt[3]{\frac{W_2}{W_1} \times \frac{W_2}{W_2} \times \frac{W_2}{W_3}} = a_2$	$\sqrt[3]{\frac{W_3}{W_1} \times \frac{W_3}{W_2} \times \frac{W_3}{W_3}} = a_3$
Calculation priority vector of	$\frac{a_1}{S} = x_1$	$\frac{a_2}{S} = x_2$	$\frac{a_3}{S} = x_3$

Source: *author's designed based on Saati, 1980*

A – assessment criterion or the comparable element,

W – assessment intensity,

A – geometrical evaluation of the comparable elements,

x – priority vector of the comparable elements,

$$S = \sum_{i=1}^3 a_i \quad (1.)$$

In the next hierarchical analysis stage the logical coordination of the obtained results was checked, which allows evaluating the correctness of the independently performed comparison. Additional intermediate calculations should be performed for determining the coordination relationship:

$$\lambda_{\max} = \left(\frac{W_1}{W_1} + \frac{W_2}{W_1} + \frac{W_3}{W_1} \right) * x_1 + \left(\frac{W_1}{W_2} + \frac{W_2}{W_2} + \frac{W_3}{W_2} \right) * x_2 + \left(\frac{W_1}{W_3} + \frac{W_2}{W_3} + \frac{W_3}{W_3} \right) * x_3,$$

where λ_{\max} - special coefficient.

$$SI = \frac{\lambda_{\max} - n}{n - 1}, \text{kur} \quad (2.)$$

SI – coordination index, n- number of comparable elements

SA=SI/SV, where

SA – coordination relationship, SV- probable coordination which depends on the size of the matrix (see Table 2).

Table 2. Average coordination evaluations

Matrix size (number of comparable indicators)	1	2	3	4	5	6	7	8	9	10
Probable coordination (SV)	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

To clarify the variation homogeneity of experts' opinions, variation coefficients have been calculated. The following formula was used for the calculations:

$$V = \frac{\sigma}{\bar{x}} * 100 \% \quad (3.)$$

V – variation coefficient

σ – standard deviation

\bar{X} - average value

The hierarchy developed in the research consists of 4 levels:

Level 1 sets the goal – effective use of ESF financing,

Level 2 offers criteria groups whose significance is evaluated by experts,

Level 3 groups types of ESF support. The grouping is based on the logical criteria of the variants of support allocation,

in Level 4 alternatives for the use of ESF financing have been developed and experts have to evaluate them against the criteria of Level 2 and Level 3 groups.

Criteria groups, execution and interpretation of results are based on previous research (Valsts administratīvi..., 1999; Rivža, 1999; Ramute, 2008)

The author's developed alternatives for the use of ESF financing are characterised in Table 3. The offered five alternative models for ESF financing that comprise different opportunities – from the allocation and acquisition of ESF financing at the regional level and acquisition of ESF financing at the entrepreneurs' level and finishing with a complete centralised allocation of ESF financing at the national level.

Table 3. Alternative models for elaborating the effective use of ESF financing

No.	Alternative models	Characterisation
1.	Allocation and acquisition of ESF financing according to the regions' developed model	ESF financing is used (allocation and acquisition) in the regions and in their territories according to particular criteria: 1. number of the employed; 2. number of the unemployed and the unemployment level; 3. number of enterprises; 4. tax revenues; 5. other socio-economic indicators. As provided by the EU and Latvia's planning documents, the priority areas and industries for the use of ESF financing are defined. Based on the assessed criteria, ESF financing is allocated to the present municipalities to level off socio-economic differences.
2.	Acquisition of ESF financing involving entrepreneurs	According to the priority areas for support as determined in the country and based on simplified terms, entrepreneurs receive ESF financing for establishing work places, increasing the employee capacity/competitiveness.
3.	Integrated allocation	Allocation and acquisition of ESF financing is performed partly by the

No.	Alternative models	Characterisation
	and acquisition of ESF financing	defined priority support areas/industries in the country and partly by criteria for the allocation and distribution of financing developed by regions.
4.	Centralised allocation and acquisition of ESF financing	Centralised allocation and acquisition of ESF financing. The number of institutions administering the EU funds is reduced, every EU fund has only one cooperation agency that can simultaneously offer the possibility to equal requirements for project implementers, thus making the project implementation easier.
5.	Maintaining the present situation in the allocation and acquisition of ESF financing	The Ministry of Finance as the leading institution of the EU funds. Priority support areas are divided between particular ministries (responsible institutions); planning the use of the EU funds, document development is at the level of the responsible ministries, each ministry has one or more EU funds cooperation authorities. There are differences between the requirements for the EU funds implementation as determined by the responsible institutions and their supervised cooperation institutions.

Source: *author's research*

Both in the 2004-2006 planning period and the 2007-2013 planning period the goal of the EU funds support is to facilitate faster economic growth of the country and its approaching to the average welfare level in the EU Member States. This goal is measured as a desire to attain the average GDP level per capita of the EU Member States. To attain the goal, investment of the EU funds is planned according to three thematic axes: human resource development and efficient use; increasing competitiveness and movement to knowledge capacity economics; improvement of public services and infrastructure as a precondition for a balanced development of the country and its territory. In the efficient use of ESF financing, the country's interests embrace the total development of the country and the ability to compete globally and to integrate successfully. According to the author, a significant factor in the efficient use of ESF financing is observing different interests, which is the socio-economic basis of Latvia as the common EU region. Experts were offered to evaluate Level 2 hierarchy group, which was divided into the following criteria groups:

- state interests;
- regional interests;
- municipality interests;
- entrepreneurs' interests;
- population interests (Ramute, 2008).

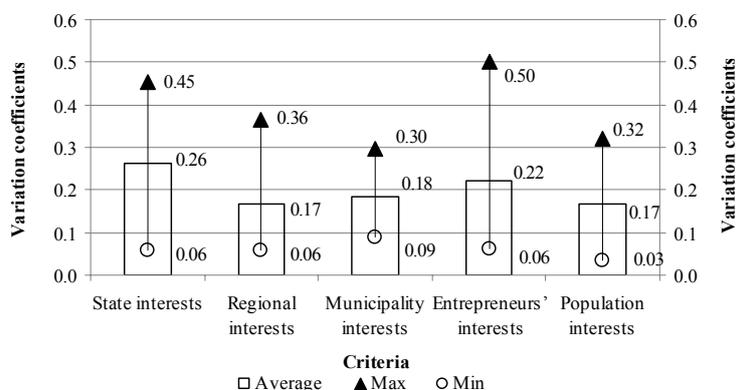


Fig.1. Experts' evaluation mutually comparing Level 2 criteria groups about the efficient use of ESF financing

Source: author's research and construction

Summarising the experts' opinions about the possibilities of the efficient use of ESF financing and mutually comparing different criteria groups (see Fig.1), the experts have assigned the highest value to "State interests" (0.26), which is followed by "Entrepreneurs' interests" (0.22) and "Municipality interests" (0.18). The criteria groups "Regional interests" and "Population interests" have the lowest evaluation (0.17).

Calculating the group variation coefficients for criteria groups, "Entrepreneurs' interests" has the highest variation coefficient (70%), which is followed by "State interests" with 65%, "Population interests" with 61% and "Regional interests" with 60%. The high variation coefficients indicate to the differences in the experts' opinions. A homogeneous experts' evaluation is observed regarding the need for the use of the EU funds according to the "Municipality interests" (37%).

At Level 3 of hierarchical analysis criteria groups have been made based on the variation logical criteria, which are determined for ESF financed measures in the EU funds planning documents, as well as based on the author's experience gained in the EU funds administering institutions from 2003, including in ESF introduction and monitoring. The main goals of the EU social policy – to enhance employment, to facilitate the growing work efficiency and quality, to make the labour market more accessible taking into consideration the competence required for the job, to pay more attention to lifelong education and training, to ensure effective social policy appropriate for European competitiveness, to enhance equal opportunities (Latvijas nacionālā..., 2005). The basis of the EU social progress policy is made by free movement of labour force, social cohesion, ESF and human resources development, employment policy, education, training and youth problems, living and working conditions. The mentioned goals and their criteria can be used to evaluate the overall functioning of the social and economic system.

The social and economic development of the regions is a part of the country's social and economic development and social policy, therefore it is necessary to ensure the social and economic development according to the country's social and economic development programmes and goals. ESF is an instrument that is applied to the implementation of the state social policy and to the

attainment of socio-economic goals. The author of the present research has included the total of the following criteria groups in the “State interest” at Level 3:

- reaching the average EU level of welfare,
- reducing the unemployment level,
- increasing the employment level,
- balanced regional development,
- increasing the competitiveness of human resources.

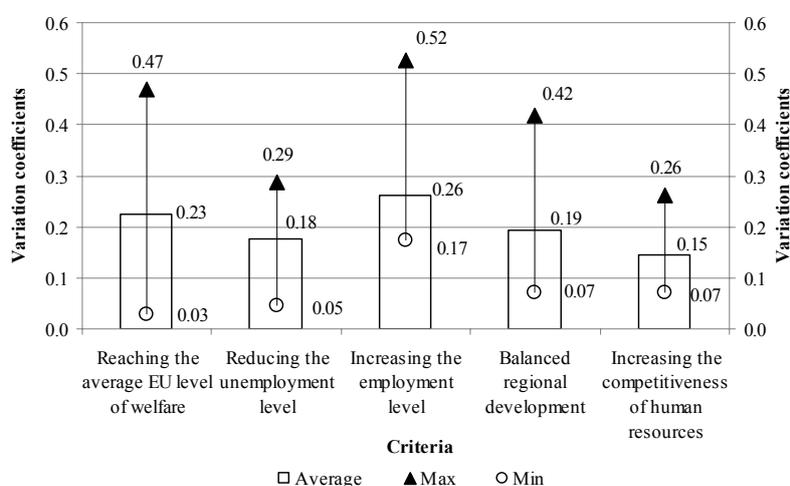


Fig.2. Experts’ evaluation about the efficient use of ESF financing alternatives based on state interests

Source: author’s research and construction

In the state interest group experts have mentioned increasing the employment level as the most significant criterion (see Fig. 2) for the efficient use of ESF financing, with the highest priority vector (0.26), which is followed by reaching the average welfare level of the EU Member States (0.23), balanced regional development (0.19) and reducing the unemployment level, with the priority vector 0.18. Increasing the competitiveness of human resources has the lowest experts’ evaluation (0.15).

Calculating the variation coefficients of experts’ opinions about the alternatives of the efficient use of ESF financing according to state interests presents the largest variety of experts’ opinions about reaching the average welfare level of the EU Member States and balanced regional development – 70% and 68% respectively, which indicates to high dispersion around the mean indicator. Experts’ opinions are more unequivocal about increasing the employment level (53%). The lowest variation coefficients are observed for the criteria: reducing the unemployment level (45%) and increasing the competitiveness of human resources (42%), which in this case indicates to slight differences in experts’ opinions and low dispersion around the mean indicator.

The EU goal is balanced and sustainable regional development and ESF financial support if it is used purposefully, in a planned manner and efficiently, which is significant for reducing regional differences in Latvia. The uneven regional development in Latvia is influenced by both different resources and insufficient national policy for reducing socio-economic differences. The Law on Regional Development provides that a balanced and sustainable development of the country should be facilitated and ensured, observing the peculiarities and opportunities of the entire country and separate its territories, unfavourable differences between them should be reduced, as well as the features and the development potential characteristic for the nature and culture environment of each territory should be maintained and developed (Reģionālās attīstības likums, 2002). The amendments to the Law on Regional Development adopted on June 22, 2006 by the Saeima stipulate that a planning region is a derived public person with its own autonomous competence and a particular place in the state administration system, as well as an instrument to ensure coordination of the development priorities of industries and regions – coordination commission of the planning region, which consists of the representatives of the planning region and the respective ministries, as well as representatives from the private and the public sector. Strengthening of the status of the planning region is a significant precondition to strengthen their role in the acquisition of the EU funds, including ESF. Based on the above described, the author considers regional interests to be one of the most significant criteria groups for the efficient use of ESF financing. In the group of regional interests the author has selected the following criteria:

- balanced development of the territory;
- socio-economic development of the region;
- maintaining and attracting qualified human resources;
- attracting additional funding;
- increasing/strengthening the capacity of regional institutions.

Evaluating the efficient use of ESF financing according to “Regional interests” (see Fig. 3), experts have evaluated maintaining and attracting qualified human resources as the most significant criterion for regional development with the highest priority vector (0.26). The three criteria that follow have similar priority vector values, where socio-economic development is 0.21, attracting additional funding – 0.20 and balanced development of the territory – 0.19. The lowest priority vector and experts’ evaluation is observed for increasing/strengthening the capacity of regional institutions (0.14).

Calculating and comparing the variation coefficients of experts’ opinions (see Fig. 3), balanced development of the territory and attracting additional funding have the highest (55%) variation coefficient while socio-economic development of the region has the lowest (43%). The variation coefficient for the criterion increasing/strengthening of the capacity of regional institutions is 48% and for maintaining and attracting qualified human resources is 45%, which in overall assessment of variation coefficients indicates to the homogeneity of experts’ opinions.

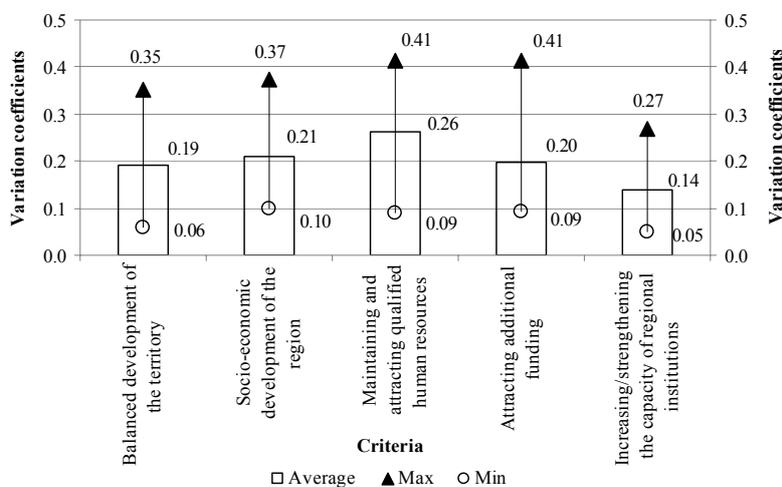


Fig.3. Experts' evaluation about the efficient use of ESF financing alternatives based on regional interests

Source: author's research and construction

Municipality level is also one of the state administration levels, where both economic and social issues can be most effectively resolved because it is possible to analyse the situation in each municipality. It has to be taken into consideration that there is a sufficient number of instruments of influence in municipality institutions the use of which can affect the situation in the desirable direction. Action policy documents can serve most effectively as such instruments, in the framework of which programmes, plans and projects can be developed. Municipality development plans are planning documents of the local level, the development of which is coordinated with the planning documents at the regional and at the national level. The development plans designed by municipalities are based on a comprehensive present situation analysis of every municipality, their strategic choice is based on the characteristic statistical indicators, comparison of the present situation with other municipalities, current development tendencies, geographical territory, as well as taking into consideration the available resources. The present state budget subsidy to municipalities and population tax revenue do not provide the necessary financial resources for the municipality development and thus the attraction of the EU funds, including ESF, in the municipality offers the opportunity to resolve the socio-economic problems determined in the municipality development plans.

In the municipality criteria group the author has included the following criteria (see Fig. 4):

- socio-economic development of the municipality;
- providing work places;
- attracting additional funding;
- population employment;
- development of social services.

Evaluating the efficient use of ESF financing in the criteria group “Municipality interests” (see Fig. 4), the experts have assigned the highest evaluation to population employment (0.29), which is followed by providing work places (0.21), socio-economic development of the municipality (0.20) and attracting additional funding (0.19). Development of social services has the lowest priority vector and experts’ evaluation (0.11).

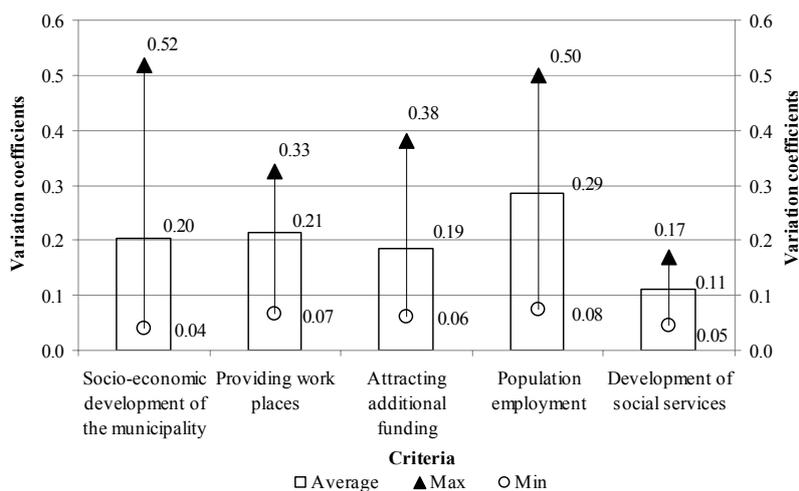


Fig.4. Experts’ evaluation about the efficient use of ESF financing alternatives based on municipality interests

Source: author’s research and construction

The largest differences of experts’ opinions are observed regarding the socio-economic development of municipalities, where the variation coefficient is 70%. The variation coefficient for the criterion ‘Attracting additional funding’ is 61% and population employment is 53%. Providing work places (44%) and development of social services (39%) have the lowest variation coefficients, which indicates to the similarity of experts’ opinions and low dispersion around the mean indicator.

The stability of the business environment and developed entrepreneurship is a significant factor for the territory of every country, region and municipality because it simultaneously provides jobs and tax revenue. Development of enterprises should be related with efficiency, quality, innovations and satisfying client needs, which is possible to be ensured by technology development, increasing productivity, efficient use of nature, human and financial resources, increasing the product quality. Entrepreneurs have ideas for development and have growth opportunities, but the implementation of their ideas are often delayed by the lack of their own capital and additional financial investment is necessary, which could be the EU funds, including ESF financing, which, according to the determined support areas, are meant for entrepreneurs’ support.

In the entrepreneurs’ interest group the author offers the experts to evaluate the following criteria (see Fig.5):

- stability of the business environment;
- attracting additional funding;
- efficient use of labour force;
- establishing work places;
- increasing employee qualification.

The experts' evaluation in the criteria group "Entrepreneurs' interests" (see Fig. 5) is rather similar for all five offered criteria, where the priority vector is between 0.23 and 0.17. The stability of the business environment (0.23) received the highest experts' evaluation, which is followed by the efficient use of labour force (0.22), attracting additional funding (0.20) and increasing employee qualification (0.19). Establishing work places has the lowest priority vector and experts' evaluation (0.17).

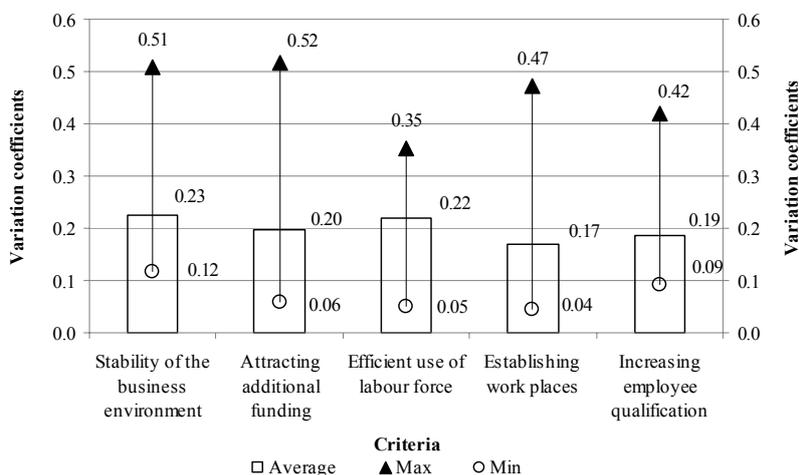


Fig.5. Experts' evaluation about the efficient use of ESF financing alternatives based on entrepreneurs' interests

Source: author's research and construction

Experts' evaluation in the interest group "Entrepreneurs' interests" demonstrates the highest variation coefficient in the establishment of work places – 72%, which is followed by attracting additional funding with 66%, stability of the business environment with 62% and increasing of employee qualification with 59%. Efficient use of labour force has the lowest variation coefficient and the least difference in the experts' opinions (46%).

The quality of population's life to large extent depends on the possibility to realise their economic and social needs. A significant precondition to improve the population's living conditions is to offer people the opportunity to work and receive the deserved remuneration simultaneously also increasing their education, knowledge, competitiveness and social security. The place of residence should not be a reason to subjugate oneself to poverty and risk of social exclusion. At the time when the population

of the country has been influenced by the recession, it is important with the help of the EU funds, including ESF, support to offer the inhabitants the possibilities of work, education and qualification improvement, availability of social services, health care, transportation, which would ensure reducing social risks and would enhance the public activity of the population, involvement in the state and public processes, as well as would enhance employment.

The author offers the experts to evaluate the following criteria in the interest group “Population interests”:

- job opportunities,
- increasing the education level;
- availability of the state offered services;
- development of social services;
- improving living conditions.

According to the experts, ‘job opportunities’ has the highest significance level (0.35) in the criteria group “Population interests” (see Fig. 6). Experts’ evaluation for the criterion ‘increasing the education level’ is 0.20 and for ‘improving living conditions’ – 0.18. The lowest evaluation can be observed for the criteria ‘development of social services’ and ‘availability of state offered services’ – 0.15 and 0.13.

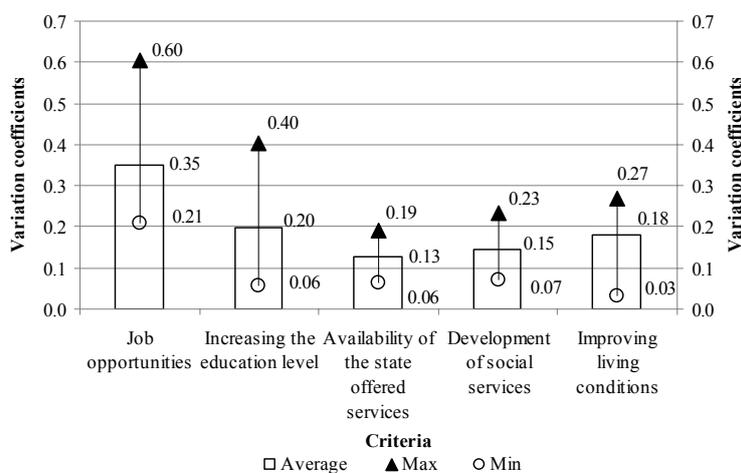


Fig.5. Experts’ evaluation about the efficient use of ESF financing alternatives based on population interests

Source: author’s research and construction

In difference from other considered interest groups, experts’ evaluation about the interest group “Population interests” is rather homogenous and indicates to the uniformity of the experts’ opinion. The lowest variation coefficient of the experts’ opinions - 25% is assigned to the criterion ‘job opportunities’, which is followed by improving the living conditions with 31%. The variation

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coefficient for the criterion 'availability of the state provided services' has 41% and increasing the education level has 46%. The largest differences in the experts' opinions can be observed regarding the development of social services, where the variation coefficient is 51%.

Already from the beginning of the EU funds acquisition in 2004, the statement that the EU funds administration system is heavy and bureaucratic, thus reducing the effectiveness of the EU funds acquisition, including ESF. Compared with the 2004-2006 planning period, regarding the requirements for introducing the EU funds, several improvements have been introduced in the EU funds introduction system of the planning period 2007-2013. To facilitate the acquisition of the EU funds, requirements for the businesspeople have been eased, project implementation has been simplified and the work of authorities involved in the EU funds management has been optimised. Also, the procedure for controlling project implementation sites has been improved, reporting about discrepancies and their recording has been unified, as well as information publicity about the EU funds projects has been ensured. Along with the mentioned initial improvements in the 2007-2013 planning period in the EU funds introduction system, at the end of 2008 the MoF started to work on further simplification of the EU funds introduction system both at the EU and the national level.

At present Latvia does not have a uniform positive definition for simplification within the EU funds context. By attracting the experts of the National Development Plan (NDP), the Ministry of Regional Development and Local Government (RAPLM) and its supervised authority State Regional Development Agency (VRAA) have assessed the problems of the EU funds management system that hamper the successful acquisition of the EU funds both at the level of the EU Member States and at the level of Latvia (RAPLM, 2009). Based on their experience and the one of other institutions, recommendations how to achieve a maximum fast and effective yield of the EU funds by using the available financial resources to facilitate the economics of Latvia were developed. During the evaluation process recommendations to simplify the acquisition of the EU funds at the national level were expressed. They comprise measures aimed at enhancing economics, optimisation of the institutions administering the EU funds and reducing administrative obstacles for the EU funds acquisition. To simplify the acquisition of the EU funds with the goal to facilitate economics, it is offered to reduce the number of the EU funds activities, reviewing the economic benefits the EU funds activities and the need for their implementation. To optimise the EU funds administering institutions reducing the number of institutions involved in the administering of the EU funds is offered, recommending that the assessment of project proposals and monitoring of the implementation are organised in one institution, thus ensuring observing the one-stop agency principle in providing services to the project applicants. To reduce the administrative obstacles of the EU funds acquisition RAPLM offers to accelerate the announcement of the tender and the EU funds acquisition thus precluding approving double criteria.

Whereas in the "Entrepreneurs' Plan for Facilitating Economics 2009" developed by the Chamber of Commerce and Industry of Latvia (LTRK, 2009) one of the goals regarding the system for the EU funds acquisition contains the need to establish an effective, unified, simple and cheap system for the management of the EU Structural Funds and accepting legislation and monitoring their implementation. In both cases it is a matter of simplifying both the legal and the institutional framework, as well as increasing efficiency and reducing the administrative burden.

In the research performed by "GF Konsultācijas", Ltd. "Pre-study on the Possibilities to Simplify the EU Funds Management System" (GF Konsultācijas, 2009) several recommendations speak about the need for as possible harmonised system. It would make the process of the EU funds acquisition simpler and more transparent. The leading institution would need to play the main role in the entire

harmonisation process and also providing measures that would ensure sustainability of the harmonisation results. Research executors express an opinion that a more balanced division between the introducer and the administrator, anticipating larger responsibility and including service quality requirements in standard agreements could raise the quality of services offered to support beneficiaries, as well as could introduce more discipline in the entire EU funds introduction system.

To increase the acquisition of the EU funds and to optimise the EU funds introduction system, the national reform program of Latvia “EU 2020”(EM 2011) developed by the Ministry of Economics (MoE) plans to reduce the number of institutions involved in administering the EU funds to implement the strategy until the end of 2013. Beneficiaries of the EU funds will have to cooperate with maximum 3 agencies. In addition, the beneficiary of the EU funds financing will have unified requirements in administering the EU funds projects, thus easing the project implementation.

At Level 4 of the research the author has determined the alternatives for elaborating the efficient use of ESF financing (see Table 3), whose experts have evaluated against twenty-five Level 3 criteria:

- Alternative 1: Allocation and acquisition of ESF financing according to the regions’ developed model;
- Alternative 2: Acquisition of ESF financing involving entrepreneurs;
- Alternative 3: Integrated allocation and acquisition of ESF financing;
- Alternative 4: Centralised allocation of ESF financing;
- Alternative 5: Maintaining the present situation in the allocation and acquisition of ESF financing.

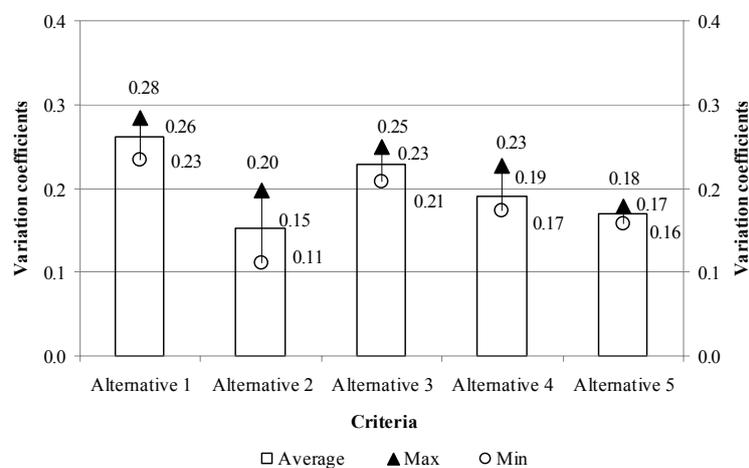


Fig.6. Experts’ evaluation of the alternatives of the efficient use of ESF financing based on the “State interests” group criteria

Source: author’s research and construction

According to the experts’ evaluation, state interests (see Fig. 6) can be best ensured by the alternative model - Allocation and acquisition of ESF financing according to the regions’ developed model (Alternative 1), whose evaluation is 0.26. Acquisition of ESF financing involving entrepreneurs has

received the lowest evaluation (0.15). The other alternatives of the efficient use of ESF financing is evaluated between 0.17 – 0.23. The high values of the variation coefficients of experts' evaluations indicate to the differences in the experts' opinions. Reaching the average welfare level of the EU Member States has the lowest variation coefficient – 78%. The variation coefficient is 80% for increasing the employment level, balanced regional development and reducing the unemployment level, but increasing the competitiveness of human resources has 90%.

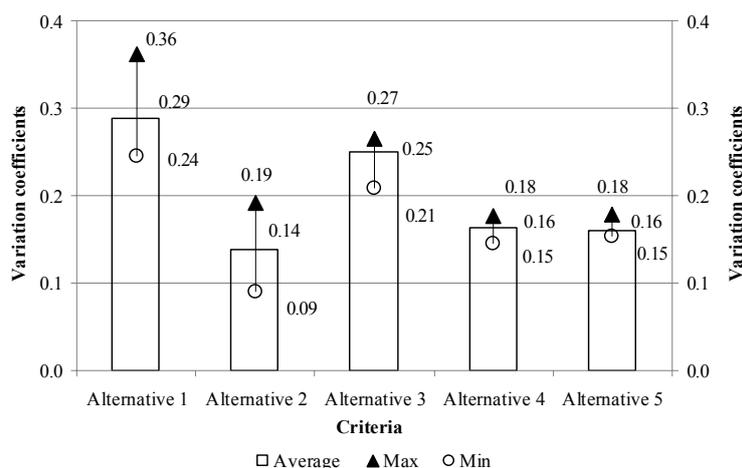


Fig.7. Experts' evaluation of the alternatives of the efficient use of ESF financing based on the "Regional interests" group criteria

Source: author's research and construction

According to the experts, regional interests (see Fig. 7) can also be ensured by using the alternative model – Allocation and acquisition of ESF financing according to the regions' developed model (Alternative 1), as the priority vector is 0.29. Likewise to the state interests' group criteria case, the lowest evaluation is for the Acquisition of ESF financing involving entrepreneurs (0.14). The other alternatives have received evaluations between 0.16 – 0.25. Regional interests criteria are evaluated between 0.24 – 0.36; experts have admitted the socio-economic development of the region as the most significant (0.36) in the introduction model – Allocation and acquisition of ESF financing according to the regions' developed model. The lowest variation coefficient of experts' evaluation – 53% - is also for the socio-economic development of the region while the other variation coefficients of experts' opinions are between 65% and 81%, which indicates to a variety of opinions among the experts.

Evaluating municipality interests (see Fig. 8) experts admitted the Allocation and acquisition of ESF financing according to the regions' developed model (Alternative 1) as the best alternative for the use of ESF financing – evaluation 0.28. Alternative 4 – Centralised allocation of ESF financing - was evaluated as the worst model (0.14). Also in this case the fluctuations of the variation coefficients of the experts' opinions indicate to the differences in opinions. Socio-economic development has the lowest variation coefficient (0.53), which is followed by the development of social services with 60%, the other dispersion indicators fluctuate around the mean value between 79% - 84%.

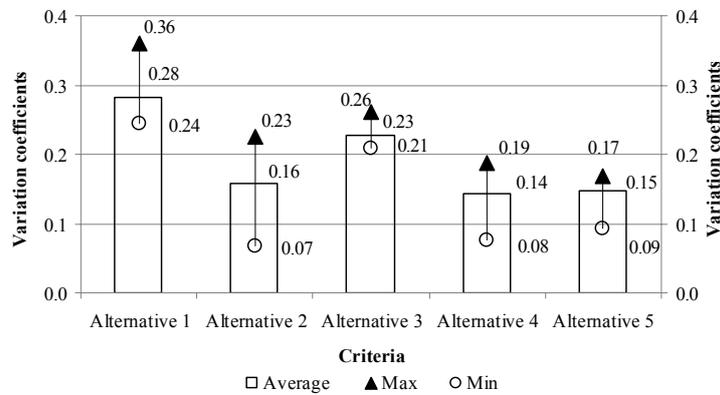


Fig.8. Experts' evaluation of the alternatives of the efficient use of ESF financing based on the "Municipality interests" group criteria

Source: author's research and construction

According to the experts' evaluation, entrepreneurs' interests (see Fig. 9) can be best ensured by the integrated allocation of ESF financing (Alternative 3) and the evaluation is 0.25. Alternative 4 – Centralised allocation of ESF financing (0.15) and Alternative 5 – Maintaining the present situation in the allocation and acquisition of ESF financing (0.16) have the lowest evaluations. The other alternatives of the efficient use of ESF financing are evaluated between 0.21 – 0.23. Variation coefficients of the experts' evaluation are comparatively lower if compared with the previously discussed alternatives and the dispersion of evaluations approves of a slightly larger conformity of experts' opinions. Stability of the business environment has the lowest variation coefficient (44%), which is followed by attracting additional funding (52%); the other dispersion indicators fluctuate around the mean between 60% and 68%.

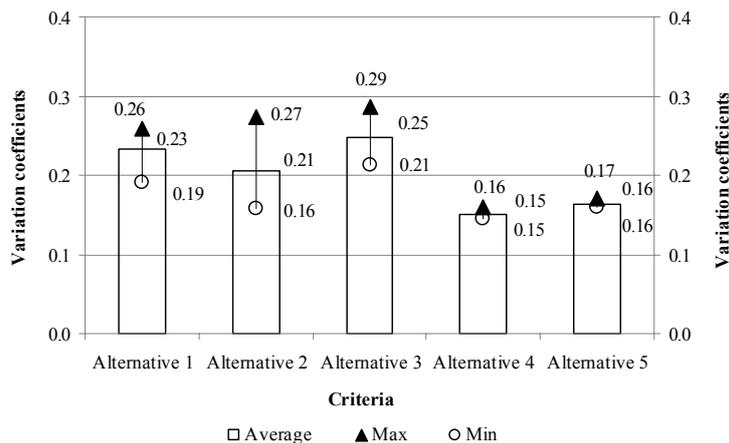


Fig.9. Experts' evaluation of the alternatives of the efficient use of ESF financing based on the "Entrepreneurs' interests" group criteria

Source: author's research and construction

Evaluating the population interests (see Fig. 10), the Allocation and acquisition of ESF financing according to the regions' developed model (Alternative 1) has been admitted the most suitable alternative for the efficient use of ESF financing - the evaluation is 0.27. Likewise the cases with the state interests and regional interests criteria Alternative 2 – Acquisition of ESF financing involving entrepreneurs has the lowest evaluation (0.15). Evaluation of the other alternatives is between 0.16 – 0.23. According to the experts, the variation coefficients have the same lowest value (60%) for the development of the state offered services and the development of social services, the highest variation coefficient and the largest difference in experts' opinions (90%) is attributed to increasing the education level. The dispersion indicators of the variation coefficient for improving living conditions and for job opportunities fluctuate around the mean between 72% - 79%.

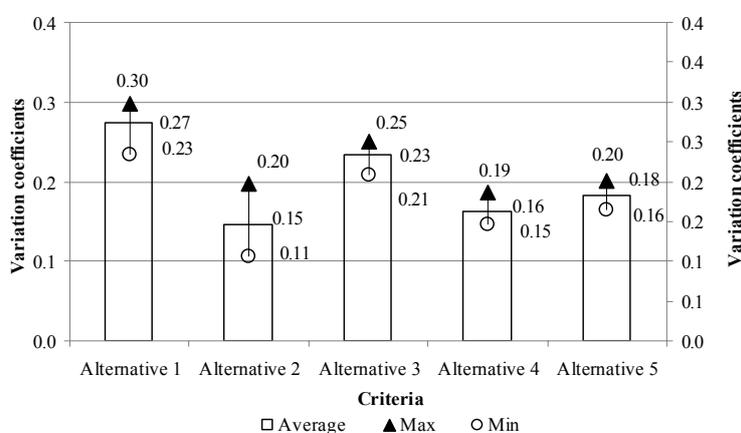


Fig.10. Experts' evaluation of the alternatives of the efficient use of ESF financing based on the "Population interests" group criteria

Source: author's research and construction

Summarising the experts' opinions, the author can make the following conclusions:

- experts have admitted that the efficient use of ESF financing is necessary for Latvia to reach the average level of life of the EU Member States, which requires establishing a stable macroeconomic environment for entrepreneurship, to achieve a balanced social and economic development of the region, including reducing unemployment, which is the main reason of poverty and social exclusion, to increase population education level and competitiveness in the labour market and to ensure sustainable development of the country. To attain the goals of state interests, it is necessary to increase the employment level and competitiveness of human resources;
- to ensure regional interests, maintaining and attracting qualified human resources, attracting additional funding are the most necessary tasks that would allow enhancing the socio-economic development of the region;

- the main interests of municipalities are connected with population employment and providing work places, which would provide a stable, necessary for the development availability of financial resources from the population income tax revenues;
- investing ESF financing in measures that facilitate providing the stability of entrepreneurship is in entrepreneurs' interests;
- interests of the inhabitants are related with job opportunities, which is a significant precondition to improve the living conditions of the population, simultaneously also increasing their education, knowledge, competitiveness and social security;
- maintaining the present situation in the allocation and acquisition of ESF financing, as well as the author's offered alternative model – Centralised allocation of ESF financing – according to experts, have not been of full value and do not enhance the efficient use of ESF financing. Experts admitted that most optimal model of the efficient use of ESF financing would be *Allocation and acquisition of ESF financing according to the regions' developed model*, which would best be able to solve the interests of the state, region, municipality, inhabitants and entrepreneurs.

In total, the hierarchical analysis method offers a convincing answer to the optimisation of the introduction system of the EU funds, including ESF, to accelerate and to use more efficiently the available EU financing. However, it also has to be mentioned that the large difference of experts' opinions indicates that up to now in Latvia there has been observed a large difference of opinions among various society members about the efficient use of the EU, including ESF, financing.

5. CONCLUSIONS

1. The most significant areas of the investment of ESF financing are development and enhancing of active labour market policy, enhancing equal opportunities in the labour market, improvement of the training, education and consultation system for facilitating lifelong learning, development of qualified, educated and able to adapt labour force, facilitating of creativity and the ability to adapt, facilitating the establishment of favourable environment for entrepreneurship and new work places, increasing employee skills.
2. With the help of the hierarchical analysis method experts' opinions about the factors affecting the efficient use of ESF financing have been found and they are as follows:
 - Experts admitted that it is most important to ensure state interests for the efficient use of ESF financing so that ESF financing would be used for increasing the employment level.
 - Socially and economically developed regions facilitate the overall development of the country. Experts admitted that in regional interests the most effective investment of ESF financing is in maintaining and attracting human resources to regions, mentioning the need to attract ESF financing for measures facilitating the socio-economic development of the region as the next one.
 - Socially and economically developed regions are made by developed municipalities and, according to experts, the efficient use of ESF financing for municipalities is mainly associated with the employment of the inhabitants, which is followed by providing work places.

- Due to the development of entrepreneurship environment and stability, the development and stability of municipalities, regions and the entire state are ensured. According to the experts' evaluation, effective investment of ESF financing in the measures facilitating stability of the entrepreneurship environment, as well as investing financing in the efficient use of the labour force, is in the entrepreneurs' interests.
 - Neither a prosperous country, nor socially and economically developed regions or strong municipalities can exist without inhabitants, but who are not satisfied with their place of residence and welfare level. According to the experts' opinion, the highest evaluation in population interests in relation with the efficient use of ESF financing is job opportunities, which is a significant precondition for the quality of life and the possibilities of the inhabitants to realize their economic and social needs.
3. With the help of the hierarchical analysis method, experts' opinions about the need to improve the efficient use of ESF financing were found and they are the author's offered alternative models for ESF introduction: Allocation and acquisition of ESF financing according to the regions' developed model; Acquisition of ESF financing involving entrepreneurs; Integrated allocation and acquisition of ESF financing; Centralised allocation of ESF financing; Maintaining the present situation in the allocation and acquisition of ESF financing.
 4. Choosing the most optimal alternative for the efficient use of ESF financing experts selected the Allocation and acquisition of ESF financing according to the regions' developed model, which would best be able to solve the interests of the state, region, municipality, population and entrepreneurs. Maintaining the present situation in the allocation and acquisition of ESF financing, as well as the author's offered alternative model – Centralised allocation of ESF financing, according to experts' opinions, have not been of full value and do not facilitate the efficient use of ESF financing and have received the lowest evaluation.

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CREATIVITY AND MANAGERIAL PERFORMANCE

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Abstract

We live in a world vibrating from a rich diversity, full of creative energy and new ideas (Hübner, 2009). Therefore, we intend to emphasise the importance of creativity as a main stimulus for personal, social, and economic development. On the background of a growing competitiveness, and of important global challenges, innovating practices and creative solutions lead to the increase of managerial performances. Abilities, ideas, processes, all combine in order to obtain a performing management through managerial performance.

Key words: *creativity, managerial performance, performance evaluation process, managerial performance evaluation*

1. INTRODUCTION

The appearance of new information, both scientific and unscientific, has influenced along the time the development of companies, regardless of their area of activity. Creative thinking and imagination are important elements of activity in any area of expertise, and the absence of creativity can undoubtedly lead to stagnation in development, and, in time, can even cause an economic downfall of a company. Therefore, creativity is a natural characteristic of all rational beings, and not necessarily the privilege of an elite class of human beings. Since the beginning of time, man has been forced to be creative, mainly in order to survive. The satisfaction of the most elementary human necessity, the one for shelter, is the best example to this effect. In the beginning, shelter was offered by the natural setting, a rock, a cave, and afterwards it was built, an action which surpassed all the stages of innovation: formulation of the problem at hand, incubation, enlightenment, action, verification (Giurgiuman, 2012). Within the company, the innovative activities do not take place as a campaign, and no manager can have a consistent support in order to plan fix deadlines for the conception of an innovation (as a result of creativity), as he cannot forecast or expect the immediate recovery of the invested efforts of energy, money or time to experiment and to release the new products and services. Therefore, creativity and innovation represent unavoidable practices by the distinctive impact they have in their development (Nagy, 2012).

2. CREATIVITY CONCEPTS

Along the time, creativity has had a number of definitions, among which the following: creativity is “the capacity to identify connections among elements (objects, events, laws) with no apparent connection among them” (Băloiu L.M., Frăsineanu I., 2004, 35). Consequently, “creativity is the production or revealing of a new fact, law, relation, device, product, procedure or system, which is based on accessible knowledge, but which does not occur directly, simply or by the intermediation of a

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logical process from the information at hand. We could say that it is based on intuitive processes. Creativity is a cognitive process close to reality, but which develops against the accepted rules (this is why it leads to something new)” (Băloiu L.M., Frăsineanu I., 2004, 35).

According to the Explanatory Dictionary online (<http://dexonline.ro/definitie/creativitate>, accessed on the 9th of April 2012), to create means to come up with something which did not exist before, to establish, produce, set, organize, invent, invent, conceive. Encyclopaedia Britannica uses a similar definition, as it follows: the ability to do or to bring something new, either a new solution to a problem, a new method or tool, or an object, or artistic form. These definitions emphasise two main determiners of creativity. According to the first determiner, there must be something new, imaginative, different or unique – we generally refer to this component when we say “divergence”. According to the second determiner, the divergence produced must solve a problem or have certain “relevance” (Smith and Yang, 2004).

According to Smith and Yang (2004), creativity was approached from a number of perspectives. Similarly to the psychology definitions, creativity in marketing is usually defined as having the two characteristics mentioned above: *divergence* and *relevance* (sometimes also called efficiency). A product or a reaction is considered creative when it responds accordingly, usefully, correctly or quantifiably to a challenge or necessity. Creativity is sometimes considered the artistic side of marketing, which is difficult to measure and to assess. Some marketing managers wisely subcontract the creative function to the specialists in the field from outside the company (advertising agencies, independent creation services), but ultimately they have to somehow determine if the creative purposes are met.

Alexandru Roşca (quoted by Gherman, 2010) states that *the term of creativity* can have different acceptations, depending on the emphasis: on the product newly created, during the creative technological process, or on the person who created it. According to the researcher Jean Gremier, the word “*to create*” has different meanings and overlapping significances, it derives from a Sanskrit root – Kr, with the general meaning of to do.

Stimulating the employees’ creativity is an important factor in managing a company. The term of *creativity* refers to the employees’ intellectual ability and force to find new ideas, and *innovation* usually refers to putting into practice the new ideas. In a company, these ideas can refer to the conception of new products, new services, or new procedures of performing the services. *The creative manager* is the one who can, through his general or special training, through his knowledge background, coordinate and involve the other categories of personnel in order to solve in a different way a great diversity of problems. In the technical literature (Androniceanu, quoted by Toma and Dimitriu, 2009), *the problems of the study of creativity in the field of management* are oriented mainly towards the decisional process, to solve certain problems using techniques and methods which stimulate creativity.

Motivation is the component of performance by individual creativity, this being the most neglected by the researchers in the area, theoreticians and those who apply creativity.

However, from certain points of view, this can be the most important component. When recruiting the personnel or distributing the tasks, it is important that, besides the abilities, the intrinsic motivational qualities should be taken into consideration. This is why it is important to know which are the motivational factors for creativity in a working environment, and how the organizations can intensify and use the employees’ creativity to maintain the profitability of their business in a fiercer competitive environment. Creativity research is a normal extent of the motivational research. The same contextual

variables which develop the inner motivations are also associated with the creative performances, and consequently the companies can influence efficiently both the motivation and the creative performance.

In order to emphasise the creative side of management within the Romanian companies, it is necessary to act in the following directions (Comella, quoted by Toma și Dimitriu, 2009):

- Promoting or familiarising the personnel and the managers with notions of creativity;
- Extending the preoccupations of the management for the identification of creative employees and forming creative groups which should participate in solving the problems of the company;
- Creating a psychosocial climate of creativity which should encourage the creative persons to express themselves;
- Realisation in the company, based on scientific criteria, of some creative circles in the area of management, of some creative cores in each team; even of some creative interdisciplinary groups which should participate in solving the problems of the company.

Therefore, to maintain the competitiveness requires a continuous and innovative creativity for the development of more sophisticated, more refined, more individually emphasised new products and services. Creativity requires that the managers of the companies periodically re-evaluate the dimensions of the market segments they are positioned, to analyse very carefully products and services in order to eliminate from their offers those products, services and procedures whose profitability decrease very fast. Obviously, a manager's decision concerning the restriction of the range of products and services can become active only when the company previously secured its portfolio of new substitutive offers, which leads to the necessity of paying the required attention to the process of creativity.

3. CREATIVITY AND CREATIVE MANAGEMENT

Gherman (2010) considers that everything in the world changes at an extremely high speed. The latest 50 years brought more changes in the human society than the last 50.000 years. The prognosis shows that after a period of 50 more years, the present world will experience even more revolutionary transformations concerning the evolution of our mind, of the human body, of nanoscience and nanotechnology, operating with molecules and atoms as raw material. All the creations of the future should be used in the advantage of the species existing on earth. Creativity, especially in the ethnical field, always presented a duality: *opportunities to make people live better (by higher risks for their security)*, and threats (by economic instability and bigger crises).

3.1. Creative personality

Solving the problems conditioning the future progress of the humankind greatly depends on the creative personality, which should „discover” a new approach to the threatening problems created by the future, generating insecurity in the human society, a sort of “*something unpredictable*” which might appear.

Creative persons belong to a universal patrimony, they form themselves in the training process. That is why in different Western or Asian countries different programmes of scientific research were created, focusing on the problems of the talented persons, taking into consideration all the issues related to *inspiration, talent, aptitudes, capacities, development environment, motivations*, etc.

The creative persons are very complex personalities, capable to obtain unique results oriented towards the values and necessities of human expectations. They must manifest in a specific development environment, which allows the creative persons to define themselves, to reach the reason flexibility and originality, the orientation towards self-improvement. The human being is the unique product of nature having the ability to create his future and to lead his destiny through the ocean of threats.

The research brought convincing proofs according to which the individuals' creative abilities are connected especially to the emotional and behavioural experiences, related to reason. They have a great capacity of self-control and lucidity, they understand the other people's feelings and thinking processes, all compared to their own emotional experiences.

The duality of the new creates hope and fears. This refers to the changes taking place nowadays in science and technology under the generic name of creativity, and which brought not only advantages for the people, but also negative effects and dangers. This duality of the human being maintained from the machine era, industrialisation era, continuing with nuclear era, the informational one, genetics, nanoscience, and nanotechnology. All these evolutions related to human creativity made the human beings confront with a paradox: *the fantastic change force generated by science and technology renewed very much the possibility of progress of the mankind, but also the danger of its total destruction. The new creates a new context, which most of the times is an unknown factor.*

These unknown factors are the ones which can determine the appearance of dangerous manifestations for the mankind. *Creativity*, so necessary for finding answers for the present economic problems on a global level, represents the main factor of progress and change, the vector of the change rate of solving the more and more complex problems with which mankind confronts nowadays, and especially the ones which will appear in the near future.

We could define creativity as the human activity of imagining new and original answers, fundamentally different from the answers given in the past to the problems with which the mankind confronts itself (Gherman, 2010).

3.2. Creation and creativity

The average people perceive very vaguely the concept of creativity, usually associating it with the artistic creations, scientific discoveries, innovations, and then with the scientific concept associated by psychologists with pure revelation.

The concept of creativity, also called *divergent thinking*, associated with the action generating the new, was introduced in psychology by Gordon Willard Allport (1897-1967). Several studies were realised on creativity in daily life, on the exceptional and on the artificial one, over 60 definitions were given to creativity, but no one has an authority unanimously accepted, and there are no evaluation techniques for creativity. Along the time, creativity was exclusively attributed to the Divine intervention, cognitive processes, chance, personality characteristics, and it was associated with genius, mental diseases, and even with sense of humour.

Creativity involves elements as (Toma, V., R., and Toma, M., 2009):

- Creativity is an exclusively human attribute, a characteristic, a special gift to imagine something new and original;
- Creativity depends on our actions to propose ourselves to become creators. The maximum creativity is between the age of 6 and 9 years old, it lowers to its minimum at 30 years old, it increases

again at 40 years old, it has again a minimum level around 50 years old, after which it increases again, but slower;

- The unknown stimulates creativity;
- The imagination is an essential component of creativity;
- The novelty is the distinctive element of creativity;
- The originality of creation must be put in practice;
- In order to have value, creativity should correspond to people's demands

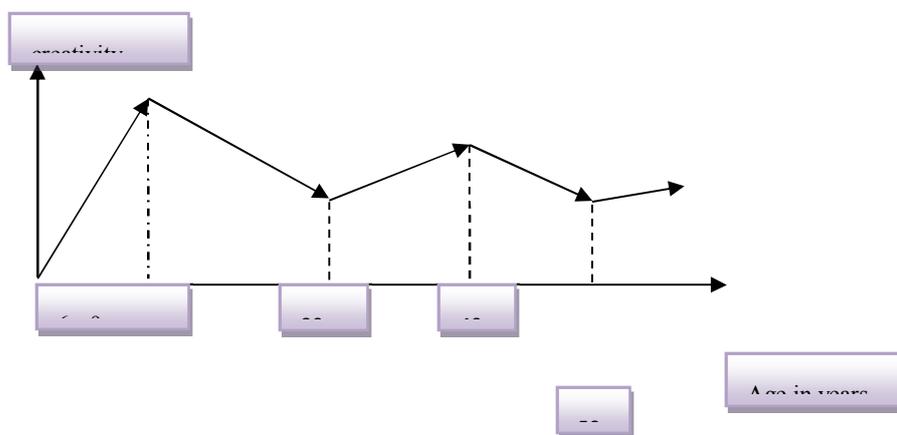


Figure no. 1. *Relationship between creativity and age*

Source: Gherman, (2010)

Starting with 1950, the study of creativity has developed, and research institutes have appeared in the field of creativity. Creativity is an essential requirement for the survival of mankind, which is very important for the progress, for the individual existence, and for the progress of the society. Most of the authors in this field consider that *the creativity process* has three main elements which are interconnected: *the process of creation, the creative product, and the creative person*.

3.3. *Creative managers and leaders*

At present, maybe more than ever in the history of economic evolution, the manager's task in a company is to be efficient both on a personal level and for the company, to create lasting excellence in the company, to be innovating, creative, imaginative, capable of great effort, to be the first to reach the target.

Intelligence, imagination and knowledge are essential resources, but only efficiency and efficacy transform them into results. They establish by themselves only the limits to what can be obtained (Druker, 1994).

In most of the specialty works we can find the idea that human intelligence is of two categories: *cognitive intelligence* (analytical and logical), and *emotional intelligence* (Burloiu, 2010).

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Creative managers possess nowadays central positions in companies, different positions and managerial roles being created especially for them. According to a study realised by Harvard Business School, the creative managers of the latest decade are called „T”- managers, and there are two major components:

- *The horizontal component*, symbolised by the upper part of the „T” in the relationships of hierarchical subordination, realized voluntarily, exchanging ideas with other managers or specialists;
- *The vertical component*, symbolised by the lower part of the „T”, representing the attributes possessed as a leader, in relationship with direct subordinates and superiors.

The research realised on 41 *creative managers* from several European countries showed that the main characteristics of this group are the following:

- Their education is mostly on a university level;
- The managerial experience in the company they lead is of eight years;
- 50% are appointed to this position by the general manager of the company;
- Accepting the position is motivated by the “challenges” and “threats” the company confronts with;
- They elaborate managerial strategies focused on *knowledge and creativity* in the interest of the company;
- The insufficient budgets for the *creativity management*.

In what concerns the „T”- managers of the companies *based on knowledge and creativity*, we must emphasise three main elements:

- The creative managers or the „T”- managers are a special category of managers, with specific characteristics, confronting with challenges of a special nature;
- The number of creative managers will increase in the future society based on knowledge;
- The difference between performant managers and the rest of the managers is decreasing as long as the companies are evolving from sufficient to good, from good to lasting excellence, and then to companies based on knowledge and creativity.

In order to realise this purpose, *creative managers* should act in the following directions: *development of technology and information, adapting production networks to global consumption, access to innovation and creativity, performant personnel, adapting the companies to change*.

The company based on *sustained creativity* has balanced approaches from an economic point of view, uses at its best its own resources and knowledge, generating long periods of efficiency and performance, valid on the market and recognised by clients.

Globally, there are three types of approaches of creativity management:

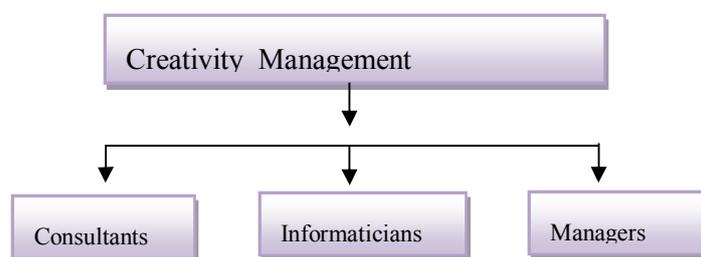


Figure no 2 Approaches of creativity management

Source: Gherman, (2010)

Creativity Management is approached in relation with:

- The top informational technologies;
- High importance given to the innovation.

Creativity management is a key element in the companies, leading to high economic performances, generating profits and wealth.

4. A FEW CONCLUSIONS CONCERNING PRETESTING MANAGERS' CREATIVITY AND ITS IMPACT ON MANAGERIAL PERFORMANCE

4.1. Research methodology

Pretesting has the main purpose to identify the clients' perception concerning the managers' creativity in tourist accommodation structures from NE Romania.

The objectives of pretesting are: to obtain useful data by the use of the questionnaire as an instrument of data collection, which was applied to the managers from NE Romania; to analyse the clients' attitude concerning the innovating services and technologies used in these tourist accommodation structures; to identify the types of managerial strategies concerning creativity.

In order to reach the objective of this work, theoretical and practical aspects were combined along the research.

The methods used in this research were diverse, in accordance with the objectives established. These methods are as follows: the documented study with two aspects: bibliographical documentation from internal sources, and bibliographical documentation from external sources; theoretical analysis; observation; practical documentation and collecting the informative material realised by the research from NE Romania; exploratory study involving to obtain data with the help of the inquiry, using the questionnaire as an instrument of data collection, applied to the clients of tourist accommodation structures; synthesis of the information, which were processed with the programme SPSS Statistics 17.0 for the centralisation of the information; analysis of the information and establishing the conclusions and their utilisation.

In what concerns the population under research, a random target group was established, formed of 54 clients.

4.2. Results of the research

The results concerning the clients' perception on the concept of creativity in a tourist accommodation structure are presented in Table 1.

Table 1 Clients' perception concerning the definition of the concept of creativity

(What does the concept of creativity in a hotel mean to you?)

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Creation of new and modern products	21	21.2	21.2	21.2
The interior arrangement of the hotel	21	21.2	21.2	42.4
Technical equipment of the room and of the peripheral areas of the hotel	45	45.5	45.5	87.9
The software used for the realisation of certain services	12	12.1	12.1	100
Total	54	100	100	

It is obvious that the most important aspect from the point of view of creativity is represented by the technical equipment of the room, and of the peripheral areas of the structure, with a percentage of 45%. The creation of new and modern products, and also the interior arrangement of the hotel are the most important in defining the concept of creativity, the percentage obtained being 21% for both. Only 12% of the total clients consider that the software used for the realisation of basic services defines the concept of creativity.

Table 2 shows the results obtained concerning the types of creative managerial strategies.

Table 2 Clients' opinion concerning the managerial strategies concerning creativity

(Which of the following strategies do you consider that would be successful in the field of manager's creativity?)

Types of strategies	Frequency	Percentage	Valid Percentage	Cumulative Percentage
<i>innovative strategies</i> – based on the quick promotion of the technical progress, new technologies and products	22	26.2	26.2	26.2
<i>diversification strategies</i> – involve the extension of the range of products used	34	40.5	40.5	66.7
<i>specialisation strategies</i> – based on restraining the range of items produced	13	15.5	15.5	82.1
<i>quality-price strategies</i> of the products and services offered	15	17.9	17.9	100
Total	54	100	100	

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The industry of tourist accommodation structures is changing rapidly due to the acceleration in the field of technology of information. Therefore, managers bring proactive modification, focusing on the clients' preferences, on quality, technological elements, in order to remain competitive in a dynamic environment.

5. CONCLUSIONS

As a result of the long lasting research, the specialists from Harvard Business School (coordinated by professor doctor in psychology and Head of the Entrepreneurial Management Department of Harvard Business School, Teresa Amabile) enriched the field with one of the simplest and also largest theoretical frames.

Creativity represents a combination of three components:

1. *Knowledge* – all the individual contribution as a result of a creative effort.
2. *Creative thinking* – refers to the way that people approach the problems and depends on the personality and thinking or working style.
3. *Motivation* – is in general accepted as key of creativity, the most important motivational factors being passion and intrinsic interest towards work (Adams K., 2006, apud Amabile T., 1998).

Pretesting offers answers to the opportunities and threats appearing from the projection of the future of human development in the field of creativity. It must administrate and monitor the change, using a creative management of the duality of the new: *opportunity*, but also *serious threats* to the fate of humankind.

In conclusion, the phenomena of change are quick and unpredictable, and the management of the companies must create added value, being a scientific interdisciplinary concept with action directed towards reaching a pre-established target. Consequently, the notion of creative managers or „T”-managers appeared, leading the company based on knowledge and creativity towards excellence, which is the only one that generates managerial performance, having profit and wealth as results.

ACKNOWLEDGEMENT

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**INSTITUTIONALIZING ‘COMMUNITY VOICE’ WITHIN THE FRAMEWORK
OF A UNIVERSITY’S DEVELOPMENTAL MISSION**

Marcellus F. Mbah

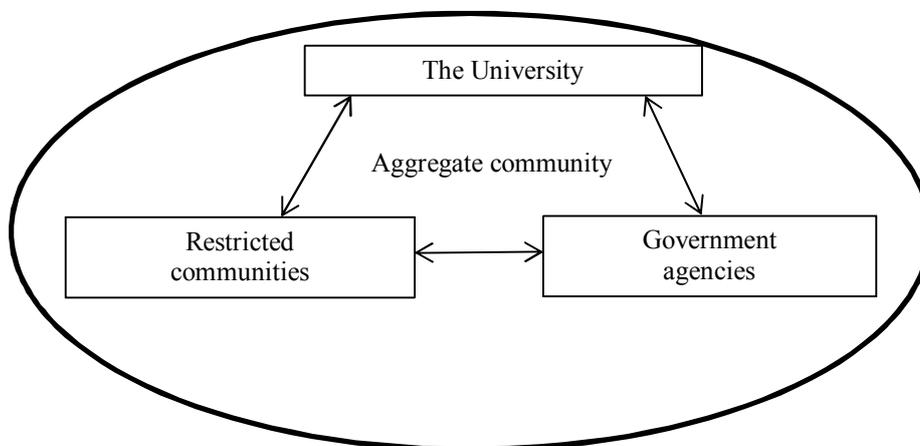
Canterbury Christ Church University, Kent, United Kingdom

Abstract

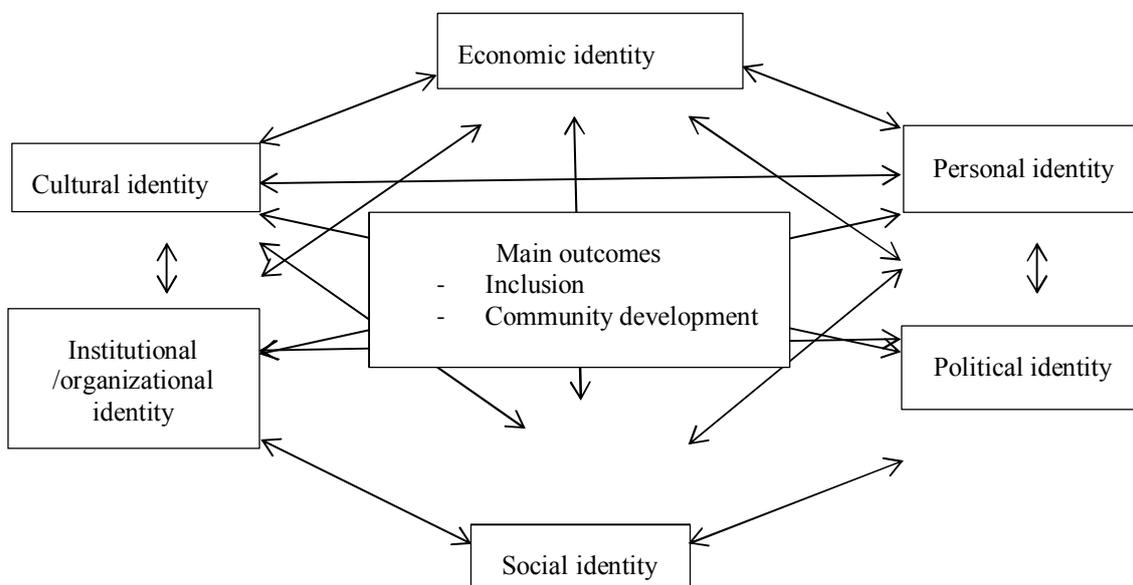
From its primary and oldest function of educating students and providing the foundations for civilization, to conducting research and being involved in outreach to communities; the university institution continues to experience changes within the framework of its mission. Given the growing complexity surrounding the nature of university in contemporary times, one may ask: what is the current mission of African universities? Although it is difficult to generalise due to tremendous diversity, African universities have increasingly been considered to possess the resources and intellectual capital that can foster community as well as national development. Notwithstanding, the voices of the communities they have the mandate to serve are usually not captured in their mission. As a consequence, several residential communities are still vastly under-developed despite the growing number of universities. Backed by empirical findings from a university and its surrounding community, this paper reports on a project drawing on critical social theory and concepts of ‘community voice’. Recommendations of strategies that can foster a university’s developmental mission in residential communities are discussed.

Key words: *University, Community Voice, Community Development*

The notion of ‘development’ often refers to a complex array of factors, including social development, economic development, cultural development and human capital development. However, for the purposes of this paper, ‘community development’ will be used as a term that is designed to incorporate these other definitions of development. Although the phrase is widely used in the academia, political, social and economic sectors, different definitions have been assigned to it such as: working in unison to effect a difference and organising to address shared needs in the community (Flora et al. 1992); a process by which the efforts of the people are united... to improve the economic, social and cultural conditions of communities, to integrate these into the life of the nation and to enable them to contribute fully to national progress (United Nation, 1963 in Kishindo, 2003, p. 380); and collectively initiating a social action process to change the social, economic, cultural and environmental situation of the community (Christenson et al. 1989). From these definitions, one could ascertain that community development revolves around two themes, namely: “togetherness” and “change”. However, “togetherness” for the sake of “change” is not limited to people but also include institutions such as universities; organizations such as community based organizations and government agencies as illustrated thus:



From the above illustration, it can be deduced that universities reside in enlarged communities (Mayfield et al, 1999, p. 863) also referred to as aggregate communities which are made up of restricted communities such as faith based organizations, the civil society and government agencies. Given the multidimensional nature of community development, it can be redefined as working together across organizational, institutional, political, cultural, economic, social and personal divides to realize the overall developmental progress of a residential community with each community sector experiencing positive change. This interaction across different divides can be demonstrated by the following interactive model of community development:



(Adapted from Flora (2003) 's model of community economic development)

From this perspective, it can be maintained that several residential communities in Africa would consist of different institutions, organizations, economic drives, political actors, cultural leanings, social orientations and personal preferences but the ability of community members to work across these identities is fundamental to the realization of community development. Given that university is part of the matrix which constitutes a community, a question arises: how can it overcome its cultural and structural uniqueness to foster development in residential communities?

1. UNIVERSITY AND COMMUNITY DEVELOPMENT

In Barnett's (2011) concept of the 'ecological university', he noted that the university has both the position and the civic responsibility to care about and for the world. Whilst Barnett further asserts that the ecological university's care for the world is engendered by global concerns such as: poverty, illiteracy and gender imbalance which can be considered evidences which depict the need for development, it does not indicate how a university can advance community development in remote regions or communities. Similar to the concept of a university's civic responsibility, a former United Nations Secretary General Kofi Annan noted that the university should be a primary tool for Africa's development in the current century (Annan in United Nations Information Service (2000), cited by Bloom, Canning and Chan, 2005). Annan's call for development oriented universities was not a new idea as Inman and Schuetze noted that "the American land-grant universities and most of the newly established universities in the West of the US and of Canada, had an explicit further mission, that of service to the community... and fostering the economic, social and cultural development of their city or the region where the university was located" (Inman and Schuetze, 2010, p.14). Just as with America's land-grant universities, many State owned universities in Africa were assigned the mission to advance development in communities and nationally by their respective States. For instance, the research mission of one of the universities in Cameroon highlights that the university will "conduct research for sustainable development and to enhance the quality of life of Cameroonians" (Mbuntum et al, 2008, p. 8) and similarly, the mission statement of one of Ghana's universities reads: "our mission is to develop world class human resources and capacities to meet national development needs..." Given these assertions, the crux of the matter in this paper is not to flag up the call for universities to be involved in community development or for mission statements to express developmental goals but the need to realize mechanisms and processes that can transform a university's developmental mission into a process of change (development) in communities. On the basis of this, this paper is interrogating the usefulness of "community voice" in bringing about community development.

2. WHY "COMMUNITY VOICE" MATTERS

The concept of "community voice" as used in this paper represents the aggregate of possible voices from a residential community. It calls for the amelioration of power relations in a manner that creates an enabling environment where the poor and ordinary people of the community can also have a voice in decisions, and processes aimed at fostering their development (Mansuri and Rao, 2003). In realizing developmental objectives, Nyerere (1968) maintained that "people cannot be developed; they can only develop themselves by participating in decision and co-operative activities which affect their well-being" (Nyerere (1968) in Oakley et al, 1991, p.2). From this perspective, it can be argued that community participation within the framework of a university's developmental mission in residential communities is imperative if community inhabitants are going to benefit from human capital

development as well as other types of capital development such as: natural capital development, social capital development, cultural capital development and economic capital development (Flora, 2003). Whilst several authors have underscored the significance of university and community collaboration (Thompson et al., 2002; Stuart, 2002; Mayfield et al, 1999), many African universities are out of touch with residential communities. Taal (2011) asserts that they could be seen serving the interest of the elites, perpetuating an ivory tower image and alienating the masses. Given that community development highlights the importance for a participatory framework and the achievement of shared needs, the United Nations Development Programme (UNDP) asserts that the challenge facing development in Africa “is to develop institutions and processes that are more responsive to the needs of ordinary citizens, including the poor, and that promote development” (UNDP webpage on democratic governance). From this assertion, it could be argued that university stands a better chance of aiding community development when it listens to “community voice” to ascertain community needs and processes aimed at achieving these needs.

3. THEORETICAL UNDERPINNING

The notion of “community voice” as articulated in this paper is embedded in critical social theory (CST) which can be considered a product from a postmodern influence of critical theory (Bevan et al, 2012). Given that many types of voices abound such as: the authoritative voice, the critical voice and the therapeutic voice with each type reflecting a different process of articulation and intended outcome (Hadfield and Haw, 2001), the focus of this paper is on critical voice and its transformational potential in residential communities. This paper acknowledged voices from the community within the framework of critical social theory for the sake of promoting inclusion, thinking and discourse on the university and the implication of integrating “community voice” within the framework of its developmental mission. Furthermore, the choice of CST is owed to its multidisciplinary knowledge base which reflects both critical and social theories as it grapples with issues of empowerment, engagement and participation (Leonardo, 2004) which are central to the concept of “community voice”. It can be argued that CST have the potential to advance reflections and dialogues in such ways that can create an enabling environment where the voiceless may have a voice and voices from the community can be captured by the agenda setting and realization processes of a university mission in residential communities in an attempt to improve the wellbeing of ordinary people who under normal circumstances may not have the leverage over developmental decisions.

4. CONTEXTUAL BACKGROUND

This paper describes a qualitative project with a case study approach which led to an in-depth exploration of a bounded system. Given that different types of case studies abound (Creswell, 2009), this project employed a single case study design to investigate the intricacies surrounding the integration of “community voice” within the framework of university’s mission in residential communities. In the light of this paper, the bounded system is a municipality in Cameroon which is made up of eighty-five villages. It is worth noting that the government of Cameroon carved out administrative units into villages, towns, cities, municipalities, districts, subdivisions, divisions and regions. The municipality was chosen for this reason because it is a locality I am familiar with and is host to one of the State universities in the country. An older university and a much bigger one (in terms of population) in the country could have been chosen for this research but in view of the potential additional costs in terms of translations due to language barrier would have been an obstacle

to its execution. Furthermore, my service at the chosen university over an eleven year period gave me the advantage of access to university and community participants who were able to provide vital information during the inquiry process (Holliday, 2007). Given that the government of Cameroon classifies the municipality at the centre of this research as a rural council, the sampling frame of this research was intentionally skewed towards a rural municipality (council). The reason for the choice of a rural council rather than an urban council is because the majority of African population resides in rural areas (United Nations publication, 2011) making it relevant to the context of this research which seeks to explore community participation within the context of a university's developmental mission. This paper argues that because the demographic structure of Africa is predominantly rural than urban, being involved in Africa's development largely suggests being involved in rural development.

5. METHODOLOGICAL CHOICE

Interviews were the main instruments used in this project for data collection and these were semi-structured. Following the need to inductively generate meanings from the responses of participants, open ended questions were used. Creswell (2009) noted that the more open-ended the questioning, the better, as the researcher listens carefully to what the participant says. The semi structured interview approach also allowed space to probe beyond the structured predetermined questions, affording the inquiry process not only more opportunities for clarifications and elaboration, but also enabling a more flexible collection of rich qualitative data. The data collection phase of this research was carried out in the month of December 2011 and prior to going to the field; the objectives of the research and plan of action were approved by the Ethic Community of the Faculty of Education of the University where I am based.

Given that the municipality at the centre of this research is not a homogenous society due to the continuous influx of students and families from different parts of the nation, an attempt was however made to have an objective and representative sample of participants recruited from disparate background within the municipality. Three sampling techniques were employed, namely: purposive sampling, opportunistic sampling, and snowball samping (Holliday, 2007; Langdridge and Hagger-Johnson, 2009; Merrill and West, 2009). The following table represents the distribution of participants and how they were selected:

	Description	Number	Method of selection
1	University members	3 Academic staff 1 Student	3 Purposive 1 Snowball
2	Community heads	6 Local chiefs 1 Municipal head	Purposive
3	Representatives of Non-governmental organizations	3 Members	Purposive
4	Government agencies	2 Employees	1 Opportunistic 1 Snowball
5	A community member	1 University graduate	Opportunistic
	Total	17 participants	

Interviews were carried out on a one-on-one basis and participants generally responded to questions on: 1) the nature of existing collaboration between the university and the community and whether there were any perceived 2) benefits of existing collaboration 3) challenges to collaboration or any concerns 4) opportunities for future collaboration 5) assessing the university's impact in the community. Recorded interviews were transcribed and themes identified in connection with the research questions (Howit and Cramer, 2007).

6. ANALYSIS OF PARTICIPANTS' RESPONSES

Participants' response to the inquiry process raised a lot of issues. The following tables represent the themes that stood out:

6.1 *The nature of existing collaborations and benefits*

Category	Existing collaboration	Benefits
University members (U)	There are few existing formal collaborations between the university and the community.	The university have been able to carry out student placement in some community based organizations as well as join execution of some research with community partners.
Community heads (CH)	There are some forms of collaboration with the university but these were not consistent.	The community gained relevant knowledge from students and staff during field work.
Representatives of NGOs (NGO)	There are no formal collaborations with the university.	No common benefits were identified in this category but most of the participants anticipated the possibility of shared knowledge.
Representatives of government agencies (G)	Collaboration with the university was informal and non-structured.	Seminars organised by the university provided useful knowledge.
A community member (CM)	There are some kinds of collaboration between the university and the community but these are inconsistent.	The community have benefited from training through seminars organised by the university

From themes that stood in connection with inquiry on the nature of existing collaborations and the benefits of such collaborations, the following inferences can be made:

- Existing collaborations identified were generally informal and inconsistent.

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- Most of the participants under the “community head” category who are village chiefs acknowledged the existence of collaboration, although they sometimes had a limited understanding of the term, as illustrated by participant (CH5) who believed there was evidence of “good collaboration” with the university simply because there were university students residing in his village.
- A majority of university participants (three out of four) identified “student placement” as benefit derived from collaborating with some sectors of the community. On the other hand, many of the community heads interviewed identified knowledge gained from students and staff during their field work as benefit gained from collaborating. It is worth noting that most of the benefits identified by university participants were different from those identified by community participants and this can be considered in part due to their differences in priorities and goals.

6.2 Challenges and concerns identified, opportunities for future collaboration and the university's impart in the community

Category	Challenges /concerns	Opportunities	Impact
University members (U)	Lack of funds to engage in outreach, inadequate forum for dialogue with the community and lack of structures to accommodate community outreach programmes.	Participants anticipated opportunities for future collaboration between the university and the community such as in funded community based research.	The government implementation some of the recommendations made by some community based research.
Community heads (CH)	Lack of dialogue between the university and the community, and there is need to enhance the professionalization of university education.	Participants revealed a willingness to collaborate with the university whenever the need arise.	Population growth and the boom of local businesses.
Representatives of NGOs (NGO)	Insufficient dialogue between the university and community sectors.	Participants indicated a willingness to collaborate when need arises.	Population and economic growth.
Representatives of government agencies (G)	A Lack of professionalization in university education.	Participants revealed a general willingness to collaborate when need arises	Population growth provided market for sale of local farm produce.
A community member (CM)	Lack of resources to foster university's outreach and inadequate means of communication between the university and the community.	-	Many community members have been trained by the university and the level of literacy has increased.

Given participants' response to questions on challenges and concerns in connection with collaboration, opportunities for future collaboration and the university's impact in the community, the following inferences can be made:

- Three out of the four participants from the university identified the challenge of limited funds and this can be justified. Annual State subsidies have not kept pace with the growing number of students and the increasing need for more infrastructures. Irrespective of other sources of funding at the university such as: self-generated income which principally come in through the payment of registration fees and which account for about 35% of the university's budget, generous donations from friends through a development scheme intended to assist the university's development efforts and research grants from foreign partners, the university continue to face the challenge of limited financial means to advance its developmental mission in residential communities due to donor fatigue in the case of the development scheme, the slow growth of Cameroon's economy, and the stringent nature of competing for research grants from foreign sources.
- In most categories, participants identified lack of dialogue between the university and the community as an obstacle to meaningful collaboration.
- Several community participants identified the need for the professionalization of university studies in an attempt to facilitate the employability of university graduates.
- Even though most of the participants did not identify concrete plans for future collaboration, they were however optimistic and interested in future collaborative engagements.
- All participants interviewed maintained that the university's presence in the community have had a positive impact irrespective of the hike in prices of essential commodities, growth in social unrest and rise in promiscuity.

7. GOOD PRACTICES

In addition to the inferences that have been made following the themes that stood out in participants' response, this paper proceeds to highlight some good practices uncovered at the university and its surrounding community which could have the potential to foster "community voice" and enhance development.

7.1 *Representational governance*

The university has a governance system with the Council at its helm. It has four representatives of the private sector representing different areas of interests and appointed by the government. Whilst this is a good practice that could ensure the voice of the private sector is represented in deliberations and decision making processes at the university, there is also need to ensure that these representatives are not merely representing the ideologies of the government that appoints them but are able to represent the voices of the masses including those living on the margin of society. It can be argued that the kind of representational governance that projects community voice and enhances development is that which bring community representatives "into an even-handed deliberation amongst equals resulting in community ownership of decisions as well as new insights and knowledge" (Thompson et al., 2002, p. 265). In the absence of this kind of representational governance that gives community members a sense of ownership of decisions, the university could be seen staging a false impression of what it is not.

7.2 Reaching out to the community through an intermediary organization

Given the possibility of an organization liaising with a “sister” organization to extend its services to desired targets or neighborhoods, a participant (NGO3) indicated that his organization was provided computers by the university to enable it promote computer literacy amongst community members who are not computer literate. This paper considers this a good practice and maintains that the university’s presence in remote regions could be better facilitated through working closely with organizations that have an established presence within those regions. To corroborate this, a participant (NGO2) noted “I don’t think you will learn women and gender studies in the class room. The university should be able to work in collaboration with people who are working with women on the field”. From this assertion, it may be further argued that several community based organizations presents good opportunities for the university to partner with and consequently extend its mission to remote locations. In the process of working with community based organizations in remote locations, the university can retain an environment where community voices can be heard and indigenous knowledge gained to compliment knowledge and processes generated at the University for community development.

7.3 Mutual agreements

Some of the benefits of collaboration identified in this project were the outcomes of mutual agreements between the University and some segments of the community. For instance, a participant (CH3) indicated that on the basis of a mutual agreement, a village provided the university with a water source and in return the university constructed a village hall for the community. Another participant (U1) also indicated that on the basis of a mutual agreement, the university provided training for the staff of an organization and in return the university had the right to place students in the said organisation for experiential learning. On these regards, this project argues that this kind of win-win situations gives the community and the university reasons for collaboration. Furthermore, the consequence of a win-win collaborative framework goes beyond the promotion of dialogue and interaction between the university and the community to helping both to cut down financial costs in areas where each is able to receive some kind of support from the other.

8. RECOMMENDATIONS

Although the sample size is limited, and further research is ongoing, the data underlining this paper provide interesting findings, from which it is possible to draw the following recommendations:

8.1 Community participation in curriculum design

Given that many participants in this research called for professionalization in university education, there is need to bring the community nearer to where educational curriculums are designed. To corroborate this, a participant (NGO2) noted “I think the programmes that are designed at the university are supposed to be designed with the eyes of the community; that is, it should be ensured that these programmes are going to affect the development of the community”. From this perspective, this project argues that community participation within the framework of curriculum design can accommodate the needs and expectations of the civic society and consequently improve the potential of graduate employment and sustainable development. Notwithstanding, this project also upholds that it is not only essential for university education to be professionally relevant to community and societal needs; it should also be globally robust in order to enable university graduates compete internationally.

8.2 The crafting of inclusive policies

Policies are meant to articulate standards or rules for the conduct of individuals, organizations and institutions (Lerner et al, 1999) but when they are skewed to favour a given system, it may impede community development. Given that the university is State owned and is guided by State policies, this paper advances the need for a government; university and community joint partnership based on mutual respect and the willingness to learn from one another in designing policies that will accommodate the demands of all stakeholders with the goal of achieving community development.

8.3 Embracing an interactive collaborative model

Although collaboration may be defined simply as working together (Himmelman, 1996), it can be better defined as ‘an interactive process amongst individuals and organizations with diverse expertise and resources, joining together to devise and execute plans for common goals as well as to generate solutions for complex problems’ (Gronski and Pigg, p. 783, 2000). An interactive process ensures that collaboration is not hijacked by a single actor or member of the community but enables an environment where ordinary people of the community can also have their voices heard. Given the concern of lack of dialogue identified by many participants, it is clear that there is a need for an interactive collaborative model between the university and the community. While answering a question on challenges to collaboration, a university participant (U1) sincerely noted: “there is the question of communication because as it appears now, we have no forum in which we can come to know what the community expect of us. But we have many communication channels; we publish newsletters, we have websites, we hold seminars, we give interviews and so on about what the university can do but we do not know what the community expects from us”. From an assertion of this type, this project maintains that it does not matter how many activities the university gets involved in; without a commitment for dialogue and interaction with the community, its mission to foster community as well as national development is unlikely to be realized.

8.4 Creation of structures to support sustainable collaboration

Given the benefits of collaboration mentioned in this paper, it is worth noting that the collaborations themselves were mostly inconsistent and consequently the benefits are inconsistent. From this perspective, this paper argues that there is a need to ensure that adequate structures are put in place for a sustainable collaboration that would equally guarantee sustainable development for the community. Structures for a sustainable collaboration that will engender development would ensure that collaboration is grounded on relevant research partnerships, community capacity building, networks between the university and the community (Barnes et al, 2009), and as well as adequate partnership management, fostering of social capital, collective goal setting, and shared power, resources and responsibility.

In conclusion, the concept of institutionalizing “community voice” within the framework of a university’s developmental mission in residential communities as expressed in this paper cannot be laid to rest without identifying other fundamental concerns of university freedom and democratic values which are also have the potential to enhance “community voice” and foster community development.

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