

## **SCHOOL FACILITIES ACHIEVED IN THE FIELD OF NATURE AND SOCIETY WITH PERSONS WITH EASY INTELLECTUAL DISABILITIES IN THE PRIMARY SCHOOL**

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**Abstract:** *The main objective of this research refers to the correlation of perceptual skills and attention to the adoption of materials as well as contributions surveyed variables on school achievement in the program area of “The seasons, changes caused by their replacement in nature and society”. The sample consisted of 93 interviewees with mild intellectual disability, aged 8 to 12 years and 3 months, both sexes, no neurological, sensory and combined disturbances. To assess the ability of respondents we used the first and third subtest Acadia test of developmental skills (auditory and visual discrimination), C3 scale Luria Nebraska Battery for Children (tactile perception), trunk and Criterion test knowledge test. The results show a significant correlation between estimated cognitive ability and achievement in the program area of “The seasons, changes caused by their replacement in nature and society”, which is taught in the subject of Natural and Social Sciences. Of all the estimated abilities visual discrimination occupies the most significant place, with the standard coefficient Beta 0.288, while behind it there is a listening discrimination with 0.071, tactile 0.200 and attention with 0.56 percent.*

**Key words:** *perception; attention; Natural and Social Sciences; mild mental disability.*

## **Introduction**

Intellectual disability (ID) is defined as a limitation in present functioning, characterized by below-average intellectual functioning and limitations in adaptive behavior, as expressed in conceptual, social and practical adaptive skills (AAMR, 2002). In order to adequately diagnose ID, it is necessary to assess a child's intellectual abilities and adaptive behavior, which means fitting in with the demands of the social environment in a way that is appropriate to a person's age (Tomić, Mihajlović, 2008)

Adaptive behavior is the collection of conceptual, social and practical skills that enable a person to function appropriately in daily life. Limitations in adaptive behavior are not assessed in relation to the best behavior in daily life. It must be viewed within the context of the individual's cultural background, because it influences skill acquisition and determines the motivation to acquire and use what has been learned. Conceptual, social, and practical skills are components of adaptive behavior, and significant discrepancies can be detected in one or all three areas of adaptive behavior. (Not, 2008)

There is limited literature concerning practical skills in children with ID, and given that they provide the ability to cope with activities of daily living, our primary goal was to point out, based on theoretical and empirical knowledge, the conceptual definition and specificities of practical skills in children with ID in the field of nature and society.

However, when it comes to achieving positive social outcomes for inclusive education, parents and teachers sometimes overestimate the social position of students with ID, viewed through the sociometric status of students. Koster and associates (Koster, Pijl, van Houten, & Nakken, 2007) report that 65% of parents have a more positive view of the social position of students with ID than their peers. On the other hand, only 10% of parents underestimate the social position of children with ID. Also, more than 50% of teachers overestimate the social position of students with ID in a regular educational setting (Koster et al., 2007; Monchy et al., 2004). These results indicate that parents' and teachers' perceptions of the positive effects of inclusion may not correspond to the real situations in the classroom, and it is therefore important to examine the achievement of positive social outcomes through the prism of peer perceptions.

Although, according to proponents of inclusion, education of children with ID in regular classes should, among other things, lead to an increase in peer acceptance and a decline in rejection by typically developing children (Gresham and MacMillan, 1997), research does not always support these predictions. Simply placing children with ID in a regular school setting does not guarantee that contact with typically developing students will actually

take place, and many of them may not be high quality contacts and may not be viewed as equal status contacts between groups (Gottlieb and Leyser, 1981). Even though children with ID can benefit from education and schooling in an inclusive environment, such as having more opportunities to interact and play with more competent social partners, there is also an increased risk of rejection and neglect in these conditions (Brojčin, 2007; Brojčin, Glumbić, 2007). Some parents of children with ID have concerns about possible social isolation and negative effects on the emotional development of these children in an inclusive environment (Leyser, Kirk, 2004). Studies conducted in a population of typically developing students suggest that rejected children are at greater risk of certain negative factors, such as a more frequent victimization and open and relational aggression (e.g., Crick, Bigbee, 1998; Putallaz, et al., 2007).

Inclusion of students with ID in the teaching activity of Natural and Social Sciences

In Natural and Social Sciences (Science and Social Studies) school subject, by processing the material in concentric circles, students acquire elementary and practical knowledge about the natural and social environment. Seven program areas of this school subject are taught at younger school age by upgrading knowledge from previous grades, ie. in the form of a spiral. Results of previous research indicate that students with intellectual disabilities (ID) do not master the curriculum at the initial levels of education, which suggests that it is impossible to expect an "upgrade / improvement" at the next school age. Particularly poor achievements were noted when assessing the adoption of teaching materials in the program area "The changes brought about by the changing seasons in nature and in society" / "Seasons, and how change of seasons affects nature and society" (Japundza, 2002), which includes abstract terms such as the concept of air, appearance of soil, highlands and lowlands, barren and fertile lands, and this area is the base for the study of Natural and Social Sciences at an older school age. Therefore, our interest is based on identifying certain factors that influence better learning of this program area.

One of the primary motives that parents have to include children with ID in regular schools is to provide more opportunities for social relations with typically developing students (Monchy, Pijl, & Zandberg, 2004; Scheepstra, Pijl, & Nakken, 1996). Most parents of children with disabilities agree that inclusion provides opportunities for children with disabilities to participate in various, not necessarily academic, activities. These parents perceive potential positive social and emotional outcomes as main benefits of inclusive education for children with disabilities, which are positively expressed through teaching Natural and Social Sciences, where students with ID gain

experience about nature and society through practical skills. (Leyser, Kirk, 2004).

During the entire development, while discovering space, the child also discovers his or her bodily integrity. Information on the position of the body and its parts, is a necessary condition for planning and performing any motor activity. Children with mild ID exhibit motor awkwardness / clumsiness, which is often directly related to issues with the visuospatial ability, which is instrumental in the teaching of Natural and Social Sciences.

Perception, as a basic cognitive component, is the recognition and discrimination of stimuli. It develops gradually, with maturity and enrichment of outdoor experiences. From the earliest stage of development, the child, receiving stimuli through senses, becomes aware of his or her surroundings, and later, through speech, acquired experiences connected by words become concepts. Therefore, many authors state that perception is crucial for success in adopting academic skills and abilities (Dykens, 2000; Jacobsen et al., 2001).

Attention, as a basic cognitive ability of the individual, enables directing mental abilities towards a particular activity, phenomenon or object. Children with mild ID have a short attention span. Their attention is fluctuating, volatile, making it difficult to resist distractors and unable to separate essential from non-essential information. Studies conducted on a sample of children with intellectual disabilities indicate that concentration and selective attention issues appear to be high in this population, especially in young school-age children, which greatly impedes acquisition of academic knowledge and skills (Hastings et al., 2005), while other studies point to perception as a significant condition for success at school (Dykens, 2000; Jacobsen et al., 2001).

Conceptual definition and relevant activities

Practical skills and abilities in children in the general population are described as a subjective experience of remembering that is acquired without conscious effort and control (Metcalf, Michel, 1999). They are a collection of hands-on activities whose primary objective is to allow proper functioning in life circumstances, which includes personal, instrumental activities, activities of daily living, occupational skills, as well as maintenance of a safe environment.

Personal activities of daily living include adoption of hygiene habits, feeding habits, safe movement in the social environment, as well as skills related to getting dressed and undressed. Instrumental activities of daily living include preparing meals, maintaining a household, traveling, taking medication, managing money, using the telephone, etc. (Not, 2008).

Children need to learn practical skills before they start school, as they are the basis for overcoming obstacles posed by the social environment. When a child learns to dress and eat prepared food, he or she feels safe, because he or she learns to perform elementary tasks on his or her own. Typically developing children master practical activities in childhood and know how to take care of themselves and their environment. During late adolescence and early adulthood, adults exhibit complete independence in the pursuit of activities of daily living at home and in the community.

In our study, the research paper is based on the premise that the formation of concepts about the natural and social environment around students with mild ID is determined by a number of cognitive factors. Our interest is based on the assessment of attention and perception as important cognitive elements that determine academic success of this school subject. Perception, as an active mental activity, is the original source of knowledge, followed by activation of attention that allows selection of relevant stimuli from irrelevant ones as well as ignoring of distractors. Therefore, this study is based on research problems that have been considered in these questions: Is there a correlation between these two predictors and the success in the teaching field "The changes brought about by the changing seasons in nature and in society" / "Seasons, and how change of seasons affects nature and society" in Natural and Social Sciences - and if there is, which factor is more significant?

Research objectives

- Examine the correlation between perceptual abilities and attention, and school success
- Determine which of the factors examined has the most important influence on better school achievement in the program area "The changes brought about by the changing seasons in nature and in society" / "Seasons, and how change of seasons affects nature and society".

## **Method**

### **Sample**

The survey included 31 second, third and fourth graders with mild ID, who were included in the inclusive education process, assessed by the inter-ministerial committee, whose data are contained in the school's pedagogical documentation, accounting for 93 students in the total sample. Subjects were of calendar age from 8 to 12 years and 3 months, both sexes, without neurological, sensory and combined disorders. The survey was conducted in all elementary schools in Belgrade attended by students with mild ID. It is important to emphasize that the sample included students with ID who can read.

## Data collection instruments

### Instruments for assessing visual, auditory and tactile perception

#### Acadia test

Visual and auditory perception abilities were assessed by means of Acadia test of developmental abilities. Authors of this scale are Atkinson, Johnston, and Lindsay. This scale has been translated and adapted in its entirety by Prof. Dr. Marija Novosel, whose instructions we have followed (Novosel, 1989). Since the scale was in Croatian and we could not use it in our research, we used the Serbian version of this scale (Povše-Ivkić, Govedarica, 2001).

Acadia test, taken as a whole, consists of 13 independent subtests and serves to evaluate abilities that are required for success in school. We used two subtests in our research. Examination was performed individually.

#### Subtest 3

Visual perception is assessed by Subtest 3 - Visual discrimination. We examined visual perception with tasks that require respondents to find the same image or word from a group of objects, solely through visual means. The test consists of 20 items. Tasks in the test are hierarchically conceptualized. Respondents are expected to circle, from four shapes or four words, two that are the same. The first three items refer to images, while other items refer to words that are quite similar, which excludes the possibility of reading and requires visual perception of those words. A correct answer scores one point; two answers given for one item are considered an error and that answer earns zero points. The highest score on this subtest is 20.

#### Subtest 1

Subtest 1 is used to assess auditory perceptual abilities - Auditory discrimination, consisting of 20 items. Each item implies a pair of words that are similar in sound, and the respondent is expected to answer which pair of words is different and which pair is the same. Items 5, 10, 12, 17 and 18 refer to the same pair of words, all other items include two different words. The test is used to assess verbal auditory perception. Each correct answer gets one point. Maximum score for this subtest is 20.

Gross scores are then converted to standard scores according to the table that comes with the Acadia test. To determine standard scores, it is necessary to determine each respondent's calendar age, year and month included. Standard scores have an arithmetic mean of 50 and standard deviation of 10. If standard scores of a respondent are below two standard deviations, then it is considered necessary to include defectological treatment (Novosel, 1989; Povše-Ivkić, Govedarica, 2001).

#### Luria-Nebraska Neuropsychological Battery scale

Luria-Nebraska Neuropsychological Battery Scale for children (LNNB-C) was used for assessing tactile perception. C3 Luria-Nebraska Neuropsychological Battery Scale evaluates tactile functions and aims to evaluate perceptual rather than sensory abilities, which is why it is necessary to determine the presence of sensory deficits before applying the scale. The applied scale (C3) is most sensitive to deficits of the parietal lobe of both hemispheres (Goldstone and Barsalou, 1998).

The tactile perception scale is the most difficult scale to apply, because it is necessary to administer uniform stimuli. It is believed that healthy respondents should do this scale without error (Pavlovic, 1999). Hierarchically conceptualized, the C3 scale consists of 16 items grouped in pairs, so that the same tasks assess the quality of tactile development on both sides of the body. During the application of the scale, the respondent is blindfolded, thus excluding the influence of other stimuli. The hands are placed flat on the table, palms facing down. No tasks should be repeated during the test.

The first two items (43-44) assess the localization of touch, the next two tasks (45-46) test the ability to discriminate touch (blunt, sharp), while items 47 and 48 assess the ability to differentiate the strength of touch. The following set of items (49 and 50) assesses the ability to discriminate between two points. Tasks 51 and 52 measure the ability to differentiate forearm tactile sensitivity. Discrimination of different shapes is assessed by items 53 and 54, while the ability to recognize numbers “written” on the hand (graphesthesia) is assessed by the next pair of items (55-56). The final set of items (57 and 58) assesses stereognosis (Pavlovic, 1999).

The Luria-Nebraska Neuropsychological Battery predicts two types of scoring: quantitative and qualitative. Qualitative scoring implies a number of appropriate errors for each category, and qualitative observations should be described as comprehensively as possible. Within the implementation of the C3 scale, we used quantitative scoring, which implies a score at three levels:

- 0 (normal achievement),
- 1 (borderline achievement) and
- 2 (pathological achievement).

The respondent receives a certain number of points depending on the number of errors. The scale is negative because, if the respondent has a smaller number of points, it practically means that he or she is more successful on the applied test. Pathological scores indicate the existence of a stronger cognitive lesion, whereas a borderline score indicates the presence of a weaker cognitive deficit. The final processing of obtained results was performed according to the instruction given with the battery, in accordance with the set goals (Golden, 1987).

### Attention assessment instruments

Selective attention was assessed by the Stroop Test. This test evaluates the selective processing of one visual feature with continuous blocking of the processing of others (Milovanovic, 2001). The test is an assessment of the dysfunction of the prefrontal cerebral regions, which is responsible for distractibility (Krstic, 1997).

In our study, we used all three sections of this test, comprising three 5x10 stimulus cards. The first part refers to words that indicate the names of 4 primary colors (red, blue, green and yellow). Respondents are expected to read written words in sequence. The second part of the test consists of squares drawn in the colors red, blue, green and yellow. Respondent should name the colors. And the third part comprises the words that are written in color that is always different from that indicated by the word. The task in this part also involves naming the color. The rating records the time in seconds and the number of errors, both for the test as a whole and for the first and second five rows. Spontaneously corrected error is scored as the correct answer.

The results in our study were evaluated in terms of time expressed in seconds and the number of errors in all three parts of the test. The score is negative because if the respondent needs more time to take the test, it practically means that he or she is less successful, and the same applies to the number of errors (more errors indicate that the respondent is less successful).

Assessment instrument for mastering Natural and Social Sciences program content.

Success in mastering the field "The changes brought about by the changing seasons in nature and in society"/ "Seasons, and how change of seasons affects nature and society", which is studied as part of Natural and Social Sciences, was assessed by the Criteria Cognitive Aptitude Test / Criterion-Referenced Test (?)

The Criteria Cognitive Aptitude Test/ Criterion-Referenced Test (?) measures mastery of a specific content area. Prior to the development of the Criteria Cognitive Aptitude Test/ Criterion-Referenced Test (?), it is necessary to accurately establish educational goals and objectives, as well as success criteria (Miladinović, 1994). This practically means that it is necessary to determine what students need to master after processing a specific subject content, as well as to set separate criteria for each task.

The Criteria Cognitive Aptitude Test/ Criterion-Referenced Test (?) in our research / study was based on the Natural and Social Sciences curriculum for the second, third and fourth grades. For each curriculum area, a number of questions have been formulated.

Three levels of qualitative assessment were used:

- + (program contents completely mastered)
- + - (program contents partially mastered)
- (program contents not mastered)

Application of the Criteria Cognitive Aptitude Test / Criterion-Referenced Test (?) implies that students have mastered 75% of the educational / teaching / subject material. In accordance with that request, our research was conducted at the end of April. Testing was conducted individually and continuously.

In the final stage of data processing, each task rated with +, + - and -, got 2, 1, 0 points. Considering research goals that were set, the percentage of success in relation to the maximum number of points for each grade had to be calculated separately. That is how we obtained results of the sample Criteria Cognitive Aptitude Test/ Criterion-Referenced Test (?) as a whole.

Other data required for our research, relating to the level of intellectual functioning (IQ), respondent's family socio-economic status, as well as academic/ school achievement in Natural and Social Sciences, were obtained by standard analysis of pedagogical documentation.

Statistical data processing

The results obtained are presented in tabular form. The analysis of collected data was conducted by different models of parametric and non-parametric statistics. SPSS software was used for data analysis and a file was created for collected data. By using the Acadia test, Subtest 1 and Subtest 3, we were in direct contact with students through surveys, interviews and systematic observation protocols, thus directly collecting data on teaching practice and inclusion of students with ID in the (education) process, while using open and closed-ended question surveys as instruments. Data were processed by statistical methods and techniques: frequencies, percentages, arithmetic mean, standard deviation, testing for the significance of linear correlation coefficients, which were then interpreted below and presented in tables.

## Results

The total score of this research processed data was interpreted in table no. 1. The 15% score speaks of the fact that the auditory, visual, tactile discrimination and attention assessment are implicit in the "The changes brought about by the changing seasons in nature and in society" / "Seasons, and how change of seasons affects nature and society" program field. Selection of mainstream elementary schools included in research was made on the basis of available information by reviewing pedagogical documentation on the number of students with ID attending elementary schools in Belgrade. A tentative list of schools was then established, which during the research underwent slight changes due to changes in the structure

of the sample, such as the transition from class teaching to subject teaching (like in the case of fourth graders).

Table 1. MODEL SUMMARY

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.43	0.185	0.15	1.90

Table no. 2 shows the results of the significance of linear correlation coefficient testing that indicates that there is a statistically significant correlation between examined variables. The correlation coefficient indicates that there is a statistically significant relationship between the set of predictors together and the program field "The changes brought about by the changing seasons in nature and in society" / "Seasons, and how change of seasons affects nature and society". 15% indicates that assessment of auditory, visual, tactile discrimination and attention is implicit in this program field.

Table 2. TEST FOR SIGNIFICANCE OF LINEAR CORRELATION COEFFICIENT

	збир	df	M	F	P
Regression					
Residual					
Total	71.889				
	316.692				
	388.581	4			
	88				
	92	17.971			
	3.599	4.994	.001		

Table no. 3 shows standardized beta coefficients for auditory, visual, tactile discrimination, and attention. The table indicates that visual discrimination is the most significant variable.

Table 3. COEFFICIENTS

	Standardized Coefficients	t	p
Beta			
auditory disc.	0.071	.661	.510
visual disk.	0.288	2.712	.008
tactile	0.200	-1.828	.071

attention      0.056   .506   .614

Beta coefficient indicates that visual discrimination is of the highest value for success in the program field "The changes brought about by the changing seasons in nature and in society"/ "Seasons, and how change of seasons affects nature and society".

#### Discussion and Conclusion

The main purpose of the research project defined in this way was to evaluate the relationship between basic cognitive functions and success in the program field "The changes brought about by the changing seasons in nature and in society"/"Seasons, and how change of seasons affects nature and society". The results obtained suggest that there is a statistically significant correlation between perceptual abilities (auditory, visual and tactile perception) and selective attention with respect to success in the tested program units. Our research confirms that these examined abilities are the basis for acquiring the curriculum and that, without quality development of perceptual abilities, as well as the ability to be attentive, adoption of school curriculum cannot be expected.

Adoption of school curriculum is conditional upon a number of significant factors hence the statistically significant low correlation can be only understood conditionally. Our research indicates that of all the variables assessed, visual perception is the most significant when it comes to adopting the curriculum material "The changes brought about by the changing seasons in nature and in society"/"Seasons, and how change of seasons affects nature and society". This information confirms the fact that it is of utmost importance in the teaching process that the teaching material be presented in the form of visual maps in order to make data more easily accessible, easier to remember and much more concise. The information that students receive must be presented in pictures as well as in words, and teacher's primary task is to teach students how to use visual tests. In this way, students will learn the curriculum much better than in the conventional way, which involves solely verbal testing. Visual tests involve much more than word communication, so context maps, process maps, tables, charts and diagrams are used for this purpose (Molin, 2009). Full adoption and understanding of abstract teaching content in children with mild ID can be expected if the information is drawn, not just written or presented. Observations about changes in nature students can record using simple symbols in pre-made schemes. Such short activities can be performed on a daily basis.

Practical guidelines of this research would relate to the use of games in the teaching process. If we consider the fact that play is a child's basic activity, it

is possible to influence the process of cognitive development through play. The use of games can influence the formation of abstract teaching content as well as the process of cognitive development acceleration (Kamenov, 1974). In that regard, the classroom in which the content of Natural and Social Sciences subject is realized should have a collection of various manipulative objects/manipulative play materials/manipulative toys, which will be gradually collected. Such toys accelerate development of visual, auditory, tactile perception as well as attention and facilitate adoption of subject content.

By using games and toys, some of the content of the aforementioned curriculum can be learned outside, on the playground, in the park or in the schoolyard. In this way, the emphasis would be on a more independent direct comparison of natural phenomena in the environment, without theoretical explanations and details, while activating children's perception and attention at the same time. Results interpreted in this scientific study contribute to the study of inclusive practice and a possible impetus for future studies which will broadly analyze the organization of teaching in primary schools that students with ID attend. Some of the subsequent research could be based on students with ID who cannot read, so that a parallel can be drawn with this research in which all the students interviewed knew how to read, and then data obtained can be analyzed.

Implications arising from theoretical findings regarding the research tasks are not universal, but rather indicate the need to organize teaching individually according to a particular student's needs, in this case, a student with ID. When it comes to this type of teaching, there are guidelines that should be followed when adjusting the conditions in which teaching is conducted.

If we present teachers with tasks that are also challenges, then it is necessary to offer them a support system as well, some of which they can find on their own. A student with ID is the teacher's best aide. If both sides' initial views are based on good communication and information sharing, a solid foundation can be created for future cooperation. The system can offer teachers support in order to enhance the competencies that are otherwise built by developing communication skills. Members of the student's family can also be a great source of information, so parents, as teacher's aides, can share valuable information about their child. We should not neglect to cooperate with experts who, if not from birth, then from the child's early age, have known about the child's issues, work with him or her and have specialized / expert knowledge about the nature of the disorder. It is possible to receive recommendations for work in school settings from the experts who know the student well. The system could offer teachers specialized training

or seminars, organized according to the type of disability. When it comes to different types of support, peers, who can be an invaluable source of information, should not be neglected.

In theory, focus is on individual capabilities, potentials, needs, and not on disabilities, as this would allow for optimal development of each student. Individualization of teaching should be the goal of adapting the teaching process, not because the law requires it, but because the well-being and the development of students are of primary concern. The importance of education in the school system is indisputable, but it is necessary to fulfill certain prerequisites in order to implement it adequately. The need to belong is one of the most important needs of every person, which is why close attention must be paid to peer socialization.

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### **Statement**

The authors have equally contributed to the paper.

### **Conflict of interest**

We declare there is not conflict of interest between authors.

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