Cognitive education As a Tool for the Inclusion of Students with Specific Needs

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Abstract

Aim: The aim of this study is to provide a theoretical-methodological analysis of the use of the concept of intervention activity for the development of cognitive functions as a support tool for the inclusion of students with specific needs.

Concept: From a methodological standpoint, this study operates on the foundational assumption that cognitive functions should not be viewed as an individual's static or unchangeable attributes. Instead, it posits that these functions are dynamic and subject to modification through various interventions, experiences, and learning processes. This perspective is rooted in contemporary cognitive science, which increasingly recognizes that the brain has the capacity for neuroplasticity—that is, the ability to reorganize itself by forming new neural connections throughout life in response to learning and experience. For research purposes, we verified the effective cognitive education for students with special needs involves several key components, each contributing to cognitive functions' overall development. When evaluating cognitive education's effectiveness, it is important to consider the following elements: personalized intervention, engagement and motivation, holistic support system, impact on cognitive functions, and long-term outcomes. We monitored the participants in 10 subtests of cognitive functions before and after intervention support lasting 3 months. The research was carried out using the aforementioned quasi-experimental method. The experimental plan consisted of three basic steps: pretest, exposure, and posttest.

Results: In the contribution, we managed to formulate and defend the thesis that the concept of the intervention activity we used aimed at the development of cognitive abilities, specifically the ability to learn and study in the context of the results of the pretest and posttest. We can state that the score of individual subtests was increased, and the targeted intervention had the desired effect.

Conclusion: The main conclusion of the study is that the mentioned concept and research results are of interest to the authors, and they state that cognitive education methods and techniques are a significant accelerator of inclusive education. The activation of an individual's cognitive potential, particularly in the context of their social environment, involves a complex interplay of factors that go beyond formal education, including tertiary education.

Keywords: inclusion, student with specific needs, cognitive education, intervention services, concept learn to learn

1. Introduction

Otherness and difference, whether physical, mental, or social, often arise from disabilities, illnesses, or economic and material conditions. Despite being a common aspect of society, otherness frequently evokes negative emotions, such as fear, usually stemming from a lack of familiarity. The topic of inclusion in education has been widely discussed by experts across various fields and has become highly politicized and publicly debated. Inclusive cognitive education is essential for creating equitable, supportive, and effective learning environments. It ensures all students have the opportunity to succeed, fosters a culture of respect and empathy, prepares individuals for a diverse world, and addresses educational disparities. By embracing inclusive practices, educational institutions contribute to every student's overall well-being and success while also advancing societal goals of equity and inclusion. Initially, inclusive education targeted younger students, but as more students with disabilities completed their secondary education, there was an increased need for inclusive practices at the university level (Moreno et al., 2016). A

significant issue is the lower participation of people with disabilities in tertiary education, partly due to the existence of special schools at lower educational levels without equivalent alternatives in higher education.

- Special Schools: Operate at lower educational levels but may not provide pathways to higher education.
- Transition Challenges: Limited support and accommodations for students with disabilities in higher education.
- Lower Participation: Results in reduced enrollment and retention rates in tertiary education.
- Impact: Affects career opportunities, socioeconomic status, and social inclusion. This flowchart outlines the progression from the issue of special schools at lower levels to the resultant lower participation in tertiary education, highlighting the key factors and impacts along the way.

Additionally, societal attitudes sometimes imply that people with disabilities do not belong in universities, especially in certain study programs. For instance, a student with autism in a primary education teaching program may face challenges because of specific graduate profile requirements and practical application criteria. According to Anderlíková, social inclusion is achieved when individuals, regardless of their disability, are accepted and integrated into the structure of society (cited by Sender & Polackova, 2022).

According to Law no. 131/2002 Coll. on universities (2002), students with medical handicaps are classified as those with specific needs who require additional support and attention from universities. For successful inclusion, universities must ensure all students, including those with specific needs, feel welcome and supported to achieve their goals (Sender et al., 2023). Universities play a critical role in ensuring students with specific needs receive the necessary support to succeed academically without lowering the institution's academic standards. This balance is achieved through a combination of policies, services, and accommodations designed to create an inclusive environment that fosters equal opportunities for all students. Support centres are established at universities to assist these students according to §100 of the Act on universities and Amendments to Certain Acts no. 131/2002 Collection of Law of the Slovak Republic (in table 1).

Table 1. Characteristics of students with specific needs

Group	Definition of specific needs
A1	Blind student
	Weak-sighted student
B2	Deaf student
	Hard-of-hearing student
C1	Student with a physical disability of the lower limbs
C2	Student with a physical disability of the upper limbs
D	Student with autism or other pervasive developmental needs
	Student with learning disabilities
E	Student with a chronic illness
	Student with a medical impairment
	Student with a mental illness

Source: Own research

The number of students with specific needs at universities has been increasing since 2015. Prior data are unavailable, but it is assumed that almost every university in Slovakia had such students, with support provided individually through tailored study programs. Analyzing the data, we found that the number of registered students stabilized from 2018–2019 to 2021–2022, with a slight decline in 2021–2022 partly due to the transition to online education during the pandemic. This shift was challenging for some students with specific needs. Currently, the number of these students has doubled. Inclusive efforts are being made to create optimal conditions for joint education, ensuring students with specific needs have the necessary support measures to succeed in their studies.

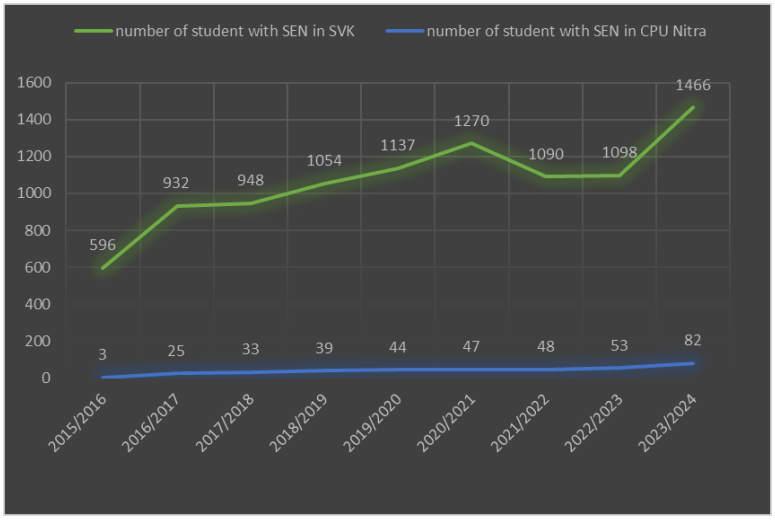

Figure 1. The number of students with specific needs at universities in Slovakia and CPU Nitra

Source: Own research

The student centre, specifically the Support and Counselling for Students With Specific Needs section, is responsible for creating optimal conditions for inclusion at the university. This section offers comprehensive information and counselling services tailored to students with specific needs, assisting in selecting appropriate study programs, screening, and registration. Academic support focuses on proposing modifications, providing support services during studies, and assisting with interpretation services for the deaf. Intervention and therapy services address specific learning disabilities. Therapy and intervention services for students with specific learning disabilities are comprehensive and tailored to address each student's unique needs. By providing these services, universities and schools create an environment where students can overcome their challenges, develop essential skills, and succeed academically and socially. These interventions not only address the academic difficulties associated with learning disabilities but also support the emotional, social, and cognitive aspects of learning, contributing to students' overall well-being and success. Technical support includes providing necessary equipment, accessible study literature, and assistive technologies. A key aspect of this support is enhancing their learning and self-regulation abilities in cognitive and metacognitive education. To strengthen the research analysis on supporting students in developing hard skills, soft skills, and self-awareness, particularly in the context of cognitive and metacognitive education, the following recent references can be considered:

1) Zimmerman, B. J., & Moylan, A. R. (2020). Developing self-regulation and metacognition: Revisiting Zimmerman's cyclical model.

- Journal: *Educational Psychologist*
- Summary: This article revisits Zimmerman's cyclical model of self-regulated learning, focusing on developing self-regulation and metacognition in students. It emphasizes the importance of teaching strategies for self-monitoring, goal-setting, and reflection to enhance students' learning and self-regulation abilities. The study provides evidence on how these skills can be cultivated in educational settings and their impact on academic achievement.
- Relevance: This research supports the idea that developing self-regulation and metacognitive skills is critical for student success, aligning with the focus on helping students enhance their learning abilities and self-awareness in cognitive education.

2) Dignath, C., & Büttner, G. (2018). Components of fostering self-regulated learning among students: A meta-analysis on intervention studies at the primary and secondary school level.

- Journal: *Educational Research Review*
- Summary: This meta-analysis examines various intervention studies aimed at fostering self-regulated learning (SRL) among students at the primary and secondary school levels. The findings highlighted the effectiveness of teaching metacognitive strategies, self-assessment, and goal-setting in enhancing students' self-regulation, academic performance, and soft skills such as perseverance and responsibility.
- Relevance: The study provides a comprehensive overview of how SRL interventions can improve cognitive and metacognitive education, supporting the need to help students develop both cognitive skills and essential soft skills for academic success.

These references provide recent insights and evidence-based practices that underscore the importance of developing students' self-regulation, metacognitive strategies, and soft skills, aligning with the goal of enhancing their learning and self-awareness in cognitive education.

2. Research Goal and Research Methods

Cognitive education involves structured activities designed to enhance existing cognitive functions (Roth, 2006). According to Diamond and Lee (2011), cognitive education involves structured activities designed to enhance existing cognitive functions, such as executive functions, through targeted interventions and training. Similarly, Klingberg (2010) discussed how cognitive training programs can improve working memory and other cognitive abilities through systematic practice. The authors stated that newer data and information on the issue are not accessible, which is a disadvantage. This topic deserves more attention. These references provide recent insights into how structured activities in cognitive education are used to enhance cognitive functions. It operates through cognitive activation, which includes both passive and active mechanisms, with varying levels of intensity. Interventions in cognitive education improve motivation, metacognitive processes, intelligence, and learning capacity, directly contributing to an individual's social inclusion and quality of life. This study presents the results of cognitive education interventions at our university. To support inclusive education, we provided services to students with special needs. During the summer semester of 2023/24, we conducted the workshop Learning to Learn and Study. In these sessions, we employed selected methods and techniques of cognitive education, particularly elements from Feuerstein's instrumental enrichment (FIE) program. The FIE program consists of more than 500 pages of paper and pencil exercises, divided into 20 instruments. Each instrument is aimed at a specific cognitive deficit but is designed to acquire many other learning prerequisites. Among these instruments, 14 are regularly used in classrooms during 1-hour lessons, the frequency of which should be 3–5 hours per week for 2 years. This is the optimal situation Feuerstein proposed. Our research was action-based, utilizing a quasi-experimental method to observe selected cognitive functions crucial for our students' academic skills.

We focused on creating supportive conditions and interventions for SEN students, aiming to positively impact their cognitive functions and thereby enhance their educational and social inclusion. The partial goal was to assess the cognitive education methods' effectiveness and their impact on selected cognitive functions. The research sample consisted of seven voluntary participants from the workshop, chosen through available selection rather than random sampling. We evaluated the participants using 10 cognitive function subtests before and after a 3-month intervention.

The quasi-experimental research design included three steps: pretest, intervention, and posttest. The monitored subtests included discrimination ability, fine motor skills, shape discrimination, size discrimination, quantity and order discrimination, observational ability, critical observation, concentration, memory, understanding of illustrative objects and situations, speech comprehension, and general learning prerequisites. The results of the pretest and posttest comparisons are presented in the form of box graphs to clearly illustrate the findings.

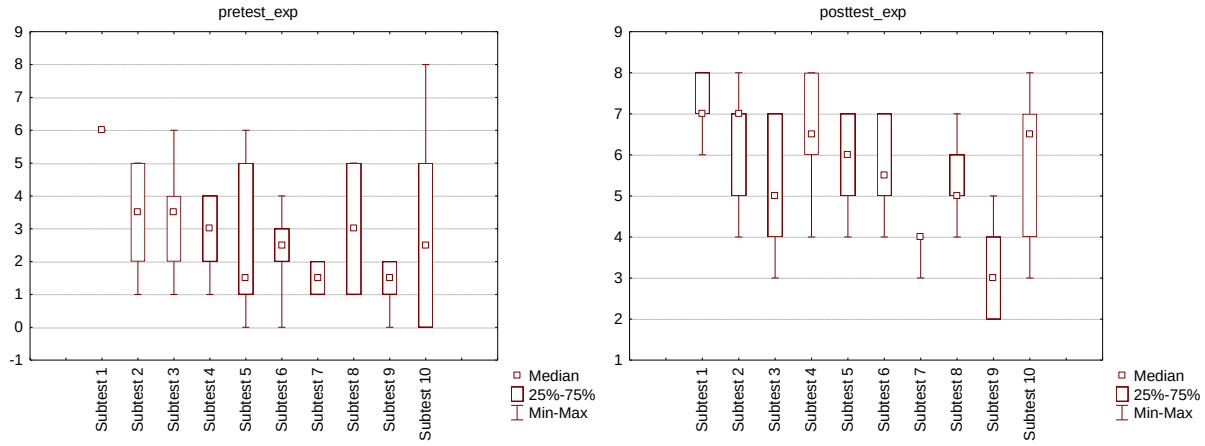

Figure 2. Pretest and Posttest results

Source: Own research

From the above graphs, it can be concluded that the scores of the individual subtests were increased, and the targeted intervention had the desired effect. In the next phase of the research, we will deal with the questions of how cognitive education can affect students' social inclusion. The research is currently in the stage of preparing theoretical documents, operationalizing concepts, and collecting the results of research findings.

3. Analysis of Research Findings

The research conducted represents the initial stage of exploring cognitive education as a tool for fostering an inclusive higher education environment. A lecturer who utilized methods and techniques of cognitive education, primarily the FIE program (arrangement of points), facilitated a workshop with the participants. I assessed cognitive functions in 10 areas before and after the individual sessions. The areas analyzed include the following.

- Discrimination Ability: Focused on cognitive operation phases (input, elaboration, and output) and preferred cognitive functions. Issues existed at the input level, such as concentration problems, attention loss, and difficulty identifying essential information.
- Fine Motor Skills: Initially, students struggled with precision and were resistant to changing learned mechanical activities. Targeted work and verbal naming of individual steps gradually improved their fine motor skills, as evidenced by significant progress toward the end of the exercises.
- Shape Discrimination: Students were familiar with working on paper but had difficulty when the properties of individual elements changed. The FIE program's geometric shapes maintain consistent characteristics related to the variable of maintaining constancy.
- Size, Quantity, and Order Discrimination: This area involved spatial orientation and tasks connecting the right and left hemispheres, which are prerequisites for developing mathematical skills. Humanities students' backgrounds may have influenced results, with this subtest showing the most significant change.
- Observational Ability: Emphasis was placed on moving from superficial, episodic perception to systematic perception, such as detailed reading and deriving implicit and explicit instructions.
- Critical Observation: This subtest assessed the relevance of information for mental operations, which is essential for developing critical thinking.
- Concentration and Memory: Students processed tasks in a set order without considering time or other demands. Tasks also related to working memory.
- Understanding Illustrative Objects and Situations: Different ethnic or social groups attribute meanings to signs, gestures, and connotations describing their social environment. Travel and IT technologies have broadened young people's understanding of many meanings.
- Understanding Speech and Content: Although students are generally well traveled and open to multicultural experiences, there were issues related to economic, social, or health barriers to education, leading to personalized interpretations of their meanings.

- General Learning Prerequisites: Students reported difficulties with the volume of information and knowledge required for their studies. This subtest focused on learning habits and preferred styles, which can significantly facilitate their studies.

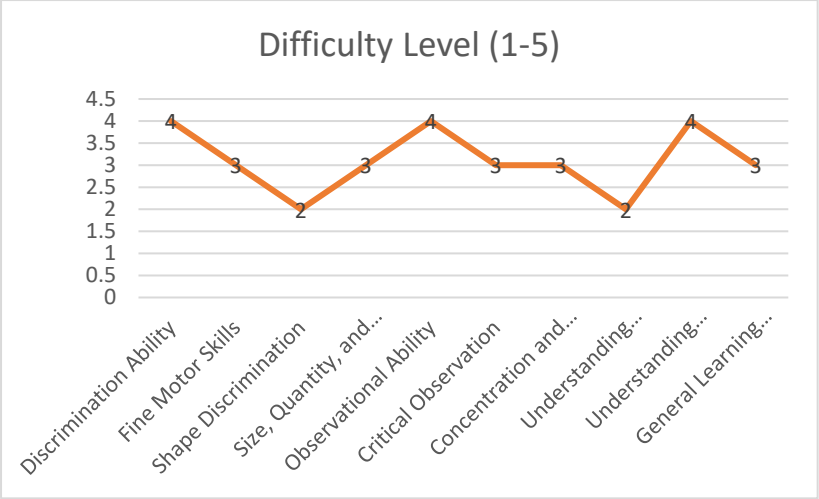

Figure 3. Result

Source: Own research

Although the self-constructed tests did not show significant differences, improvements were noted in all subtests. These results provide a foundation for further research on social relationships, acceptance, and satisfaction among students with specific needs and their reflection in social inclusion.

4. Conclusion

The activation of an individual's cognitive potential should be understood within the context of their social environment. When we view the relationship between the individual and their environment dynamically, we recognize that both the individual and their circumstances evolve over time. This dynamic approach allows for the implementation of intervention programs that positively affect not only the individual's cognitive level but also their adaptation to the environment. Therefore, applying inclusive education requires a resolute approach with a long-term perspective while being mindful of current solutions. Inclusive education seeks both formal and informal educational opportunities, focusing primarily on ensuring the educational process accommodates the variety and diversity of pupils and students.

According to Sender and Poláčková (2022), there is a lack of consensus in Slovakia about the nature, significance, and feasibility of inclusive education because there has been no political demand for inclusive tertiary education until recently. However, the current version of Act No. 245/2008 Coll. on Upbringing and Education (School Act), effective from January 1, 2023, defines inclusive education in §2 among the basic terms. According to Act No. 245/2008 Coll. on Upbringing and Education in §2 letter ai), inclusive education means "the joint upbringing and education of children, pupils, students, or participants in upbringing and education, based on opportunities and respect for their educational needs and individual characteristics, supporting their active involvement in the educational activities of the school or school facility." We anticipate that the concept of inclusive education will soon be defined in the Higher Education Act as well.

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