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JAVA APPLETS AND TEACHING AS A NEW PHENOMENON

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Resume: *The paper reports the aspects related to Java applets creation and their application in teaching technical subjects. The author of the paper also presents the Java applets he himself created and applied in the teaching process. At the same time he emphasises the irreplaceability of didactic and professional mastership of a teacher in the teaching process using Java applet programmes.*

Key words: *teaching electrotechnical subjects, applets*

1 Introduction, Basic Notions and Terms

The arrival of computer technology has offered unprecedented opportunities for the application of computer simulation and animation in the teaching process. It has raised our awareness of the necessity of a new quality platform creation for visualisation of objects, processes and phenomena in teaching technical subjects. Our expectation as well as the goal of our research was to prove that the new visualisation platform would help increase the effectiveness in the technical subject teaching process.

It is necessary to note that in all fast-developing scientific branches (such as information technologies) a great deal of dynamics is observed also in their terminology and translation. New and new terms are continuously being coined and introduced or the content of some already existing terms is being changed, stabilized or made more precise. Due to the dynamics of computer terminology the following definition of an applet taken from Wikipedia is only one of several possible definitions [4].

An applet is a software component that runs in the context of another program, for example a web browser. An applet usually performs a very narrow function that has no independent use. Hence, it is an *app*lication *-let*. The term was introduced in AppleScript in 1993. An applet is distinguished from "subroutine" by several features. First, it executes only on the "client" platform environment of a system, as contrasted from "servlet". As such, an applet provides

functionality or performance beyond the default capabilities of its container (the browser). Also, in contrast with a subroutine, certain capabilities are restricted by the container. An applet is written in a language that is different from the scripting or HTML language which invokes it. The applet is written in a compiled language, while the scripting language of the container is an interpreted language, hence the greater performance or functionality of the applet. Unlike a "subroutine", a complete web component can be implemented as an applet.

This long definition requires to be appended by another short description which characterises a Java applet from the didactical point of view. In our view an applet is a "small" special monofunctional application programme used for example for interactive animations or calculations made by a client herself/himself without the need of cooperation with a server. Being applied in the pedagogical process a Java applet enables a teacher to create texts with simulations. Thus, it becomes a tool for creating interactive teaching materials.

2 Research Objectives

The main goal of our research was to create Java applets for improving technical subject teaching. Our objective was not only to **create** an innovative system of teaching electrical engineering subjects but also to verify it in the conditions of real school.

For this purpose we created over two hundred Java applets in the Java environment. The applets were created, i.e. **the individual static pictures and figures from the traditional printed text books or schemes** included in the instructions for use in **pupils' model construction kits (meccanoes) were animated (or simulated).** Our final objective was to create a virtual visualisation 'appendix' which enlarged the radius of action of traditional printed text book visualisation (as well as visualisation of instructions how to use pupils' model electro-component-construction kits) and moved it behind its natural borders.

Moreover, on one of the applets we demonstrated the technique of the applet creation and its didactic application. The creation principles, strategies and tactics of the other applets are analogical. In general, the key point of the application of visualisation may be articulated as follows: those phenomena, processes and objects that can be visualised in a traditional, it means static way (a picture or a figure in a textbook, a plastic model or other three-dimensional models such as a model construction kit, etc.) are to be visualized traditionally. Those phenomena, processes and objects which go beyond the possibilities of the traditional and conventional ways of visualisation are to be visualised by means of Java applets ('enlargement of a hand of knowledge').

On the contrary, the visualisation by means of an applet may be improved by a practical and real attribute that is contained in a textbook or a model construction kit but not in an applet.

3 A Set of Selected Applets Designed for Thematic Teaching in Electrical Engineering

The created collection of applets was called *Electrical Engineering and Informatics around us in Applets*. In order to strengthen the didactic application of the applet the names of the individual applets begin with the words "How does .... operate/function? To be more concrete: "How does a digital thermometer function at measuring the human body temperature? In the process of the applets creation and application the elements of teaching project concept were used. Below some of the selected applets of the created collection will be presented (including the outline of the recommended methodology of their application in the teaching process).

3.1 The applets for teaching basic circuits of residential electrical installation

Fig. 3.1.1 The applet – How does a circuits of electrical installation function? (the outline of the applet creation principles and its application in didactics)

Fig. 3.1.2 The applet – How does a circuits of electrical installation function? (the selection of the key sequences of the decelerated animation process)

3.2 The applets for teaching automation technology

Fig 3.2.1 The Applet – How does a lift operation control function? (the outline of the applet creation principles and its application in didactics)
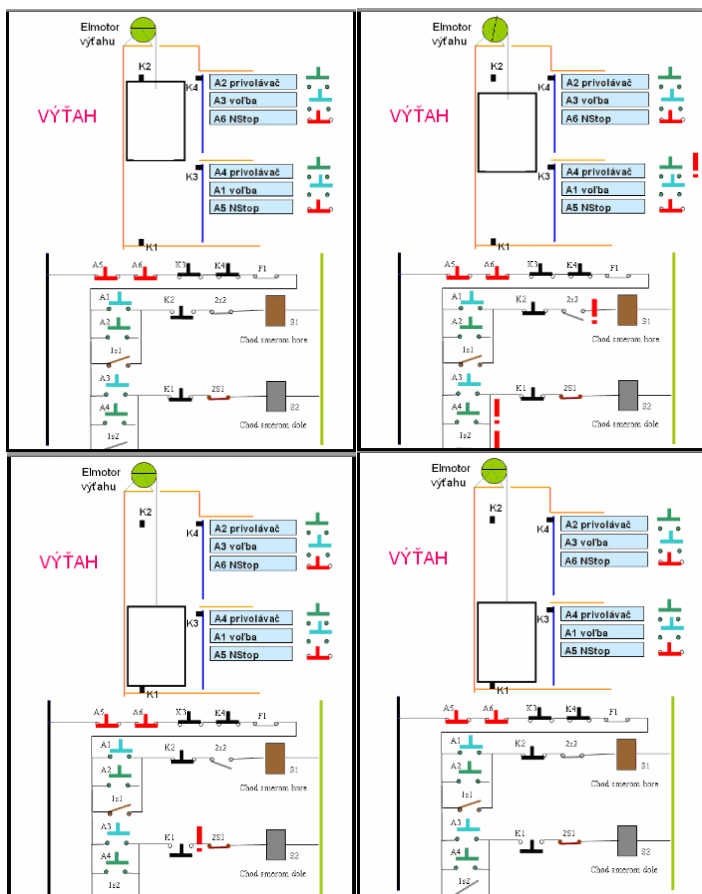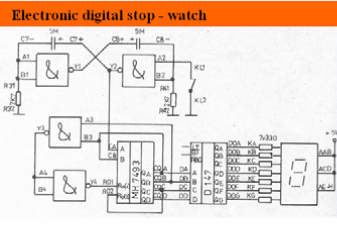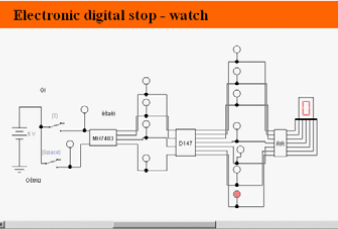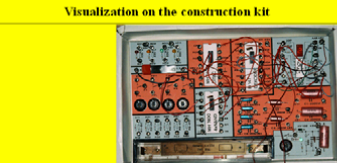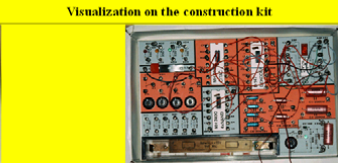
Fig. 3.2.2 The applet – How does a lift operation control function? (the selection of the key sequences of the decelerated animation process)

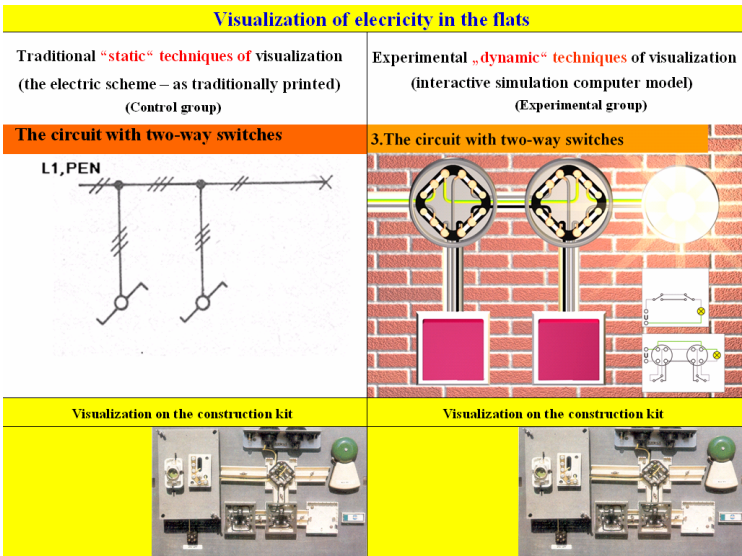## 3.3 The applets for teaching electronic digital systems

Fig. 3.3.1 The applet – How does an electronic digital stop watch function?
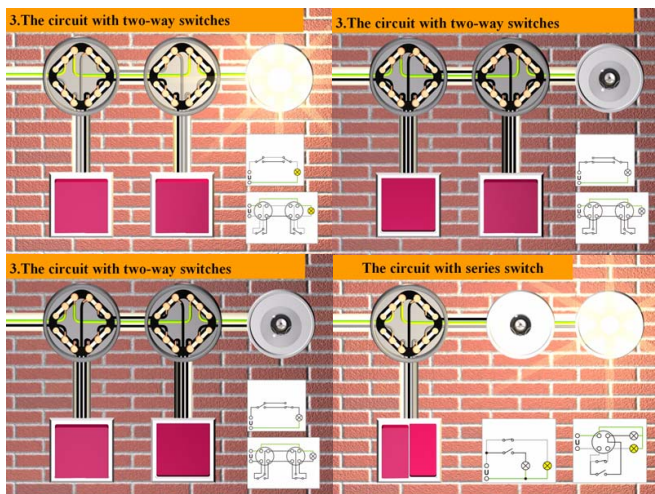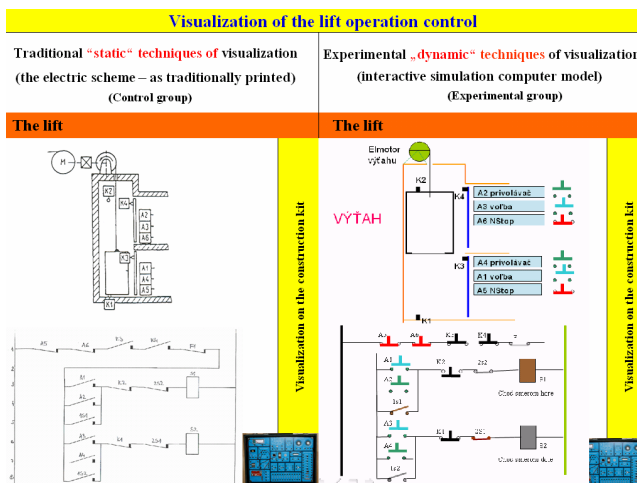(the outline of the applet creation principles and its application in didactics)
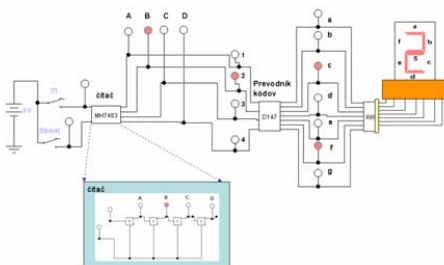
Fig. 3.3.2 The applet – How does an electronic digital stop watch function?
(the selection of the key sequences of the decelerated animation process)

4 Empirical Research Conducted into Java Applets Application in Teaching Process
(Experimental verification of their didactic effectiveness in the conditions of real school)

We made a database of Java applets that served as a platform for the creation of the experimental innovative teaching system called NIESVEA. It was designed for visualisation of teaching processes and phenomena through applets. In the process of our research the NIESVEA system (in the form of concrete models designed for teaching selected thematic sections in electrical engineering at non-electrical engineering faculties) was also experimentally verified.

The method of pedagogical experiment was used to compare the two teaching systems in the experimental group (the NIESVEA system) and the control group (traditional teaching system). The principle of the pedagogical experiment is demonstrated in Fig. 4. The concrete teaching system (the lift operation control) is demonstrated in Fig. 3.2.1.

Common Features	
In both the experimental and control groups an identical technical object, phenomenon, or process were visualised	
Different Features	
The control group	The experimental group
- a traditional technique of visualisation using static pictures in a textbook, transparencies (an overhead projector)	– an experimental technique of visualisation by means of a Java applet using computer animation and simulation (an LCD projector)

Fig. 4 The principle of the pedagogical experiment

The main aim of the experimental research was to investigate the possibilities of the **NIESVEA** system application in order to increase the effectiveness of the teaching process.

4.1 Initial Hypothesis of the Research

H **The initial hypothesis:** the proposed experimental teaching system (hereinafter NIESVEA) will be more effective than the traditional teaching system. In order to be able to conduct successful quantitative and qualitative verification we divided the initial hypothesis into the following subhypotheses:

H1 The cognitive learning performance (the results of the output didactic test) of the students thought by means of NIESVEA will be better than of those thought traditionally.

H2 At the end of the experimental period the students thought by means of NIESVEA will achieve better or the same level of memory performance in comparison with the students thought in a traditional way (in the subtest N1 of the output didactic test).

H3 At the end of the experimental period the students thought by means of NIESVEA will achieve better or the same level in knowledge comprehension (in the subtest N2 of the output didactic test) compared with the students thought in a traditional way.

H4 At the end of the experimental period the students thought by means of NIESVEA will achieve better or the same performance in the knowledge application (in the subtest N3 of the output didactic test) compared with the students thought in a traditional manner.

We present here only the central subhypotheses in the cognitive area. (For the subhypotheses in other areas see [2].) The test division into the individual subtests was made in accordance with the learning taxonomies of Niemierko.

The effectiveness of the NIESVEA application in **the electrical engineering teaching process** at non-electrical engineering faculties was verified during a continuous series of long-term empirical research in 1993–2005. **The total number of pupils and students** taking part in our research activities (in its all forms, phases and positions) was **580**.

The **selection of research samples** was conducted by means of methods of probability and mathematical statistics. Based on the F-test result (analysis of variance) we considered the selected **samples statistically equivalent.**

In the process of our research the **following methods (the method of pedagogical investigation and psychological-pedagogical method)** were used:

1. the **pedagogical experiment** – the main method, a two-group model of the experiment (an experimental and a control group) conducted synchronously and simultaneously;

2. **didactic tests** – for the verification of the hypotheses **H1, H2, H3, H4, H5,**

3. **the questionnaire method** – for the verification of the hypotheses **H10, H11,**

4. **the method of dialogue** – for the verification of the hypotheses **H10, H11,**
5. **the method of observation** – for the verification of the hypotheses **H13,**
6. **the statistical methods of research data analysis –** used for statistical verification of research hypotheses (descriptive statistics – basic characteristics of the research sample, correlations; inductive statistics – test of normal distribution, F-test, Chi-square test; Quartile and Cluster analyses ...).

4.2 The Major Experimental Research Analyses Findings

The statistical interpretation of the research analyses findings is concise as the graphs are explicatory enough. They include the digital data related the values in question as well as the basic characteristics of the statistical ensembles arranged into the tables. As we find them sufficiently descriptive we do not provide any additional verbal explanations.

Graph G.1.1 – Frequency distribution of learners' performances achieved in the final didactic test within the pedagogic experiment
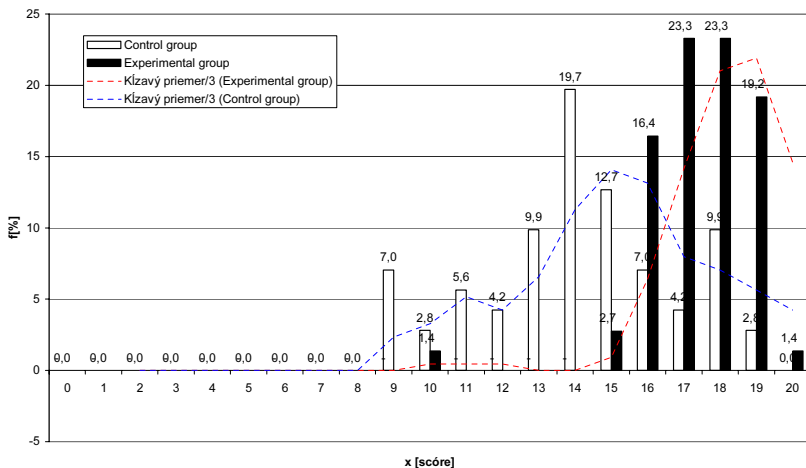
Descriptive Statistics							Descriptive Statistics						
TAB 1.1E	XmaxE =	20	XminE =	11	AverageE =	17,35484	**TAB 1.1C**	XmaxC =	19	XminC =	9	AverageC =	14,42188
EXP	test.norm.	yes	MedianE=	17	Mode E=	17	CON	test.norm.	yes	Median C=	14	Mode C=	14
0.quartile =	11	1.quartile=	16	2.quartile=	17		0.quartile =	9	1.quartile =	13	2.quartile=	14	
3.quartile =	18	4.quartile=	20					3.quartile =	16	4.quartile=	19			
					Inductive Statistics								
		Stat. confid. (E-C)		k = 2	ni1 =	1	ni 2 =	62					
		Fkr [95%] =	6,8	Fvyp =	94,14889	signifik =	áno						
		Fkr [99%] =	3,9										

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Graph G.1.2 – Distributive function of learners' (scores) achieved in the final didactic test within the pedagogic experiment
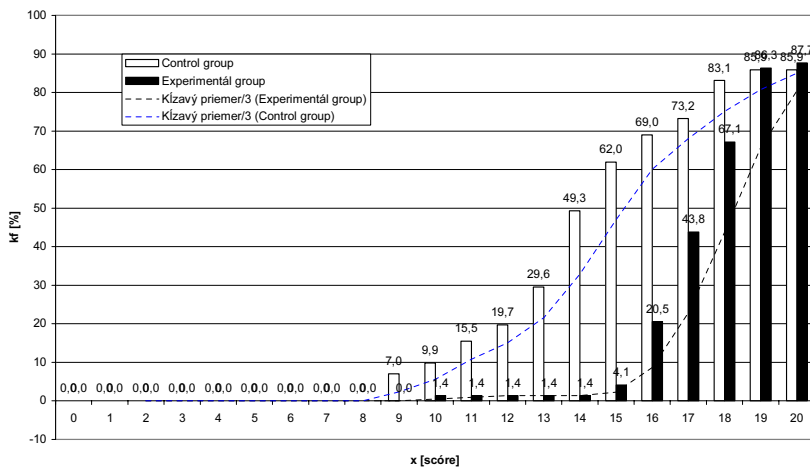
4.3.1 Some results of the structural statistical analysis on the level of subtests system created on the basis of Niemierko taxonomy levels of teaching

Graph G.2.1 – Frequency distribution of learners' performances achieved in subtest N1 (remembering) of the final didactic test within the pedagogic experiment
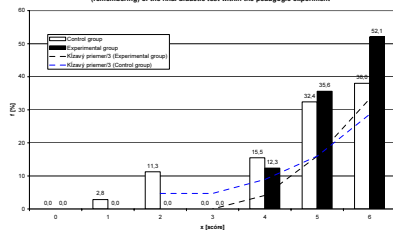
Graph G.2.2 – Distributive function of learners' scores achieved in subtest N1 (remembering) of the final didactic test within the pedagogic experiment
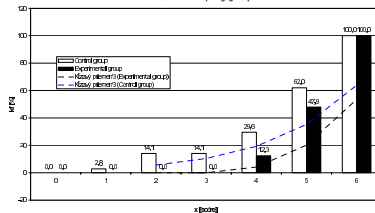
Graph G.3.1 – Frequency distribution of learners' performances achieved in subtest N2 (comprehension) of the final didactic test within the pedagogic experiment
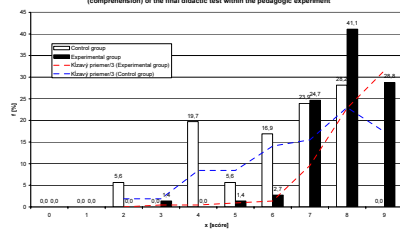
Graph G.3.2 – Distributive function of learners' scores achieved in subtest N2 (comprehension) of the final didactic test within the pedagogic experiment
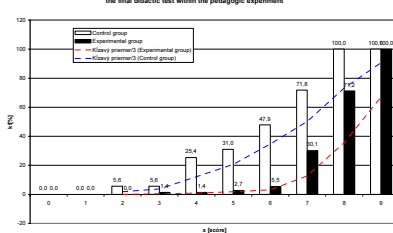
4.3.2 Some results of the structural statistical analysis on the level of the system of subtests created on the basis of particular teaching topics

Graph G.4.1 – Frequency distribution of learners' performances achieved in subtest N3 (application) of the final didactic test within the pedagogic experiment

Graph G.4.2 – Distributive function of learners' scores achieved in subtest N3 (application) of the final didactic test within the pedagogic experiment

Graph 5.1 – Frequency distribution of students performances achieved in thematically focused subtest T1 of the final didactic test within the pedagogic experiment

Graph 5.2 – Distributive function of lerners' scores performances achieved in the thematically focused subtest T1 of the final didactic test within the pedagogic experiment

4.3.3 Some results of the structural statistical analysis on the level of system of subtests created on the basis of particular tasks in the final didactic test

G.8 – Graph of solution successfulness of the particular tasks of the final didactic test (within the pedagogic experiment) by the experimental and control group

G.9 – Comparison of solution successfulness of the particular subtests (from the viewpoint of taxonomy of educational aims) by the experimental and control group in the final didactic test within the pedagogic experiment

G.10 – Comparison of solution successfulness of the particular thematically focused subtests by the experimental and control group in the final didactic test within the pedagogic experiment

4.3.4 Some results of the quartile and cluster statistical analysis

Quartile analysis

Exp. gr. Contr. gr.

to graph G.1.1

Cluster analysis

| | vst.celok | | | vst.celok |
| N3 | N2 | výst. celok | N1 |

Euclidean distance

Exp.sk   Kont.sk
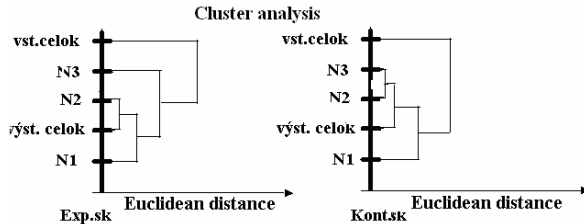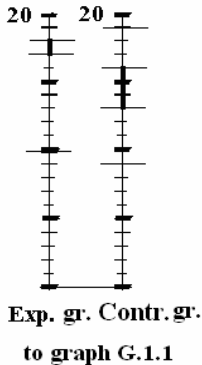
4.5 The Interpretation of the Major Experimental Research Analyses Findings

The overall analysis of the application of the present innovative teaching system utilising computer animation and simulation of technical processes and phenomena by means of Java applets proves the good prospective of the introduction of the innovative system into school practice. Moreover, it proves the system to become a valuable tool for increasing the effectiveness of the teaching of electrical engineering at non-electrical engineering faculties. Furthermore, it provides evidence to be a helpful means for achieving positive qualitative changes in students' knowledge structure. The most encouraging is the fact that the present innovative system can be introduced into the teaching process without any radical transformation of the traditional teaching system (and in our view it is its crucial advantage).

In addition, the **NIESVEA system** was regarded as much more attractive and motivating than the traditional one by the participants of the research. What is more, the experiment students said that they were looking forward to being taught by means of NIESVEA.

The research findings confirmed that the Java applet application in teaching electrical engineering is of great didactic importance. It broadens the horizon of visualization, application, didactic and educational possibilities which cannot

be made available by traditional techniques of visualization of objects, processes and phenomena in the electrical engineering teaching process.

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[4] **WIKIPEDIA:** http://en.wikipedia.org/wiki/Main_Page

Biography

Milan Bernát (Ing., Ph.D., Ph.D.) was born in Košice, Slovakia, in 1959. He was awarded the Ing. (MSc.) degree in electrical engineering by the Faculty of Electrical Engineering and Informatics, Technical University of Košice, in 1983. He gained his Ph.D. in the scientific branch 26-34-9 Electrical Engineering and Informatics at the Faculty of Electrical Engineering and Informatics, Technical University of Košice, in 2001 (thesis **[1]**) and the Ph.D. degree in the scientific branch 75-02-9 Theory of technical vocational subjects teaching at the Faculty of Education, Constantine the Philosopher University in Nitra, in 2005 (thesis **[2]**).

Renáta Bernátová (doc., RNDr., Ph.D.) was born in Prešov, Slovakia, in 1966. She was awarded the RNDr. degree by the faculty of Natural science, UPJŠ of Košice, in 1989. She works as a docent at Pedagogical Faculty of Prešov University.

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CAN WE PLAY WITH MATHEMATICS?

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Abstract: *Teachers have been constantly facing a problem how to make mathematics more interesting to pupils. Motivation plays definitely the most important role in this respect. It is motivation that assigns subjective sense to the learning activities of the pupil. It has been shown a number of times that solving non-standard tasks, projects, games or other motivational activities can help to change the way mathematics is viewed as only a school subject. The above-mentioned activities can have a formative influence on the pupil only on condition that the teacher knows the pupil's personality, creates such environment for his/her learning activities that the pupils themselves can organize their work so that they could take active part in the lesson and could perceive learning mathematics as solving interesting problems. We aim at showing that the word "to play" need not collocate with spare-time activities only. On contrary, it can help in making mathematics more popular. It is shown with presentation of the activities which were realised in the STM Morava project.*

Keywords: *mathematics, motivation, mathematical activities, constructivist view of education, creative view of education, STM Morava, didactic game*

HRÁTKY S MATEMATIKOU?

Abstrakt: *Neustále se mezi odborníky, učiteli matematiky i mezi širší veřejností hovoří o potřebě popularizace matematiky jako učebního předmětu. Na rozdíl od jiných výukových předmětů se matematika málokdy těší z přízně žáků, ba naopak, ve velkém procentu případů se jí žáci spíše bojí. Jak již bylo dříve ukázáno, řešení nestandardních aktivit, projektů, her nebo dalších motivační aktivity může pomáhat změnit pohled žáků a veřejnosti na matematiku jako pouze na školní předmět. Výše jmenované činnosti mohou však mít formativní vliv na žáka jen v případě, že učitel*

zná osobnost žáků a vytváří takové prostředí, při kterých si žáci sami mohou organizovat svou práci tak, aby mohli matematiku vnímat jako výzvu k řešení zajímavých problémů. Cílem příspěvku je ukázat, že vhodně zakomponovaná matematická aktivita může pomoci zvýšit atraktivitu matematiky v očích žáků i veřejnosti. Toto je prezentováno na aktivitách, které byly realizovány v rámci projektu STM Morava.

Klíčová slova: *matematika, motivace, matematické aktivity, pedagogický konstruktivismus, tvořivé vyučování, STM Morava, projekt, hra*

The motivation by didactic game
with constructivist background

In psychology, motivation refers to the initiation, direction, intensity and persistence of behaviour (5). Motivation is a temporal and dynamic state that should not be confused with personality or emotion. Motivation is having the desire and willingness to do something. Motivated pupils can be reaching for a long-term goal such as becoming a scientist or a more short-term goal like learning how to solve some equations. One of the best ways how to motivate pupil is using didactic game.

The didactic game requires using of the learning materials in uncommon situations; otherwise the student won't be challenged to develop analytical and mathematic skills. Each game has to be prepared according to the principles of the theory of didactical games and must have special phases which children have to go through to learn something new in mathematics. We think that the most important feature of the game is that children acquire their knowledge without teacher's didactical influence, they work only themselves. Researches report that, regardless of the subject matter, pupils working in small groups tend to learn more of what is taught and retain it for longer period than when the same content is presented in other instructional formats.

So we can characterize this pedagogical sense of the games as follow (6, p. 139):
- motivation of pupils, making them active,
- possible use of the game for making students work on their own, competitions (of individuals, groups etc.)
- developing of counting skills.

To incorporate the game dynamically into the lesson, we must follow the basic principles of the learning game's structure (3):

1. The rules of the game must be simple and clearly formulated, and the mathematics must be appropriate to the student's knowledge level. Otherwise, the game won't stimulate interest and will be just a formal process.
2. The game must have enough materials to stimulate critical thinking; otherwise it won't provide the support to the teacher in achieving the goals, and it won't develop math and concentration skills.
3. Each student must be an active participant; waiting too long for one's turn will decrease the child's interest in the game.
4. When organizing a game that involves team competition, you must ensure that you can control the results of the entire class. The results of the competition must be public, clear, and fair.
5. If you use games in several class periods, and they all include the same kind of deduction, then the math content must be organized by the principle of simple to complicated, and specific to abstract.

Let us give a simple example of connection between didactic game and pedagogical constructivism. We would like to present a situation, which is very common in our schools.

Tom recently turned eight and he is a good math problem-solver, he likes to play with numbers and invent routines, but because of a schooling mixup, he is behind in mastering his math facts. What will happen, if we afford him this suggestion? "Tom, this is a fun game you will enjoy; it will also help you learn the addition and subtraction skills that you're a little behind in. You will be glad, because learning that stuff is something you want, too."

Pupils do construct meaning from their experiences; learning should be meaningful and derive from an authentic context, so they should be allowed to pursue individual learning goals. We believe that Tom has a pretty good idea of what the game is doing for him, and the kind of fun he is deriving from it. As he chooses to make use of the game, he is actively constructing meaning and new knowledge. He has also plenty of other opportunities to exercise his more creative talents; his use of the game is filling a needed learning gap to meet the expectations and pace set by his school.

Project "playful mathematics"

The National Programme of Research II project of the Ministry of Education, Youth and Sports Research on New Methods Competition of Use Crea-

tivity Focused on Motivation in Scientific Area, Especially in Mathematics, Physics and Chemistry is a chance to apply efficient instruments of motivation in teaching mathematics while following the basic constructivist principals. When solving one particular task of the project (S 006, preliminary name Playful mathematics, B. Novák) we were inspired by the above-mentioned ideas and tried to confront them with the actual elementary school practice. Our experiment focused on creation and support of and research into educational efficiency of a number of activities: school mathematical competitions, projects, events for parents and public. It is aimed at various elementary school target groups: mathematically talented pupils as well as "average" pupils (focus on raising and developing their interest in mathematics) or special needs pupils.

We are going to show the features of these activities using the first of them, held in November 2006 at Primary School Uničov as an example. The motto of the project day was Playful Mathematics. The event was aimed at pupils of the 7th and 8th grades with the extended programme of mathematics; the 9th grade pupils participated actively as well – theirs was the role of referees of the given activities. Twelve teams of four competed; the names of the teams (e.g. Bambini di Mathematico, Einstein's Children, Dream Team, etc.) were pupils' own ideas. The teams were required to pass 12 posts with various unconventional activities, the function of which was raising pupils' motivation for mathematics, developing the positive attitude to mathematics as a school subject on the subject integration background and especially the chance to make pupils (by means of funny and easy way – such as sudoku, tangrams, brain-testers with matches, amount estimates, object manipulation using computer graphics etc.) learn mathematics. The team with the highest score was the winner.

Didactic features of the project

Let us examine and study, which requirements of the constructivist teaching necessary from the point of view of motivating pupils to learn mathematics were implemented and respected. We build on the basic decalogue given in (1) by Hejný and Kuřina.

The active involvement in the educational process and communication and mutual interaction between pupils in social environment of the class or school have usually been quoted as the most important didactic condition of efficient teaching. Pupils at Uničov were enthusiastic over solving the tasks and they used mathematics as a tool in all the games and tasks without even noticing. They acted in some tasks on their own, in the others referees or mathematics teach-

ers were their opponents. Simultaneously, there was constant communication on several levels: between players of the same team, between players and older pupils and between players and teachers.

Constructivism emphasises pupils' own building of a set of experience, which is generally seen as non-transferable. Even though this building process results from the obtained information, it is conditioned by the cognitive pre-conceptions of pupils. Therefore we gave pupils chance and space to develop co-operative and creative thinking when implementing the project. Pupils were given a chance to experiment and discover resulting in the feelings of success and joy.

The environment of the event was challenging and encouraging; it was adjusted to the ongoing activities – this ranged from post colouring to team uniforms. All of this, however, was a result of pupils' own activity supervised by their mathematics teachers.

Naturally, precise structuring of mathematical concepts and their subsequent representation was not emphasized. However, in spite of this, such a form of education contained all the phases of the mathematical educational process. The respective tasks could not have been accomplished had the pupils not comprehended basic principles and concepts of mathematics. They had to prove that they had mastered mathematics as a skill at all posts, e.g. when manipulating geometrical models or when performing computations. They were also constantly required to apply pieces of knowledge they had acquired when solving previous tasks.

Discussed activities: examples

We are now going to give an example of specific activities, which pupils were required to pass and we are going to comment the activities freely. The most popular activities have been chosen.

The fifth post was called "How many / how much?" (Fig.1). Pupils were required to estimate amount based on the knowledge of previous amount. First, they were asked to estimate the amount of beans in a 5-litre glass based on the amount of beans in a 100 ml can. Further they were asked to estimate the number of pages of a thin booklet compared to a dictionary of 1,000 pages. At last they were to estimate the length of a wire clew based on the given length of a several metre long clew. Even though the estimates varied considerably, the pupils showed great responsibility and tried to figure out the data by means of various "scientific" approaches.

Fig. 1: How many / how much?

The seventh post used a classical brain-tester (Fig. 2). There are 15 sticks on a triangle desk. The game starts by taking out an arbitrary one. The player has to jump over to empty places in any direction (hence the name "Jump me over"). The stick, which has been jumped over, is taken out of the game. The player with the smallest number of remaining sticks is the winner. Two or three were the best results. The team usually chose its best member and trusted in him when solving the task.
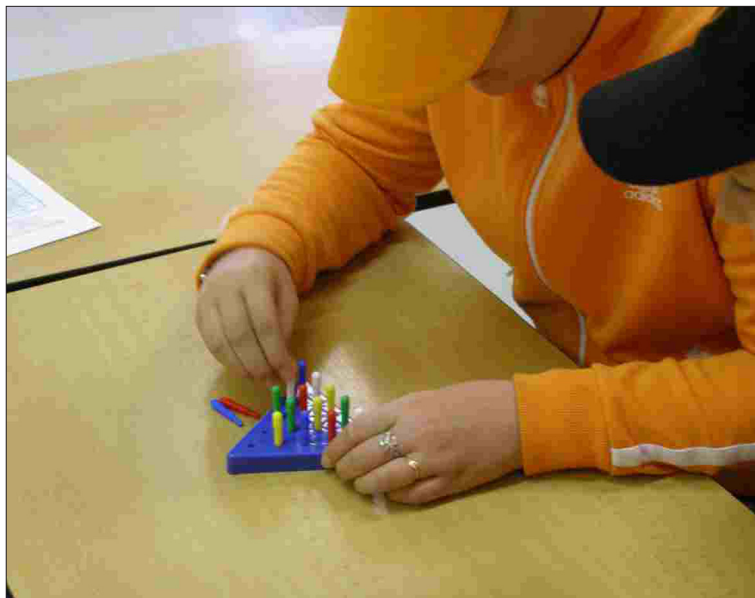
Fig. 2: Jump me over

The eighth post was called "Othello challenge" (Fig. 3). The activity was based on a well-known board game Othello (sometimes known as Reversi). The basic layout is made of a square of 8×8 fields. Reversi is played with special pieces. One side of these is white; the other is black (or coloured). When it is a player's turn, he/she places the playing piece on the board with his/her colour up. The pieces cannot be placed on arbitrary places – each move must capture one or more pieces of the opponent. These are then turned over and their owner changes. The aim of the game is to have more playing pieces than the opponent. The game is over when all the fields are occupied and none of the players can make a move.

The teams played against older pupils first. Later, the difficulty level increased and the teams played against a teacher. Apart from competing in the actual competition, teams made alliances in order to win at any cost. The whole teams got involved in order to find the best move.

Fig. 3: Othello challenge

Conclusion

Preparations for the event lasted for approximately two months. The teachers were aided by experiences and inspiration from didactic seminars at the Department of Mathematics. Postgraduate students also helped in many ways. Furthermore, parents and their presence were equally important – they could see at least a portion of their children's knowledge applied in solving mathematical problems. The fact that parents took part in the event also showed their interest in their children, which must have been positive as well.

Subsequent reflection and evaluation after event was important not only for the research into the educational efficiency within the project framework: pupils and parents could freely express their opinion and comments on a big board. Moreover, the assessment and award ceremony was patronized by mathematics teachers and the head of the school. Thus we know that pupils as well as parents and the general public liked the event and that they would like it to be

repeated. We believe that this is caused by the fact that the event gave everybody an unconventional view of mathematics, increased their interest in studying context and relations in problem solving. As far as motivation is concerned, this has enormous importance. We were happy to see the pupils' interest and enthusiasm, especially that fair play rules were never broken. This gave us the feeling of having done a good and meaningful thing.

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BIOLOGY TEXTBOOKS AND THEIR TEXT DIFFICULTY

Libuše Hrabí

Abstract: *This article presents the most important knowledge of the text difficulty evaluation of 22 current Czech biology textbooks for the 6th – 9th grades. The text analysis was carried out according to my own methodology. Results indicate that the average values of text difficulty increase from the 6th to 8th grade (from 32.11 points to 37.56 points). The textbooks for the 9th grade are characterized by a low text difficulty level (35.89 points). The scale of the biology text difficulty is a part of this paper.*

Key words: *Text difficulty, syntactic factor, semantic factor, scale of difficulty, biology textbooks*

Abstrakt: *V článku jsou obsaženy zásadní poznatky o hodnocení obtížnosti textu 22 současných českých učebnic přírodopisu pro 6. až 9. ročník základní školy. Analýzy textů byly realizovány vlastním metodickým postupem. Dosažené výsledky ukazují, že průměrné hodnoty celkové obtížnosti výkladového textu se zvyšují od 6. do 8. ročníku (od 32,11 bodu do 37,56 bodu). Učebnice pro 9. ročník se vyznačují nižší obtížností (35,89 bodu). Součástí článku je i navržená stupnice obtížnosti textů pro učebnice přírodopisu.*

Klíčová slova: *Obtížnost textu, syntaktický faktor, sémantický faktor, stupnice obtížnosti, učebnice přírodopisu*

Introduction

This article outlines a theoretical and practical perspective for the analysis of biology textbooks. It is possible to mention that textbooks have remained the most important tools in the process of education. In the Czech Republic there are more than six publishing companies producing biology textbooks. Some teachers do not know which one to use in their biology lessons because they do not have any information concerning their quality. The quality of textbooks has been studied by experts in different countries (Schmidt 1991, Olechowski 1995, Ottich – Kowalczyk 1992, Shepardson – Pizzini 1991). In our country

these studies have been realized too (Hrabí 2003, Pluskal 1996, Průcha 1984, 1997).

My experimental evaluation of the biology textbooks results in a finding whether a textbook is appropriate for learning or not.

Material and methods

Text difficulty was studied in biology textbooks for the 6th to 9th grades. Biology textbooks of the publishing companies FORTUNA (1997, 1999), JINAN (1998, 2000, 2001), NOVÁ ŠKOLA (1998), PRODOS (1998, 1999, 2000), SCIENTIA (1997, 1998, 2000, 2001) and SPN (1998, 1999) were examined. Exact citations are written in the chapter Literature. Eleven characteristics of text difficulty were examined. Ten samples of text from each of the biology textbooks were selected, and each sample consisted of 100 or more words (ΣN). Particular characteristics of difficulty, their symbols, definitions, ways of calculation are written as follows:

T – text difficulty; $T = T_s + T_p$ (points),

T_s – syntactic factor; $T_s = 0,1 \times \bar{V} \times \bar{U}$ (points),

$\bar{V}$ – average length of sentence (number of words),

$\bar{U}$ – syntactic complexity of sentence,

T_p – semantic factor,

$$T_p = 100 \times \frac{\sum P}{\sum N} \times \frac{\frac{\sum P_1}{2} + 2\sum P_2 + \sum P_3 + \sum P_4}{\sum N}$$

$\frac{\sum U}{\sum N} \times 100$ – proportion of verbs (%),

$\frac{\sum P}{\sum N} \times 100$ – proportion of substantives (%),

$\frac{\sum P_1}{\sum N} \times 100$ – proportion of common terms (%),

$\frac{\sum P_2}{\sum N} \times 100$ – proportion of scientific terms (%),

$\frac{\sum P_3}{\sum N} \times 100$ – proportion of factual terms (%),

$\dfrac{\sum P_4}{\sum N}\times100\cdot$ – proportion of repeated terms (%).

Average values of the text difficulty were calculated for particular grades. Two other characteristics – average value of syntactic factor and average value of semantic factor were calculated. The most important statistical characteristics were calculated too.

These symbols and formulas were used:

x – measured value

n – number of measured values

$n\text{-}1$ – number of degrees of freedom

$\bar{x}$ – arithmetic mean; $\bar{x}=\dfrac{\sum x}{n}$

s – standard deviation; $s=\sqrt{\dfrac{\sum(x-\bar{x})^2}{n-1}}$

$s_{\bar{x}}$ – mean error; $s_{\bar{x}}=\dfrac{s}{\sqrt{n}}$

v – variational coefficient (%); $v=\dfrac{s}{\bar{x}}\times100$

According to previous and presented results, the scale of the biology text difficulty was formed.
Recommended scale of the biology text difficulty:

sixth grade   T = 31 – 34 points
seventh grade   T = 33 – 36 points
eighth grade   T = 35 – 38 points
ninth grade   T = 37 – 40 points

Results

The most important characteristics of text difficulty are written in Table 1.

The total difficulty of text in the biology textbooks for the 6th grade demonstrates that the obtained values vary from 29 to 39 points. The values of the syntactic factor fluctuate from 5 to 10 points. The values of the semantic factor are very different and vary from 19 to 25 points. According to this study it is possible to mention that the biology textbooks of the majority of the publishing companies are suitable for teaching, with the exception of the textbook of the Prodos publishing company.

The text difficulty in the biology textbooks for the 7th grade shows that text difficulty varies from 30 to 43 points. The values of the syntactic factor fluctuate from 6 to 10 points. The values of semantic factor achieve 22 to 35 points. According to these results it is possible to mention that a lot of the studied textbooks are convenient for biology teaching, with the exception of the textbooks of the Nová škola and Prodos publishing companies.

The analyses of the biology textbooks for the 8th grade demonstrate that text difficulty varies from 35 to 40 points. The values of the syntactic factor fluctuate from 8 to 11 points. The values of the semantic factor vary from 23 to 31 points. According to these obtained results it is possible to state that the textbooks of the Jinan, Scientia and SPN publishing companies are suitable for biology teaching.

The analyses of the biology textbooks for the 9th grade demonstrate that text difficulty varies from 30 to 41 points. The values of the syntactic factor fluctuate from 10 to 13 points. The values of the semantic factor vary from 18 to 28 points. According to these results it is possible to state that the textbooks of the SPN publishing company are suitable for biology teaching.

Table 1: Main components of text difficulty in the biology textbooks

Grade	Publishing company	Text difficulty (T)	Syntactic factor (Ts)	Semantic factor (Ts)
Sixth	Fortuna	32.07	7.86	24.21
	Jinan	30.65	9.77	20.88
	Nová škola	30.85	5.47	25.38
	Prodos	38.69	7.63	31.06
	Scientia	28.91	10.12	18.79
	SPN	31.51	6.66	24.85

Seventh	Fortuna	33.88	9.19	24.69
	Jinan	30.14	9.45	20.69
	Nová škola	43.10	7.63	35.47
	Prodos	38.47	7.45	30.94
	Scientia	32.43	10.08	22.35
	SPN	34.69	6.47	28.22
Eighth	Fortuna	39.78	9.25	30.53
	Jinan	36.24	11.28	24.96
	Prodos	40.37	7.58	32.79
	Scientia	34.58	11.27	23.31
	SPN	36.83	8.70	28.13
Ninth	Fortuna	41.32	12.94	28.38
	Jinan	34.97	11.55	23.42
	Prodos	34.72	10.40	24.32
	Scientia	29.85	11.75	18.10
	SPN	38.57	12.26	26.31

The main statistical values of text difficulty in the studied biology textbooks are given in Table 2. The obtained results of the mean values of text difficulty show this range: from 32 to 38 points. The variability is not high. The mean values of the syntactic factor vary from 8 to 12 points. It demonstrates that sentences are not very long and complicated. The variability is quite high. Mean values of the semantic factor vary from 24 to 28 points. These results demonstrate that terms are not very difficult. The variability is quite high.

Table 2: Main statistical values of text difficulty in the biology textbooks

Grade	Text difficulty				Syntactic factor				Semantic factor			
	$\bar{x}$	$s_{\bar{x}}$	s	v	$\bar{x}$	$s_{\bar{x}}$	S	v	$\bar{x}$	$s_{\bar{x}}$	s	v
Sixth	32.11	1.38	3.39	10.56	7.92	0.73	1.78	22.47	24.19	1.72	4.22	17.44
Seventh	35.45	1.89	4.64	13.09	8.38	0.57	1.39	16.56	27.07	2.28	5.58	20.62
Eighth	37.56	1.09	2.45	6.52	9.62	0.73	1.63	16.95	27.94	1.74	3.89	13.92
Ninth	35.89	1.94	4.34	12.09	11.78	0.42	0.94	7.98	24.11	1.73	3.86	16.01

Conclusion

This article presents findings about evaluation of text difficulty in 22 biology textbooks. The results indicate that the average difficulty increases from the 6th

grade (32 points) to the 8th grade (38 points). The textbooks for the 9th grades show lower difficulty level.

The presented scale of the biology text difficulty enables us to evaluate the textbooks according to text difficulty, and to choose an optimum biology textbook for our teaching. The most suitable textbooks can be the ones of the SPN or Scientia publishing companies.

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THE ROLE OF TASK ANALYSES IN EFFECTIVE INSTRUCTION

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Summary: *The purpose of this paper is to discuss how task analysis (TA) can be utilized to help pre-service and practicing teachers to generate lesson plans that can positively impact the achievement of students. The connection between state standards, ordering of learning objectives, task analyses, and assessments are described. Different approaches to constructing and implementing TAs are presented. While TAs for the psychomotor domain are briefly described the emphasis is on developing such analyses for outcomes associated with the cognitive domain. Examples are provided that demonstrate the process of developing TAs for a Georgia Performance Standard, and classic guidelines for creating task analyses are reviewed.*

Key words: *Task analysis, cognitive task analysis, creative task analysis, teaching skills, lessons, achievement.*

Introduction

One of the most challenging topics our students and we face each semester in our educational psychology classes involves converting Georgia Performance Standards (GPS) into more meaningful learning outcomes that prospective teachers with limited experience can use to build their lesson plans. GPS outcomes, like their predecessors in the Quality Core Curriculum, can use ambiguous language (words and phrases such as *understand* and *demonstrate* that mean different things to different people when it is time to assess students' achievement), and sometimes cover large amounts of content. Once teachers have acquired some proficiency in converting GPS outcomes into objectives that are clear to other professionals, parents/caregivers, and students, educators must still grapple with designing both assessments and instructional activities that effectively enable students to master the concepts and skills specified in the objectives.

Assessment in effective instruction

According to Gronlund (1998) effective and valid assessments are closely aligned with effective instruction: "Effective instruction requires that we ex-

pand our concern to a teaching-learning-assessment process, with assessment as a basic part of the instructional program" (p. 3). Hickman and Anderson (1979) present a model using Robert Mager's approach to effective instruction that educators can use to evaluate the degree that curricular materials are appropriate for use with learning disabled students. Mager's approach (as cited in Hickman & Anderson, 1979) to instruction is one already familiar to those who have experience with effective instruction. First, one develops and sequences clear objectives. Each objective is then broken down into its sequenced subcomponents. Finally, instructional materials and assessments are compared to the objectives and task analyses to determine how well they are aligned.

Gronlund (2000) identified six principles of effective achievement testing. When phrases such as "effective achievement testing" are mentioned, many assume the focus is on exams, tests, and quizzes. While the phrase does include traditional testing, the word *test* is a broader term and should be viewed as a synonym for assessment (Gage & Berliner, 1992, p. 569). Thus, these rules apply to informal assessments designed to help students learn content, to formative assessments which are used to identify specific students' strengths and weaknesses, formal assessments which are taken for a grade, and summative assessments which attempt to answer the question, "How did the students do?" with respect to a particular unit or lesson.

The first principle (Gronlund, 2000) concerns the relationship that must exist between the lesson's outcomes/objectives and the items on the assessment: Assessment items must directly relate to objectives that were taught to students and be proportionate with the amount of time spent on each objective in class. Most states, today, have mandated standards for each subject and grade level, and educators are supposed to teach the content and skills associated with the state's standards to their students. As pointed out earlier, most state standards are invariably vague so teachers (hopefully in consultation with one another) must transform each standard into a set of sequenced objectives that clearly inform students what they are to say and do (and how well) after instruction. Once these objectives are developed, they must be taught to students. Each item on every assessment should clearly and directly relate to these objectives and the weight of a specific item on the assessment should approximate the time spent on the objective in class. Gronlund's second principle is related to his first: Any single assessment, including summative exams, should only have items that cover a representative set of the lesson's objectives. In other words, no single assessment is likely to have items that cover all of the objectives taught

in a lesson, but across all assessments in the lesson, all the objectives should be represented.

Gronlund's (2000) third and fourth principles are related to the type of items one uses on the assessments and the purpose of the assessment. The items on the assessment should be the type that is most appropriate for the objective it taps. If an assessment is designed to help students learn material or to acquire a higher level of fluency (i.e., worksheets done individually or in small groups, or homework), one should probably use supply-type items that require students to write rather than select items such as multiple-choice (which should mainly be used as summative assessments). Most importantly, items on assessments should reflect the same level of the Bloom et al. (1956) taxonomy as the objective it measures. The final principles postulated are that the assessment should be reliable and promote and improve student learning.

Ordering of objectives

Once one has good objectives and has identified appropriate assessments that are aligned with the objectives one must also ensure that the objectives are ordered appropriately (Resnick, Wang, & Kaplan, 1973). Content and skills covered in one objective that are pre-requisites to later objectives should precede the latter. Likewise, objectives requiring students to perform at the higher levels of the Bloom et al. (1956) taxonomy will generally come after those related to the same content but requiring students to perform at the lower levels. For example, list and describe objectives requiring knowledge and/or comprehension and should be earlier in a sequence than objectives requiring the student to apply, analyze, etc.

The ordering of objectives within each unit is based on detailed analyses of each task. These analyses are designed to reveal component and prerequisite behaviors for each terminal objective, both as a basis for sequencing the objectives and to provide suggestions for teaching a given objective to children who are experiencing difficulty. The detailed analyses identify many behaviors that are not part of the formal curriculum, but which underlie the stated objectives and may need to be taught explicitly to some children. (Resnick et al., 1973, p. 682)

Creating task analyses

After one has sequenced the objectives for the lesson appropriately, the next step in developing an effective lesson plan involves identifying the step-by-step

progression for successfully completing the skills denoted in each objective. This is formally called a task analysis (Gagne, 1962). Conceptually, a complex activity specified in an objective is reduced to its subcomponent behaviors that are placed in a sequential order.

Both Resnick et al. (1979), and Williams and Cuvo (1986) describe two approaches, general and specific, for developing task analyses (TA). Specific task analyses "...provide a detailed description of the responses and response sequences that constitute a behavioral chain" (Williams & Cuvo, 1986, p. 39), while the general approach uses only "...mandatory steps that constitute essential task outcomes" (p. 39). Their study used each approach to teach disabled clients apartment upkeep skills. They found that specific TAs were most effective to teach the clients the necessary skills, while the general TAs were best for assessing client's proficiency levels.

Hughes (1982) emphasizes that there is not just one way to construct a good task analysis (TA) for the behavior specified in an objective. One of her most important points is that objectives written at the higher levels of any taxonomy of objectives (e.g., Bloom et al., 1956) requires that the students already possess the content and skills at the lower levels, which should effect how a lesson's objectives are sequenced. For example, objectives requiring that students compare and contrast begin with students describing the features or characteristics of the elements that will be compared. Hughes states that Gagne originally described TAs as working backwards from the final response in the chain that collectively represent the complex behavior specified in the objective. She points out that this (i.e., backward chaining) is one approach to constructing TAs.

Other approaches she describes are the stimulus response table (basically an example of forward-chaining), observing a proficient student who verbalizes what she is doing as she does an objective (this is the approach most teachers probably use though the teacher does the complex activity rather than observing a student do it), flow-charting which she suggests for objectives requiring performance at the higher levels of the Bloom et al. (1956) taxonomy, and the critical incident approach in which more proficient students (those who can do the complex behavior specified in the objective) identify the sub-component responses that are most important to successfully completing the objective (what Williams & Cuvo [1986] term the general approach to TAs). The identified sub-components are then emphasized in the lesson. Ideally, teachers will use the approaches in combination to produce effective lessons that efficiently enable learners to acquire new skills in all three domains (affective, psychomo-

tor, and cognitive). The key is to insure that each subcomponent identifies an overt action that the students must perform.

Congnitive task analyses

Many of the objectives teachers use tap the higher levels of the Bloom et al. (1956) taxonomy. Task analyses for such objectives may require cognitive-based steps as well as behavioral ones. Yates (2007) has identified over 100 different types of cognitive task analyses (CTA). Yates developed a taxonomy for CTAs requiring cognitive-process steps that identifies the most frequently used CTAs and whether they refer to processes or outcomes. According to Yates, most CTAs are aligned with content stored as declarative rather than as procedural memory, which is understandable because procedural memory deals mainly with behavioral chains.

Cameron, Shapiro, and Ansleigh (2005) presented what they called a *rational task analysis* to a developmentally delayed child that was to train him how to ride a bicycle. After reviewing the task analysis program the child rejected the program. The first mistake made in this skills-based psychomotor program (since the TA was for bike riding) involved the assumption that the TA program, by itself, could be used to modify the child's behavior. While academic TAs can often be the basis for stand-alone instructional lessons that do not require teacher-implementation (e.g., a tutorial software program or an explanatory handout) most TAs, including those for academics, are developed by the teacher to be used as the basis for the teacher to develop a lesson plan to teach the students the skills/content identified in an objective. In other words, the TA identifies the sequenced sub-component responses associated with the performance in the objective, and the teacher then teaches these components to the students.

While there are several different types of TAs, the most commonly used in educational settings are whole task, backward-chaining, and forward-chaining. In a whole-task TA, the teacher would model/demonstrate the action the learner is to imitate. In backward-chaining the trainer teaches the last action in the chain, then the next-to-last, etc. In forward-chaining, the sub-component behaviors are taught in the sequence that they actually occur in the complex behavior specified in the objective.

Batra and Batra (2005–2006) used matched participants to determine which chaining procedure, whole task, forward, or backward, was most effective in teaching disabled children simple psychomotor skills such as tying shoes. In

their review of literature they found that with respect to psychomotor skills backward chaining was superior or equivalent to forward chaining (one study they cited found that all three approaches, whole task, forward, and backward were about the same). With academic responses, though, the results were mixed. In their study, forward and backward chaining were found to be equally effective as the basis for teaching simple psychomotor tasks. Whole task presentation was not studied.

Teaching skills based on the task analyses

In our experiences forward-chaining is the easiest to teach others how to do because it represents doing the behavior. In a forward-chained TA one will simply list, in order, the first thing to do, the second, etc. until the complex action stated in the objective is completed. It is a straightforward process, but novices often make predictable mistakes. The most common mistakes include (a) skipping steps, (b) not specifying an overt action at each step, and (c) not having enough steps.

Teachers generally are masters of their content and they do the tasks associated with their objectives almost rotely because they have practiced them countless times. Since it is so easy for teachers to do complex activities it is a good idea to double check the sequence of one's academic content to ensure that certain steps have not been skipped. Specifying an overt action at each step is critical because it provides the teacher and learner with an objective reference point to monitor progress. No one can objectively "know" if a person has actually acquired a skill until the person demonstrates it.

Obviously, TAs developed through different approaches are tools that teachers can use to as the basis for teaching the sub-component skills (cognitive or behavioral) to students, but TAs are usually not, by themselves, adequate to help students develop new skills. The sub-components must be taught. Most educators will teach the sub-component skills in the order that they appear in the TA by explaining and modeling. Once separate component skills are mastered, the teacher models how the sub-components occur in a smooth sequence.

Gilbert and Gilbert (1992) state that when teaching complex inter-related skills such as mathematics' times tables, performance science principles demonstrate that students learn to do a complex behavior more efficiently when first taught the more difficult components in the complex activity. This suggests an instructional approach to teach the skills and content of an objective that is different from the approaches most commonly cited in the literature (i.e.,

whole task, forward-and-backward chaining, specific [all behaviors in the chain included] and general [only critical behaviors included]).

Examples of task analyses

The following represents a sequenced set of six objectives and their TAs on the four basic types of sentences which are based on a Georgia Performance Standard and aligned to the appropriate levels of cognitive processes according to the Bloom et al. (1956) taxonomy:

Georgia Performance Standard (Source: www.georgiastandards.org) ELA4C1

ELA4C1 The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats. The student

a. Recognizes the subject-predicate relationship in sentences.
b. Uses and identifies four basic parts of speech (adjective, noun, verb, adverb).
c. Uses and identifies correct mechanics (end marks, commas for series, capitalization), correct usage (subject and verb agreement in a simple sentence), and correct sentence structure (elimination of sentence fragments).
d. Uses and identifies words or word parts from other languages that have been adopted into the English language.
e. Writes legibly in cursive, leaving space between letters in a word and between words in a sentence.
f. Uses knowledge of letter sounds, word parts, word segmentation, and syllabication to monitor and correct spelling.
g. Spells most commonly used homophones correctly (there, they're, their; two, too, to).
h. *Varies the sentence structure by kind (declarative, interrogative, imperative, and exclamatory sentences and functional fragments), order, and complexity (simple, compound).*

1. **List and define in their own words using complete sentences the 4 categories of sentences with 100% accuracy. (Comprehension)**
    Task Analysis:
    a. Write the name of one of the 4 types of sentences.

b. Using the text or notes, copy the definition of the sentence.

c. Using a thesaurus, re-write the definition using paraphrasing.

d. Punctuate each sentence according to its type (period, exclamation point, or question mark.)

e. Repeat a-d for the remaining 3 types of sentences.

2. **State the correct end punctuation associated with each of the 4 types of sentences with 100% accuracy. (Knowledge)**
Task Analysis:

a. Write the names of the 3 types of end punctuation

b. Write the symbol for each end punctuation.

c. Write period for Declarative

d. Write Period for Imperative

e. Write question mark for Interrogatory

f. Write exclamation point for Exclamatory.

3. **When given 12 sentences without end punctuation, correctly punctuate at least 10 of the sentences. (Application)**
Task Analysis:

a. Write the name and symbol for the 3 types of end punctuation.

b. Write the name of each of the 4 types of sentences

c. Write next to the name of each sentence type the end punctuation it requires.

d. Read the first sentence, if it makes a command or states a fact, used the period; if it asks a question, use a question mark; if it demonstrates a high level of emotion, end it with an exclamation point.

OR

Task Analysis:

a. Make 4 columns and write the name of the 4 sentence type, one in each column

b. Under the declarative column write, ends with a period; for imperative write, ends with a period; for interrogatory write, ends with a question mark; and for exclamatory write, ends with an exclamation point.

c. Read first sentence. If the sentence makes a command, label it imperative and end it with a dot; if the sentence simply states a fact, label it declarative and end it with a dot; if the sentence asks a question, label it interrogatory and end it with a question mark; if the sentence conveys

a high level of affect, label it exclamatory and end it with an exclamation point.

    d. Repeat step c for remaining sentences.

4. **When given 20 sentences, label at least 17 correctly as to the type of sentence each is in no longer than 15 minutes. (Application)**
   Task Analysis:
   a. read first sentence; if there is an !, write exclamatory next to it
   b. if the sentence ends in a ?, write interrogatory next to it.
   c. If the sentence ends in a ., write I or D. Re-read sentence; if sentence merely states a fact, label it declarative; if the sentence is a "power statement," label it imperative.

5. **When given a topic, Ss will write an example of each of the 4 types of sentences for the topic with 75% accuracy. (Evaluation)**
   Task Analysis:
   a. Re-write the topic/idea in your own words.
   b. Write the definition of a declarative sentence—(stating a fact)
   c. Underline in the topic (a above) a fact that is explicit or implicit
   d. Write the definition of an imperative sentence.
   e. Write a command or request related to the topic.
   f. Write the definition of an interrogatory sentence.
   g. Write a question related to the topic.
   h. Write the definition of an exclamatory sentence
   i. Write a sentence with high excitement/emotion related to the topic.

6. **On a homework or in-class assignment, Ss will, when given a topic, write at least one 5-7 sentence paragraph on the topic that employs each of the 4 types of sentences with 75% accuracy (correct grammar and spelling). (Evaluation)**
   Task Analysis:
   a. Write the topic that has been assigned.
   b. Name and define the 4 sentence types.
   c. Write 3 examples of each type of sentence that are related to the topic.
   d. Arrange the sentences in step c into a paragraph using at least one from each of the 4 types of sentences.
   e. Proof and summarize the paragraph ensuring at least 5 sentences.
   f. After each sentence in parentheses, write the name of the sentence type.

Guidelines for task analyses

Siegel and Siegel (1975) had education students develop task analyses (TA) on a group of topics over a ten-year period. They then derived 10 guidelines based on the numerous sample TAs provided by the education majors. Their first guideline is *Avoid extraneous material* (p. 16). This means that one should not add non-essential steps or behaviors; the TA should deal only with the skill the students are to learn. The second is, *Don't spend too much time in re-teaching the prerequisite* (p. 16). If the student already possesses these skills the teacher should only demonstrate/review them once or twice to activate the students' prior knowledge then begin teaching the TA's sub-component behaviors starting at the students' entry skill level (i.e., at the sub-component the students can already do). (Of course, if the students do not yet possess the prerequisite skills/knowledge, teach those before teaching the behavioral steps of the TA.)

The third guideline, *Use what the child knows-and this includes prerequisites-to help him learn the new* (Siegel & Siegel, 1975, p. 16). For example, if one's objective is to teach students how to compare the powers of the legislative branch to that of the judiciary's, one should begin by having students list the powers (already taught) of each branch as the first step to then begin the comparison. The fourth, *Assume motivation* (p. 16) simply means that one should not expend too much time and energy to either determine what the students' motivational level is, or to increase it. As the students acquire and master each behavioral step, acquisition/improvement, and mastery should be contingently reinforced following the generic rules used in shaping any new response.

The fifth guideline, *Identify the sequential components* (Siegel & Siegel, 1975, p. 17), simply specifies that the component skills one must do to accomplish the complex behavior indicated in an objective must be ordered (though not necessarily taught) in the sequence that they occur. The sixth guideline is to *Avoid the "recipe" approach* (p. 17). As the teacher you are an expert with respect to the skill being learned and can easily follow a listing (i.e., recipe) of sequenced/chained responses. The students you are teaching, however, will likely benefit from explanations and demonstrations related to many of the sub-component behaviors until the students also become familiar with them (at which point, these types of prompts should be faded as extraneous).

The seventh guideline identified by Siegel and Siegel (1975) involves, *Avoid substituting a variety of activities in lieu of an instructional sequence* (p. 18). These types of activities may give students practice on one or more of the sub-component skills, but they are not the focus of the instructional sequence that enables

the students to learn the behavior in the objective. Once the students learn the separate component responses, in sequence, then provide them with practice opportunities on the entire task so the sub-components are practiced as a whole. Guideline eight, *Become proficient in technical aspects of the instructional task* (p. 18) means that the teacher should practice the objective's behavior, and each of the sub-component responses, in order to anticipate problems and/or possible prompts to provide the learners.

The remaining two guidelines are to *Avoid scientific jargon* (Siegel & Siegel, 1975, p. 18), and *Don't just present, teach* (p. 19). Teachers often write TAs using terminology that may or may not make sense to students. Guidelines 6, 9, and 10 all suggest that the TAs one develops are primarily for the teacher (i.e., a mini-lesson for a specific objective) rather than a listing provided to the students. One uses the sequenced responses in the TA to identify the skills and content to teach rather than as the teaching vehicle. "All of these guidelines can be encapsulated into two prepotent principles: (1) Stipulate that the given child is absolutely ready for your sequence, but that (2) he is utterly incapable of learning it without specific instruction" (Siegel & Siegel, 1975, p. 21).

Discussion

This paper summarizes the role of task analysis in the creation of quality lesson plans. Once a pre-service or practicing educator has finished a TA for a specific objective, the TA is like a blueprint that can followed to teach (by explaining and modeling) students the series of discrete behaviors identified in the complex action specified by an objective, and to smoothly (via practice) acquire proficiency over the complex behavior specified in each objective. By selecting appropriate Georgia Performance Standards and creating sequenced objectives and task analyses, educators can more effectively teach the academic skills necessary to help increase the achievement of Georgia's P-12 grade students.

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PSYCHOLOGICAL AND SOCIAL ISSUES
OF THE ROMANY MINORITY

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Summary: *This paper focuses on the largest ethnic minority group in the Czech Republic – the Romany minority. The purpose of this paper was to provide several different perspectives on this group and to present various information and research conducted in this area. It discusses briefly the history and changes brought by year 1989 and focuses on characteristic features of this minority.*

Key words: *Romany minority, history, anthropological and ethnical characteristics, family, intelligence research, personality, mental health, education, major society.*

Introduction

Ethnic minority groups in the Czech Republic represent about 5 % of the whole population. The largest minority, called Romany, represents about 3 % of the population, or about 300 thousand people (Říčan 1998).

According to the 2001 population census, less than 12,000 Czech citizens claimed Romany ethnicity. However, according to expert estimations, this data is underestimated and the rough estimation is about 150,000–300,000 persons of the Romany ethnicity (Government of the Czech Republic, 2001).

Greeks began to use the term **"gypsy"** in the 10th century, but Romanies do not themselves use this term in their own language. In the past 20 years educated gypsy representatives have requested to be called **Romanies**. In their language the term Roma means "a man, a husband" (Šišková, 1998).

History and the present

The country of origin of Romanies is **India**. They lived a nomadic life and applied their craftsman-like ability, especially as smiths, tinkers, butchers and potters. They used their musical talents to entertain audiences by dancing, singing, playing instruments and doing some tricks. They probably immigrated to Europe due to a lack of food. By the time they appeared in the Czech territory they had traveled around several European countries. The first reports of their appearance in our territory coincide with the **14th century**. At first they were

welcomed because they were bringing with them the new technologies of metal elaboration, but later the situation changed.

At the beginning of the 18th century Romanies were subjected to **official assimilatory politics**, with the goal of legalizing their presence and embodying them in the society. They were forced to dress as the rest of the population, to work in agriculture, to speak the language of the majority, to live in reserved places, etc. This forced integration provoked many conflicts and resistance against the major society. Later on some of them were voluntarily agreeing to become a part of the society.

In the 20th century a law was adopted that forbade living a gypsy lifestyle (i.e., leading the nomadic life, wandering, bivouacking, etc.).

According to Nečas (1981), about **5 000 Romanies perished** during the World War II, mostly in the death camps, so only about 1,000 were left.

After 1948 the Romany situation started to get better. There was an increased emphasis on education with the goal of suppressing illiteracy, and medical programs were instituted to improve hygiene and social care. The numbers of Romanies in the Czech Republic increased due to population explosion and migration from Slovakia.

The communist regime conceived of the solution to the Romany issue simply as a social one. Romanies should be merged with the Czech and Slovakian major society and their individuality would thus be eliminated. Their culture and lifestyle were restrained, they had a minimum space for activity, and the government assumed a so-called "paternalistic pampering" attitude toward them. This meant the provision of constant employment, higher salaries for unskilled labor, benevolence in school performance evaluation, etc. In spite of all this, the gap and contrast between the sociocultural standards of the non-Romany population and Romanies was increasing (Říčan, 2000).

The fall of communism in 1989 initiated radical changes in the societies around the whole of Europe. For Romanies it brought independence and the right to speak their language, to identify themselves with their ethnic culture, to organize Romany meetings, etc. But it was very soon clear that Romanies could not take advantage of the opportunity and their situation generally got worse.

Problems brought about by the changes in 1989

–   **unemployment** – according to Vágnerová (1997), in 1997 it was estimated that about 70 % of Romanies did not work

- **crime-rate** – while statistics are not available, it has been estimated that about 20–30 % of Romanies committed criminal acts. In Brno (the second biggest city in the Czech Republic) Romanies committed 95 % of crimes involving pocket-picking and 80 % of crimes involving robbery (Večeřa, 1997). Romanies account for more than 60 % of the adult prison population.
- **media influence** – under the previous regime, reports related to Romanies were not released. Now (in contrast), reports are published and show Romanies in an unfavorable light.
- **accessibility of drugs**
- **societal aversion** – in response to Romany asocial behavior and experiences with their criminality, insufficient hygiene, etc. (which has drawn even more attention through media coverage), xenophobia has emerged.

Anthropological and ethnical characteristics

Romanies have a somewhat dark complexion, dark hair, almond shaped eyes and typical physiognomy.

In terms of **maturation,** Romanies generally have a shorter pregnancy, children are delivered earlier with an average birth weight of about 2,500 grams, but they get well faster than non-Romany children of the same weight. Romany girls start to menstruate later, but their secondary gender characteristics are developed earlier. This results in earlier partnerships and parenthood.

Malá (1988) notes that the 20-year-old Roma is, on average, about 9 cm shorter than the non-Romany boy the same age. Another research report generally supported the **shorter stature** of the Romany people as well.

Kalibová (1999) states that the average age of **mortality** in the 1980s was lower for the Romany population; averaging 55.3 years for men and 59.5 years for women. Therefore the age distribution of the Romany population has a low proportion of elderly people and a high proportion of young people. In 1991, the median age was 20 years while that of the non-Romany population was 35.4 years.

The **medical condition** of Romany children is generally worse than non-Romany children. Romanies seek disability pensions at a rate 6 times greater than their representation in the population. Reasons include unsatisfactory living conditions, insufficient diet during pregnancy and over the lifetime, bad hygiene, a non-stimulating environment, etc. The contribution of genetic influences and inbreeding is a very sensitive question but (due to concerns of racism and discrimination) there is no research in this area. Several studies conducted

in Slovakia, e.g. Chudá, Štofilová (2003), with about 1,100 Romany pupils showed that 97 % suffered from some mental disorder or mental weakness, 42 % from sensory impairment, 17 % from respiratory problems, and 15 % had some impairment of the kinetic system (Horňák, 2005).

Family characteristics

The traditional Romany family superficially appears patriarchal with the man holding the dominant position (the reality, however, is different). The value of a woman is in her fertility. Romanies tend to group closely, with the primary family members living together with other relatives. Thus the "family" consists of many members (Horňák, 2005).

Partnerships are established very early, **at the age of 13–15**. They have many children, which gives an impression that they are irresponsible and that the level of morality is low. However, research findings show that Romany marriages are stable and hold together longer (Davidová, 1995).

Demeter (1993) points out that upbringing in Romany families is typified by a lack of rules and is guided by momentary needs of family members. There is an inability (or unwillingness) to do unpleasant duties, an inability to keep attention, etc. This type of family upbringing is said to lead to environmentally conditioned sociopathy.

The family bond is very strong. However, in comparison with the past, the number of Romany children in foster care and institutional care has increased. At the end of the 1980s **almost half the children** in any institutional care (e.g., institutions for mentally retarded and physically handicapped children) were of the Romany origin (Bakalář, 2004).

Intelligence research

Klíma (1988) points to the good Romany ability to solve practical problems, especially when connected with the satisfaction of their own needs. Romanies accept reality as it is and do not try to change it.

It cannot be said that Romanies are mentally retarded but the structure of their intelligence is different. Hlubocký (in Vágnerová, 1999) even speaks about so called dispersively lowered intellect, where just the aspects which are useful for them are developed.

Concerning the assessment of intelligence, it is presumed (1) that the environment in which Romanies live does not contribute to the development of aspects which are measured by intelligence tests and (2) that there may be genetic

factors that result in Romanies scoring in the range of subnormality. Therefore, the use of common IQ tests rather underestimates and do not reflect the real IQ of Romanies. While few researches have focused on the IQ of Romanies, one study done by Ferjenčík (1997) showed an **average IQ of 87** when using the subtests of IQ tests that do not depend on language and culture. If the regular tests were used, then the findings dropped in average of 10 points.

The diagnostic examination has a several aspects as sources of disabling factors for Roma children, i.e. suitable psychodiagnostic tests, objective diagnosing (taking account of the cultural and social background and personality characteristics) and preparation before entering school (Tomatová, 2005).

Personality disposition

Klíma (1988) notes the typical traits of Romany personality that are determined by the combination of genetic disposition and specific impacts of environment.

- their temperaments include excitability, sociability, disobedience, impulsivity, higher intensity of emotionality, insufficient control of emotion in childhood that often is interpreted as behavior disorder
- they do not identify with norms and values of the major society, they accept norms formally but do not follow them, they do not have feelings of guilt, punishment for rule-breaking is perceived as unfair
- they do not tend toward introspection or self-evaluation, they do not have the idol, they are not motivated towards a change, they have a specific nonverbal empathy, their lack of education shows in naivety, a lack of criticism, magical thinking and superstitiousness
- they are focused on current moment, on presence (Stewart, 2005)

In comparison to the norms of the major society the extreme variants of Romany personality manifest as abnormal and most often are considered as psychopathy. Even though the behavior may lead to the impression of a disorder, one must remember that "different" is not necessarily "pathological". Behaviors that are inconsistent with or that violate the expectations of the larger society may lead to the impression that an individual is "disordered", not simply different.

The personality traits that increase the risk of conflict with the majority are the lack of behavior control, impulsivity, aggression, oversensitivity, intensive

emotionality and a tendency to demand immediate satisfaction of their needs. This type of personality is characterized by the term **"Romany ethnopathy"** (Vágnerová 1999).

Mental health

Okruhlica and Vejborová (in Bakalář, 2004) explored the specifics of psychological disorders in the Romany population, arriving at two conclusions:

- the comparative incidence of disorders between boys and girls is 3:1 and there is a higher incidence rate among adult males as well. These findings are unusual because worldwide there is a higher incidence rate among women.
- there was a higher incidence of mental retardation among Romany children, whereas non-Romany children showed a higher incidence of neurotic disorders (Romany children do not suffer from neurotic disorders because there are no claims and high demands made on them, they have fewer internal conflicts and are faced with fewer taboos)

The incidence of psychosis does not vary from the rest of population. The manifestations of various pathological symptoms include:

- apathy, no interest in external events, agitation, attempts to get away, unreasonable aggression
- untidiness, dullness of facial expression (unique and different from mental retardation)
- real or pretended hallucinations
- all the symptoms are accompanied by intense emotion
- higher incidence of endogenous mental disorder
- low incidence of abstinence symptoms and almost no psychotic conditions having an alcohol genesis

(Medvecká and Medvecký, in Bakalář, 2004)

Mysliveček (in Bakalář, 2004) describes the term **moral insanity** as a personality disorder that occurs frequently in Romanies as compared with the rest of the population. This type of psychopathy manifests in childhood. Symptoms include: failure to obey, lying, punishment having no impact on them, high affective irritability, lack of voluntary control, low frustration tolerance, lower intellect, aspects of sadism.

Education

An important factor is the attitude of the Romany community toward education. It does not emphasize education as a benefit for the future, there is no emphasis on individual identity, and there is a lack of ambition. Romanies are not motivated to achieve a goal, especially if a long-term goal is blocked by some barriers. Romany children do not have regular regimens, habits or internal norms (Vágnerová, 2004). They are focused on satisfaction of their current needs and tend toward constant change which Klíma (1988) explains as a residue of nomadic life. There is also the problem of an insufficient knowledge of the majority language and a different usage of communication.

Romany children also do not have positive examples from their own community to identify with (Ševčíková, 2004).

Survey of achieved education conducted by Kalibová (1999)

Table 1
Completed education in percentage

type of school	Per cent
primary school	75–80%
vocational school	7–12%
high school	1%
university education	0.4%

The results in Table 1, however, may be misleading. Some Romanies do not always correctly report their ethnicity or nationality as Romany when asked for demographic information and further, some Romanies come from the mixed families. It is estimated that **60–80% of Romany** children attend special schools.

Relationship of majority society to romany minority

Ševčíková (2003) conducted a research in 2003 where non-Romany subjects were asked to identify the positive and negative characteristics of Romanies. Romanies were asked to do the same but they were not able to identify any positive characteristics of the non-Romany population.

Table 2

Percentage of positive characteristics

Coherence	21
Artistic talent	20
Ability to be happy	14
Human duality	14
Family care	11

Table 3

Percentage of negative characteristics

Inadaptability	36
Aggression and criminal behaviour	27
Negative work habits	13
Lack of hygiene habits	13
Dishonesty	10

In answer to the question "Would you accept Romanies as neighbours?", 80 % answered no. In comparison, when asked about acceptance of a Vietnamese family 49 % subjects answered no. When asked about acceptance of an African family 10 % of the subjects answered no. When asked about having a Roma as a partner, 78 % answered no (Trávničková, 1995).

Conclusion

The Romany mentality is, in some aspects, different from non-Romany mentality. They have different patterns of behavior and activity that can be understood as direct consequences of specific traits and external environmental influences. There is still insufficient scientific research about Romanies. This is partly because of an information embargo on some statistical data related to Romanies. Statistics related to crime-rate, ethnicity, birth-rate, social or financial help, etc. could be perceived as discrimination and rasism. Another problem is the fact that common psychological tests cannot be applied to Romanies because the findings can be distorted and undervalued. The issues of integration into the society and, especially, educational improvement are still very pressing.

NOTE: The information provided here is not offered as a criticism of Romanies and/or their culture, but rather as a contrast with the larger society.

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THE PROPOSAL OF EDUCATION PROGRAMME
OF COUNSELLORS FOR SOCIAL SERVICES USERS

Jan Michalík, Kateřina Jeřábková

Summary: *The article informs about the conception of a new counselling service in the Czech Republic and about an educational system designed for workers of this service. It presents the outcomes of the authors' work because they participated in the creation of education as well as the counselling system for social services users. The authors propose an original and comprehensive conception of the educational programme fulfilling the accreditation requirements of the Ministry of Labour and Social Affairs.*

Key words: *People with disability, education, further education, counselling, Act No. 108/2006 on Social Services, prevention of social exclusion*

Instead of introduction

A new system of social services has significantly changed the rules of social services provision in the Czech Republic. The change has affected users, providers and also incorporators of social services.

Act No. 108/2006 on Social Services differs considerably from other laws which are being adopted every year because it regulates and in future will regulate matters and relations of some hundreds of thousands inhabitants of the Czech Republic.

The position of incorporators, providers and users of social services has changed fundamentally in the frame of the new system. Incorporators of social services – we can also call them investors of social services – are most frequently the state, regions, municipalities and non-governmental non-profit organisations. The revolutionary change has concerned the position of providers of social services. The law introduced the principle of registration in social services – the providers are obliged to meet conditions and criteria (given by the Social Services Act) concerning the provision of social services.

Even more fundamental changes are related to users of social services (hereinafter referred to as users) – residents of the Czech Republic and other inhabit-

ants the Act relates to. Care benefit[1] – mostly understood to be a part of social services financing – is a fundamental factor in users' shift from a passive object of social care provision to a citizen actively participating in decisions about the content of social services. The position of a user has been changed not only by care benefit but also by other aspects. The change has been caused especially by the introduction of the contract for provision of social services which replaced the former decision of a public administration authority. Citizens used to request social services and a responsible authority used to decide in administrative proceedings whether the service will be provided or not. The system of waiting lists – which is definitely not an adequate type of social care – guaranteed to some degree equality of the applicants for social services.

Nowadays the conception of a contract of provision of social services being a legal and factual basis for relations between user and a provider guarantees (at least formally) better conditions for the users' active participation in definition of their needs and selection of adequate social services. One principle applies to contracts generally – the equal position of contracting parties. But this also means that the users must admit even greater responsibility for the consequences of their decisions and choices.

Personal experiences and legal conscience of the users are markedly different due to many reasons. Thousands of citizens may consider generally desired free choice as a stressful obligation connected with serious negotiation. An obligation they did not have to meet in the past.

Above mentioned reasons encouraged the National Council of People with Disability together with experts from the Research Centre of Integration of Disabled to create a new type of counselling service for the users – persons who are dependent to a greater or lesser degree on others' help. (Details on counselling service for the users can be found on the webpage: www.poradnaprouzivatele.cz.)

A newly designated education curriculum is a part of the new counselling system. The workers are being prepared for practising their profession – a counsellor of social services users.

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[1] A new type of benefit – provided to persons or institutions that look after persons who cannot look after themselves.

The educational programme for counsellors for social services users

The programme is aimed at comprehensive training and education needed for practising the profession of "a counsellor of social service users". The counsellors practise professional social counselling connected with Act No. 108/2006 on Social Services, particularly the area of contracts between the users and the providers of services.

The target group and course participants

The target group consists of the current workers in the position of counsellors for social services users and interested people with a background in social services, in non-profit making organisations joining seniors, citizens with disability etc. The primary goal of the education course is to prepare participants for practising the profession of counsellors. Social workers who want to broaden their knowledge and abilities are not excluded from participation in the course. It is possible to include representatives of the incorporators, providers and users of social services into the course.

The conception of the educational programme

In the education programme are the participants enabled to learn the basics needed to know and understand:

- the current system of social services,
- the position and role of counselling workplace where the needs of the users are addressed,
- the use of data files concerning chosen areas of counselling,
- how to practise counselling while meeting the usual and special standards for quality in social services, including adequate communication competences,
- how to manage, organise and evaluate counselling.

The educational programme is arranged into a model timetable. The below introduced succession of lessons was created on the basis of practical verification. The organisers of the course have a certain freedom in sequencing the individual themes according to concrete educational needs of the course participants.

Goals of the educational programme:

Achieve or possibly improve the participants' competences for practising counselling in the frame of social services in the Czech Republic.

Broaden participants' current experiences gained in the area of social services and during counselling.

Inform the participants about the latest experiences and principles of counselling process.

Broaden and improve the knowledge of forms of social services.

Inform in detail about the standards of quality in social services in connection with both the counsellors' own counselling and the services providers' activities.

Give the participants an opportunity to work individually on preparation of standards of quality in the new type of social service (counselling for social service users).

Broaden and improve the knowledge of current system of welfare benefits and their connection to social services.

Improve participants' knowledge of the typology of clients, methods and forms of work with clients.

Enable the participants to acquire sufficient knowledge of psychology, communication principles and management of interpersonal relationships.

Create an adequate degree of legal conscience and expert knowledge necessary for practising counselling – particularly in the area of contracts for provision of social services.

Enable the participants to acquire the knowledge of following themes: protection of the users' rights, protection of a person and data and application of gained knowledge.

Teach the participants to understand legislation concerning normative by-laws and their position in social services.

Enable the participants to know how to work with a group of users deprived of legal capacity and with their guardians.

Prepare the participants for their own professional publishing and monitoring activities in the area of social services mainly via creation of "counsellor of social services users' portfolio".

Methodological and educational aspects of the course:

The authors suggest a certain number of consultation days but the emphasis is put on participants' individual learning. The study days should take the form of consultation of important issues, not of routine presentation by lecturers. The participants should have an access to a sufficient amount of study literature. It is recommended to use as many study text prepared especially for blended

study as possible. The practical and case study seminars are also included into the course – participants discuss cases they have experienced. It is supposed that participants already work in the position of counsellor and therefore they do not need a specially prepared practice.

The use of electronic consultations with lecturers or possibly a creation of an interactive webpage enabling participants' discussion and their guiding are expected. Participants must pass a final examination and present a written final work.

The presence of experts from all included fields of study is assumed. It is worth to choose lecturers who are experts on their field of study (layers, psychologists, social workers, etc.) and also have personal experience with social services.

The frame curriculum of the course

Subjects	Amount of hours
General	**94**
Introduction to the course	2
The position of social services users in the Czech Republic	4
Introduction to legislation	16
Introduction to social work	8
Introduction to psychology	16
Introduction to communication	16
Introduction to professional counselling	8
Welfare benefits	8
Social services	16
Special	**106**
Standards of quality in social services	16
Standards of quality in counselling for social services users	8
Contract of provision of social services	20
Methods of work with social service users	16
Problem solving, mediation	12
Normative by-laws	4
Legal capacity	4
Data protection	4
Case studies seminar	8
Burning issues of the profession	8
Seminar on written final work	4
Conclusion	2
Total	**200**

It is possible to adapt the above-mentioned frame curriculum – the content of the educational course – according to:

- participants' education,
- participants' job,
- burning issues of social services provision – according to experiences gained in the new system of social services.

Content of the course subjects

Introduction to course, The position of social services users in the Czech Republic
Inform the participants about the conception of the educational course, its goals, study materials, requirements participants must fulfil etc. Introduction to the counselling system in social services, followed by the issue of persons with disadvantage in the social system of the Czech Republic.

Introduction to social work
Introduction to the issue of social work – development and settling of the discipline, types of social work and its methods etc. Inform about the social policy of the government and the social security scheme (their position in the legal system of the Czech Republic, three pillars of the social security scheme etc.) – all should be explained in the frame of social services counselling.

Introduction to psychology
Enable the participants to gain the knowledge about general, developmental and social psychology which are important for counselling practice. Concentration on psychology of personality, especially on types of personality and its development. Training of assertiveness to use it while counselling.

Introduction to law
Introduction to legislation, to the basic terminology of the discipline (law, legislation, morality, legal conscience, legal relations). Inform about the terminology connected with the civil law and the theory of legal acts. Contractual relations in the civil law. Present an overview of activities of public administration authorities in connection with social services.

Social services
The participants learn the principles and goals of social services and are informed about the basic types of social services – social counselling, care and prevention. They are also informed about forms of provision of social services

and basic activities connected with provision of social services. The lecturer analyses and explains the provisions of Act No. 108/2006 on Social Services connected to the individual types of social services and the position of inspection and incorporators resulting from the mentioned law.

Introduction to communication

Definition of the key issues connected with communication, introduction of communication modes and analysis of nonverbal communication. Information about extra linguistic and paralinguistic communication. Explanation of specific factors of communication – tactile aspects of communication, the use of gestures, etc. Introduction to augmentative and alternative communication in connection with counselling for persons with disability.

Welfare benefits

Introduction to basic terminology connected with the area of welfare benefits. Explanation of the following terms: minimum wage, subsistence level, state relief of the poor, help in poverty. Lecturer aims at disability compensations and issue of pensions – annuity insurance, types of pensions etc.

Legal capacity

Legal personality, capacity to enter into legal acts. Closer explanation of terms: restriction on capacity to legal acts and deprival of legal capacity. Appointment of guardian and his/her actions, particularly those connected with Act No. 108/2006 on Social Services (completion of the contract of provision of social service).

Data protection

General and civil regulations concerning the issue of protection of person, particularly aimed at Act on Personal Data Protection. The analysis of potentially complicated situations that can happen to counsellors of users, potential sanctions in case of infraction of regulations.

Normative by-laws

Summary of normative by-laws. Explain in detail typical aspects, competence, creation, legal liability etc. of normative by-laws and their comparison with general legal rules.

Standards of quality in social services

The definition of quality principles of social services and introduction to standards of quality in social services. The lecturer aims at the issue of the users' rights, possible infringement of their rights and legal measures in case of an infringement. Analysis of situations when a conflict of interests can appear. Techniques of negotiations with persons interested in social services. Workers in social services – their competences, hiring, introduction to job, management and evaluation. Practising the behaviour in case of emergency or critical situations or in case of complaint.

Standards of quality in counselling for social services users

Discussion and creation of standards for quality in counselling for the users. Establishing goals and roles of counselling. Preparation of individual standards (from the point of view of counsellors) and discussion on standards and practical issues.

Contract of provision of social services

Gaining knowledge of provisions of Act No. 108/2006 on Social Services and its implementing decree which concerns the contract of provision of social services and the users' rights. Focusing on the parts a contract is obliged to have. The analysis of existing contracts, searching their unlawful or disadvantageous parts, rewording contracts. Introduction of another provisions of Act and decree and possibilities of their integration into contracts. Formulation of "sample" provisions of individual contracts in practice. Discussion on formulations and their evaluation.

Methods of work with the social service users

Information about methods of work commonly used in counselling practice and discussion of the most frequent errors which can occur in counselling. Aiming at the specifics of communication with the users who need special approach. Analysis of errors in interpersonal communication – narcissistic communication, schizoid communication, communication in stressful situations, etc.

Problem solving, mediation

Information about types of conflicts and arguments in interpersonal communication. Introduction to different types of solving a conflict situation. Focusing

on the issue of aggression and assertive behaviour. Analyse in detail the mediation, its phases and aspects and its application during counselling session.

Seminar on case studies

Solving sample situations which can occur or have already occurred in the practice of users' counsellors.

The burning issues of the profession

Analysis and interpretation of sample situations that occurred in the practice of users' counsellors and which were related to implementation of Social Services Act. Interconnection of sample situations with above mentioned theoretical subjects.

Seminar on final written work

Information about requirements for the written final work – the so called "counsellors of social services users' portfolio". Focusing on formal and content features of the work and types of research which should be used in the work.

Conclusion

Evaluation of the course and its outcomes. Increase the participants' awareness of their acquired knowledge and skills. Participants will have the opportunity to come up with suggestions and questions towards course organisers.

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LIFE-SATISFACTION AND SELECTED PERSONALITY TRAITS OF TEACHERS IN ELEMENTARY SCHOOLS

Michaela Pugnerová, Jana Kvintová

Summary: *This presentation focuses on the life satisfaction of teachers in elementary schools from two regions in the Czech Republic. The purpose of the research was to examine not only the overall life satisfaction of teachers but also the factors that may influence it. We focused on selected personality traits (extraversion, neuroticism) and their association with the overall life satisfaction of teachers. This is a part of a larger research program that evaluates the well-being of teachers in elementary schools.*

Key words: *Extraversion, neuroticism, overall life satisfaction, factors influencing life satisfaction.*

Introduction

Nowadays, as well as in the recent past, the field known as *positive psychology* has aroused the attention of psychologists. Seligman (in Pererson, Seligman, 2004) emphasizes its scientific pursuit of optimum human functioning and its focus on human strength and virtue.

Among the topics central to this new branch of research is the quality of life, in the literature often referred to as QOL or well-being (Kebza, 2005). Alternative terms (descriptors) for quality of life are *satisfaction* in the Anglo-Saxon literature, or *life satisfaction*.

All of the theoretical approaches to life satisfaction have focused on the positive aspects of the life of an individual, but since the 1980s the concept of well-being has grown in importance and systematic research has been emerging. This new area of scientific interest came to be called the *psychology of well-being* and became a well-established psychological discipline. Its goal is to explore and try to understand the positive drives (forces) in people and how to develop them (Blatný, Dosedlová, Kebza, Šolcová, 2005).

In accord with the idea of *psychological determinism* it would be argued that all life events are causal. We are then living in a chain of causation determined by many conditions in the external world. Psychological determinism empha-

sizes the acceptance of all behaviours, thoughts and emotions as regular results of a complex of psychological laws (Plevová, 2006).

Generally we can presume, though, that *life satisfaction* is a result of a regular development and that the determination of the overall subjective satisfaction of an individual is influenced by two factor domains: environment and personality (Ryffl, Heidricha, 1997). The first is related to such external factors as work and social, political and economical conditions. The second group is related to the personality characteristics of a particular individual. Teachers, like any other individuals, are influenced by these factors. Therefore, we approach teachers' life satisfaction from these two perspectives.

With regard to the environment, the teachers in elementary schools are being exposed to an increasing number of stress factors. E.g. more intensively than before they are obliged to participate in the direct and indirect assessment and intervention in children with special educational needs (pupils with specific learning difficulties, sensual or communication deficits etc.). This is related to the pressure on the elimination of routine didactic methods, stronger demands on their self-education, and generally more balanced interaction between pupils and their parents (Vitásková, 2002).

The total number of teachers in the Czech Republic in school year 2000/2001 was 175,000 (Průcha, 2002). Almost 40 % of these are teachers in elementary schools. And, of those, the largest number of them teaches in the middle level of elementary school. Considering the large number of teachers in the Czech Republic, understanding of the external and internal factors that influence them is particularly important. There is a growing field of health-related research concerned with developing, evaluating and applying quality-of-life measures to understand the relationship between health-related variables and personality traits, particularly in relation to teachers' burn-out (Urbanovská, Kusák, 2005). Various studies have been carried out on the relationship between the Big Five personality traits and health-related variables (Brickman, Yount, Blanez, Roth-berg, De Nour, 1996, Waszlkio, Fekken, 2002).

The purpose of our research was to examine not only the overall life satisfaction of teachers but also the factors that may influence it. We focused on selected personality traits (extraversion, neuroticism) and their association with the teachers' overall life satisfaction. The associations between the levels of these personality traits and life satisfaction were identified as well. This is a part of a larger research program that evaluates the well-being of teachers in elementary schools.

<center>**Method**</center>

Participants

The sample consisted of 213 public elementary school teachers, of which 195 (91.5 %) were female and 18 (8.5 %) were male. In all, 118 (55.4 %) participants were teaching at the lower elementary level (children from 6–7 to 10–11 years of age), 88 (41.3 %) were teaching at the middle level (children from 11–12 to 15 years of age), and 7 (3.3 %) were teaching at both levels.

The participants ranged from 20 to 67 years of age, with the mean age of the sample being 41.92 years (SD = 10.48); the mode was 47 years. The mean for teaching experience was 17.68 years (SD = 11.20); the mode was 20 years. Within the sample, 144 (67.6 %) participants were married, 35 (16.4 %) were divorced, 33 (15.5 %) were single, and 1 (0.5 %) was widowed.

Measures

To examine the association between overall life satisfaction and selected personality traits (extraversion, neuroticism) two standardized questionnaires and a screening survey were employed.

Life Satisfaction Questionnaire (DZS)

The DZS is a 70-item questionnaire designed to assess the overall life satisfaction of each participant (Rodná, Rodný, 2001). The questions are differentiated into 10 areas: health, work, finance, spare time, partnership, relationship to one's children, the person him/herself, sexuality, friends, and living. Each area contains 7 thematic items. On each of the items, the participants rate their responses on a 7-point Likert-type scale from 1 (*strongly dissatisfied*) to 7 (*strongly satisfied).*

Big Five, NEO Five-Factor Inventory (translated by Hřebíčková, Urbánek, 2001)

The NEO-FFI was originally developed by P. T. Costa and R. R. McCrae and it is composed of 60 self-descriptive statements. Participants are instructed to use a 5-point Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), in responding to the inventory items. This inventory is based on the currently popular five-factor model of personality traits. The five fundamental dimensions measured by this inventory are extraversion, agreeableness, neuroticism**,** openness to experience, and conscientiousness.

Survey

The survey consisted of items related to the background and demographics of participants (age, gender, family status, years of experience etc.), along with two additional statements.

The first statement examined the overall life satisfaction of teachers:

I am in my life overall satisfied.

The participants rated the extent to which they are satisfied or not on a 5-point Likert-type scale ranging from 1 (*I am not satisfied at all*) to 5 (*I am strongly satisfied*).

The second statement assessed the factors which participants perceive as influencing their life satisfaction.

My life satisfaction is mostly influenced by: work, family, health, partnership, relationships to other people.

Participants answered each question by filling in one of five possibilities, ranging from *not true of me* (coded as 1) to *very true of me* (coded as 5).

Procedure

Data was collected from October to November 2006. First we randomly selected 11 schools from two Moravian regions and, once approvals were obtained from the heads of these schools, data collection was begun by distributing the questionnaire packets. Detailed instructions concerning the completion of the inventories were given to the heads who administered them to the teachers. The confidential nature of the survey data and the fact that participation was voluntary were emphasized. Each questionnaire packet contained written instructions for administration, as well as the recommended order of scale administration. The order of administration was (1) the Survey, followed by (2) the Life Satisfaction Questionnaire, followed by (3) the NEO Five-Factor Inventory. The questionnaire packets were administered to 300 teachers and the complete data was obtained from 213 (71 %) of the teachers.

Results

Overall Life Satisfaction and the Factors Influencing It

To assess the subjective overall life satisfaction of teachers, participants were asked to rate their degree of satisfaction on a 1–5 scale ranging from *dissatisfied* to *strongly satisfied* (see Table 1).

Table 1
Frequency of Answers Related to Overall Life Satisfaction

	Frequency	Percentage	Cumulative Percentage
1	0	0	0
2	2	.9	.9
3	87	40.8	41.8
4	105	49.3	91.1
5	19	8.9	100.0
Total	213	100.0	

Out of 213 participants, 105 (49.3 %) reported being *very* satisfied with their lives, 40.8 % (87 participants) are *moderately* satisfied, 8.9 % (19 participants) are *strongly* satisfied, and 0.9 % (2 participants) are *little* satisfied. Nobody perceived his/her life as completely dissatisfying.

To evaluate the factors influencing the overall life satisfaction of teachers, participants were asked to rate the factors of work, family, health, partnership and relationships to others on a 1–5 scale in terms of their perceived degree of influence.

Table 2
Frequency of Answers Related to Factors Influencing Life Satisfaction

	N	Mean	Median	Mode	Frequency	Min	Max	SD
Family	213	4.31	4	5	106	1	5	0.86
Health	213	4.03	4	5	83	1	5	0.97
Partnership	213	4.02	4	5	90	1	5	1.09
Relations	213	3.92	4	4	110	1	5	0.77
Work	213	3.75	4	4	108	1	5	0.87

Table 2 contains descriptive statistics for influence ratings on the factors of family, health, partnership, relationships to others and work. Categories are ordered according to mean response level from most to least influential.

Relationship of Personality Variables Extraversion
and Neuroticism to Life Satisfaction

<u>Extraversion and Overall Life Satisfaction</u>. The personality trait extraversion was expected to be positively associated with the overall life satisfaction of teachers.

Pearson correlation coefficients were used to examine the relationship between extraversion and overall life satisfaction. It was found that the personality trait extraversion was significantly (positively) associated with the overall life satisfaction of teachers: $r = 0.458$, $p = < 0.000$ (see Figure 1).

Figure 1

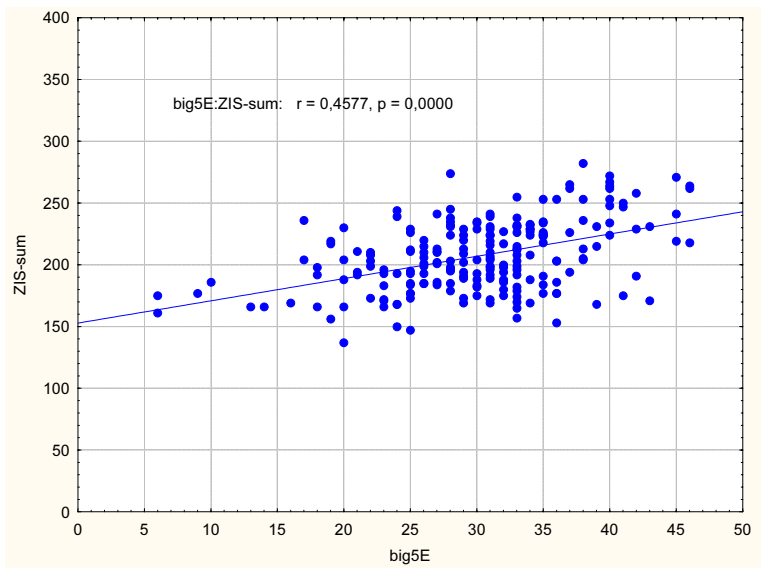Relationship of extraversion to overall teachers' life satisfaction

Figure 1 shows the linear relationship between extraversion scores and overall life satisfaction. The rising trend in the regression line reflects a positive relationship between OLS and extraversion. Increased levels of overall life satisfaction are associated with increased levels (degree) of extraversion.

Neuroticism and Overall Life Satisfaction. The personality trait neuroticism was expected to be negatively associated with the overall life satisfaction of teachers.

Pearson correlation coefficients were used to examine the relationship between neuroticism and overall life satisfaction, It was found that the personality trait neuroticism was significantly (negatively) associated with the overall life satisfaction of teachers: *r = –0.538, p = < 0.000* (see Figure 2).

Figure 2

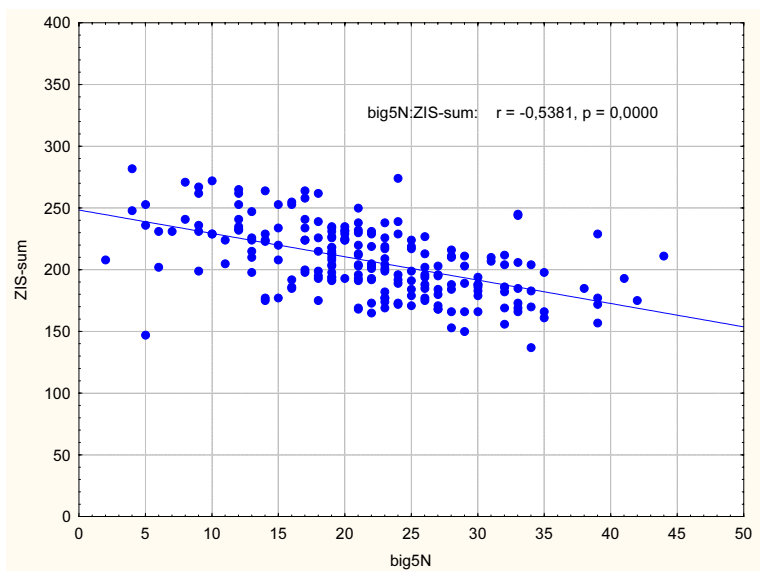Relationship of neuroticism and overall teachers' life satisfaction

Figure 2 shows the linear relationship between neuroticism scores and overall life satisfaction. The decreasing trend in the regression line reflects a negative relationship between OLS and neuroticism. Decreased levels of overall life satisfaction are associated with increased levels (degree) of neuroticism.

Relationship of Extraversion to Overall Life Satisfaction

To further examine the association between the levels of extraversion and overall life satisfaction, an analysis of variance (ANOVA) and Tukey's Method were employed. Three levels of extraversion were distinguished, *low*, *moderate* and *high*. The mean extraversion score for the low level group was 191.2, for the moderate level group it was 206.8, and for the high level group it was 225.4. The 1-way ANOVA revealed a significant main effect ($F = 25.09$, $p = < 0.000$) for extraversion level, and the Tukey procedure indicated that all three means differed significantly from one another ($p < 0.05$).

Figure 3

Relationship of levels of extraversion and life satisfaction

Figure 3 depicts the levels of overall life satisfaction for the three extraversion groups.

Levels of Neuroticism and Overall Life Satisfaction

To further examine the association between the levels of neuroticism and overall life satisfaction, an analysis of variance (ANOVA) and Tukey's Method were employed. Three levels of neuroticism were identified, *low*, *moderate* and *high*. The mean neuroticism score for the low level group was 228.3, for the moderate level group it was 206.7, and for the high level group it was 186.4. The 1-way ANOVA revealed a significant main effect ($F = 43.87$, $p < 0.05$) for

neuroticism level, and the Tukey procedure indicated that all three means differed significantly from one another ($p < 0.05$).

Figure 4
Relationship of levels of neuroticism and overall life satisfaction
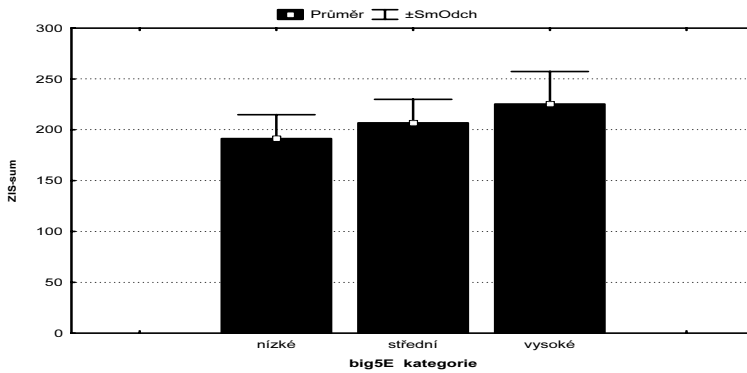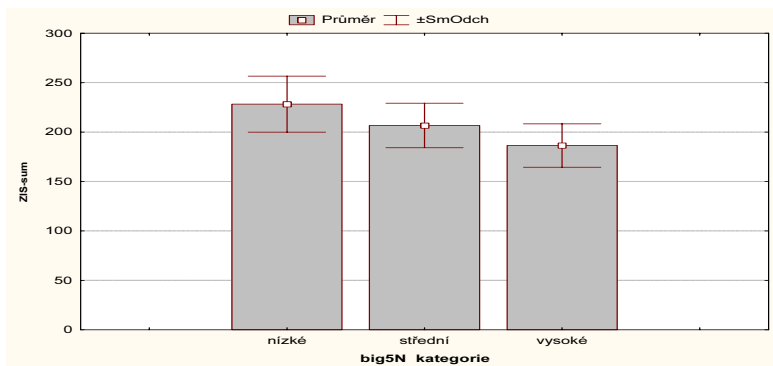

Figure 4 depicts the levels of overall life satisfaction for the three neuroticism groups.

Conclusion

The present study revealed that the personality trait of extraversion contributes substantially to the overall life satisfaction of teachers. Overall life satisfaction covaries with the level of extraversion such that persons with a high level of extraversion report high levels of life satisfaction.

The personality trait of neuroticism is negatively associated with the overall life satisfaction of teachers such that persons high on level of neuroticism report lower levels of life satisfaction. Generally, persons with a higher level of extraversion probably have a greater likelihood of life satisfaction, and this outcome is consistent with other research as well (Tišanská, Kožený, 2004). Our research shows that the higher the level of extraversion the higher life satisfaction, and the higher the level of neuroticism the lower the life satisfaction.

These findings are consistent with the research reported by R. K. Chiu and F. A. Kosiński (in Paulík, 1990). Their research was focused on the association

between extraversion and the job satisfaction of teachers. A significant relationship was confirmed with a negative association between neuroticism and job satisfaction of teachers.

Our findings show that more than 50 % of elementary school teachers, in spite of frequent verbal complaints, perceive their lives as very satisfying. Nobody perceived his/her life as dissatisfying. This finding is consistent with the research conducted by Urbanovská and Kusák (2005), related to burnt-out, satisfaction, and job stressors.

According to the teachers' reports, the factor having the greatest influence on life satisfaction is the *family*, and the least influential one is *work*. Because this finding is based on the subjective self-reports of teachers, a question could be raised as to whether the data reflect a *perceived* rather than an *actual* influencing factor. Results are considered to validly represent actual influencing factors because overall life satisfaction is generally on a good level.

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THE MOST FREQUENT TYPES
OF TASKS IN CZECH BIOLOGY TEXTBOOKS

Olga Vránová

Abstract: *This article is concerned with tasks evaluation in biology textbooks. Twenty five textbooks of the Fortuna, Fraus, Jinan, Prodos, Scientia and SPN publishing houses were analysed. This study was concentrated on the number, difficulty and diversity of tasks in each textbook. The difficulty of tasks was classified according to Tollingerová. Tasks of simple cognitive level were the most frequent ones.*

Key words: *Biology textbooks, learning tasks, types of tasks, task evaluation*

Abstrakt: *Článek soustřeďuje poznatky o rozboru úkolů v učebnicích přírodopisu. Předmětem hodnocení bylo dvacet pět učebnic přírodopisu nakladatelství Fortuna, Fraus, Jinan, Prodos, Scientia a SPN. Hodnocení bylo zaměřeno na počet, náročnost a pestrost úloh. Obtížnost úkolů byla klasifikována podle taxonomie Tollingerové. V učebnicích přírodopisu se nejčastěji vyskytovaly úkoly vyžadující k řešení jednoduché myšlenkové operace.*

Klíčová slova: *Učebnice přírodopisu, učební úlohy, typy úkolů, hodnocení úkolů*

Introduction

Learning tasks play a significant role in the learning process. Through them teachers gain an overview of efficiency of teaching and fulfilment of defined teaching objectives. Tasks are also an important instrument to test pupils' knowledge. Further they serve practising, improving and sorting knowledge and skills (Průcha – Walterová – Mareš 1995). In current modern teaching it is necessary to use such sets of tasks that develop various aspects of pupils' cogitation. However research shows that the natural science textbooks contain easy and similar tasks (Trna – Trnová 1998, Čtrnáctová 1997).

Material and methods

The tasks analysis was carried out in twenty five biology textbooks of six publishers (Fortuna 1997, 1999, 2002, Fraus 2003, 2005, 2006, 2007, Jinan

1998, 2000, 2001, Prodos 1997, 1998, 1999, 2000, Scientia 1999, 2000, 2001, 2003, SPN 1998, 1999, 2004). The complete lines of biology textbooks for the 6th – 9th grades of primary schools were concerned.

Learning tasks can be evaluated and sorted in various ways, as mentioned e.g. by Mareš (1980), Ušáková (1994), Tollingerová (in Kalhous – Obst 2002). In this article taxonomy of Tollingerová was used to evaluate tasks because it is the most detailed one. In this classification, 27 types of tasks which are ranked in five groups according to their increasing difficulty are stated. The easiest types of tasks are in the 1st group (tasks for memory reproduction of knowledge); the most complicated tasks are ranked in the 5th group (tasks for creative thinking). In each natural science textbook a classification of tasks into types and groups was carried out. These results were expressed in percentage.

The variety of tasks was measured by tasks variability index (Iv). Iv = number of task types/ number of tasks. This index takes the values from 0 to 1. The more the index value approximates 1, the more varied the set of tasks is, it means that tasks solution requires various thought operations.

Results

A review of number, difficulty, variety and location of tasks in each individual textbook was gained by tasks analysis. Comparing these data showed that some types of tasks occured in the textbooks very often and some very sporadically or not at all. For most of the evaluated textbooks the task location was the same in the explanatory part of subject matter or at the end of a theme unit (textbooks of Fortuna, Fraus, Jinan, Prodos, SPN). Only in the textbooks of Scientia the tasks are situated at the end of the textbook.

Quantitatively some types of tasks prevailed in the biology textbooks. Tasks for reproduction of data and terms, e.g.:

"How is the chordates' nervous system termed?"

"Which organelle ensures cell respiration?"

Tasks for enumeration of facts, e.g.:

"Name water animals."

"Which types of needle-leaved trees do you know?"

High number of tasks for fact correlation was found, e.g.:

"Explain the difference of vegetable and animal cells structures."

Tasks for creative thinking, problem tasks and tasks for practical application occurred very sporadically.

The variety of tasks expressed by the variability index was similar in all the textbooks. Low values of variability indexes were caused by a high number of tasks in one textbook.

In the textbooks of the **Fortuna** publishing house, tasks are found in the explanatory text. Their number was very high in some textbooks – e.g. 502 tasks (the 9th grade textbook), 784 tasks (the 6th grade textbook). There were tasks of 14–16 types. Most often, tasks of five types appeared – recognition and reproduction of facts, enumeration, description, comparing facts, facts interaction (see Table 1). The variety of tasks expressed by the variability index varied from the value of 0.02 to 0.05.

In the textbooks of the **Fraus** publishing house, tasks were found in the text and at the ends of thematic units. The number of tasks in one textbook varied from 247 (the 6th grade textbook) to 413 (the 8th grade textbook). Within this there were up to 18 different types of tasks. Four types of tasks (see Table 1) appeared most often. The value of tasks variability index varied from 0.04 to 0.06.

In the textbooks of the **Jinan** publishing house, tasks were found in texts of individual chapters. In one textbook the number of tasks was high – e.g. 604 tasks (the 7th grade textbook), 644 tasks (the 9th grade textbook). Up to 18 types of tasks were found in the textbooks of this publishing house but quantitatively tasks of five types prevailed (see Table 1). In all four textbooks the value of tasks variability index was similar – 0.03.

Tasks in the textbooks of the **Prodos** publishing house were situated in the text and at the ends of chapters. Their number was high in the 6th and 7th grades textbooks (about 630 tasks), low in the 8th and 9th grades textbooks (about 150 tasks). The tasks were divided into 5 to 14 types. Tasks of four types were the most frequent (see Table 1). The value of the tasks variability index varied from 0.02 to 0.04.

In the **Scientia** publishing house textbooks, tasks were situated at the end of the textbooks. The number of tasks in one textbook was, compared to other publishing houses, low (e.g. 112 in the 6th grade textbook). Tasks were divided into 13 – 18 types, four types of them quantitatively prevailed. The tasks variability index was the highest (up to 0.12) in the textbooks of this publishing house

In the textbooks of the **SPN** publishing house, tasks were found in the text and at the ends of thematic units. The number of tasks in one textbook varied from 182 (the 8th grade textbook) to 514 (the 7th grade textbook). The most frequent were tasks of four types – reproduction of facts, enumeration and de-

scription facts, comparing facts, facts interaction (see Table 1). The variety of tasks expressed by the variability index varied from the value of 0.03 to 0.07.

Table 1
The most frequent types of tasks in biology textbooks

publishing house	grade	number of tasks	number of task types	index of varia-bility	most frequent types of tasks			
					memory of facts	name and description of facts	comparison of facts	relation among facts
FORTUNA	6th	784	16	0.02	66.7%	6.9%	11.8%	5.1%
	7th part 1	422	14	0.03	60.7%	6.9%	10.7%	4.0%
	7th part 2	300	15	0.05	58.3%	9.7%	14.0%	3.0%
	8th	496	16	0.03	59.5%	5.6%	7.2%	8.7%
	9th	502	15	0.03	58.9%	11.9%	8.2%	5.0%
FRAUS	6th	247	16	0.06	37.6%	15.0%	15.8%	18.6%
	7th	329	17	0.05	39.2%	17.6%	16.4%	16.4%
	8th	413	18	0.04	45.0%	15.0%	12.8%	11.4%
	9th	385	18	0.05	41.2%	15.8%	16.0%	12.3%
JINAN	6th	393	17	0.04	34.6%	21.4%	14.7%	6.6%
	7th	604	17	0.03	43.4%	21.7%	8.3%	3.3%
	8th	559	17	0.03	49.0%	22.2%	10.2%	6.8%
	9th	644	18	0.03	44.5%	20.7%	11.3%	5.4%
PRODOS	6th	627	13	0.02	73.5%	2.9%	4.9%	9.8%
	7th	624	14	0.02	77.7%	2.6%	2.6%	6.1%
	8th	156	7	0.04	79.5%	1.9%	7.7%	5.8%
	9th	129	5	0.04	79.1%	0%	7.0%	0%
SCIENTIA	6th	112	13	0.12	13.4%	20.5%	10.7%	13.4%
	7th	288	16	0.06	18.7%	23.6%	17.4%	10.1%
	8th	321	18	0.06	11.5%	19.3%	11.8%	22.1%
	9th	205	17	0.08	7.3%	25.4%	5.8%	16.6%
SPN	6th	268	16	0.06	46.3%	16.0%	10.4%	11.9%
	7th	514	16	0.03	55.4%	22.4%	8.6%	8.0%
	8th	182	13	0.07	54.9%	23.1%	3.8%	2.2%
	9th	207	12	0.06	50.2%	11.1%	12.6%	4.3%

Conclusion

This article contains findings about evaluation of the tasks difficulty in 25 biology textbooks. The results indicate that task categories are similar in all the studied textbooks. The most common are memory tasks and the number of creative tasks is very low. The diversity of tasks is different in the studied textbooks.

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REFLECTION OF THE PILOT STUDY OF SELECTED FIELDS OF THE CZECH FRAMING PROGRAM FOR PRE-SCHOOL EDUCATION

Eliška Zajitzová

Summary: *This article presents results of a dissertation pilot study. This pilot study deals with the verification capacity of the research implementation, which is going to be used with the aim to check the communicative skills of children in pre-school education, which is a part of my dissertation research work.*

Key words: *Pilot research, pilot research stages, research implementation, statistical data processing, communicative competences, pre-school education, Czech Framing Program for Pre-school Education*

1 Introduction

The concept of pre-school education is based on the same principles as other branches and levels of education and it has objectives in common. It focuses on the fact that a child should have been acquiring the basic key skills principles since early age. Thanks to that children should obtain preconditions for their lifelong education, which enable them to apply their knowledge in the society more reliably and easily. (1) In the curriculum documents the key skills are generally defined as a set of presumptive knowledge, skills, abilities, attitudes, values, which are important for personal advancement and use of each individual. It produces a target output, which should be reached by students during each educational phase.

The mandatory curriculum for the firsts phase is represented by the Czech Framing Program for Pre-school Education (2004). By means of this program the systematical pre-school education should be guaranteed. With the adoption of the new curriculum we begin to put the emphasis on the verification of the Framing Program via research.

Considering the topic of my dissertation, in the research I deal with the verification of the communicative skills in the pre-school educational phase.

2 Pilot research

Since September 2007 I have been engaged in a pilot research, which is an essential component for the verification of capacity of a research implementation, which is going to be used in my dissertation called "Bases of communicative competences and their significance in the beginning of school education" The objective of my dissertation is to find out what is the level of communicative competences of children before they start to attend primary school and to compare the actual situation with expected outputs and communicative competences, which are determined by the Czech Framing Program for Pre-school Education.

The aim of this pilot research is to find out whether the proposed research implementation is appropriate for the examination of the communicative competences field and can provide results which can be used further. The verification of mathematical-statistic procedure for the processing of the acquired data was also a part of this pilot research.

The pilot research outcomes are:
– A compiled set of tasks for children of pre-school age and a supplement containing evaluation of the level which was reached in this studied field.
– An observation sheet
– Mathematical-statistic procedure for the processing of the acquired data

Pilot research stages

Time Period	1	2	3	4
A) Assessment of research objective	————			
B) Preparation of research information	————————			
C) Research method preparation	————————			
D) Data collection and processing				
E) Data interpretation			————————	
F) Writing of research report	—————————————————————			

(Caption 1 – 9/2007, 2 – 10/2007, 3 – 11/2007, 4 – 12/2007, 1/2008)

A) Assessment of research objective

Research program	Preparation and verification of the research implementation The set of tasks in the observational sheet is chosen in a specific way to be appropriate for the check of children's communicative competences
Definition of basic terms	Competence, pre-school age, nursery school
Research sample	15 children in the age of 5–6 before the start of their primary school attendance
Data collection period	November and December 2007
Circumstances under which the research takes place	Common everyday situations in the kindergarten attended by the respondent

B) Preparation of research information

In this pilot research accessible up-to-date sources of information were used.

C) Preparation of research method

The pilot research is a quantitatively orientated. As research methods, observation, scaling and interview were used.

Observation was in this case represented by monitoring children's activities, recording these activities, their analysis and evaluation. The observation of activities was direct as well as indirect. The indirect observation records were provided during the direct observations for the sake of possible data complementation, which could escape an observer's attention. The observation was intentional and systematic. It was based on thoroughly prepared focus on a child's behavior in given situations. The activities and situations were started on purpose by means of control over the child's play activities that enabled a faster and more flexible detection of important information. The children were observed during their individual activities and during their interviews with the observer. Mostly didactic games (cloze, jigsaw, activities with material, working sheets with didactic tasks etc.) were used.

The **interviews** were unstructured; the responses were being recorded in the observation sheets.

For the evaluation of the children's communicative competences the method of **scaling** was used; a scale was defined separately for each item according to

the need of evaluation details. All the outcomes had to be consulted with the teacher in each kindergarten. It was also necessary to re-verify every difference from the child's usual behavior because the conclusion of this observation should not be early and definite.

Research implementation

The verified research implementation is represented by a set of task related to communicative competences which are based on the educational content of the Czech Framing Program for Pre-school Education. This task set is included in the projected observation sheet in which the level of pre-school children's communicative competences was recorded. This was done by the means of scaling. The observation sheet was constructed on the basis of the pre-school education materials.

The observation sheet itself is divided into the following areas: formal speech advancement, oral speech, auditory perception and distinction, visual perception and distinction, writing and reading skills. The observation sheet also contained supplementary data about each child. For all of the above-mentioned areas outputs were developed which are expected from children at the end of the pre-school education period. The expected outputs which are defined in the observation sheet correspond with the expected outputs given in the Czech Framing Program for Pre-school Education. Each of the expected outputs is appointed to learning tasks, thanks to which a level of managed output can be find out. The learning tasks were defined in way to be appropriate to the age of the children and to be motivational enough in order to reach the appointed goal. The learning tasks were chosen with the purpose to get as much information as possible only with the help of few tasks. The observation sheet also mentions the sources of the applied learning tasks. The last part of the observation sheet consists of a scale rate for each of the expected outputs.

D) Data collection and processing

The data collection took place during November and December 2007 in a kindergarten in Olomouc.

The statistical data processing was consulted and later provided by RNDr. Milena Kršková from the IT Center, Palacký University, Olomouc.

E) Data interpretation

As the pilot research did not take place in the time before the end of the children's pre-school education (i.e. May, June) but at the beginning of the last pre-school education year (November, December) it is not yet possible to compare the below-mentioned results of the pilot research with the expected outputs that should be achieved by the children by the end of their pre-school education. As mentioned above, the pilot research should query possibilities of utilization of the research implementation for the check of the children's communicative competences and point out the method of statistical data processing.

The observation sheet contains 5 areas (A1–A5) including all the expected outputs.

A1) formal speech advancement
A2) oral speech
A3) auditory perception and distinction
A4) visual perception and distinction
A5) writing and reading skills

The pilot study observation group was small and that is why the statistical data processing was done only on the level of these particular five areas.

The sectional expected outputs from the observation sheets were put together (ratings were summed up); according to the responses in the given areas, the responses A1, A2, A3, A4, A5 were formulated.

To enable a comparison of the successfulness among areas, the gained points had to be transformed into percentage from the maximum available number and the calculations were done with these data.

For each area the basic descriptive characteristics were calculated. Both on the level of the gained points and the percentage (see Table 1). The average level of the children's communicative competences in each area is demonstrated in a graph (see Graph 1)

Table 1
Basic describing characteristics.

	N valid	Average	Median	Modus	Modus frequency	Minimum	Maximum	Divergence
A1	13	9.9	10.0	13.0	4	3	13	3.2
A2	12	51.8	54.0	multiple		36	62	6.8
A3	12	35.2	36.5	multiple		23	50	8.0

A4	13	13.0	13.0	13.0	5	10	15	1.7
A5	13	3.4	4.0	4.0	7	1	4	0.9
points	12	113.9	115.5	multiple		76	144	16.7
A1 percent	13	76.3	76.9	100.0	4	23.1	100.0	24.4
A2 percent	12	84.3	85.9	81.0	2	61.0	93.9	9.4
A3 percent	12	70.3	73.0	multiple		46.0	100.0	16.0
A4 percent	13	76.5	76.5	76.5	5	58.8	88.2	9.9
A5 percent	13	84.6	100.0	100.0	7	25.0	100.0	21.7
percent	13	76.3	76.9	100.0	4	23.1	100.0	24.4

Graph 1
Average level in each area (per cent)
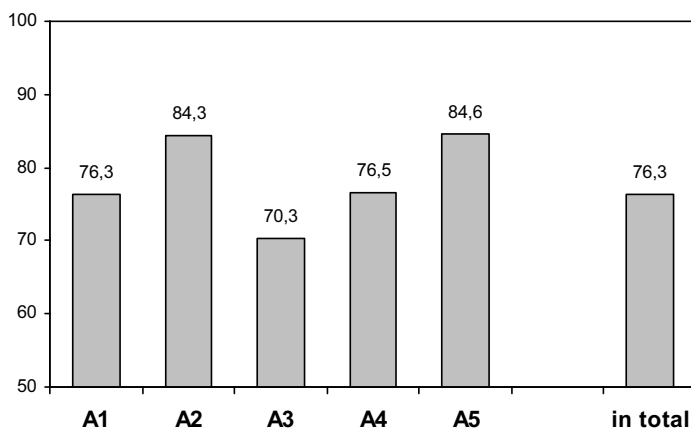
The comparison was carried out among the areas as well as with the Czech Framing Program for Pre-school Education. Because the sample was small, the non-parametrical methods were used (parametrical only as an illustration)

The comparison with the Czech Framing Program for Pre-school Education was calculated with the help of the Wilcoxon signed-rank test (see Table 2). In

all the areas the statistical difference is on 5 % significance level (i.e. p < 0.05). Alternatively also the t-test for the comparison with the reference value was used.

Table 2
Wilcoxon signed-rank test. These tests are on the significance level p < .05000.

	n	*T*	*Z*	*Level p*
A1 & A1max	13	0	2.67	**0.008**
A2 &A2max	12	0	3.06	**0.002**
A3 &A3max	12	0	2.93	**0.003**
A4 &A4max	13	0	3.18	**0.001**
A5 &A5max	13	0	2.20	**0.028**

(max = point maximum = Czech Framing Program for Pre-school Education level)

If we compare the areas among themselves again with the help of the Wilcoxon signed-rank test (see Table 3) or with the help of the t-test, we can see significant differences between A2 and A3, A2 and A4 or between A3 and A5.

Table 3
Wilcoxon signed-rank test. These tests are on the significance level p < .05000.

	n	*T*	*Z*	*Level p*
A1pct & A2pct	12	28	0.86	0.388
A1pct & A3pct	12	20	1.16	0.248
A1pct & A4pct	12	31	0.63	0.530
A1pct & A5pct	12	16	1.17	0.241
A2pct & A3pct	12	6	2.59	**0.010**
A2pct & A4pct	12	12	2.12	**0.034**
A2pct & A5pct	12	34	0.39	0.695
A3pct & A4pct	12	20	1.49	0.136
A3pct & Apct	12	9,5	2.09	**0.037**
A4pct & A5pct	13	25	1.43	0.152

But if we survey the reciprocal relation among the particular areas with the help of the correlation dependence, we will find out a significant relation between A1 and A2, A1 and A4 (see Table 4). The Spearman's rank correlation coefficient was used here.

Table 4
Spearman's correlation. These tests are on the significance level $p < .05000$.

	A1	A2	A3	A4	A5
A1	1.000	**0.704**	0.283	**0.709**	0.203
A2	**0.704**	1.000	0.286	0.218	0.353
A3	0.283	0.286	1.000	0.390	0.378
A4	**0.709**	0.218	0.390	1.000	0.262
A5	0.203	0.353	0.378	0.262	1.000

The results were classified in a Microsoft Office Excel file. For the calculations statistical program: StatSoft, Inc. (2001) STATISTICA Cz [Software system analysis], version 6. Www.StatSoft.Cz was used.

The response frequency was calculated by the SPSS program, version 12.0.

F) *Writing of research report*

The pilot research is completed with written information about its development and results in the form of a research report.

3 Conclusion

The research implementation is suitable for the check of communicative competences of the pre-school children. The observation sheet is appropriately divided into five areas focused on communicative competences. The tasks in the observation sheet are chosen in a way to obtain required information.

The statistical processing of the collected data leads to a finding what level of communicative competences children have reached before attending primary school, and it also leads to the comparison between the actual state of this level and the expected outputs according to the Czech Framing Program for Pre-school Education.

The mathematic-statistical procedure was verified. It is possible to use the Spearman and Pearson's correlation, the Wilcoxon signed-rank test and the t-test for dependent samples, the statistical program StatSoft, Inc. (2001). STA-

TISTICA Cz [Software system analysis], version 6, the SPSS program, version 12.0

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Summary

The magazine e-Pedagogium is an independent professional magazine. It is meant for the pedagogical employees of schools of all types. Its content focuses on the presentation of research information, theoretical studies and expert essays pertaining to the issue of schooling and education, with particular emphasis on the diverse fields of pedagogy, special education, pedagogical psychology and field didactics of general education subjects.

Anotace

Časopis e-Pedagogium je nezávislý odborný časopis. Je určen pedagogickým pracovníkům všech typů škol. Svým obsahem je zaměřen na prezentaci výzkumných sdělení, teoretických studií a odborných prací, vztahujících se k problematice vzdělávání a školství, zejména pak z oblasti pedagogiky, speciální pedagogiky, pedagogické psychologie a oborových didaktik všeobecně vzdělávacích předmětů.

Zaměření:
15. Pedagogika

Klíčová slova:
Pedagogika, vzdělávání