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Effects of the Universal Design for Learning (UDL) principles on the motivation of children with SEN integrated in mainstream schools

Piticari Petronela, PhD(c)
University of Bucharest, Faculty of Psychology and Educational Sciences

Abstract

The aim of this study is to analyze the differences related to students' motivation between two moments, respectively before and after participation in a program of teaching on the basis of UDL principles. The participants were 72 students with SEN enrolled in mainstream schools in Brașov county, aged between seven and 10 years, M = 8.26, SD = 1.04. The instrument used for measuring motivation was The Dimensions of Mastery Questionnaire (DMQ). A number of 37 teachers aged between 25 and 54 years, M = 37.89, SD = 7.56, were involved in the study, of which four men (11%) and 33 women (89%). They participated in the UDL PPS Course (48 training hours). After the course, they started to teach SEN children using UDL principles for six weeks. Students' motivation was measured twice, before and after the six weeks of UDL teaching. The results showed a significant increase in cognitive persistence, gross motor persistence, social persistence in relation to adults, social persistence in relation to other children, pleasure in doing things well, general competence, and a significant decrease in negative reactions. The discussions emphasize the importance of training teachers in the UDL model.

Keywords: SEN children, teacher training, Universal Design for Learning, motivation

Introduction

The benefits of inclusive education

Education is the fundamental right of every person, regardless of their abilities, and is based on the development of the skills necessary to face the challenges of life. Also, education is an important tool for achieving social changes that lead to an increase in the quality of life (Limaye, 2016). For this reason, special attention must be paid to the integration of all children and the provision of access to education and to the most appropriate development. Efforts are being made worldwide to integrate children with special educational needs (SEN), with most initiatives taking the form of national education policies (Gasteigner-Klicpera et al., 2013). These efforts are taking place due to the increase in the number of children with SEN, as mentioned in a recent UNICEF report, there are currently approximately 240 million children with disabilities worldwide (UNICEF, 2021). The UNICEF report points out that these children face multiple and complex challenges in securing their rights. It comprises internationally comparable data from 42 countries and covers over 60 indicators related to children's well-being – nutrition and health, access to water and hygiene, protection from violence and exploitation, education. The report also mentions the barriers that children with SEN face in full social participation, which often translate into negative effects on health and education.

Compared to children without disabilities, the following are mentioned about those with disabilities: they are 24% less likely to benefit from early stimulation and specialized care; they

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are 42% less likely to acquire numerical and literacy skills; they are 49% less likely to ever attend school; they are 47% less likely to complete primary school courses, 33% less likely to complete 10 grades and 27% less likely to complete 12 grades; they are 51% more likely to be unhappy; they are 41% more likely to be discriminated against; they are 32% more likely to be physically punished (UNICEF, 2021).

UNICEF representatives state in the same report that despite unanimous agreement on the importance of education, children with disabilities are still left behind and that inclusive education should not be considered a luxury (UNICEF, 2021).

Regarding the term ”special educational needs” - SEN, there is still currently a lack of agreement between professionals, parents and other involved factors, regarding its definition. Broadly speaking, the term describes people who need certain types of education, due to mental or emotional diagnoses or social difficulties that require the intervention of specialists. It is always necessary to make a special effort to understand and address diversity in order to meet the special needs of a child with a disability. Although at the declarative level schools seem to be prepared to receive and integrate children with SEN, in reality they rarely meet all the conditions to facilitate the socio-effective development and acquisition of knowledge of these children (Cambra & Silvestre, 2003).

Motivation for learning among children with SEN

In Romania, once integrated into normal schools, children with SEN benefit (from a legal point of view and on the basis of a school guidance certificate) from the support of a specialized teacher (support teacher, psychopedagogical teacher), who visits the child one hour a week, at the school where he is enrolled, carrying out specific activities to facilitate the acquisition of knowledge and optimal school adaptation. The time allocated to the child with SEN in such activities is essentially insufficient, but the duties of the support teacher also include contributing to the adaptation of the curriculum, depending on the child's real capabilities and his level of development. Based on this adapted curriculum and personalized education plan, classroom teachers can shape their teaching to meet the child's special needs as much as possible. Beyond trying to teach children with SEN, the role of teachers is also to increase their motivation to learn. Motivating students is a basic principle in the teaching process. Motivation is based on the results of behaviors performed consciously or unconsciously by the child (Kouti, 2018), prompting him to pay more attention to learning and interest in knowledge. It is based on the personal needs of students, but also on the ability of teachers to motivate children to participate in lessons in order to develop their cognitive and socioemotional skills (Anastasia, 2022).

The mobilization of motivation is guided by the child's behaviors, which develop specifically, with the aim of achieving certain objectives (Flamiatou, 2020). Motivation can be intrinsic or extrinsic, the intrinsic representing an ideal for the educational sphere, curiosity considered inherent in human nature being an essential motivating factor for learning (Deci & Ryan, 1985; Harlen, 2006). Motivational strategies in the school environment invariably have their roots in extrinsic motivators. However, intrinsic, and extrinsic motivation do not necessarily have to be at opposite poles, they can coexist naturally. For example, using a small table built in the hands-on workshop can be both a pleasure in itself, an encouragement to build some other chairs and enough reward to clean up the workshop to start a new activity.

Some children tend to act rather stimulated by external motivators, but to maintain and improve intrinsic motivation, interesting and sufficiently challenging activities are needed. The problem in

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schools is how to use extrinsic structures without hindering the emergence of intrinsic motivation. Bruner (1962, 1968) suggested that rewards and punishments should be eliminated, and Witzel and Mercer (2003) believed that teachers of students with SEN use extrinsic motivators because they believe that intrinsic motivation is more difficult to develop in these children. A child's choices, perseverance, and achievements can be justified by the confidence he has that he will do well and the value he places on the activity or the outcome of the activity. This principle is subsumed by the expectation-value theory (Eccles & Wigfield, 2020). Intrinsic goals, although situated in the present (here and now) can contribute to long-term goal setting, consciously or unconsciously (Lens et al., 2001).

Performance motivation among children with SEN

Mastery motivation is the foundation of children's active involvement in learning and in everyday activities. This has been described as the motivation to perform tasks of moderate difficulty with the goal of increasing competence (Harter, 1981; White, 1959). The concept of motivation for performance is equivalent to the intrinsic motivation derived from the internal regulation and volitional activation of the continuum described in the self-determination theory (Ryan & Deci, 2000) or the pattern of achieving goals from the achievement goal theory (Elliot, 2005). It can be seen as the child's psychological drive to make performance attempts (Barret & Morgan, 1995, 2018; Morgan et al., 2013) and to persistently try to solve problems or acquire skills (Morgan et al., 1990).

High levels of motivation for performance will lead to increased interactions with the environment, and recurrent practice will support skill development. The mechanism of increasing motivation to achieve ambitious and measurable goals consists of task persistence, task attention, effort volume, and effective use of strategies (Locke & Latham, 2013). In the case of children with SEN, especially those with neurodevelopmental disorders, the repetition of certain tasks facilitates neuroplasticity, but multiple repetitions are necessary to ensure permanent changes (Cramer et al., 2011; Lang et al., 2009). For primary, secondary and high school students, motivation for performance is important in that it supports involvement in learning tasks, physical condition, and community activities.

Motivation to achieve is positively associated with cognitive and motor development in young children with developmental delays (Gilmore & Cuskelly, 2009), with coping skills, scholastic skills, prosocial skills, and emotional functioning in preschoolers and toddlers at risk for delay (low socioeconomic status, institutionalized) (Ramakrishnan & Masten, 2020). It is also positively associated with adaptive competence in social domains in adolescents and youth with physical disabilities (Warschausky et al., 2017). Lack of motivation is considered a risk factor that limits the rehabilitation potential of children with SEN. Tatla et al. (2014) showed that interventions aimed at developing motivation in children with traumatic brain injury can improve memory and response inhibition performance. In children with delayed motor development, motivational interventions have shown positive effects on object control skills (Bandeira et al., 2017).

Motivation for learning in the context of UDL

Universal Design for Learning (UDL) provides learning opportunities for all students by making its principles accessible to all and exposing students to meaningful educational experiences (Dalton et al., 2019). Most specialists, adherents of UDL, agree that this model is based on a flexible, inclusive, and student-centered environment, so that it can ensure that all students have

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access to materials, activities and courses consistent with their developmental level (Hodges et al., 2020).

The different needs of students include different learning styles, linguistic diversity, neurodiversity, differences in learning strategies. UDL provides the means to place all students with different abilities, needs, and goals at the center of the pedagogical design process (Dolmage, 2018). The basic principles of UDL are multiple ways of student engagement, multiple ways of representation, and multiple ways of acting and expressing (Rose & Meyer, 2002). Starting from the first principle, it becomes obvious that one of the objectives of UDL is to increase students' motivation for learning.

Teachers could close the gap between motivated and unmotivated students, and UDL can "equip" teachers with the tools and means to achieve this goal, as it helps teachers engage all students, by removing barriers and by designing a curriculum according to the learning needs of students (Chardin & Novak, 2021). Meyer et al. (2014) asserted about UDL that by providing diversity in learning it could help unmotivated students to gain wings if learning is optimized according to their strengths and weaknesses. Judicious lesson design can help students find motivation to engage with assignments. Students' lack of choice is one of the barriers to engagement in learning. However, too many opportunities to choose can lead to a decrease in motivation (Novak, 2022). Thus, a balanced design in the teaching process is necessary to meet the learning needs of all students.

The need to train teachers in the UDL area

The field of special education is booming due to the increasing intensity of inclusion policies for children with SEN. Changes in recent years have required teachers to be trained to meet the special needs of the increasingly diverse students they encounter in the classroom. Thus, teacher training should include models of inclusive practices. Another desideratum of teacher training is to find a common language between teachers in normal schools and psychopedagogical teachers, so that, together, they manage successfully and in the best interest of the child, all his educational needs.

The general principles of teacher training in this direction are based on four main axes (components) related to the attitudes, knowledge, and skills that they must develop and interconnect. The first component refers to two concepts of a value nature: i) the values that the teacher has towards inclusive education, the ability to look at it critically and actively promote it; ii) to appreciate the differences between students as normal, natural and dynamic. The importance of a dynamic way of thinking about the potential of teachers to develop certain skills among students is highlighted by a number of studies on growth mindset, which show how these beliefs have positive effects on teachers' pedagogical practices, and on student outcomes (Blackwell et al., 2007; Dweck, 2017). The second component, the ability to create learning environments and promote differentiated and flexible pedagogical approaches, takes into account the variability of students and reflects an awareness of the constant evolution of their capacities. The third component refers to the ability to collaborate with the families. Its subcomponents include the mastery of appropriate communication techniques and the correct use of collaborative teaching practices (Friend & Cook, 2013). The fourth component addresses the ability of teachers to self-analyze and reflect on their own work to achieve a circularity between practice, planning, application, evaluation, reflection and correction (EADSNE, 2012).

The training of teachers in the UDL area meets the conditions imposed by the increasingly complex demands of the teaching profession, helping them to select their teaching strategies by promoting

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student-centered pedagogical practices. In a study of teachers' professional development through participation in UDL training courses, it was shown that they were able to move from conceptual knowledge of UDL principles to practical skills in applying the principles in the classroom (Craig et al., 2019). Darling-Hammond et al. (2017) highlighted the basic characteristics of courses addressed to teachers, among which are: content-focused instruction, active learning, models and modeling of concrete useful practices, opportunities for feedback and reflection, and appropriate duration.

In a systematic literature review on the implementation of UDL specialization courses among teachers, Rusconi and Squillaci (2023) mentioned a number of effects of these courses. Among them is the enrichment of the area of competence of the teachers, but not the modification of their conceptions regarding inclusion. Another highlighted result was the increase of teachers' skills in planning and implementing lessons, with increased attention to the diversity of students, by diversifying and adapting contents to their learning needs. Overall, the study highlighted increased teacher effectiveness in the area of classroom management with a wide variety of students.

The present study

Starting from the above, we propose to describe the effects of the implementation of a professional development program addressed to special education teachers, more precisely to psychopedagogical teachers who work with children with SEN enrolled in mainstream school classes. The program implemented by us had in mind the training of teachers on the principles and application models of UDL and included six modules of eight hours each. The program, hereinafter referred to as the "UDL PPS" was designed by us, using the theoretical foundations and specific instructions imposed by the original UDL model. It took place in April 2023.

The present study addresses students with SEN and has a quasi-experimental design, with two measurements, before and after they received UDL training. The teachers participating in the course evaluated the motivation level of the students they worked with. The first measurement took place in April 2023. After the teachers participated in the UDL PPS course and after acquiring the necessary knowledge, specific to the UDL model, they applied the new principles with the students and used the newly acquired materials and techniques. Students benefited from the UDL model for six weeks. At the end of this time interval, their level of motivation was again measured.

Study hypotheses:

H1. Children will report higher levels of motivation following participation in courses based on UDL principles.

H2. Children will report lower levels of negative reactions following participation in courses based on UDL principles.

Statistical analyses included the paired-samples t-test for differences in student motivation across the entire sample of students and the nonparametric. Statistical analysis program IBM.SPSS.24 (IBM Corp, 2016) was used.

Method

Participants and procedure

A number of 72 students with SEN enrolled in mainstream schools in Brașov county, aged between 7 and 10 years, M = 8.26, SD = 1.04, participated in the present study, of which 56 were boys (78%) and 16 were girls (22%). Regarding the children's diagnosis, 19 have ADHD (26%), 38

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have ASD (53%) and 15 have a learning disorder (21%). The sampling was one of convenience, the group of children being selected through the pedagogic teachers who participated in the UDL PPS Course. Although 48 teachers attended the course, not all agreed to participate in the study and collect data from students. Thus, 37 teachers aged between 25 and 54 years, M = 37.89, SD = 7.56, were involved in the study, of which four men (11%) and 33 women (89%).

The teachers were informed about the organization of this course through CJRAE Brașov and the principals of special and mainstream schools. Those who were interested in participating in the course were asked to enroll in a Google Classroom by providing the login link. This was the main method of communication between the trainer (the author of this study) and the teachers participating in the course. Along with enrolling in the course, the teachers were briefly presented with the research plan of the study and were then asked to read and sign the informed consent and agreement to participate in the study, as well as the agreement to process personal data. A week before the start of the course, the teachers were asked to rate the children they were working with. Prior to this step, informed consent forms and agreement to participate in the study were printed for the parents of the children, as well as the form with the questionnaire to be applied to the children. After the parents read and signed the mentioned forms, the children were tested. Each teacher tested approximately two children out of the total number of children they worked with. The testing did not involve the direct request of the child, but the completion by the teacher of a questionnaire with 41 items related to aspects associated with the child's motivation. Although some teachers completed questionnaires for all the children they worked with, only those of children with comparable diagnoses, namely ADHD, ASD, and learning disorder, were retained in the study. The completed questionnaires were scanned and sent by the teachers by email to the author of the study, before the first lesson. Two child assessment sessions took place. The first was at the beginning of April 2023, and the second was at the end of June 2023, just before the start of the children's summer vacation.

Instruments

Sociodemographic data. For reasons related to new legal regulations, the only sociodemographic data collected from participants were age and gender. These were collected through a simple checklist at the beginning of the motivation questionnaire.

Student motivation was measured with the Dimensions of Mastery Questionnaire (DMQ) (Morgan et al., 2020). The instrument includes 41 items and measures seven dimensions related to motivation: cognitive persistence, gross motor persistence, social persistence in relation to adults, social persistence in relation to other children, pleasure in doing things well, negative reactions, general competence. Answers are given on a five-point Likert scale, where 1 – not at all child-specific and 5 – very child-specific. The questionnaire is completed by adults who frequently interact with the child, such as parents or teachers. Examples of items: "He is excited when he solves a problem he has worked hard on", and "Tries to find out what adults like and dislike". Scores for each subscale are obtained by calculating the arithmetic mean of the scores of the subscale's component items. The questionnaire was translated from English by the author of the study according to the rules in force (sent for retroversion to a specialist and corrected according to his suggestions).

UDL PPS Course

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The course lasted three weeks and took place between 19.04.2023 and 04.05.2023, totaling 48 hours of training. The meetings were held in a hybrid format, physical and online, twice a week, each lasting eight hours, of which four hours were synchronous and four hours were asynchronous. The course had the following structure:

Module 1. Face to face

a. knowledge and self-knowledge (2 hours), psychopedagogy duties and responsibilities (Education Law), differentiation and intervention at the level of student classes (Education Law)

b. fundamentals and principles of UDL (2 hours), brief presentation of UDL principles (practical examples), bibliography and presentation of study materials

Module 2. Online

a. Multiple means of representation; access to printed materials (1 hour), presentation of contents in different forms: text, audio, video, each course in four forms (video presentations, PowerPoint, MP3, text), reading texts in digital format, video captures, additional simulations, interactive websites, optional asynchronous recorded sessions, weekly posts highlighting previous and upcoming content.

b. multiple means of action and expression; improving the writing process (1 hour), flexibility in how to complete weekly projects and assignments (allowing presentation in multiple formats: writing, multimedia presentations, video, graphic organizers, etc.), the choice to participate in discussions using text, video, etc., flexible deadlines for certain tests and examinations, gradual introduction of new modules, highlighting the essential elements that the final projects must include, multiple opportunities to receive feedback, feedback from colleagues

c. cooperative learning (2 hours)

Module 3. Face to face

a. lesson plan. Practical application. Exercises. Activities according to UDL principles, practical applications of introducing the UDL approach into the lesson plan, learning strategies, attention.

b. motivation (overview); motivational techniques, bibliography, study materials

Module 4. Online

a. cooperative learning, learning techniques, learning techniques on support levels I, II, III, IV (cooperative learning)

b. motivation, self-control tools

c. homework, study materials

Module 5. Face to face

a. curricular differentiation, psychopedagogical diagnosis, psychopedagogical assessment and differentiated learning, school diagnosis (types, planning models, intervention)

b. motivation, reward (Token system)

c. bibliography, study materials

Module 6. Online

a. curriculum design from the perspective of UDL, presentation and analysis of individualized applied program models (in other educational systems in Europe) and in our own, developed in the course, UDL design and psycho-pedagogical planning; student models, models of psychopedagogical intervention in class, group, individually.

b. final project presentation: case study, psychopedagogical file - case study, conclusions

Results

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Descriptive statistics

Means, standard deviations, internal consistency coefficients, and correlations between variables are presented in Table 1 (pretest) and Table 2 (posttest). Skewness and kurtosis are in the range (-1.10, 1.27), which reflects a normal distribution of the data.

Table 1. Pretest descriptive statistics

	M	SD	α	PERCOG pre	PERMGE pre	PERSAD pre	PERSCO pre	PLALBI pre	REANEG pre	COMGEN pre
PERCOG pre	2.71	.51	.65	1						
PERMGE pre	2.81	.74	.82	.10	1					
PERSAD pre	2.46	.66	.78	-.22	.64**	1				
PERSCO pre	2.36	.77	.85	-.17	.78**	.86**	1			
PLALBI pre	3.17	.72	.74	.45**	.73**	.37**	.54**	1		
REANEG pre	3.81	.44	.62	.24*	-.48**	-.59**	-.68**	-.24*	1	
COMGEN pre	2.34	.45	.61	.30*	.36**	.35**	.40**	.27*	-.40**	1

Note: **. p < .01, *. p < .05.
PERCOGpre – Pretest Cognitive Persistence, PERMGEpre – Pretest Gross Motor Persistence, PERSADpre – Pretest Social Persistence with Adults, PERSCOpre – Pretest Social Persistence with Other Children, PLALBIpre – Pretest Enjoyment of Doing Things Well, REANEGpre – Pretest Negative Reactions, COMGENpre – Pretest General Competence.

Table 2. Posttest descriptive statistics

	M	SD	α	PERCOG post	PERMGE post	PERSAD post	PERSCO post	PLALBI post	REANEG post	COMGEN post
PERCOG post	3.33	.42	.67	1						
PERMGE post	3.15	.67	.79	.19	1					
PERSAD post	3.02	.71	.86	-.22	.68**	1				
PERSCO post	2.76	.82	.90	-.20	.70**	.88**	1			
PLALBI post	3.41	.58	.66	.35**	.68**	.51**	.51**	1		
REANEG post	3.43	.42	.64	.33**	-.49**	-.67**	-.78**	-.28*	1	
COMGEN post	2.74	.37	.68	-.01*	.48**	.51**	.49**	.26*	-.50**	1

Note: **. p < .01, *. p < .05.
PERCOGpost – Posttest Cognitive Persistence, PERMGEpost – Posttest Gross Motor Persistence, PERSADpost – Posttest Social Persistence with Adults, PERSCOpost – Posttest Social Persistence with Other Children, PLALBIpost – Posttest Enjoyment of Doing Things Well, REANEGpost – Posttest Negative Reactions, COMGENpost – Posttest General competence.

Hypotheses testing

In order to test the hypotheses, the paired samples t-test was performed, comparing the levels of the seven dimensions of motivation, measured before and after the children benefited from courses based on the principles of UDL.

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Table 3. Mean scores reported by the participants before and after participating in the courses based on the principles of UDL

		M	N	SD	MSE
Pair 1	PERCOGpre	2.71	72	.51	.06
	PERCOGpost	3.33	72	.42	.05
Pair 2	PERMGEpre	2.81	72	.74	.09
	PERMGEpost	3.15	72	.67	.08
Pair 3	PERSADpre	2.46	72	.66	.08
	PERSADpost	3.02	72	.71	.08
Pair 4	PERSCOpre	2.36	72	.77	.09
	PERSCOpost	2.76	72	.82	.10
Pair 5	PLALBIpre	3.17	72	.72	.08
	PLALBIpost	3.41	72	.58	.07
Pair 6	REANEGpre	3.81	72	.44	.05
	REANEGpost	3.43	72	.42	.05
Pair 7	COMGENpre	2.34	72	.45	.05
	COMGENpost	2.74	72	.37	.04

Note: PERCOGpre – Pretest Cognitive Persistence, PERMGEpre – Pretest Gross Motor Persistence, PERSADpre – Pretest Social Persistence with Adults, PERSCOpre – Pretest Social Persistence with Other Children, PLALBIpre – Pretest Enjoyment of Doing Things Well, REANEGpre – Pretest Negative Reactions, COMGENpre – Pretest General Competence, PERCOGpost – Posttest Cognitive Persistence, PERMGEpost – Posttest Gross Motor Persistence, PERSADpost – Posttest Social Persistence with Adults, PERSCOpost – Posttest Social Persistence with Other Children, PLALBIpost – Posttest Enjoyment of Doing Things Well, REANEGpost – Posttest Negative Reactions, COMGENpost – Posttest General competence.

Table 4. Paired samples t-test – motivation before and after the participating in the courses based on the principles of UDL

			M	SD	MSE	CI 95% Lower	Upper	t	df	p
Pair 1	PERCOGpre PERCOGpost	-	-.62	.38	.05	-.71	-.53	-13.94	71	.00
Pair 2	PERMGEpre PERMGEpost	-	-.34	.35	.04	-.43	-.26	-8.26	71	.00
Pair 3	PERSADpre PERSADpost	-	-.56	.43	.05	-.66	-.46	-11.09	71	.00
Pair 4	PERSCOpre PERSCOpost	-	-.41	.37	.04	-.49	-.32	-9.60	71	.00
Pair 5	PLALBIpre PLALBIpost	-	-.23	.36	.04	-.32	-.15	-5.52	71	.00
Pair 6	REANEGpre REANEGpost	-	.38	.31	.04	.31	.45	10.55	71	.00
Pair 7	COMGENpre COMGENpost	-	-.40	.32	.04	-.47	-.33	-10.78	71	.00

Note: PERCOGpre – Pretest Cognitive Persistence, PERMGEpre – Pretest Gross Motor Persistence, PERSADpre – Pretest Social Persistence with Adults, PERSCOpre – Pretest Social Persistence with Other Children, PLALBIpre – Pretest Enjoyment of Doing Things Well, REANEGpre – Pretest Negative Reactions, COMGENpre – Pretest General Competence, PERCOGpost – Posttest Cognitive Persistence, PERMGEpost – Posttest Gross Motor Persistence, PERSADpost – Posttest Social Persistence with Adults, PERSCOpost – Posttest Social Persistence with Other Children, PLALBIpost – Posttest Enjoyment of Doing Things Well, REANEGpost – Posttest Negative Reactions, COMGENpost – Posttest General competence.

The results have showed that there are significant differences for all seven dimensions of motivation, with students achieving improved scores after participating in courses taught based on

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UDL principles, compared to baseline. Thus, for cognitive persistence, a pretest score M = 2.71, SD = .51 was reported, compared to the posttest score M = 3.33, SD = .42, t(71) = -19.24, CI95%(-.71, -. 53), p < .01, for gross motor persistence, there was a pretest score M = 2.81, SD = .74, compared to the posttest score M = 3.15, SD = .67, t(71) = -8.26, CI95% (-.43, -.26), p < .01, for social persistence in relation to adults, there was a pretest score M = 2.46, SD = .66, compared to the posttest score M = 3.02, SD = .71, t(71) = -11.09, CI95%(-.66, -.46), p < .01, for social persistence in relation to other children, there was a pretest score M = 2.36, SD = .77, compared to posttest score M = 2.76, SD = .82, t(71) = -9.60, CI95%(-.49, -.32), p < .01, for the pleasure of doing things well, a pretest score M = 3.17, SD = .72, compared to the posttest score M = 3.41, SD = .58, t(71) = -5.52, CI95%(-.32, -.15), p < .01, for general competence, a pretest score M = 2.34, SD = .45 was recorded, compared to the posttest score M = 2.74, SD = .37, t(71) = -10.78, CI95%(-.47, -.33), p < . 01. Regarding negative reactions, there was a pretest score M = 3.81, SD = .44, compared to the posttest score M = 3.43, SD = .42, t(71) = 10.55, CI95%(.31, .45) , p < .01.

Conclusions

The present study aimed to analyze the effects of a program based on the principles of UDL on the motivation of students with SEN. A number of 48 teachers were trained in the UDL area. Of these, only 37 agreed to participate in this study. Participating teachers benefited from training in the course called UDL PPS, the program running for three weeks and comprising six modules, two per week. Each module had a duration of eight hours, thus totaling 48 hours of training. The teachers are psychopedagogues from special schools in Brașov county and work as support or itinerant teachers to work with children with SEN integrated in mainstream schools. Each teacher has approximately eight children with SEN in his work schedule, whom he assists once a week, for one hour.

As a result of participating in the study, teachers began to work with children with SEN using the principles of UDL, using specific strategies, methods, and materials. For six weeks, the children thus benefited from the new way of training/assistance. In the present study, the performance motivation of children with SEN was analyzed. Thus, the teachers completed questionnaires regarding the motivation level of 72 children with SEN, there being two measurements. The first measurement took place one week before the teachers started the UDL PPS Course (April 2023) and the second measurement took place at the end of the school year after implementing the new principles with children with SEN (June 2023). The children participating in the study have diagnoses of ADHD, ASD and learning disorder, being enrolled into mainstream schools in Brașov county.

The results revealed a significant increase in the students' motivation level in all six dimensions analyzed, as well as a significant decrease in negative reactions. The biggest difference was reported in cognitive persistence, which reflects the child's persistence in the task, completion of homework, trying to decipher the steps to solve a problem, active and long involvement in interesting tasks, choosing complex tasks in favor of simple ones. This result can be attributed to the fact that, based on the principles of UDL, teachers put more emphasis on the active involvement of the child and not necessarily on the result. In this sense, UDL proposes to develop and offer interesting, funny, meaningful tasks for the child and consistent with his interests. For example, if a child is fond of Lego, the addition and subtraction operations that need to be trained

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can be done with Lego pieces. Shapes and figures can be built from Lego pieces that help the child understand numbers and operations, but also produce an object that can be played with later.

The next significant difference was reported in social persistence in relation to adults. This result can be attributed to the fact that the teacher's attitude has changed, being more centered on the student, on his immediate and not general needs, on the immediate and not long-term goals. In the light of UDL, the professional-child relationship is a warm one based on closeness, with attention not only on the child's cognitive capacities, but also on his emotional states. The change in approach on the part of the teacher seems to have encouraged this type of social persistence, which essentially refers to the extension of discussions between the teacher and the child, the initiation of discussions by the child, efforts on the part of the child to make the teacher interested in his/her views and be understood, the effort to understand what pleases the teacher and to decipher his emotions.

A decrease in negative reactions was also observed. These are manifested in the form of feelings of frustration, shame or sadness when not accomplishing a task, vehement protests if his/her efforts are not crowned with success, lack of eye contact, tantrums, or withdrawal. The change can be caused by the attitude of teachers who use, according to the principles of UDL, multiple ways of presenting materials and assigning tasks, so that children do not feel negative emotions and therefore increase their general state of well-being and the courage to practice those activities that they still do not fully master.

There was also a high difference in general competence, which is described as how quickly the child solves problems, how well he performs at tasks, how well he copes with tasks that are more difficult than those for his age, and how well he understands things. This result can be determined not only by increasing the child's skills in general, but rather by changing the teacher's strategies and choosing tasks of moderate difficulty, then gradually moving to increasingly difficult tasks. In the light of UDL, the teacher has the freedom to shape the curriculum in such a way as to adapt the activities to the existing level of the child. The emphasis is not on "ticking off" the activity, but on practicing the skill specific to that activity until it is performed correctly. Another significant difference was reported in the increase of persistence in relation to other children. This result is particularly important because it is well known that students with SEN often have reservations and even difficulties in communicating and interacting with their peers. This persistence translates into the child's attempts to make others feel better, to tell them interesting things, to understand them, to befriend them, to join groups of children doing interesting activities, to prolong the play with them. The growth of this type of persistence can be determined by the idea of normalization induced by the teacher, but also by his unconditional acceptance, which according to the principles of UDL means understanding the child as he is and accepting diversity as a natural thing. The teacher's change of perspective can be immediately perceived by the child, who is more likely to gain the courage to try to integrate into peer groups and participate in all the activities that he can do in one form or another.

Regarding gross motor persistence, the differences were significant but lower. The result can be attributed to the fact that in the special education classes the teachers do not have the necessary time to perform physical exercises, although the situation of some of the children requires this. For example, speech therapy training to improve verbal communication involves performing certain physical exercises in a certain period of time. Taking into account the fact that psycho-pedagogical teachers are more oriented towards increasing the cognitive skills of children, it is possible that during the hours, and so few, they did not insist much on physical exercises. Gross motor

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persistence also refers to the persistence with which the child performs activities from sports lessons or from interactions with other children. The increase, although small, is significant, which may reflect greater engagement with peers.

The lowest increase was reported in the pleasure of doing things well. This dimension is highly subjective and refers to the child's self-satisfaction as a result of doing a task correctly, expressing enthusiasm, joy in understanding how a certain thing works, delight in a personal achievement after submitting a great effort, the well-being induced by a good result. Beyond the contribution of teachers in encouraging and praising the child for his achievements, the temperament of the child is also important, as well as the severity of the diagnosis. For example, children with ASD show their emotions less visibly or not at all, which can convey to others that they are not enjoying their own achievements.

Limitations and future research direction

One of the limitations of the study is the small number of participants, children with SEN, which to some extent prevents the generalization of the results. Added to this is the fact that the children's diagnoses are only ADHD, TSA and learning disorders, and children with sensory, neuromotor disabilities or other syndromes not being included in the study. In our future studies, we will consider including a larger number of children with SEN, with the most varied diagnoses, but also children without SEN.

Another limitation of the study is the use of a motivation assessment instrument that has not been validated on the Romanian population, although the rules in force for the translation of the questionnaires were respected. Also, the completion of the questionnaires was carried out by the teachers, who looked at the child from the perspective of the educator. In our future studies we will opt to involve parents, so that we can also get their opinion on the characteristics and evolution of the child.

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