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MULTIDIMENSIONAL ASSESSMENT OF LEARNING ABILITIES IN STUDENTS WITH CEREBRAL PALSY IN AN INCLUSIVE SCHOOL: A CASE STUDY

MULTIDIMENZIONALNA PROCJENA SPOSOBNOSTI ZA UČENJE UČENIKA SA CEREBRALNOM PARALIZOM U INKLUZIVNOJ ŠKOLI: STUDIJA SLUČAJA

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Case Report

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ABSTRACT

The aim of this paper is to highlight the importance of a multidimensional approach to the contextual assessment of learning abilities in students with cerebral palsy. The paper presents a case study of a nine-year-old student with multiple developmental disabilities (cerebral palsy and additional influencing difficulties) attending a regular primary school with an individual educational program (IEP). In order to determine the measures for individualizing the educational process for the student, the assessment of internal conditions and learning abilities was conducted individually within a daily rehabilitation center, while the environmental conditions were observed within the school setting. The evaluation of the assessment results emphasized the significance of conducting assessments in all relevant contexts, as it was the only way to obtain a comprehensive understanding of the student's level of functioning and the necessary measures for improving her learning and participation.

Key words: multidimensional assessment, learning abilities, cerebral palsy.

SAŽETAK

Cilj rada je prikazati važnost multidimenzionalnog pristupa kontekstualnoj procjeni sposobnosti za učenje kod učenika sa cerebralnom paralizom. U radu je opisan prikaz slučaja devetogodišnje učenice sa višestrukim razvojnim teškoćama (cerebralna paraliza i dodatne utjecajne teškoće) koja pohađa redovnu osnovnu školu po prilagođenom programu.

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U svrhu određivanja mjera individualizacije nastavnog procesa za učenicu, procjena unutarnjih uvjeta i sposobnosti za učenje vršena je individualno u okviru rehabilitacijskog centra, dok su okolinski uvjeti opservirani u školskom okruženju. Evaluacija rezultata procjene ukazala je na važnost realizovane procjene u svim kontekstima, te jedino tako omogućila kompletan uvid u nivo funkcionisanja učenika i potrebne mjere individualizacije za poboljšanje njegovog učenja i učešća.

Ključne riječi: multidimenzionalna procjena, sposobnosti za učenje, cerebralna paraliza.

INTRODUCTION

Cerebral palsy describes a group of permanent developmental disorders affecting movement and posture, resulting in activity limitations, and attributed to non-progressive disturbances that occurred during the fetal or infant brain development. Motor impairments in cerebral palsy are often accompanied by sensory, perceptual, cognitive, communication, behavioral, epilepsy, and secondary musculoskeletal problems (Bax et al., 2005; as cited in Savić, 2017). Although there is no universally accepted international definition yet, the currently widely accepted definition from 2005 indicates that cerebral palsy is a complex condition characterized by primary difficulties in motor functioning, often accompanied by additional influencing difficulties. The impairments most commonly affect the functional ability of the hand, which poses a significant obstacle in the educational process, as the hand is an organ of creation (Mahmutagić & Prstačić, 2006). Consequently, education and schooling for children with cerebral palsy present a significant challenge for the child, their parents and family, as well as for schools, the education system, and society as a whole (Radivojević, 2017). Various adaptations may be required throughout the schooling process, starting from the physical environment of the educational setting, preparation of subjective inclusion assumptions, adjustment of educational situations, didactic and methodological approaches, to the educational content itself and expected learning outcomes. At an individual level, there is a wide range of abilities necessary for acquiring and applying school knowledge, and their assessment requires a multidisciplinary and multimethod approach that is comprehensive, flexible, and easy to implement (Gligorović, 2015). Ilić-Stošović (2011) particularly emphasizes the significance of the development and condition of motor, cognitive, and speech-language abilities for the quality and quantity of opportunities for students with motor difficulties to participate in teaching. For effective planning and programming of the educational process, with measures for individualization for students with motor difficulties, a multidimensional contextual assessment of learning abilities and participation in the teaching process is crucial, where specific expertise, skills, and competencies of educator-rehabilitators play a key role. This includes the assessment of individual learning abilities (functional abilities of the upper and lower extremities, manipulative dexterity, practical organization, graphomotor abilities, sensory functioning, intellectual abilities, cognitive functions, executive functions, social and emotional skills), as well as the assessment of the school environment and the assessment of the child's functioning within the school environment.

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

The aim of this paper is to present the process of multidimensional assessment of learning abilities in students with cerebral palsy in order to determine adequate measures for individualizing the educational process.

CASE PRESENTATION

N.N. is a girl of chronological age 9;11 years, currently attending the 4th grade of a regular primary school in the city of Tuzla. The medical documentation indicates that she has cerebral palsy, specifically spastic diplegia type. As additional influencing difficulties, she has a visual impairment (exophoria). According to the assessment report by the expert commission for evaluating abilities and determining the level of support for children and youth with special needs, she is categorized as a person with multiple developmental disabilities.

From the medical records, it is known that her early psychomotor development was delayed (social smile appeared at 4 months, reaching for objects at 6 months, rotations at 12 months, sitting with support at 14 months, crawling at 20 months, speaking at 4 years). She lives in a complete four-member family with harmonious relationships. The family has developed cultural and hygiene habits. There have been no previous cases of identified developmental difficulties in the extended family.

N.N. currently attends the 4th grade of a mainstream primary school, following an individual educational program (IEP), with occasional support from an assistant in the classroom. In addition to school, since 2015, she has been regularly using the services of the Center for Children with Multiple Disabilities "Koraci nade". At the rehabilitation center, she attends individual rehabilitation sessions twice a week with educator-rehabilitators, speech therapists, and physiotherapists. The current assessment of learning abilities was conducted to determine the student's level of functioning in the school environment and teaching process, as well as to prepare for the development of a transition plan for her transition from the class-based to subject-based teaching.

PROCEDURES AND INSTRUMENTS

The multidimensional assessment of learning abilities was conducted over multiple sessions during the months of April and May 2023. The average duration of each session was between 60 and 90 minutes, depending on the child's level of fatigue and motivation. The assessment was carried out individually, with two examiners involved. One examiner administered the test tasks, while the other recorded data and assessment results. The observation and assessment took place in the premises of the "Steps of Hope" Center for Children with Multiple Disabilities in Tuzla, under optimal spatial and temporal conditions with minimized distractions. The assessment of the school environment and the child's functioning within the school environment was conducted through direct observation of the school environment, observation of classroom dynamics, and an interview with the teacher. The following instruments were used for the assessment of learning abilities: ACADIA test of developmental abilities (Novosel, 1989), Gunzberg 2, Gross Motor Function Measure (GMFM), Gross Motor Function Classification System (GMFCS), Manual Ability Classification System (MACS), as well as individual tasks from the Practicum of General

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

Defectological Diagnostics (Povše-Ivkić & Govedarica, 2000), Protocol for assessing educational potentials of children with developmental disabilities (Gligorović, 2015), and the Practicum for assessing individuals with motor disorders (Stošljević, Stošljević, & Odović, 2004). For the assessment of the school environment and the student's functioning within the school environment, a structured observational checklist created specifically for this research was utilized.

RESULTS OF THE ASSESSMENT

Individual Abilities Assessment

During the first session with the examinee, a good rapport was established. The examinee accepted the test tasks and demonstrated adequate cooperation with the examiners. Through direct observation and the use of tasks, it was observed that her speech and language development were in line with her chronological age. She used functional sentences, effectively expressed her feelings and needs, and acquired new concepts with support. However, her voice was extremely soft, and she lacked initiation in communication. She interacted with peers when prompted but had difficulty initiating interactions herself. The examinee was very shy and had difficulty engaging with unfamiliar individuals. She responded to questions briefly or through nonverbal expressions, and exhibited a noticeable lack of self-confidence. In terms of motor development, consistent with her diagnosis and medical condition, her motor skills were delayed compared to her chronological age. Manipulative dexterity and functionality of the upper extremities were higher than those of the lower extremities. With adult support, she could walk. She had a dominant left hand and struggled with activities requiring her right hand. In the cognitive domain, there were also some deviations from her chronological age. She imitated movements in the assessment of praxic organization, demonstrated good knowledge of body parts, and had established self-lateralization. Spatial orientation was well developed, while temporal orientation was partially developed. Functional and symbolic play were present. She effectively used materials such as clay, building blocks, and enjoyed puzzle games. She could write printed letters, words, and sentences, although syllable analysis was still used when writing multi-syllabic words. Regarding self-care skills, she independently used eating utensils and performed personal hygiene tasks. Support was needed for dressing. Toilet training had not been achieved due to sphincter control issues, and she used diapers and a urinary catheter.

Using the Gunzberg 2 test, it was determined that the girl had acquired 49.99% of the psychomotor abilities expected at the age of nine, indicating developmental deviations in all areas of psychomotor functioning. The results of the Gross Motor Function Measure (GMFM) indicated that the girl had developed 54.57% of gross motor functions, including lying and rolling (96.07%), sitting (53.33%), crawling and kneeling (83.33%), standing (17.94%), and walking, running, and jumping (22.22%). Her GMFCS and MACS levels were classified as level 3. The ACADIA test of developmental abilities assessed auditory discrimination, visual-motor coordination, shape drawing, picture drawing, visual memory, visual-auditory discrimination, visual associations, sequence tracking and coding, concept formation skills, and language knowledge. The results showed that visual memory combined with visual-auditory associations was a strength for the participant.

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

A multimodal learning style that combines visual and auditory modalities should be involved when presenting content and during teaching. Furthermore, the examinee demonstrated well-developed concept formation skills but had deficits in coding, decoding, sequence tracking, and language knowledge, which aligns with observed cognitive abilities. Deficits were also observed in visual-motor coordination and shape and picture drawing, which are related to the examinee's manual abilities.

Assessment of the School Environment

The schoolyard is located behind the main school building, fenced and protected from traffic as it is not adjacent to a main road. The classroom of the student is situated on the ground floor of the school building, with a direct exit to the schoolyard and without architectural barriers. The playground is located within the schoolyard and is separately fenced with tall fences to avoid interfering with other activities in the yard. The school also has an accessible ramp with an appropriate incline at the main entrance of the building. The entrance doors are wider than standard dimensions, allowing smooth passage for individuals using orthopedic wheelchairs.

The school hallway is spacious and centrally located, connecting significant school areas such as the canteen, sports hall, and classrooms for primary education. Architectural barriers have been completely eliminated in the hallway, with no thresholds, wide doors, and a non-slip floor. The school does not have a lift or alternative means of communication between floors other than stairs.

The school canteen is centrally positioned and directly connected to the school hallway. The kitchen and cafeteria with seating areas have an open layout, allowing unobstructed passage for individuals using orthopedic wheelchairs.

The restroom is located near the classroom where instruction takes place, at the end of the hallway. However, the entrance door to the restroom is narrow, of standard dimensions, and inadequate for a person using a wheelchair. The cleanliness of the restroom and all school facilities is maintained at an exceptionally high level. The toilets are clean and equipped with all necessary sanitary and hygiene supplies. The sink is at an appropriate height. Within the individual restroom cabins, there are toilet bowls. The cabins are narrow and do not allow maneuvering with orthopedic wheelchairs.

The school sports hall is inaccessible for students with physical disabilities. It is located on the ground floor of the school building; however, the access and entrance to the hall are slightly lower than the main level of movement on the ground floor. In other words, there are descending stairs to enter the hall.

Regarding the organization of the classroom workspace, it is important to note that the desks do not have a fixed arrangement and are mostly individual, allowing for easy changes in the spatial organization according to needs. They are arranged in rows or U-shapes. Depending on the arrangement of the tables, it is possible to provide adequate wheelchair accessibility within the classroom. The entire outer wall of the classroom is made of glass, allowing natural light to illuminate the teaching space without the need for artificial lighting. Built-in curtains are used during hot summer days. No significant distractors that impeded the student's participation in class were observed.

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

The classroom is equipped with a television, a green board, and various purposeful educational posters. The posters are designed simply, highlighting important information, and actively used by the teacher during instruction and by students during task completion. Furthermore, no significant materials, supplies, or other distractors were noticed on the work desk.

Assessment of the student's functioning within the school environment

The student follows classes according to an IEP, except for skill subjects. The IEP reduces the scope and depth of the curriculum, modifies the expected learning outcomes, and defines the activities of both the teacher and the student. The IEP forms comply with the legally prescribed forms and the current regulations on the education and upbringing of children with special educational needs. The IEP is documented in the student's file, which also includes existing medical documentation, pedagogical records, initial observations of the student, and forms of the teaching materials. In the class register, under the remarks section, it is stated that the student attends classes according to the IEP, with the designated reference number of the program approved at the School Council meeting.

During classes, the student sits in the front row, next to the teacher's desk. She shares the desk with a classmate. She does not have any adapted chair or desk and instead sits in her orthopedic wheelchair during classes. It is noticed that the current school desk is too high in relation to her morphological and anthropometric characteristics. While sitting, the student is ergonomically positioned. However, during writing, reading, or any other activity at the desk, the student exhibits a pronounced kyphotic posture. She leans towards the desk, her arms and the shoulder area are raised due to the height of the desk, and her body is bent towards the paper on which she writes. Depending on the taught unit, the teacher prepares special didactic aids for the student to use during activities. The use of improvised low-tech assistive technology devices such as paper fixators, enlarged prints, and matte contrast paper with highlighted writing lines is observed. During class, the student actively engages in completing all tasks prepared by the teacher. She accepts the work and completes the tasks, sometimes independently and sometimes with the teacher's motivation. However, the student does not demonstrate self-initiative and proactivity. Active participation, such as volunteering answers or going to the board, is absent. The student engages in communication with other students only if a peer initiates communication and interaction or if they are instructed by the teacher for group work or paired activities. During school breaks, depending on weather conditions, students spend time in the classroom or the schoolyard. Even in that context, the student does not independently initiate socializing or contact with peers. She remains isolated unless peers initiate interaction.

Considering that the student follows classes according to the IEP, the teacher simultaneously covers new content and presents instructional units to both the class as a whole and the student N.N. Individualized work with the student mostly takes place during other students' independent work time. During the work, the teacher continuously checks and directs the student's attention to the task. It is also observed that the curriculum content covered by the student according to the IEP does not significantly deviate from the subjects taught to other students according to the regular curriculum.

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

In addition to the teacher's direct support, the student is assisted by a teaching assistant. The teaching assistant is employed at the school for 20% of their working hours and provides support to the student for approximately 2 classes per day. The assistant sits next to the student and is consistently dedicated and focused on the student and the completion of tasks prepared by the teacher. It should be emphasized that there is no difference in the support provided and the implementation of the teacher's methods to encourage the student's engagement, regardless of the presence or absence of the teaching assistant. Additionally, the student receives specialized support from an educator-rehabilitator who visits the school once a week and spends an average of 1 hour per week working with the student.

CONCLUSION

The applied multidimensional assessment involved evaluating the individual learning abilities of a student with cerebral palsy, as well as assessing the school environment and the student's functioning within it. The results of the assessment of the student's individual learning abilities identified her strengths, which are crucial factors in the didactic and methodological planning of her education.

The school facility and premises are generally adapted for a student with physical disabilities who uses a manual wheelchair for mobility. Since the student is still attending class-based primary education, the next school year should be utilized to develop a transition plan from class-based to subject-based education and prepare solutions for accessing higher floors (such as installing portable ramps or reorganizing the teaching process at the school level). Additionally, consideration should be given to the possibility of installing a ramp at the entrance to the school sports hall and adapting one restroom to be accessible for students with disabilities.

Regarding the student's functioning within the school environment, a positive social climate within the classroom is a significant prerequisite for inclusive education. Within the classroom, it would be necessary to provide an adapted chair that allows the student to use her wheelchair for mobility as intended, and an orthopedic adapted chair for seated tasks. Additionally, due to the possibility of developing additional postural impairments, it would be important to provide or adapt the student's desk to be height-adjustable. The desk should have a sloped working surface to facilitate visual perception difficulties and maintain proper body posture. It would be beneficial to use more group work and pair activities to encourage collaboration with peers. Furthermore, encouraging the student to approach the board to solve tasks, read aloud, or present her work would help build her self-confidence. Given the currently developed social and emotional climate within the classroom, it is crucial to prepare the future class teacher and subject teachers for working with the student during the transition period through education, meetings with the inclusive team, supervision, etc. Additionally, it is necessary to intensify the level of educational and rehabilitative support in the school to the extent possible. The educator-rehabilitator should act as a bridge in communication and collaboration among all parties, with a particular role during the transition period. Furthermore, in collaboration with parents and utilizing available resources, psychological support should be provided to the student to work on strengthening self-esteem, self-awareness, proactivity, and self-initiative.

Research in Education and Rehabilitation 2023; 6(1): 128-135. **DOI**: 10.51558/2744-1555.2023.6.1.128

In this case study, a multidimensional approach to assessing learning abilities proved to be the only correct method as it provides a holistic picture of the biopsychosocial functioning of a student with cerebral palsy. Due to the heterogeneity of multiple factors' influences, the diagnosis, classification, or clinical presentation of cerebral palsy as a condition or level of motor functioning alone are insufficient parameters for making appropriate recommendations and measures for individualizing the educational process. Various assessment contexts also played a significant role in making recommendations. Therefore, in educational work with students with cerebral palsy, regardless of the form and dominant type of impairment, it is important to conduct a comprehensive, multi-contextual, and multidimensional assessment of learning abilities, taking into account all aspects of the individual student's functioning. It is recommended to include individual learning abilities assessment (motor, cognitive, social-emotional, speech-language skills, executive functions, previous experience and specific learning styles), existing educational measures' assessment (IEPs, teaching materials, assistive technology, extra-curricular activities, school's inclusive policies), objective environment assessment (school, schoolyard, sports hall, classrooms, community resources) and subjective environment assessment (peers, teachers, non-teaching staff, school management, parents, family). In this process, the educator-rehabilitator plays a crucial role in communicating with the child, their family, teachers, and other therapists to identify the child's potentials and specific needs, and subsequently develop individualized support strategies.

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