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# TEACHER'S OPINION ABOUT THE IMPLEMENTATION OF INCLUSIVE EDUCATION IN TEACHING INTEGRATED NATURAL SCIENCES

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**Abstract**

This paper analyzes the problems which primary school teachers face during these science lessons and their willingness for professional development to enable themselves to implement the inclusion model in teaching science in primary schools. The research included 332 primary school teachers. The data was collected using a survey and analyzed by comparative and descriptive methods. It showed that the initial professional development program enabled teachers to gain some general knowledge about the inclusion model, but it did not qualified them for applying this model in integrated science teaching in primary schools. Teachers believe that science should be taught by qualified science teachers who have some experience with the inclusion model. Teachers also want to improve their knowledge through further professional trainings. They are faced with a lack of cooperation with institutions which deal with inclusive education, the lack of adequate literature on the inclusion model and its implementation in science teaching, as well as a variety of financial and technical barriers. They want to gain knowledge about the inclusion model, so that they can apply it during their science lessons.

**Key words**: integrated science, inclusion, teacher, primary school, Serbia.

# МИШЉЕЊЕ УЧИТЕЉА О ПРИМЕНИ ИНКЛУЗИВНОГ ОБРАЗОВАЊА У НАСТАВИ ИНТЕГРИСАНИХ ПРИРОДНИХ НАУКА

**Апстракт**

У раду се анализирају проблеми са којима се сусрећу учитељи у Србији током примене инклузивног метода у реалиацији садржаја из интегрисаних природних наука. Анализира се њихово мишљење о њиховој оспособљености за примену инклузивне наставе, као и њихова спремности за даље образовање, како би повећали своја знања и компетенције за примену инклузивне наставе. У истраживању је учествовало 332 учитеља у Републици Србији. Техника истра-

живања је анкетирање, а инструмент истраживања је анкета креирана на основу постављеног циља и задатака истраживања. У истраживању је коришћена дескриптивна, аналитичка и компаративна метода. На основу добијених резултата истраживања закључује се да су учитељи стекли општа знања о инклузивном образовању, највише током семинара која су организована под менторством Министарства просвете, науке и технолошког развоја Републике Србије. Међутим, на семинарима нису стекли знања како да примене инклузивни модел у настави интегрисаних природних наука. Током реализације инклузивне наставе већина учитеља се суочава са недостатком сарадње са институцијама које се баве инклузивним образовањем, недостатаком адекватне литературе о инклузивном моделу и његовој примени у настави интегрисаних природних наука, као и низом финансијских и техничких баријера. Већина учитеља сматра да нема потребна знања за примену инклузивног модела у реализацији садржаја интегрисаних природних наука, због чега заступају мишљење да ове садржаје треба да реализују професори природних наука који имају доста искуства у примени инклузивног модела. Учитељи желе да унапреде своја знања кроз даље стручно усавршавање. Они желе да стекну нове компетенције у примени инклузивног модела у настави интегрисаних природних наука, као и да се оспособе за примену различитих метода учења, савремених образовних технологија у реализацији садржаја интегрисаних природних наука. поштујући при томе принципе индивидуализоване наставе. Овај став учитеља представља њихову високу унутрашњу мотивацију да унапреде своја знања и треба га имати у виду током организовања перманентног стручног усавршавања учитеља, кроз стручне семинаре и друге облике доживотног образовања. Кроз организовано стручно усаврашавање учитеља у примени инклузивног модела у настави интегрисаних природних наука, повећале би се компетенције учитеља и настава интегрисаних наука и она би била доступна сваком ученику, поштујући његове менталне, когнитивне и физичке карактеристике.

**Кључне речи**: интегрисане природне науке, инклузија, учитељи, разредна настава, Србија.

## *INTRODUCTION*

Children learn first things about nature in an integrated form (integrated natural science) during their preschool education and then in one-teacher education. During classroom learning children with special needs, in accordance with their abilities, should acquire some basic knowledge in integrated science on their primary school science lessons. It is particularly important that within the inclusive education model (IEP), teachers choose the most suitable approach and methods to satisfy the pupils' curiosity for studying nature and to help them acquire some basic knowledge in integrated science (Cardoso Gomes, Mortimer and Kelly, 2011). Topics from integrated science are important notions which should be included in many children's games and activities. These topics not only provide knowledge about nature for children with special educational needs (Scruggs and Mastropieri, 2007), but also develop the skills and attitudes necessary for life in a society. Children needs through primary school science education develop interest and enthusiasm that

characterize early childhood. They learn how to adapt to specific situations and how to develop their own creativity. Through the individualized education plan, with the help of their teachers, children should acquire the basic principles of studying nature. They should learn how to identify the problem, how to make assumptions, how to conduct simple researches, how to make conclusions and finally how to check them (Mastropieri, Thomas, Scruggs and Graetz, 2005). The individualized education plan for teaching integrated natural science should include methods that will help the children to master the basic techniques of observation and teach them how to focus on the essential characteristics of the object of observation, how to record and test ideas, how to make notes, measurements and write reports (Van Driel, Beijaard and Verloop, 2000). The teacher should, considering the mental and physical abilities of the child, organize an observation, i.e. the teacher, with a series of questions, should guide the observation of the objects' characteristic features, phenomena and relations between phenomena. Children would achieve better results if natural phenomena and processes were taught in the natural environment Bodzin, Shiner and Klein, 2010). However, when this is impossible, then experiments should be applied (Lederman, 2008). Through experiments, children directly study nature and acquire knowledge that is not only based on judgement but also on close encounter with reality. Experiments in integrated natural science education of children with special educational needs must be simple, adjusted to their abilities (Ellen, 2010). Conditions under which experiments are carried out must be simple so that they could be easily explained to children. The experiment together with the verbal method, drawing and writing makes a whole. When choosing the experiment, teachers should check whether the experiment is a good method, whether it is methodically correct and required. Whenever possible, teachers should allow the children to run the experiment by themselves, in consideration of their mental and physical abilities. Through independent experiments, children learn about the subject matter, and they also allow them to acquire knowledge through expressing their own ideas and thoughts, and giving their own explanations. Children get an opportunity to test their hypotheses, and to gradually adopt all stages of the scientific method. This way, they learn that the best way to acquire knowledge is through facts that were logically and experimentally confirmed, which is actually scientific approach to reality. When children independently perform experiments, if they are physically and mentally able to do so, and they satisfy their need for physical activity, as well as their great curiosity to examine everything that comes within the scope of their senses (Murphy and Beggs, 2003). Unsuccessful independent experiments do not affect children negatively. On the contrary, they motivate them to investigate the causes of failure, to remove them and to perform the experiments again by following the directions.

Teachers, who teach science in lower grades of primary school to children with Special Educational Needs (SEN) are expected to have adequate knowledge in science; to have skills and ambition to work with children with SEN; to recognize, consider and respect differences between children and to appreciate the abilities each child has. They are also expected to be team players, to have great knowledge about the subject matter they teach and to be prepared for further training and continuous education. They should also be able to create individual education plans and to set individual goals regarding patterns in children's development.

The attitudes of teachers can enhance or impede the implementation of inclusion (Dulčić and Bakota, 2008). In addition to general attitudes towards inclusion, researchers most frequently study factors that have an impact on teacher attitudes: their gender, age, experience, professional training and education, as well as the types and level of impairments/SN in children, sources of support and the distribution of resources, support from the school administration and colleagues, organization framework, etc. (De Boer, Pijl, and Minnaert., 2011; Jerlinder, Danermark and Gill, 2010). Many researchers show that younger and less experienced teachers are more inclined to implement inclusion, while their older and more experienced colleagues are more concerned about its implementation (Tsakiridou and Polyzopoulou, 2014; Rakap and Kaczmarek, 2010) . The younger teachers with the least experience are more positive about inclusion. The studies have emphasized the importance of teacher training that prepares them for inclusion and gives them more professional expertise. They are better prepared for work with children, have better self-confidence and a more positive attitude towards inclusive practice (Lakkala and Määttä, 2011; Kudek Mirošević and Jurčević Lozančić, 2014). The inclusion is implemented in Serbian education system long time ago but the research which related of opinion the primary school teacher of a inclusion still missing or is very weak (Karić, Mihić i Korda, 2014).

## *RESEARCH METHODOLOGY*

Most researches about inclusive education are focused on general problems of application, as well as the problems, views and opinions of teachers about the possibilities of implementing inclusive education in teaching. Insufficient number of papers on the willingness of teachers to implement inclusive education in teaching integrated natural sciences. This study aims to obtain results on which to gain insight into the problems that teachers face in implementing inclusive education in teaching integrated natural sciences.The main aim of the research is to analyse of teacher's opinions on their competence for the implementation of the inclusion model within integrated science education in primary schools and the problems they encounter; as well as the analysis of the problems

and providing support for teachers who implement the inclusive education model whilst teaching integrated science in primary schools. The tasks of the research were to inquire:

1. Teacher's opinion about the importance of introduction the inclusive education model to state schools;
2. Teacher's opinion about their capability of making EB and IEP for teaching integrated science in the primary education;
3. Teacher's opinion about the problems they face whilst implementing the inclusive education model in teaching integrated science in the primary school;
4. Teacher's opinion about their methodological competence for implementing the inclusive education model in teaching integrated science in the primary school;
5. Teacher's attitude towards further professional trainings in the field of applying the inclusive education model in teaching integrated science in the primary school.

The main hypothesis is: Teachers, who have completed the training program on inclusive education, are professionally and methodically trained for the application of inclusive education model in teaching integrated science in the primary school, moreover they are successfully applying it. The study uses descriptive-analytical and comparative methods. The data in the research was gathered by a survey, which as the instrument of the research, was constructed in accordance with the goals and objectives of the research. The survey contains 58 questions and consists of 5 parts. In order to determine the reliability of the questionnaire as a whole, Cronbach alpha coefficient (α) of reliability was calculated. In terms of Cronbach α, the tested internal reliability of the instrument was high (α=0.859). For the statistical analysis of data, SPSS 19.00 was used. T-test was used to determine differences between the attitudes of teachers who had completed training on inclusive education and had experience in working with children with SEN and the attitudes of teachers who lack this experience. This test was also used to analyze differences in attitudes and beliefs about the inclusive education model between teachers who had not completed the professional training and teachers who had. F test was used to examine differences in attitudes and beliefs about the importance and implementation of inclusive education between the three groups of teachers (those, who have completed a training on inclusive education and gained experience in implementing the inclusive education model; those, who have completed a training on inclusive education but lack experience; and those, who had not finished any training program for the implementation of the inclusive education model.

The examined group had 332 members, primary school teachers of different gender and with different number of years of experience. These teachers work in primary schools in various places on the territory of the Autonomous Province of Vojvodina (the Republic of Serbia). 50.3% teachers

have finished a professional training for implementing the inclusive education model, but only 25.6% have experience in the field. 82.3% attended two seminars on inclusive education, while a smaller percentage attended three (3.5%), or one seminar (14.2%). The survey did not ask teachers to indicate concise names of seminars. It was important that these seminars were accredited by the Ministry of Education, Science and Technological Development of Republic Serbia. Most of the teachers (85.4%) attended two seminars, while a smaller number attended one seminar (14.6%). 49.7% teachers have not received any training on inclusive education. We selected the teachers who have or have not completed training on inclusive education, in order to examine the influence of professional development on teachers opinion about their professional and methodological competence for implementing the inclusive education model whilst teaching integrated science in primary education.The average work experience of the surveyed teachers was 17.8 years. The study included 214 female and 118 male teachers male, which partly reflects the division of teachers by gender in the Serbian education system. The survey was conducted between October, 2014 and May, 2015. A great percentage of teachers (81.1%) perform educational activities in classes with 15 to 25 students, which is considered to be an optimal number. 13.2% of teachers work in classes where there are more than 25 students, and 5.7% of teachers work in classes with less than 15 students. Based on the gathered data, it is concluded that for the majority of teachers, the number of students in the classroom is not a factor that could negatively affect the implementation of the inclusive education model.

## *RESULTS*

The difference in opinions on the competence in creating the pedagogical profile of students (PP) and individual educational profile IEP (Serbian IOP) at the beginners' level integrated science education between the teachers are showed in table (Table1).

*Table 1. The difference in opinions on the competence in creating the PP and IEP at the beginners' level integrated science education between the teachers who have completed the professional training and those who have not.*

| Teachers | Competence in Preparing the PP | | | | Preparing the IEP(IOP) at the Beginners' Level Integrated science Education | | | |
|---|---|---|---|---|---|---|---|---|
| | AS | SD | t-test | p | AS | SD | t-test | p |
| Those who have completed the training | 3.9 | 3.211 | 5.88 | .000 | 1.8 | 2.239 | 0.621 | .529 |
| Those who have not completed the training | 2.8 | 3.529 | | | 1.3 | 2.372 | | |

The difference in opinions between the teachers who have completed the professional training program and have or do not have the working experience in teaching the children with special needs, according to their methodological knowledge needed for the implementation of inclusion at the beginners' level of science education are showed in table (Table 2).

*Table 2. The difference in opinions between the teachers who have completed the professional training program and have or do not have the working experience in teaching the children with special needs, according to their methodological knowledge needed for the implementation of inclusion at the beginners' level of science education*

| Type of applied knowledge | AS | SD | t | p |
|---|---|---|---|---|
| Verbal-textual methods (VTM) | 1.4 | 2.365 | .129 | .708 |
| Practical work (PW) | 2.3 | 2.823 | .069 | .781 |
| Demonstrative experiments (DEM) | 3.2 | 3.925 | .404 | .750 |
| Children' s experiments (CE) | 1.2 | 2.114 | .000 | 1.000 |
| The scientific method (SM) | 0.8 | 1.358 | .068 | .785 |
| Example-based classes (EC) | 2.2 | 1.222 | .051 | .809 |
| Research-based classes (RC) | 1.3 | 2.065 | .073 | .787 |
| Problem-based classes (PC) | 1.5 | 2.112 | .404 | 750 |
| Project-based classes (PRC) | 1.1 | 1.852 | .029 | .847 |
| Multimedia classes (MC) | 2.8 | 2.855 | .076 | .799 |

## *DISCUSSION*

The teachers that have participated in the survey have answered the following question: *What is your definition of the inclusive education?* and their answers can be reduced to statement: *The inclusive education is the education of children with special needs*. Of those who have answered the question, 93.1% have said that the children with special needs have disabilities in physical, motoric, sensory and intellectual development and multiple disabilities as well. None of the participants have included in the category of the children with special needs the children with disabilities that are caused by their social and economical environment, or the problems that stem from differences in cultures or languages. There are probably two factors of such answer distribution (Rabadán Rubio and Giménez-Gualdo, 2012): insufficient information on how teachers can assess children with special needs and insufficient cooperation among teachers, doctors and inclusive education experts. A part of the claim can be supported by a finding from our research which states that the majority of the teachers who have been teaching the children with special needs have not been receiving sufficient assistance from school doctors (83.5%) and social service experts (82.4%) in planning and implementation of the inclusive approach to teaching. The results obtained were very similar to results of other studies

(Lifshitz, Glaubman and Issawi, 2004; MacFarlane and Woolfson, 2013). In addition, teachers should be able to seek and use the assistance of other actors who can serve as valuable resources in inclusive education, as well as support staff, parents, communities, school authorities and other relevant stakeholders (Veljić, 2005). In the previous research, the teachers expressed the opinion that they needed co-operation with all participants in the educational process, as well as the help of defectologists, and also continuous professional development (Đević, 2009).

76.3% of teachers have a positive attitude towards inclusive education i.e. they completely agree that inclusive education is necessary in the process of regular education A significant percentage of teachers (23.7%) have no attitude towards inclusive education (these are the teachers who have not yet completed the professional training on inclusive education). In a compation these results with previous research, it can be concluded that the teachers' opinion on inclusion education in Serbia has gradually changed for the better. From teachers' opinions to can neglect the rest of the class if there were a child (or children) with disabilities, as well as in the suspicion of the academic success of the inclusive department (Ćuk, 2006; Đević, 2009), through neutral attitudes towards inclusive education, to more positive expectations regarding the inclusion results, (Galović, Brojčin i Glumbić, 2014), to the present positive positive opinion.The teachers who have completed the training tend to have a more positive attitude towards inclusive education when compared to those who have not (t=9,576, p=0,000). It is encouraging that no participants in the survey are against the inclusion, which leaves open a possibility of further implementation of inclusion within the educational system of the Republic of Serbia. Clearly, teachers—and teacher educators—play a critical role in meeting these challenges, but inclusive education must be seen as a responsibility to be shared by all teachersand stakeholders in education, not just a few (Donnelly and Watkins, 2011). The teaching experience has not made the teachers doubt their positive attitude regardless of the difficulties they have encountered in the implementation of inclusion (those are looked into in the second group of questions). This is also an encouraging fact since it shows how hardworking, motivated and aspiring the teachers are, when they are working with the children with special needs. This fact and the fact that the teachers are willing to educate themselves further in the implementation of inclusion (which can be seen in the results of the fifth part of the survey) are considered to be a very good basis for a more successful future implementation of inclusion in Serbia. The obtained results were similar to the results of the research group of authors on the attitudes of teachers on inclusive education (Karić, Mihić and Korda, 2010; Schmidt and Vrhovnik, 2015).

The teachers who have experience in working with the children with special needs think that their professional training has helped them to actively participate in the preparation of PP. Survey participants'' teaching experience

in the implementation of inclusive education is short (2.8 years on average). Regardless of that fact, the experience has caused the teachers who work with the children with special needs to consider themselves more competent to work in a PP (pedagogical profile of students) team than their professionally trained counterparts (Table 1) without the experience (t=9.453; p=,000). This claim is supported by the average grade on the preparation of PP, based on the teachers' opinions on their own knowledge. The average grade on the preparation of PP decreases in the following order: the teachers with teaching experience that have completed the professional training program (3.95), the teachers without teaching experience that have completed the professional training program (3.03), the teachers that have not completed the professional training program (2.15). The difference in the teachers' opinions on their competence to prepare a PP is caused by different factors. It should not be doubted that the teachers who work with the children with special needs have been demanded to review their existing knowledge and also gain new one in order to be able to actively participate in the inclusion implementation team. In addition to that, the teachers' cooperation with their PP team counterparts has enabled them to gain new knowledge and be able to depend more on their own previous knowledge in comparison with the teachers who are equipped theoretically, but have no teaching experience with the children with special needs.

The following results are somewhat unexpected because they show that there is no statistically significant difference in opinions on competence in preparing the individual educational profile (IEP) at the primary integrated science education between the teachers who have completed the professional training program and the teachers who have not. This is supported by the average grades acquired when the teachers have been asked to self-assess their knowledge needed for creating the IEP for beginners' education in integrated science. The average grades on the teachers' competence for creating the IEP are as follows: the teachers with teaching experience that have completed the professional training program (2.18), the teachers without teaching experience that have completed the professional training program (2.03), the teachers that have not completed the professional training program (1.87). A statistically significant difference has not been found between the teachers who work with the children with special needs and the teachers without teaching experience that have completed the professional training program (t= .386; p=.805 ). This leads to conclusion that the teachers' seminars have primarily been aimed at gaining general knowledge on inclusion, and the rules and principles in preparing the PP and IEP and the like. The seminars have had little or no focus on the concretization of inclusion for science topics as well as the specific features in creating the IEP at the beginners' level of science education. These claims can also be supported by the analysis of the teachers' professional training seminar catalogues in the Republic of Serbia. The analysis of seminars' aims shows that there are no seminars which would train teachers to implement

inclusion in integrated science in the primary school. The results obtained were very similar to results of studies Majda Schmidt and Ksenja Vrhovnik (2015). This result is consistent with similar studies from the region, in Montenegro, in addition to the lack of professional seminars in the field of inclusive education, there is a big lack of study programs that deal with this topic (Šakotić and Veljić, 2010). Education and training systems should aim to ensure that all learners—including those from disadvantaged backgrounds, those with special needs and migrants—complete their education, including, where appropriate, through second-chanceeducation and the provision of more personalized learning, (Council of the European Union, 2009).

Implementation of inclusive education in general, and inclusive integrated science education at the beginners' level in particular, has been challenged by several technical problems. In the third part of the survey, the teachers have listed biggest problems that they have met. Based on the frequency of their answers, the problems are given in the following order:

1. there are no seminars to educate the teachers in teaching science classes (94.9%);
2. there are no adequate literature on implementation of inclusion at the integrated science or science education (84.9%);
3. there is no assisting technology that is needed in teaching the children with special needs (74.1%);
4. there is no sufficient system support by the educational advisers in the implementation of inclusion at the integrated science or science education (66.9%);
5. insufficient professional support by colleagues who teach science (66.0%);
6. insufficient correlation between the inclusion authorities and the schools where the teachers work (52.1%);
7. poor technical conditions and insufficient capacities of schools for implementation and development of inclusive education (41.0%); this affects the development of inclusion implementation at the integrated science or science education;
8. disharmony of legal documents with the real needs of children and teachers in the process of inclusive education (33.1%).

The teachers need more support and help (which they expect) from the relevant experts and institutions in implementation of inclusion at the education in integrated science, as well as in other school subjects. The problems stated by the teachers, along with their expectations, are similar to those given by their colleagues included the survey, conducted at the end of 2010 by the Province ombudsman, regarding the protection of children's rights, as well as the survey, conducted in the same year, within the project of the Teachers' Association of the Republic of Serbia, titled "Support for Inclusive Education through the Educational System"

(IEM). This indicates that, from then up to this research, little has been done to improve material, technical and educational prerequisites for the implementation of inclusion within the educational system of Serbia.

The largest number of teachers with the experience in the implementation of inclusion (81.2%) has asked for help from IEM. The teachers, above all, have needed the assistance for particular problems regarding children' s behaviour (88.2%) or for establishing cooperation with the families of children with special needs (71.8%). The majority (81.2%) of these teachers have never asked for assistance from the IEM during the implementation of inclusion at the education in integrated science or science. 11.7% of the teachers have asked for the assistance, but have been dissatisfied with its quality. The teachers without teaching experience who have completed the professional training program, as well as those who have not completed the program have never asked for the IEM assistance. The majority of the teachers (69.4%) who have participated in the implementation of inclusion within the integrated science or science education have relied mostly on assistance by other science teachers. According to their opinion, the received assistance is insufficient, and the reason for this is the fact that the consulted teachers also have not had sufficient knowledge to implement inclusion. The significant percentage of the teachers (30.6%) refused to offer assistance on the implementation of inclusion to other teachers.

95.8% of the teachers agree that it is necessary to establish a partner relationship with parents in planning and providing support for children with special developmental needs (3.2% of the teachers have not answered this question). All the teachers with experience in teaching children with special needs are very satisfied with cooperation with parents and guardians of non-Roma children with special needs. However, the majority of them (84.7%) have a poor cooperation with parents of Roma children with special needs. The reason for such behaviour of Roma parents should be traced to their insufficient education and poor economic and social conditions of Roma families in Serbia (Srdić and Cvjetićanin, 2012). It is a somewhat unexpected fact that less than one quarter of the teachers who have completed the professional training program (22.8%) completely agrees with the statement that parents or guardians can assist the realizations of goals and aims of inclusion at integrated science or science education. Most of the teachers who have completed the professional training (72.9%) have no attitude on importance of parents' or guardians' participation, while 4.2% of all teachers have not answered this question. There is no statistically important difference in attitudes on this issue between the teachers with teaching experience that have completed the professional training program and those without teaching experience ($t= 1.154$, $p=0,378$). These results lead to several conclusions. Firstly, there is insufficient cooperation between the teachers who teach the children with

special needs and their parents or guardians in the implementation of inclusion at the beginners' level in integrated science education, or there is cooperation between them on the general inclusion-related issues, but not on the specific ones. Secondly, the majority of the teachers doubt the parents' skills and knowledge needed for participating in the implementation of inclusion in science education (Mastropieri, Scruggs and Graetz, 2005). Thirdly, due to insufficient professional and methodological competence for implementation of inclusion in beginners' integrated science or science education, the teachers do not know how to include parents in the process of education. To solve the problem, it is important to include information on ways of parental engagement in the professional training programs aimed at teachers in beginners' integrated science or science inclusive education.

The majority of the teachers (92.5%) completely agrees with the statement that, when the students with special needs are being taught, other students in the same class are being neglected. 86.4% of the teachers completely agrees with the statement that the science education should be carried out by the experts for the implementation of inclusion. There is no statistically significant difference between the teachers (in terms of their experience in teaching children with special needs or completion of their professional training) on the opinions that the inclusion contributes to neglecting the children without special needs ($F=1.732$, $p=0,372$), or that the experts should carry out inclusive science education ($F=0.213$, $p= 0.805$). Attitudes like these probably stem from the teachers' feeling of distrust in their own abilities for quality and successful implementation of inclusion in beginners' integrated science or science education. The teachers are professionally insecure which discourages them to change their attitudes and, consequently, their teaching. The result of the insecurity can be teaching failure, which, in turn, strengthens their negative attitude towards the inclusion in general. The opinion of the teachers who have completed the inclusion implementation program but lack adequate knowledge needed to actively participate in the preparation of IEP in the beginners' integrated science education is closely related with their opinion that they are insufficiently, professionally and methodologically, competent to implement inclusive education in integrated science. 80.8% of the teachers have graded their general knowledge of inclusion implementation at the beginners' level of integrated science education with the grade *sufficient (2)*, while a small percentage (3.3%) have graded themselves with *good (3)*, and a significant percentage (15.9 %) have given themselves the lowest grade -- *insufficient (1)*. (The teachers have used Serbian elementary school grading system. It consists of a five-point scale, given in decreasing order: *excellent (5)*, *very good (4)*, *good (3)*, *sufficient (2)*, and *insufficient (1)*.).

89.0% of the teachers with teaching experience have graded their own knowledge with the grade *sufficient (2)*. This kind of results are expected

because the teachers have not gained sufficient knowledge through the initial education and professional training in order to implement the inclusion in science education. In the survey, the teachers have had to assess their knowledge of application of different working methods, the scientific method, and the different types of education at the beginners' level of integrated science education on the scale from 1 to 5. The measurements of descriptive statistics show that teachers' average score in the questions regarding their own knowledge (which does not deviate significantly from the normal Gauss curve with the basic statistical values of M=28.7 and SD=5.86) shows their objectivity in self-assessment. This is a good starting point in the process of priority task identification of the inclusion implementation and improvement at the beginners' level of integrated science education.

Gender, teaching experience and professional competence for teaching the children with special needs (the *t* value in questions, which has tested the effect of every given factor, is at the importance level higher than 0.05) do not affect the teachers' opinion on their own knowledge needed for application of different working methods, the scientific method, and different types of education at beginners' level of integrated science education. There is no statistically significant difference (the values of the *t* test in all questions are at the importance threshold higher than 0.05) in the opinions between the teachers that have completed the professional training program with or without the teaching experience in the implementation of inclusion (Table 2). Based on the average value of their assessment, it can be concluded that the teachers who have participated in the survey, whether or not they have completed the program, should gain knowledge of: application of practical teaching (2.1), demonstrational (1.8) and students' (children's) experiments (1.4), the scientific method (1.3) the application of the scientific method in research-based (1.8), project-based (1.2), and problem-based (1.6) classes at the beginners' level of inclusive integrated science education (Graph 2). The teachers should improve their knowledge on implementation of multimedia classes (2.0). These facts should be included in the programs that focus on professional competence of teachers within the implementation of inclusion.

The result data indicate that the children with special needs gain the knowledge of integrated science and science in the traditional way without using experiments and other modern forms of education. In that way they are prevented from easy understanding (according to their individual characteristics) of the cause and effect relations in nature and applying the gained knowledge in their everyday life. The results show that the teachers doubt their abilities to determine which integrated science topics a child needs to study; they doubt their ability to choose the adequate methods, teaching means, didactic materials and tools. This means that they do not feel competent enough to plan the common, individualized or interactive teaching

activities and to anticipate their duration and changeability, as well as to provide material and technical prerequisites of the classroom work. The result data indicate that, at the beginners' level of integrated science or science education, the teachers are not certain how to assess child's work and his or her improvement appropriately. The obtained results were similar to the results of the research group of authors on the preparedness of teachers of class and subject teachers to work with children with disabilities (Spasenović and Matović, 2015)

78.9% of the teachers are aware that there are inclusion-specific professional training programs. A high percentage of the teachers (21.1%) are not aware of these programs, which can inhibit the introduction of the inclusive education to schools. All teachers who have participated in the survey are prepared to be included in the professional training programs in order to be competent for the inclusion implementation at the science education. The majority of them (92.8%) view professional training as a continuous process, lasting for several years, consisting of frequent consultations. The teachers think that it is also important to monitor and support the application of their knowledge gained through the training programs. In the survey, the teachers have had to list the areas which need to be included in the training programs in order for them to be more competent for inclusion implementation at beginners' level of integrated science education. The teachers have given their answers in the following order:

1. making individual educational plan 82.8%
2. planning and programming of teachers' work 82.8%
3. monitoring, assessment and grading children at the beginners' level of integrated science education 81.0%
4. the application of the experimental method on various topics 79.8%
5. the application of practical work 78.0%
6. the application of the scientific method in research-based, project-based and problem-based classes 76.8%
7. the application of modern teaching method 75.5%
8. the application of modern teaching tools and educational technology 74.7%
9. cooperation with parents in the realization of goals and aims of beginners' integrated science education 69.9 %
10. adequate literature for the implementation of inclusion in science education 64.8%

The results coincide with the teachers' opinion on their own competence for the inclusion implementation at the beginners' level of integrated science education. 83.1% of the teachers do not use the literature on inclusive education (available through electronic media and the inclusion web site), a small percentage (14.9%) use it rarely, while only 2% use it regularly. The reason for this is that the majority of the teachers (80.1%) are not aware that the additional literature on inclusive education is available.

There is no significant difference in the usage of the additional literature between the teachers who have completed the professional training program, and those who have not (t=4.257. p= 0.729), There is also no difference between the teachers who have had the experience in teaching children with special needs and those who have had not (t=2.403. p=0.275). The insufficient usage of available literature on inclusion by the teachers and the lack of adequate for the implementation of inclusion in science education impedes additionally the implementation of inclusion at the beginners' level of integrated science education.

## *CONCLUSION*

The results show that although the teachers, as an important part of the educational system of the Republic of Serbia, are making great efforts to implement the inclusive education, they are not completely prepared for the implementation of inclusion at the beginners' level of science education. The teachers' self-assessment shows that they are not competent both professionally and methodologically to implement inclusion in science and (especially) integrated science education. Inclusive education professional training programs that the teachers have completed have not qualified them to implement inclusion at the beginners' level of science education. This leads to conclusion that they are not able to completely provide science education to children with special needs.

The teachers should learn how to be in control of teaching strategies at the beginners' integrated science education of children with special needs and to realize important functions (pedagogical-diagnostic, planning-programming, leading-innovation and others). They need support the teachers in the implementation of inclusion at the beginners' level of integrated science education in particular and science education in general. The support should be planned on a different quality levels (raising awareness, informing and educating the teachers, horizontal exchange, good examples from practice etc) to fit the different needs of the teachers. The teachers need better coordination between them and institutions that deal with the inclusive education and a better support by the experts on the implementation of inclusion at the beginners' level of integrated science or science education. It is important to provide teachers literature on inclusive education and its implementation in science education, or, at least, to provide a better access to it. Experts need to create new literature which would help the teachers in the implementation of inclusion on specific topics as well as to improve schools' equipment with assisting technologies. The teachers without teaching experience with the children with special needs a chance to gain some practice in the implementation of inclusion during the professional training program. It is very important to motivate and support the teachers who would like to transform their

good practical experience into the professional training programs, since the results have shown that the teachers are mostly prepared for the horizontal exchange and learning. It also means that teachers are encouraged to exchange their experiences with their colleagues from the countries where the inclusive education has been implemented longer than in Serbia, as a form of support in the implementation of inclusion in all areas, and especially at the beginners' level of integrated science education.

## *REFERENCES*


Bodzin, A., Shiner, K., Klein, B. (2010). *The Inclusion of Environmental Education in Science Teacher Education*. New York: Springer.

Cardoso Gomes, F., M., Mortimer, E, Kelly, G. (2011). Contrasting Stories of Inclusion/Exclusion in the Integrated science Classroom Journal: *International Journal of Science Education, 33(6*), 747–772.

Ćuk, M. (2006). *Potreba nastavnog i stručnog osoblja za osnaživanjem u radu sa decom sa smetnjama u razvoju*. [The need of Teaching and Professional Staff for Empowering Children with Disabilities]. Novi Sad: Naša škola.

De Boer, A. A., Pijl, S. J., Minnaert, A. E. M. G. (2011). Regular primary school teachers' attitudes towards inclusive education: a review of the literature. *International Journal of Inclusive Education, 15(3),* 331–353.

Đević, R. (2009). Spremnost nastavnika osnovne škole da prihvate učenike sa teškoćama u razvoju. [Readness of Primary School Teachers to Accept Disabled Children]. *Zbornik Instituta za pedagoška istraživanja*, 41(2), 367–382.

Donnelly, V., Watkins A. (2011). Teacher education for inclusion in Europe. *Prospects 41*,341–353.

Dulčić, A., Bakota, K. (2008). Stavovi učitelja povijesti redovnih osnovnih škola prema integriranim učenicima oštećena sluha i učenicima s poremećajima govorno-jezične komunikacije te specifičnim teškoćama u učenju. [Attitudes of History Teachers in Regular Elementary Schools toward Integrated Hearing Impaired Pupils and Pupils with Speech and Language Disorders in Communication and Specific Difficulties in Studying]. *Hrvatska revija za rehabilitacijska istraživanja, 44(2),* 31–50.

Ellen, D. (2010). *Doing What Scientists Do, Second Edition: Children Learn to Investigate Their World*, Portsmouth: Heinemann.

Jerlinder, K., Danermark, B., Gill, P. (2010). Swedish Primary School Teachers' Attitudes to Inclusion – The Case of PE and Pupils with Physical Disabilities. European Journal of Special Needs Education, 25, 1, 45–47.): Swedish Primary School Teachers' Attitudes to Inclusion – The Case of PE and Pupils with Physical Disabilities." European Journal of Special Needs Education, 25, 1, 45–47.

Karić, T., Mihić, V., Korda, M. (2014).Stavovi profesora razredne nastave o inkluzivnom obrazovanju dece sa smetnjama u razvoju. [Attitudes of Teachers toward Inclusive Education]. *Primenjena psihologija, 7(4),* 531–548.

Kudek Mirošević, J., Jurčević Lozančić, A. (2014): Stavovi odgajatelja i učitelja o provedbi inkluzije u redovitim predškoskim ustanovama i osnovnim školama. [Attitudes of Educators and Teachers Regarding the Implementation of Inclusion in Regular Preshools and Primary Schools]. *Hrvatska revija za rehabilitacijska istraživanja, 50(2),* 17–29.

Lakkala, S., Määttä, K. (2011). Towards a theoreticalmodel of inclusive teaching strategies – an action research in an inclusive elementary class. *Global Journal of Human Social Science, 1(8)*, 31–40.

Lederman, M. (2008). Scientists and 21st century science education. *Technology in Science, 30*, 397-400.

Lifshitz, H., Glaubman, R., Issawi, R. (2004). Attitudes towards inclusion: the case of Israeli and Palestinian regularand special education teachers. European. *Journal of Special Neeeds Education, 19(2*), 171–90.

MacFarlane, K., Woolfson, L. M. (2013). Teacher attitudes and behavior toward the inclusion of children with social, emotional and behavioral difficulties in mainstream schools: An application of the theory of planned behavior. *Teaching and Teacher Education, 29*, 46-52.

Mastropieri, M., Thomas E., Scruggs, T., Graetz, J. (2005). Cognition and learning in inclusive high school integrated science classes. *Cognition and Learning in Diverse Settings Advances in Learning and Behavioral Disabilities*, *18*, 107–118.

Murphy, C., Beggs, J. (2003). Children's perceptions of school science. *School Science Review, 84(308)*, 109-116.

Rabadán Rubio, J. Giménez-Gualdo, A. (2012). Detección e intervención en el aula de los trastornos de conducta. *Educación XX1*, 15(2), 185-212.

Rakap, S., Kaczmarek, L. (2010). Teachers' attitudes towards inclusion in Turkey. *European Journal of Special neeeds Education, 25(1),* 59–75.

Šakotić, N., Veljić, Č. (2010). Inkluzivno obrazovanje u bolonjskom procesu. [Inclusive Education in the Bologna Process]. *Sociološka luča, IV(1)*, 185–195.

Schmidt, M., Vrhovnik, K. (2015). Attitudes of Teachers towards the Inclusion of Children with Special Needs in Primary and Secondary Schools. *Hrvatska revija za rehabilitacijska istraživanja, 51(2)*, 16–30.

Schmidt, M., Vrhovnik, K. (2015). Attitudes of Teachers towards the Inclusion of Children with Special Needs in Primary and Secondary Schools. *Hrvatska revija za rehabilitacijska istraživanja, 51(2)*, 16–30.

Scruggs, T., Mastropieri, M. (2007): Science Learning in Special Education: The Case for Constructed Versus Instructed Learning. *Exceptionality, 15(2),* 57–74.

Spasenović, V., Matović, N. (2015). Pripremljenost nastavnika razredne i predmetne nastave za rad s decom sa smetnjama u razvoju. [Preparedness of Class and Subject Teachers for Work with Children with Developmental Difficulties]. *Nastava i vaspitanje, 64 (2)*, 207-222.

Srdić, V., Cvjeticanin, S. (2012). The Educational Integration Process of the Roma in Serbia. *Drustvena istrazivanja, 21(2),* 569-587.

Tsakiridou, H., Polyzopoulou, K. (2014).Greek Teachers' Attitudes toward the Inclusion of Students with Special Educational Needs. *American Journal of Educational research, 2(4)*, 208-218.

Van Driel, V.H., Beijaard, D., Verloop, N. (2000). Professional Development and Reforms in Science education: The Role of Teachers' Practrical Knowledge. *Journal of Research in Science Teaching, 2*, 137-158.

Veljić, Č. (2005). *Zaštita i tretman osoba sa invalidnošću u Crnoj Gori*. [Protection and Treatment of Persons with Disabilities in Montenegro]. Podgorica: Savez društva defektologa SiCG.

# МИШЉЕЊЕ УЧИТЕЉА О ПРИМЕНИ ИНКЛУЗИВНОГ ОБРАЗОВАЊА У НАСТАВИ ИНТЕГРИСАНИХ ПРИРОДНИХ НАУКА

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**Резиме**

У раду се анализирају проблеми са којима се сусрећу учитељи у Србији током примене инклузивног метода у реалиацији садржаја из интегрисаних природних наука. Анализира се њихово мишљење о њиховој оспособљености за примену инклузивне наставе, као и њихова спремности за даље образовање, како би повећали своја знања и компетенције за примену инклузивне наставе. У истраживању је учествовало 332 учитеља у Републици Србији. Техника истраживања је анкетирање, а инструмент истраживања је анкета креирана на основу постављеног циља и задатака истраживања. У истраживању је коришћена дескриптивна, аналитичка и компаративна метода. На основу добијених резултата истраживања закључује се да су учитељи стекли општа знања о инклузивном образовању, највише током семинара која су организована под менторством Министарства просвете, науке и технолошког развоја Републике Србије. Међутим, на семинарима нису стекли знања како да примене инклузивни модел у настави интегрисаних природних наука. Током реализације инклузивне наставе већина учитеља се суочава са недостатком сарадње са институцијама које се баве инклузивним образовањем, недостатаком адекватне литературе о инклузивном моделу и његовој примени у настави интегрисаних природних наука, као и низом финансијских и техничких баријера. Већина учитеља сматра да нема потребна знања за примену инклузивног модела у реализацији садржаја интегрисаних природних наука, због чега заступају мишљење да ове садржаје треба да реализују професори природних наука који имају доста искуства у примени инклузивног модела. Учитељи желе да унапреде своја знања кроз даље стручно усавршавање. Они желе да стекну нове компетенције у примени инклузивног модела у настави интегрисаних природних наука, као и да се оспособе за примену различитих метода учења, савремених образовних технологија у реализацији садржаја интегрисаних природних наука. поштујући при томе принципе индивидуализоване наставе. Овај став учитеља представља њихову високу унутрашњу мотивацију да унапреде своја знања и треба га имати у виду током организовања перманентног стручног усавршавања учитеља, кроз стручне семинаре и друге облике доживотног образовања. Кроз организовано стручно усаврашавање учитеља у примени инклузивног модела у настави интегрисаних природних наука, повећале би се компетенције учитеља и настава интегрисаних наука и она би била доступна сваком ученику, поштујући његове менталне, когнитивне и физичке карактеристике.