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PRESCHOOL TEACHER ASSESSMENT OF THE NTC PROGRAM REACH: ENCOURAGING CREATIVE ELEMENTS OF THINKING

Summary: The paper presents a part of the findings of an evaluation study which is experimental in character and in which the experiment with one group was used as a method. The subject and problem relate to the observation of the effects of the project "Smart Children Network - SMART", code: 1286, which is based on the NTC learning system with the emphasis on encouraging the development of critical thinking, therefore, only the findings related to teacher assessment of the instructions for application of the mentioned program are given. The question posed in this part of the research are related to: how educators evaluate the content of the NTC program, i.e. the instructions they were involved in and which presented the basis for the program implementation, i.e. whether they are equally valued and based on this, the program effectiveness is evaluated, i.e. the need for further clarification of certain contents from the NTC program for its more effective methodical interpretation.

The intention was to get information on the possibilities of knowledge transfer and applying them to the field of didactics, and thus, in a sense, to the scope of the NTC system, as well as the possibility for educators to focus on the details of the program and become qualified for the application of didactic methods and procedures for a more effective encouragement of children's creativity elements, as a basis for the development of critical thinking, that is, intellectual autonomy and flexible approaches in the adoption of functional knowledge in further development. The basic assumption, for this segment of research, is related to: Educators involved in seminars for the application of the NTC program have given equal importance to the encouragement of creative thinking elements and the methodical reach of seminar content segments for the application of the NTC program, as well as the criterion variables, except for work experience, were important factors in the assessment of the effects of the instruction.

The basic findings refer to: Statistically significant differences found, which support the segment related to the *influence of learning and teaching methods on the development of creative thinking*, which explains 39.77% of the total variance indicates that teachers' assessments put to the forefront the significance of the seminar segments which encourage creative thinking, which coincides with the intentions of the NTC program, which essentially refer to didactic approaches to the development of creative thinking elements of preschool children. That is the goal, but also the

reason for the educators' decision to become part of this program. Their interests were aimed in this direction, and were therefore met in a satisfactory way.

Key words: NTC program (the relation between cognition and neurobiology), creativity, preschool teachers, didactics (methodology).

Introduction

Contemporary discourses on the competences of preschool teachers focus on a reflexive practitioner, indicating that the competences of modern preschool teachers (this text refers to preschool teachers in preschool institutions, because the research is related to them, and the aforementioned discourses on competencies is related to everyone who is professionally in the field of education, that is to say, teachers on all levels of education) do not assume a professional-technician (Tajber, K., op.cit, 78), but a professional who follows modern trends in the international pedagogical scene, because the world is in the process of globalization, it is changing and becoming increasingly uncertain, and in a pedagogical sense this also means that didactic procedures need to be changed, which means that their application is explored in their own context. And this presupposes an intellectual level of critique of the theoretical approaches and innovations which are recommended, i.e. the readiness or competency of preschool teachers for mature assessment of the adequacy of innovative approaches from different angles (pedagogical, psychological, philosophical…).

The research results presented in this text are connected to the need of preschool teachers to, through their competencies, search for new research and think about the teaching and learning which is happening within their didactic strategies and instructions. They should also read more than just the instructions they get with advice for the application of innovations or guidelines for the introduction of new practices. In this way they would be in a position to reach professional decisions about which suggestions should be wholeheartedly accepted, which should be applied with caution, and which should be seriously questioned, i.e. whose reach should be researched.

The basis for the creation of the project "Smart Children Network - SMART", code: 1286[1] was reflection on the core of modern trends in the area of the professionalization of the pedagogue calling, on reflexivity as the main characteristic of contemporary competence in the pedagogue profession, but also for the profession of the preschool teacher. This project was an evaluative study on the effects of the NTC system of learning on the development of critical thinking. More specifically, this study monitored the effects of the NTC system on the development of divergent production and functional knowledge of preschool aged children. The answers to the following questions were sought: to what extent were the tasks saturated with processes of creative thought; to what extent did creative imagination and inventiveness and divergent thinking free the children from conformist thinking and what sort of effects they gave in the divergent production and functional knowledge. This would, in essence, mean that the study informs on the effects of the mentioned project, which is in this way evaluated. The project, in one part, deals with the instruction of preschool teachers and

[1]Interreg-IPA CBC Romania-Serbia "Smart Children network - SMART", code: 1286, international neighbouring project implemented in 2016 by the following beneficiaries: Preschool institution "Dečja radost" Pančevo (Serbia) with partners - Kindergarten "Floarea-soarelui" Reșița (Romania) and Prescholl Teacher Training College "Mihailo Palov" Vrsac

parents for the application of the NTC programs. From this evaluation study for this paper we will only explore the results which refer to the preschool teachers' evaluation of the methodological reach of the NTC program, i.e. the encouragement of creative elements of thinking in children and their effects on the completion of functional tasks.

From the theoretical standpoint, the starting position was the assumption that, because of their methodological training, preschool teachers possess the competence to efficiently assess the effects of new ideas in their working environment so that they could critically experiment with simplified theoretical concepts, constructs and didactic models which are present in the literature. Based on this, they can assess the possibilities of their implementation, possible adaptations etc. which presupposes strong theoretical knowledge, critical questioning of that knowledge in reference to relevant sources and the results of one's own and others current research. Therefore, it is not expected from the preschool teacher, as a reflexive practitioner, to learn from a model, but to be able to test and modify approaches to teaching and learning of children in their own pedagogical practice through cycles of carefully evaluated studies (empirical, action, developmental, preliminary…) both their own and other's in their classroom-study.

Such an expected characterization of a reflexive practitioner is the basis for competencies which enable noticed problems in practice to be viewed as part of the complex phenomenon of teaching and learning, a detail in a specific educational context which can be easily generalized and anticipated as relevant for other contexts. This is important since it presents argumentation for the view that studies in education should deal with the question of context (Taber, according to: Stojanovic A., Gojkov, G., 2014). In some cases this means asking questions which the study deals with in a specific sense – having in mind that the study refers to a certain age group, in a certain type of educational institution within a certain national educational system – while other studies are more inclusive, i.e. more comprehensive, but, therefore must include representative samples which are considered to incorporate the variation in relation to the dimensions which are considered important for the study. Research sources are always limited, therefore, although studies gather information from a wider base, they are usually limited to conformational studies, in which precise questions and categories of answers can be defined at the start of the research. However, the job of the preschool teacher, as well as the teacher is often on a much more empirical level, where there is a need for more open and in depth work, and where results of studies with strict outlines can only be of hypothetical help. This is just one more reason why preschool teachers should be enabled to conduct studies on their own practice, which nicely fits into the pedagogical didactic views based on the concept of emancipation[2].

However difficult and unreachable this might seem because of various difficult circumstances, practice will, we believe, at every moment be able to confirm the need for the mentioned and other ever more complex competencies of teachers which qualify them as reflexive practitioners, who answer to the demands of the times (Gojkov, G. i Stojanović, A., 2011).

Since didactics still does not have a comprehensive theoretical basis of learning, and since the following will refer to didactic instructions used for the development of creative abilities for

[2] Cambridge University already has one form of enabling teachers for the competencies which we have discussed (PGCE – Post-Graduate Certificate of Education and Secondary PGCEPost-Graduate Certificate of Education). For further information please adress: http://jotter.educ.cam.ac.uk/

the theoretical framework of the project, from whicha section is presented in this paper which deals with the preschool teachers' assessment of the NTC program, i.e. one of the strategies for the encouragement of creativity in preschool children, elements of Osborn's and Torancce's (Torancce, as cited in: Kvaščev, 1981) systems of developing creativity were used. The core of this system is: revealing the multiple meanings of facts and increasing the value of the available facts; developing strategies of creative production learning through discovery; developing the motivational components of creativity, synthesis of empirical research and theoretical simplification, the associative basis of discovery; reaching something new on the basis of incomplete facts and partially structured material; individualization of creative production learning according to the cognitive development of the subject (Kvaščev, R., 1981). This was considered significant since part of the project referred to enabling of preschool teachers for the encouragement of the aforementioned abilities. Furthermore, the NTC program also refers to the attempts to translate into the didactic language the knowledge which has been gathered from neuroscience concerning the question of the neurological brain functions significant for intellectual ability, i.e. good functioning of the neural system. Therefore, also included in the instructions for the preschool teachers were contents which among other views of intelligence (psychometric, developmental, cognitive) included the biological approach (Lurija, 1983). The focus was placed on the material which considers questions regarding the build and types of functioning of the human brain (intelligence is not a static characteristic, it is projected in problem situations...), then questions regarding human genetics and to what extent is intelligence an inherited characteristic, questions of the biological approach to intelligence – the way in which the nervous system is developed, or in which it is not developed, the way in which genes are expressed or how they do not manage to be expressed in various points in development. Technology which enables considerably more specific determination of brain functions has been developed. Standpoints were considered according to which the nervous system acts as a collection of a few thousand isolated centers which are "turned on" at will, as well as its magnificent harmony and in tune action of billions of nervous cells in a united experience. Some of these ideas refer primarily to the following: developmental view, universal mental representations, various forms of intelligence, for and against early presentations, the role of individuality, motivation and emotion… A focus was also placed on the results of studies which support the hopes of biological artistic researchers oriented towards the possibility of future direct reading of intelligence through the analysis of brain wave recordings or genetic equipment (Gojkov, G., R. Rajović, A. Stojanović, 2015).

In the theoretical basis, and therefore in the content of the preschool teachers' instructions for the preparation for work on the project the findings from R. Kvascev (1981) were included, from which it can be concluded that intellectual operations and psychological principles form a general scheme of creative processes (Kvascev, 1981), which is among others formed by divergent thinking. The core meaning of this complex phenomenon could be reduced to intellectual operations of assessing many different solutions to a problem, producing a large number of new ideas, associative fluency (organizing ideas within theories and systems), flexibility (various approaches to solving problem situations and the ability to solve problems in different ways; originality; elaboration (development of work strategies, theories and systems)) (Gojkov, G., R. Rajović, A. Stojanović, 2015).

Apart from the aforementioned, for the theoretical framework, and therefore also for the content of the seminar for the instruction of preschool teachers, as help for the clarification of the theoretical framework of divergent thinking and parts of Gilford's theory of ability

(Gilford, 1967, prema: R. Kvaščev, op.cit.) the following factors of divergent thinking were used: *finding the new and unusual; methodological originality; anticipation of new ideas, solutions and answers; finding new meanings; flexibility; fluency of ideas…* Among the theories of creativity we single out Mednick's (Mednick, 1967, according to: R. Kvaščev, op.cit.) understanding of creative thinking, which is formed of associative elements of new combinations which fulfill certain demands, or are in some way useful. The focus was also placed on the main task in creative thinking, on connecting ideas which are far apart, on the associative mechanism of the creative process "mediation" and the wider flexible cognitive structure as the mediator between the stimuli and answer, based on relations, and not only on associations (Mednik, as cited in: Gojkov, G., 1995), as well as on the contribution of distant associative elements and their categorization in new usable combinations (Gojkov, G., R. Rajović, A. Stojanović, op.cit).

The abovementioned content was given to the preschool teachers within a number of seminars with tasks and examples. Their task was to touch upon the question of creative production from a number of angles. Therefore, to indicate the importance of the ability theory, their connection with the theory of creativity, to highlight that they are the source of numerous principles which form the basis of theories for the encouragement of creativity, with which we determine the factors and mechanisms which explain these complex psychological mechanisms and in that way form a framework for understanding the theoretical basis for the evaluation study the results of which are presented in this paper, and which were the basis for the selection of the evaluative approach, that is its elements.

In the search for the results of other studies which dealt with same topic we reached the conclusion that the interests of the researchers in this area were directed on the observation of preschool children's creativity, but not from the angle of the preschool teachers' opinion on the methodological content, connected to the encouragement of creativity in preschool children. Therefore, the special angle of viewing this topic was left without the option to take into consideration others experiences, questions etc.

Methodological framework

This paper implements a type of research which could be called an evaluative study with an exploratory character, in which an experiment with one group was used as a method. The *subject* and *problem* refer to the monitoring of the effects of the "Smart Children Network - SMART" project, code: 1286. At the core of the project is the NTC learning system[3] with the

[3] NTC is an acronym of "Nikola Tesla Center" – department for the gifted within the Serbian Teachers Union, which also functions within Mensa Serbia, the Matica Srpska and Teachers Society in Novi Sad. The aim of the program is to encourage the intellectual development of school-aged children and the detection of gifted children. The NTC program had been created by Ranko Bugarski (founder of Mensa in a number of countries and a long-standing member of the Board of directors and member of the Mensa International Committee for Gifted Children and UNICEF associate for education) and Uros Petrovic (long-standing president of Mensa Serbia and a writer for children). The program has been implemented in Slovakia, Italy, the Czech Republic, Romania, Montenegro, Croatia, Bosnia and Herzegovina, Slovenia and Serbia. It is conducted during a summer camp which usually lasts for 10 days, and has workshop exercises (*Rajović, Dautović i Lucija, 2009*). The core of this program has its basis in cognitive psychology which has for a time now been interested in the relationship between cognition and neurobiology, and many authors deal with this question from the angle of biological basis of cognition (Rajovic, 2012). There is large interest for the way in which the anatomy and physiology of the nervous system influence cognition (Bojanin, 1985). Cognitive psychology is interested in the connection between the brain and other aspects

aim to encourage the development of critical thinking. However, in this paper, as has been mentioned earlier, the analysis of only one part of the project which refers to the preschool teacher assessment of the instructions will be given.

The question this part of the research looked answer for refers to the following: how do kindergarten teachers evaluate contents of the NTC program, i.e. instructions they were involved in and what was the essence of the help in finding their way in application of the program they had been trained for. The findings are supposed to reflect its efficacy, i.e. the need to further explicate certain contents of the NTC program, in order to interpret it more efficiently regarding its teaching methodology.

The intention was to get to the information on the possibilities of knowledge transfer and application in the terrain of didactics, thus also, in a sense, on the reaches of the NTC system, as well as the contribution of the encouragement of preschool teachers to, in cooperation with their Romanian colleagues, relying on their pedagogic-psychological service and seminar leaders focus on the details of the program and become fully trained to apply the didactic methods and procedures for more efficient encouragement of children creativity elements, as the basis of development of critical thinking, i.e. intellectual autonomy and flexible approaches to acquisition of functional knowledge in further development.

The main assumption which served as a starting point for this segment of the research refers to the following: Preschool teachers involved in the seminars for application of the NTC program of encouragement of creative thinking elements have equally positively evaluated teaching methodology reaches of all the segments of seminar contents.

Working hypotheses:

1. There is no statistically significant difference in the assessments of preschool teachers in regard to teaching methodology reaches of the segments of the contents of the seminar for application of the NTC program.
2. Predictor variables (the states in which preschool teachers work, working experience, level of education, the number of seminars they attended dealing with

of the nervous system with cognitive processing and human behavior (Rajovic, 2012). Questions which the NTC program deals with, refer to myelination, which as a biochemical process, helps in monitoring the process of neuron development for the completion of their specific function. This is integrated in the program, since it is considered that the myelination process starts according to certain genetic program, which lasts until it finishes the wrapping of certain groups of neurons by white myelin layer, leaving, according to the same program a permanent, completely built and stabile formation (Bojanin, 1985). It is thought that myelin membrane improves the quality of function of the neurons wrapped by it. This is significant, since a correlation has been found between the process of myelination and stimulating factors of external environment, creating adequate sensitive and before all kinesthetic stimuli. It is significant to mention that myelination of certain structures ends around the year of 7, i.e. 12, while, according to Lurija (Lurija, 1983), certain structures finish their myelination even in the third decade of person's life. NTC learning system, as a specialized program, even though primarily focused on early development, empowers all the adults to stimulate in their pedagogic work accommodation of eye, movement coordination, development of fine and gross motor skills (jumping, rotation, graph-motor skills) in children as well as cognitive development including reasoning and conclusion making, abstract thinking and visualization, critical and logical thinking, on the one hand, and divergent and creative thinking, on the other hand. Furthermore, the approach does not neglect development of a child at emotional and motivational level, making it more supportive and comprehensive (Rajovic, 2012).

teaching methodology of work with the gifted children as well as encouragement of creativity development) are not significant factors in the assessments of methodological reaches of the segments of seminar contents.

Variables:

1. predictor: NTC program, the states in which preschool teachers work, working experience, level of education, the number of seminars they attended dealing with teaching methodology of work with the gifted children as well as encouragement of creativity development;
2. criteria: preschool teachers' evaluations of the effects of their training.

Two questionnaires were used as instruments in order to record the evaluations of kindergarten teachers: (UV-1; UV-3). Initial testing was organized in the beginning of May 2016, and final in the end of October 2016. The questionnaire used in the initial phase of the research was used to screen the level of interestedness of the research subjects into the subject contents, in order to adjust seminar contents to the needs of kindergarten teachers participating in the program offered by the project, i.e. NTC program; the questionnaire used in the final phase of the research the attitudes of the kindergarten teachers towards the effects of the seminar were examined (UV-2). According to the calculation of the Crombach Alpha Coefficient it was established that the scale in the initial testing (Crombach Alpha Coefficient equals 0,87) shows high level of reliability and internal consistence for the chosen research sample; it was the same case with the final testing (Crombach Alpha Coefficient equals 0,9), and these are important pieces of information for further considerations of the research findings.

Statistical analysis was carried out in the SPSS program, by a student of doctoral studies, Marija Malovic, who is also an assistant at the pedagogical group of courses at the Preschool Teacher Training College "Mihailo Palov" in Vrsac.

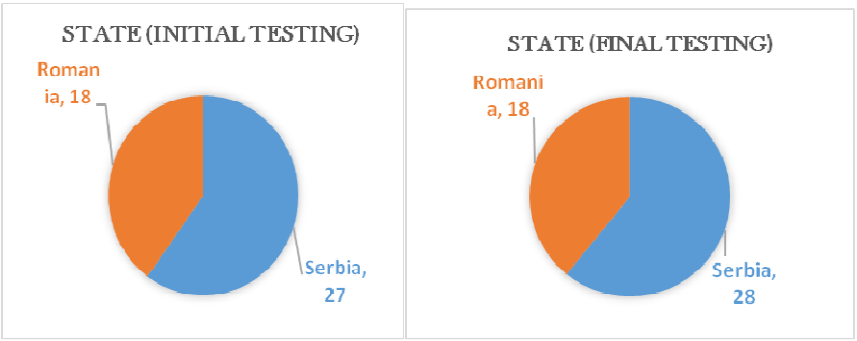
Research subjects and organization: Recording of the program effects included 43 preschool teachers (25 teachers from Pančevo and 18 from Resica). In other words, it was a convenience sample. The details regarding the structure are given in the tables and graphs along with the findings and interpretation. The training dealing with the application of the NTC program was carried out by Dr Ranko Rajović, Mensa Serbia, Gifted Department, Novi Sad and Aleksandra Ružičić, Preschool institution "Dečija radost" Pančevo.

The important segment of this evaluation study refers to preschool teachers, while the text focuses on this very segment. Namely, the project anticipated to, apart from the support to parents and children, provide support preschool teachers, as main actors in reaching the aims of the project. What follows is the recapitulation and analysis of their training for application of the NTC program, from the standpoint of their assessments of the effects of both the training and the program.

Sample structure according to the states the subjects come from

The initial testing covered 27 preschool teachers from Serbia and 18 preschool teachers from Romania. The retest, i.e. final testing included 28 preschool teachers from Serbia and 18 from Romania.

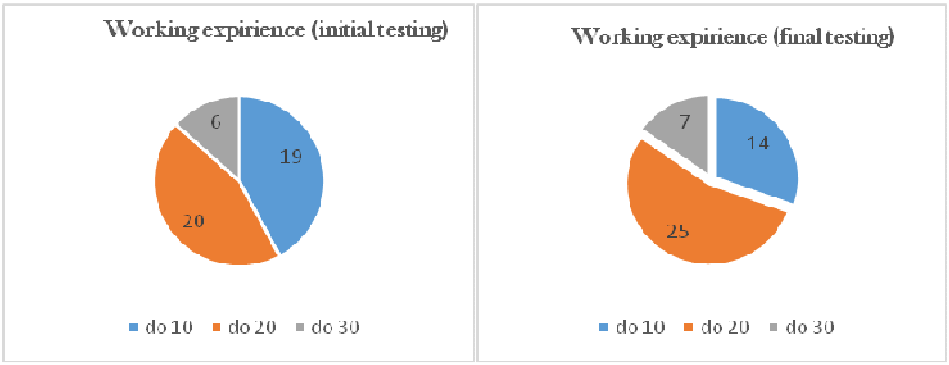
Graph 1: Sample structure according to the states the subjects come from (initial and final testing)



Sample structure according to working experience of preschool teachers

Initial testing included 19 preschool teachers who have more than 10 years of working experience, 20 preschool teachers who have up to 20 years of working experience and 6 preschool teachers who have up to 30 years of working experience. Final testing included 14 preschool teachers who have more than 10 years of working experience, 25 preschool teachers who have up to 20 years of working experience and 7 preschool teachers who have up to 30 years of working experience.

Graph 2: Sample structure according to working experience of preschool teachers who participated in initial and final testing

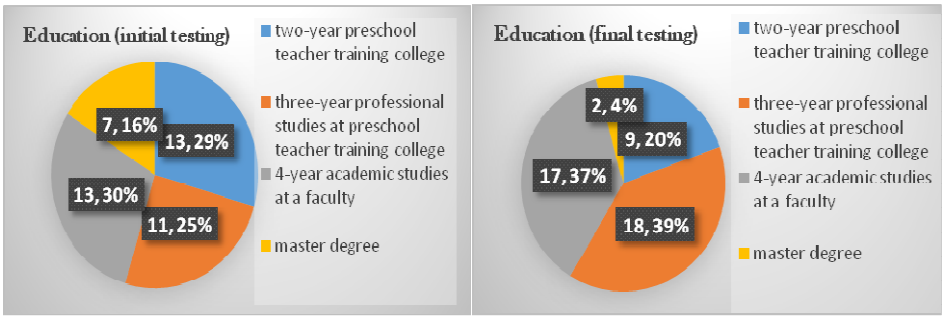


Sample structure according to the level of education of the subjects

During the initial phase of the research, one subject did not provide an answer to the question on the level of education, while 44 subjects did: 13 of them graduated from a two-year preschool teacher training college, 11 subjects graduated from a three-year professional studies at preschool teacher training college, 13 of them finished 4-year academic studies at a faculty, while 7 subjects have a master degree. In the final phase of the research the sample structure according to the level of education was as follows: 9 of them graduated from a two-year preschool teacher training college, 18 subjects graduated from a three-year professional

studies at preschool teacher training college, 17 of them finished 4-year academic studies at a faculty, while 2 subjects had a master degree.

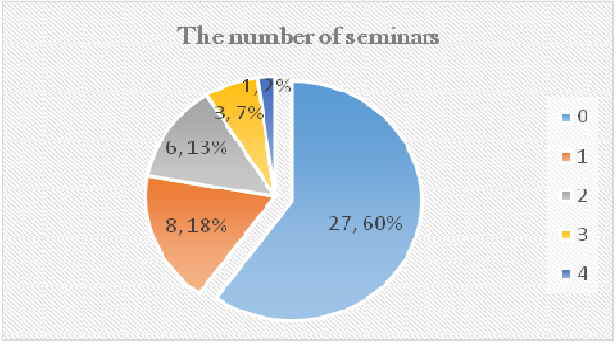
Graph 3: Sample structure according to the level of education of the subjects who participated in the initial and final phase of the research



Sample structure according to the number of seminars the subjects attended dealing with teaching methodology of work with the gifted children as well as encouragement of creativity development

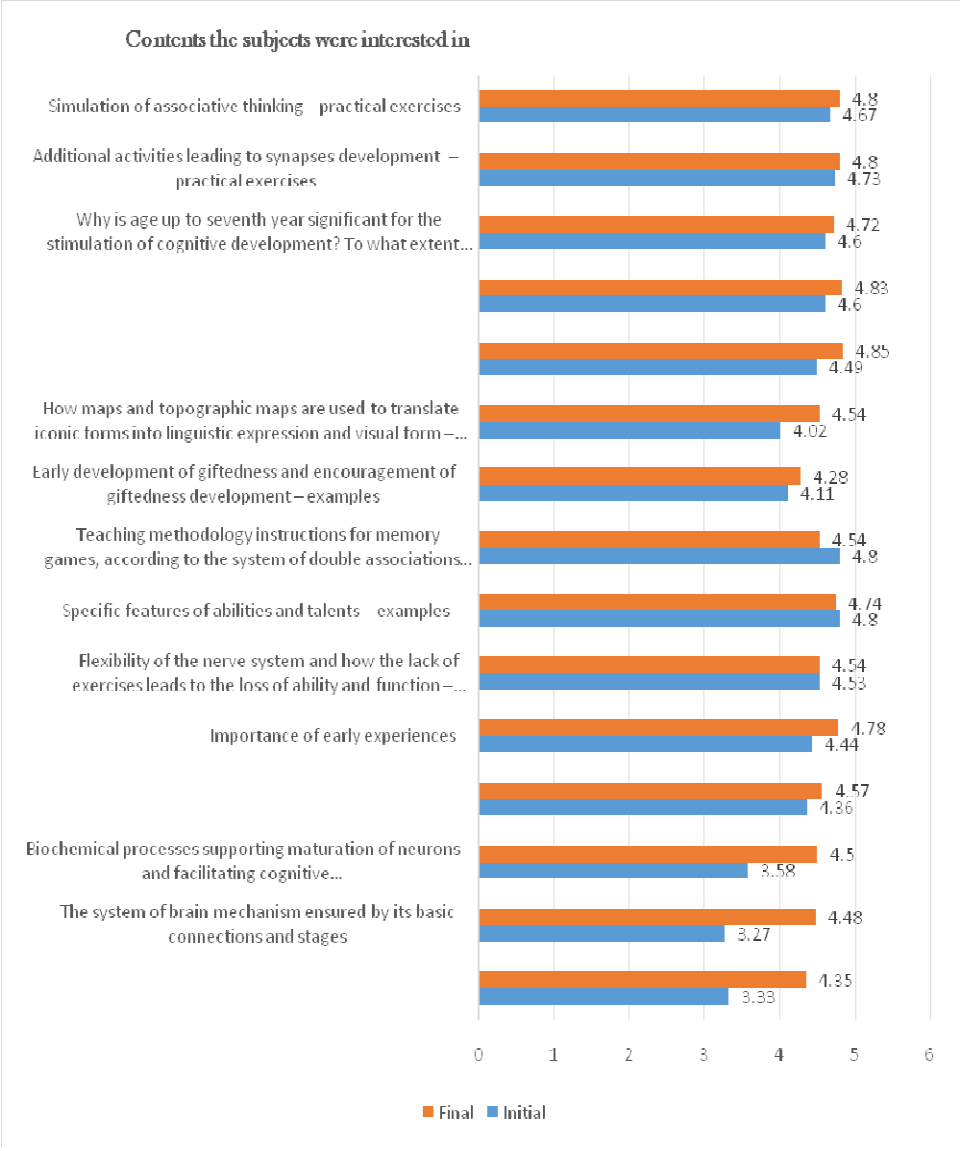
Out of 45 preschool teachers who participated in the research (initial testing), 27 of them did not attend seminars improving their teaching methodology of work with the gifted or their preparedness to encourage creativity development, 8 of them attended one seminar from these fields, and 3 preschool teachers attended 3 such seminars. One of the subjects attended 4 seminars dealing with teaching methodology of work with the gifted children as well as encouragement of creativity development.

Graph 4: Sample structure according to the number of seminars the subjects attended dealing with teaching methodology of work with the gifted children as well as encouragement of creativity development



Contents the subjects were interested in (both initial and final testing)

Graph 5: Outline of the assessments of the suggested content structure



The graph above shows that in the initial testing the subjects assess the following seminars as those most useful for them (they express the highest degree of interestedness in participating in them):

1. Specific features of human abilities and talents (on the average, their responses have a value of 4,8);
2. Teaching methodology instructions for memory games, according to the system of double associations and puzzles – examples, practical exercises, instructions (on the average, their responses have a value of 4,8);
3. Additional activities for synapsis development – practical exercises (on the average, their responses have a value of 4,73);

In the final testing, the following seminars turned out to be the most useful for the subjects:

1. How to encourage productive combinatory operations – divergent thinking, fluency, flexibility of ideas – practical exercises (4,85)
2. Simulation of associative thinking – practical exercises (4,8)
3. Simulation of functional thinking – practical exercises (4,8)

In the **initial** phase of the research, the subjects evaluate the following seminars as those the least useful to them (those they are least interested in participating in):

1. System of brain mechanisms ensured by their basic connections and stages (on the average, their responses have a value of 3,27);
2. Relation between cognition and neurobiology; biological grounds of cognition, new discoveries in the field of neuroscience (on the average, their responses have a value of 3,33);
3. Biochemical processes facilitating maturation of neurons and cognitive maturation, leading to learning (on the average, their responses have a value of 3,58);

In the **final** phase of the research, the subjects evaluate the following seminars as those the least useful to them (those they are least interested in participating in):

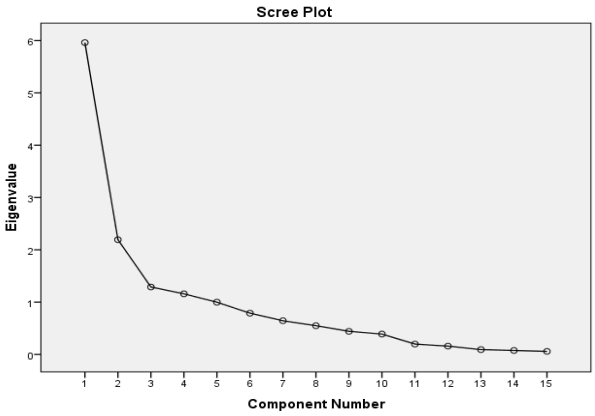
1. How maps and topographic maps are used to translate from iconic forms into linguistic expression and visual form – practical exercises (4,28)
2. The relation between cognition and neurobiology; biological grounds of cognition, new discoveries in the field of neuroscience (4,35)
3. Biochemical processes facilitating maturation of neurons and cognitive maturation, leading to learning (4,5).

It is obvious that there are differences in interests, i.e. expectations from seminars anticipated for the training of preschool teachers for the application of the NTC method and program of teaching and learning of younger children, reflected in subjects' evaluations of the contents they would have had the opportunity to acquire during their training for the application of the NTC program. Lower level of interest for neurobiological ground of cognition might be explained according to the poor familiarity of subjects with biochemical neurological aspect of the topic, as well as the widely accepted viewpoint that there is greater interest into examples which can be directly applied in practice, as compared to theoretical grounds of strategies and methods of learning and teaching.

The outline of a comprehensive evaluation of all the courses estimated according to the scale

What follows are the data illustrating how the subjects generally estimated all the courses which were offered to them to evaluate.

Factor analysis included the total number of 15 items from the evaluation scale. Kaiser-Mayer-Olkin test (KMO) and Barlet test showed that the factor analysis for the established items was justified. The identified factors can be noticed in data analysis. It can be seen that the total of 4 factors explains the total of 70,69% of the variance. Identification of four most important factors is also obvious according to the *scree plot*, showing that the *cut* can be made at the fourth factor.



According to the Rotation Method: Promax with Kaiser Normalization, factor saturation was found at each factor. As a criterion of minimum saturation the value of 0,44 was taken. At this criterion of saturation, the following factors are identified, i.e. singled out:

1. First factor including the following scale items:
    - How to encourage productive combinatory operations – divergent thinking, fluency, flexibility of ideas – practical exercises
    - Simulation of functional thinking – practical exercises
    - Simulation of associative thinking – practical exercises
    - How iconic thinking can be developed according to the techniques of sequencing of higher order information – practical exercises
    - How maps and topographic maps are used to translate iconic forms into linguistic expression and visual form – practical exercises
    - The link between myelination (biochemical process) and external stimuli, i.e. the influence of method of learning and teaching on the development of psychological functions – examples
    - Additional activities leading to synapses development – practical exercises; ***it might be called: The influence of learning and teaching method on creative thinking development.***

2. The second includes the following items from the scale:
    - The system of brain mechanism ensured by its basic connections and stages
    - Relation between cognition and neurobiology: biological grounds of cognition; new discoveries in the field of neuroscience
    - Biochemical processes supporting maturation of neurons and facilitating cognitive maturation, and, consequently, learning. Name: ***Brain mechanisms as fundamentals of cognition, i.e. The relation between cognition and neurobioloty.***

3. The third factor includes the following scale items:
    - Importance of early experiences
    - Flexibility of the nerve system and how the lack of exercises leads to the loss of ability and function – examples;
    - Specific features of abilities and talents – examples
    - Teaching methodology instructions for memory games, according to the system of double associations and puzzles – examples, exercise, instructions. Suggested name: ***Influence of teaching methodology instructions on development of abilities – examples, exercises.***

4. Fourth factor includes the following items from the scale:
    - Early development of giftedness and encouragement of giftedness development – examples
    - How maps and topographic maps are used to translate iconic forms into linguistic expression and visual form – practical exercises. Suggested name: ***Early identification of giftedness and encouragement of its development – examples.***

All the above leads to a conclusion that the preschool teachers have attributed great importance to the first factor: ***The influence of learning and teaching method on creative thinking development.*** It is present in 39,77% of the total variance. This means that the subject find it of greatest importance, evaluating it as the best achievement. This might be considered logical, having in mind that the essence of the NTC program is oriented towards innovative teaching methodology approaches in the sense of encouraging of creative elements of thinking based in brain mechanisms as grounds of cognition; the program is also focused on the relation between cognition and neurobiology, which was highly appreciated by the kindergarten teachers as one of the contents of NTC program, having given it the second place in the factor analysis. So, it can be concluded that from the angle of preschool teachers assessment NTC program met all their expectations, which was also confirmed by the assessment of the effects of the program given within the analysis of changes in the elements of creativity, i.e. divergent thinking and functionality of knowledge. Nevertheless, the question remains referring to the importance of prior knowledge in order to be able to accept and acquire new contents, and their inauguration, i.e. transposition into teaching methodology practice in those parts which are the cause of differences in evaluation of the segments of the NTC program, which is especially true for the parts associated with neurological contents. What also imposes itself as a need is to examine the issue from the angle of abilities of preschool teachers for the transfer or theoretical assumptions into practical procedures and actions, since it is not difficult to notice that the transfer of theoretical knowledge into practical actions has deteriorated recently.

Differences of responses in regard to working experience of the subjects

The calculation of Persons linear correlation coefficient has shown that the variable *working experience* does not have influence on providing responses to 13 questions from the scale. Namely, it was determined that there is no correlation between this variable and the offered responses for none of the questions from the scale. In other words, it was found out that **working experience does not influence the way subjects generally value all the courses offered in the scale.**

Differences in regard to the level of education of the subjects

The calculation of Persons linear correlation coefficient has shown that the variable *level of education* influences providing responses to 4 questions from the scale, while it has no influence on the rest of the questions. What follows is the outline of the results of Persons linear correlation coefficient and their influence of the variable *level of education* on those questions where the existence of correlation was determined.

Mean positive correlation (r=0,34, N=45) at the level of significance of 0,05 between the variable *level of education* and the way the subjects assess the offered course: "*The system of brain mechanisms ensured by its connections and stages*". Namely, it turned out that the subjects who have higher level of education more positively assess this course.

Mean positive correlation (r=0,33, N=45) at the level of significance 0,05 between the variable *level of education*and the way the subjects assess the course "*Importance of early experiences".* **Namely, it was found that the subjects who have higher level of education more evaluate this course more positively.**

Mean positive correlation (r=0,38, N=45) at the level of significance of 0,05 between the variable *level of education* and the evaluation of all the offered courses. **This means that the subjects who have higher level of education attribute greater significance to all the courses in general.** This finding is logical, having in mind that the contents given within certain exercises anticipated higher level of understanding, i.e. certain prior knowledge, in order to be able to understand the practical exercises and their function, leading to higher motivation and evaluation of such contents. If we consider this from the angle of pedagogic implications, a question is raised on the way to increase awareness on the need to provide preschool teachers with professional development opportunities in order to ensure adequate support to development of children at this age.

Differences in regard to the number of seminars the subjects attended in the field of teaching methodology in the work with the gifted and encouragement of creativity

Correlation of Pearson's linear correlation coefficient has shown that the variable *number of seminars* influences the answer to only one of the questions within the scale, while it has no influence on the rest of the questions. Medium negative correlation was found (r=- 0,41, N=45) at the level of significance 0,01 between the variable *number of seminars* and the way the subjects evaluate the following course: "Simulation of functional thinking – practical exercises". In other words, the subjects who attended more seminars in the field of teaching methodology in the work with the gifted evaluate this course as less important as compared to those who attended less seminars, i.e. courses from the mentioned field.

According to the calculation of the Pearson's linear correlation coefficient it was found that there is no influence of the variable the *number of seminars* on the way they generally evaluate the offered courses. It remains to be examined in some further research what is the cause of such an attitude. There are more factors which might have led to this. One of them is the previous finding, i.e. the lack of knowledge on the matter causes the lack of interests, inefficient ways of professional development, etc.

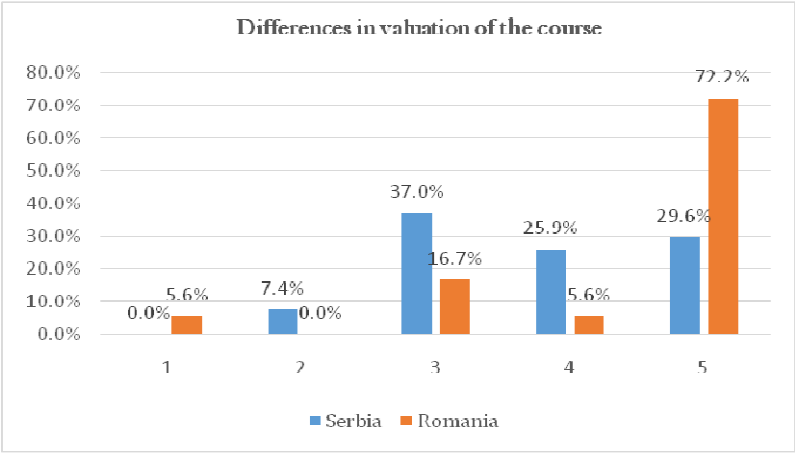
Chi-quadrate independence tests were carried out in order to examine the differences in providing answers to the questions covered by the scale, in the case of subjects classified into two groups, according to a certain feature. It was possible for us to classify the subjects in to groups according to the state they come from and according to the insight if they had or had not attended courses from the field of teaching methodology in the work with the gifted and creativity encouragement.

Differences in evaluation of the course within NTC program according to the states the subjects come from

Chi-quadrate independence tests have shown that the **subjects coming from two different states do not differ in regard to their responses to the questions covered by the scale, apart from one course: "How iconic thinking can be developed according to techniques of sequencing of higher order information – practical exercises".** What follows is the outline of this difference.

It was established according to the Chi-quadrate independence tests that there is statistically significant difference, a the level of 0,05 (χ^2= 11.104, p=0,025) between the variables *the state a subject is coming from* and evaluation of the course "How iconic thinking can be developed according to techniques of sequencing of higher order information – practical exercises. It was found that there is moderate influence (V=0,5) between the variables.

Graph 6: *Differences in valuation of the course of the subjects coming from different states*



Differences in responses to the questions included in the scale depending on whether the subjects had previously attended courses from the field of teaching methodology in the work with the gifted and creativity development encouragement

It was established according to the Chi-quadrate independence tests that the subjects divided into two groups depending on whether they had previously attended the courses in the field of teaching methodology in the work with the gifted and creativity development encouragement **do not differ in regard to giving responses to any of the questions covered by the scale.**

Conclusions

The discussion of the findings leads to the conclusion that the first hypothesis has not been confirmed, having in mind that the kindergarten teachers did not attribute the same level of importance to the reaches of the segments of seminar contents for the application of the NTC program. In other words, the established statistically significant differences in favour of the segment referring to the *influence of teaching and learning methods on creative thinking development*, explaining 39,77% of variance imply that in their evaluations they pay most attention to the segment of the seminar referring to innovative teaching methodology procedures encouraging creative thinking, which is in line with the intensions of the NTC program, having in mind that it focuses on didactic approaches to development of creative elements of preschool children thinking. Namely, it was the aim of the program and, at the same time the reason why the preschool teachers opted for participating into this professional development program. In other words, their interests were in this direction. This might be considered logical, but what remains questionable and underlying the opposite standpoint in the formulated hypothesis is the question why the preschool teachers had evaluated as less useful and placed less emphasis on those segments on the NTC program focused on encouragement of elements of creative thinking, grounded on brain mechanisms as basis of cognition, or the relation between cognition and neurobiology, which NTC program generally puts accent on. These are new contents to them and it was to be expected that they would show greater interest in such contents. Nevertheless, as it was confirmed, the level of their interestedness into this segment was lower. Consequently, the subsequent steps should be directed towards more fundamental understanding of these contents as well as their teaching methodology implementation, in order to expect comprehensive application of the NTC program. The reasons for this are yet to be found, but it could be assumed that their weak knowledge on the contents did not allow the possibilities of transfer into practical teaching methodology procedures; thus, their values were also in the secondary place. One of the assumptions is also the possibility that learning organized within the seminars through workshops diminishes otherwise common practice of teachers to look for themselves for way of translating of theoretical contents and ideas into practical activities and this causes the lack of resourcefulness in transfer. This statement might be considered a hypothesis for a new step in the research on the subject matter.

The outlined findings have also disputed the second hypothesis, assuming that predictor variables (the state the subjects come from and work in, their working experience, the level of education, the number of seminars the subjects had attended in the field of teaching methodology in work with gifted children and development of children's creativity) were not significant factors in evaluations of teaching methodology reaches of the segments of the contents of the seminars for application of the NTC program. As the findings have shown, it turned out that the variable *the number of seminars* has influence on assessing seminar effects. Furthermore, the variable *the state the subjects come from and carry out their pedagogic function* turned out to be significant in the evaluation of the effects of the course; on the other hand, their level of education was found to be significant in evaluation of all segments of the course. This is especially manifested in the case of practical exercise, since the contents implied higher level of understanding of broader contents, i.e. more significant prior knowledge, in order to be able to understand the exercises and their function, as well as the motivation and evaluation of the subjects. If we consider this from the angle of pedagogical implications, a question is raised how to increase the awareness on the need for professional development of preschool teachers leading to provision of adequate support to

the development of children in these fields of knowledge and learning. Only the variable *working experience* cannot be included, since it turned out not to be significant in the assessment of the contents of the NTC program, i.e. the part referring to the seminars, i.e. training of preschool teachers for its application, which is in favour of the conclusion that all the preschool teachers are equally motivated to apply the NTC program, leading to a conclusion that this might be a significant variable for the established efficacy of the project as a whole. A brief overview of the values of this evaluation study might lead to a conclusion that the study actually established more elements for new hypothesis, implying the need to guide preschool teachers in the direction of acquiring of competences for new independent teaching methodology transfers of theoretical knowledge and their testing in their own practice (Stojanovic and Gojkov, 2014). Furthermore, such a conclusion assumes solid knowledge on theoretical relations of the observed phenomena, as well as methodological approaches to their testing, leading to the need to further look for the ways to train and equip preschool teachers for self-reflexivity of their own practice, in order to make more confident steps towards emancipatory upbringing and education.

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