

Teaching methodology in students with special educational needs during their transition to secondary education

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Abstract. The gap between the skills of students with special educational needs (SEN) and learning requirements is widening as they move from primary to secondary education. The purpose of this research is to implement and evaluate the pedagogical tool "Targeted, Individual, Structured, and Integrated Program for Students with Special Educational Needs" (TISIPfSENS), through which a special teaching methodology is proposed for the reading support of students with SEN. The methodology applied was mixed and lasted 5 years in 5 general Greek secondary schools. The study sample consisted of students with neurodevelopmental disorders (N = 10) and adults (N = 130) who encountered them learning, therapeutically, and socially. The qualitative data were collected in the context of the action research with the utilization of observation and intervention tools, while the quantitative data were collected from an unbalanced questionnaire. The results showed that "TISIPfSENS" supports students with neurodevelopmental disorders in reading skills during their transition to secondary education. The findings showed that students can actively participate in the general learning process, provided that the intervention is governed by certain principles, such as individualization of teaching, structuring of teaching methodology in certain phases, informal pedagogical assessment, and differentiation activities for the cultivation of neurodevelopmental areas.

Keywords: School transition, TISIPfSENS, neurodevelopmental disorders, reading skills, secondary school, teaching methodology.

INTRODUCTION

The transition from primary to secondary education can cause several challenges for students with neurodevelopmental disorders. This is one reason why many elementary school students with special educational needs (SEN) either do not continue in secondary education or do not complete it (Richter, Popa-Roch and Clément, 2019). Evangelou *et al.* (2008) report that the successful transition of students with SEN in secondary education depends on the development of new friendships and the improvement of students' self-esteem and self-confidence, their growing interest in school work, and their easy adaptation to new teaching routines and school organization.

According to Mackenzie *et al.* (2012), students' school transitions are examined both socially and academically. The barriers they may face when entering secondary education or from middle school to high school are likely to result from a change in the learning environment and educational evaluation, as the school climate becomes more competitive and student effort is less valued. Still, according to the same researchers, social concerns during the transition period are of paramount importance. Adolescence is a period in which social acceptance is usually considered by students to be of great importance. The experiences of some students with SEN at the social level in secondary education are considered reduced and

have an impact on their academic performance.

A study by Rodriguez *et al.* (2017) on the school transition of students with neurodevelopmental disorders made it clear that although the majority of the literature and legislation focuses on the transition from secondary education to adulthood, cannot be omitted by the scientific community, as to how early school transfers are managed strongly affects the results of their later educational and extracurricular course. The same researchers point out that these students need to be supported both in their skills in organizing and managing the learning process and in their active participation in learning activities. When entering high school, students do not always acquire appropriate academic skills in order to meet the curricula of general education, as special education and general education teachers are not properly trained to adapt the curricula of general education and differentiate teaching interventions according to students' abilities.

The above reasons are further reinforced by the research of Hanley-Maxwell and Molfenter (2017) who, regarding the access of students with mental or developmental disabilities in secondary education, point out three inhibitory factors. The first factor is related to the teachers' questioning about whether these students can participate in the Curriculum of General Education (CGE) and what is happening in a general classroom. The second issue concerns the methodology of their teaching and evaluation, as well as the provision of knowledge adequacy so that they can move on to the next class. Finally, the third issue is related to the redefinition of school success criteria which until now are evaluated only by academic criteria.

Objective of the study

Based on the above, in the present study, we apply and evaluate a teaching methodology for the support of students with SEN during their transition from grade to grade. Specifically, the present study aims to propose a teaching methodology for supporting reading skills in students with SEN in order to move to larger grades. The specific goal is expanded through interventions carried out in school classrooms and the attitudes of adults towards the specific teaching methodology that is proposed. For the above goal, the current study aimed at the following:

1. To what extent does the proposed teaching methodology support students with SEN in curriculum courses?
2. Whether the proposed teaching methodology supports students in learning readiness skills, special educational needs, as defined by Framework Curriculum of Special Education (FCSE), general learning difficulties as defined in the curriculum and special learning difficulties.

3. To what extent do adults agree with this proposed teaching methodology?

Students with neurodevelopmental disorders

According to the American Psychiatric Association (2013), Neurodevelopmental Disorders are a group of difficulties that occur during the developmental periods of a person's social and mental development and are characterized by developmental deficits. These neuropsychiatric disorders, such as autism in children and young people, are also identified through pedagogical practices in the school, academic community, and the family (Drossinou-Korea, 2007). These disorders include autism spectrum disorders (ASD), intellectual disability, and specific learning disabilities (American Psychiatric Association, 2013). ASD refers to deficits in communication and social interaction, as well as to limited repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). Intellectual disability refers to the disorder that begins during the developmental period of the individual and includes deficits in intelligence and adaptive behaviors (American Psychiatric Association, 2013). Finally, specific learning disabilities are diagnosed when there are deficits in a person's ability to perceive or process information effectively and accurately. They are also characterized by difficulties in learning academic skills in reading, writing or mathematics (American Psychiatric Association, 2013). As for the language skills of these students, their performance fluctuates at low levels compared to their peers without disabilities. Specifically, 62% of students with SEN respond below the basic reading level compared to 19% of their non-disabled peers. An image that has been a constant challenge for more than 35 years (Hock *et al.*, 2017).

Students with specific learning difficulties going to secondary education structures show deficits in their language skills. McCulley *et al.* (2013) observed that these students had low percentages in terms of using appropriate vocabulary in secondary education, as they were asked to understand and use words they did not use in their previous school experience. Also, according to the same researchers, in terms of readability, they face challenges in decoding and word coding skills, in the rhythm of reading, while they show difficulties in expression, prosody and accent. As for the written word, there are shortcomings in the spelling and morphology of the letters, while weaknesses are recorded in the organization and production of structured paragraphs. According to Gargiulo (2012), they also show a fundamental deficit in reading comprehension, and especially in recalling key facts, the chronological sequence of events, and the basic meaning of texts. Vaughn and Wanzek (2014), referring to students with reading difficulties, point out that these students do not

make progress in reading at the same rate as their peers without disabilities, as they move on to the next school year. They also emphasize that teaching methods for reading in secondary education consist of low-level schoolwork, without students having access to pedagogical material with multisensory stimuli. This is credited to higher education according to Drossinou-Korea (2012), which in research has studied the case of the Agricultural University of Athens focusing on students with dyslexia who go from the Secondary to the Metropolitan University through the facilities of oral assessment.

Students with ASD are particularly vulnerable to school transition, as they often have problems accepting and dealing with changes in their daily routine. Their transition to secondary education is considered one of the most difficult in their educational careers, usually causing a stressful increase in the expectations of their academic and social ability (Makin *et al.*, 2017). They fear that they will not be able to cope with the new learning conditions and are worried about the increased demands of schoolwork and the stricter teachers (Peters and Brooks, 2016). Howorth, Rooks-Ellis, Flanagan and Ok (2019) report that some students with ASD cope with word decoding and coding skills, but tend to have more difficulty understanding due to their reduced ability to draw conclusions or understand the metaphorical meaning of language. Brum, Hall, Reutebuch and Perkins (2019) point out that students with ASD have deficits in comprehension of conclusions and literal interpretation of texts, as well as in clear and precise answers to closed or open-ended comprehension questions. The same researchers claim that the learning image, which can remain throughout the secondary education level and emphasize that it is important for teachers to support students linguistically, considering their special learning needs, to build individualized teaching plans by applying adaptations to the learning content and making systematic assessments.

Finally, students with intellectual disability in secondary education have certain characteristics that hinder the cultivation of their basic language skills, such as lack of concentration, inability to remember short-term and functional memory, and deficits in developmental skills and general skills (Gargiulo and Bouck, 2017). Furthermore, the scientific literature states that the lack of motivation and sense of failure experienced by these students during the first school years leads to the need to support teachers with individualized teaching during secondary education (Mays, 2017). Gilmour, Fuch and Wehby (2018) conducted a meta-analysis of 23 studies conducted between 1998 and 2016. The researchers looked at students' participation in the curricula of general education, finding the gap in language skills between students with or without SEN, such as those with intellectual disabilities. The results of their research showed that the language level of these students falls

short of three school years compared to that of their peers, without, however, determining the cause. They only assume that the size of the gap is due to ineffective teaching interventions. Strnadova *et al.*, (2016) also report that students with mental disabilities face several challenges in transitioning to secondary school due to their social skills deficits, the bullying they receive from their interlocutors, but also because of the low level of learning as most of them have attended special schools. Also, the same researchers point out that the school transition of students with intellectual disabilities requires specific skills not only from the students themselves but also from the parents and teachers.

McCoy *et al.*, (2020) in their research on the school transition of students with SEN in the secondary education level in Ireland point out that this particular student population is likely to face more social and academic difficulties compared to their peers. In particular, they emphasize that these students in secondary education have a low learning profile, create problematic relationships with their peers, have low self-esteem and show aggressive behavior. They also report that ineffective individualized programs and demanding curricula may adversely affect their schooling. They also point out that the transition of students with SEN has received relatively little attention at the research level. Their research findings show that these students are more likely to experience a negative transition to high schools, such as those with ASD, while students with learning disabilities and intellectual disabilities are three times more likely to experience a poor transition than their classmates without SEN. Their study underscores the importance of student support until the second year of secondary education, promoting positive teacher-student interactions and providing additional academic support for those with lower levels of education in primary school. Finally, the researchers themselves emphasize the need to implement educational programs so that students can move and adapt smoothly to secondary education.

Targeted, individual, structured, and integrated program for students with special educational needs (TISIPfSENS)

The Targeted, Individual, Structured, and Integrated Program for Students with Special Educational Needs (TISIPfSENS) is a pedagogical tool to support students with SEN in the educational process. The need to address teaching issues led to its creation with the basic mission of directing the teacher's work by highlighting the teaching methodology and providing differentiated and personalized educational strategies, as well as evaluations (Drossinou-Korea, 2017). The reference to "Targeted" expresses the dynamic tendency that secondary school teachers need to set teaching goals tailored to students' abilities, needs and interests.

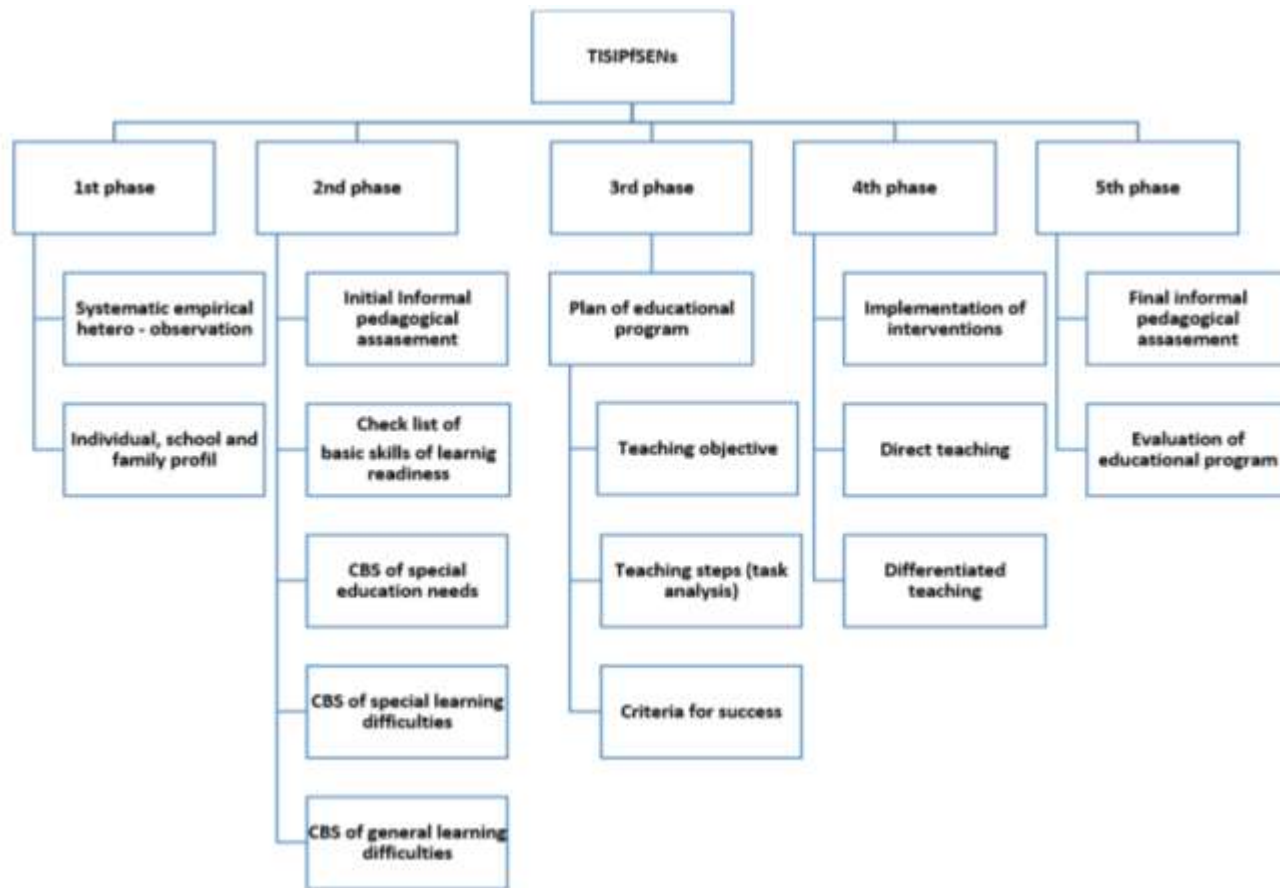


Figure 1. Structure of TISIPfSEns.

According to Targeted, Individual, Structured, and Integrated Program for Students with Special Educational Needs [(T)ISIPfSEns], the teaching objectives for each student are defined based on the Framework Curriculum of Special Education (FCSE), the curricula of general education, and the neurodevelopmental areas of learning readiness (Drossinou-Korea, 2017). The reference to the "individual" refers to the individualized teaching approach in order for the student to adopt his way of studying and to be led to expanded levels of autonomy.

The implementation of TI(S)IPfSEns is structured in five phases (Drossinou-Korea, 2017). The first phase concerns the systematic and empirical observation through which the teacher studies the case of the student and according to his experience ends up with other observations about his individual, school and family history. The second phase of TI(S)IPfSEns refers to informal pedagogical evaluation, through which the difficulties in school subjects are identified and understood. The informal pedagogical evaluation is carried out in accordance with Checklists of Basic Skills (CBS). Through CBS, students' abilities and weaknesses are assessed and examined. The third phase of TI(S)IPfSEns is included in the plan of the structured annual, monthly and weekly curriculum, based on the

objectives set by the teacher. According to the student, his level of reading skills according to the TI(S)IPfSEns, the long-term, medium-term and short-term teaching goal, the teaching steps, the pedagogical materials and means and the criteria for the success of the program are written in it. The fourth phase of the program includes the implementation of the curriculum through direct and differentiated teaching. In the fifth phase of TI(S)IPfSEns, the teacher evaluates the educational program (Figure 1).

The reference to the "Integrated Program" expresses the general and specific pedagogical principle that each teaching program has as its functional purpose to promote the school and social integration of students with EEA (Drossinou-Korea, 2017). Furthermore, TIS(IP)fSEns ensure the student's teaching routine by reducing his uncertainty and stress (Drossinou-Korea, 2017). It is a guide for the teacher and the student (Drossinou-Korea, 2017).

The purpose of the research is the evaluation of the special teaching methodology proposed through the application of the pedagogical tool TISIPfSEns. In particular, the effectiveness of this pedagogical tool in cultivating language skills in students with neurodevelopmental disorders during their transition from primary to secondary education and from middle school

Table 1. Profile of the student.

N (Students)	Gender	Age	SEN
(1)	Girl (G)	13	Intellectual Disability (ID)
(2)	Boy (B)	17	Autism Spectrum Disorders (ASD)
(3)	B	13	Special learning difficulties
(4)	B	13	ASD
(5)	B	17	ASD
(6)	B	14	ASD
(7)	B	16	ASD
(8)	B	16	ASD
(9)	B	16	ASD
(10)	G	17	ID & ASD

to high school is being investigated. Furthermore, the study investigates whether the teaching principles that govern TISIPfSEs promote the active participation of the specific students in the curriculum of general secondary education.

METHOD

The methodology of this research is mixed. This methodological approach was chosen, as it holistically examines research questions, allowing the use of more data collection techniques avoiding the limitations of using only qualitative or only quantitative research (Papanastasiou and Papanastasiou, 2016). The data collection was part of action research.

The research sample consists of 10 students, who attended 5 schools in three prefectures of the Greek region. The selection criteria for the students were as follows: (a) the existence of an official diagnosis-opinion from the competent Center for Educational and Counseling Support (KESY), which clarified and made accurate the nature of the problem, making clear the existence of special educational needs, (b) the completion of the 13th year of their age, where their educational course in general secondary education structures officially begins, and (c) their attendance schools of general education (Table 1). One student was in the last grade of elementary school (sixth grade of elementary school). Two students were in the first grade of middle school, one student in the second grade of middle school, and one in the third grade of middle school. Also, four students were in the first grade of high school and one student in the second grade of high school.

In addition, the study involved adults who were involved educationally, socially, or therapeutically with the students so that the conclusions from the qualitative data were reliable for the educational program that was implemented. The sample was mainly a sample of convenience, in an effort to capture the views of all parties involved and to achieve the number of at least

100 people, which would allow a fully representative picture to be given. The participants of the research came from the school and family environment of the students, as well as from the diagnostic or educational centers of the prefectures that the specific students visited. The total number of participants who came in contact with the students was 140. Of these, 130 took part in the survey. In terms of gender, 30% of the sample were men and 70% were women. In the specialty section, the vast majority of general education teachers hold 63.8%. This is followed by special education teachers with 21.5% and students' parents with 7.7%. Finally, in terms of the workplace, 73.1% of the sample worked in an urban area, 21.5% in an island area and a small 5.4% in the mainland (Table 2).

Ethical considerations

The parents signed a responsible statement of law 1599/1986 according to which they allowed the anonymous information to be used from the teaching interventions that were implemented in the students. Furthermore, the completion of the questionnaire was done anonymously and voluntarily, in order to maintain the confidentiality of the data.

Tools

In particular, field notes were used through empirical systematic hetero-observation and pedagogical hetero-observation, where the recordings were narrative-descriptive without predetermined questions and answers. In addition, some Checklists of Basic Skills (CBS) were used, which were supplemented through informal pedagogical assessment, in order to produce results for students' performance in terms of learning readiness (LR) skills. These include the neurodevelopmental area (a) of oral skills, which controls listening skills, dialogue skills, and clear and precise expression skills, (b) psychomotor skills, which are

Table 2. Profile of the adult.

	Frequency	Cumulative percentage
Man	39	30.0
Woman	91	100.0
Total	130	
General education teachers	83	63.8
Special education teachers	28	85.4
Special Auxiliary Personnel (caregivers)	3	87.7
Special education staff (Speech and language therapists, occupational therapists, psychologists)	6	92.3
Parents	10	100.0
Total	130	
Rural-mountainous area	7	5.4
Rural-Island area	28	26.9
Urban area	95	100.0
Total	130	

assessed by skills large and fine mobility, spatial orientation, rhythm, time, and pleurisy, (c) mental abilities examining visual, auditory and functional memory skills, concentration, logical-mathematical thinking and reasoning and (d) emotional organization, which evaluates self-esteem skills, controls interest in learning, and examines collaboration skills with others. The CBS of special educational needs (SEN) were also used, as defined by the Hellenic Framework Curriculum of Special Education (FCSE) and concern (a) experiential skills in neurodevelopmental areas of oral speech, psychomotor skills, mental abilities and emotion, basic academic skills, which refer to the individual fields of reading, comprehension, writing and mathematics, (b) social skills, which are related to the sections of autonomy, adaptation to the environment, as well as social behavior, (c) creative activities for the sections of leisure and aesthetic arts and (d) the area of pre-professional readiness, which includes pre-professional skills, as well as vocational guidance skills. We also recorded the performance of students based on the CBS of general learning difficulties (GLD) as defined by the Curriculum of general education for each subject, as well as the CBS of the specific learning difficulties (SLD) with which we tested: (a) perceptual skills, such as optical, acoustic, audiovisual and multisensory, (b) functional, long-term and short-term memory skills, (c) spatio-temporal orientation skills, stationery and graphic space acquisition, (d) basic Reading skills, such as phonological comprehension, writing, spelling, morphology, semantics and written skills, (e) basic math skills, such as numbering skills, arithmetic symbols and the language of mathematics, and (f) emotional behavioral skills, (g) programming and (h) reading self-image (Drossinou-Korea, 2017).

The CBSs are completed in an Excel file table as follows: the horizontal lines record the skills of each area,

which are assessed according to the interactive pedagogical relationship and experience, the student's performance in cognitive and academic skills, as well as functional and adapted behavioral skills (Figure 2). The vertical lines of the tables record the semesters of study according to the formal and compulsory education, on an ascending scale from the number 1 corresponding to the first semester of formal education of the kindergarten to the number 26 corresponding to the second semester of formal study of the third grade of High school. A horizontal solid line crosses the horizontal lines and forms the "baseline", which corresponds to the current semester of the student's study according to his chronological and school age. The researcher-teacher of special education symbolically marks the cell in the table, where he estimates that it corresponds to the level of achievement of each skill. When this process is completed, a zigzag line is created that shows the student's highest and lowest deviation from the baseline. The researcher-teacher of special education is asked to create two zigzag lines that record the student's performance during the initial and final informal pedagogical assessment. The students' performance was measured based on the CBS, describing their learning levels according to the semesters of study that the Greek school system goes through.

The teaching interaction form was also used as a research tool. According to this, we made diary entries and pedagogical reflection through self-observation and hetero-observation, evaluating the educational process and student progress (Drossinou-Korea, 2017). Differentiated pedagogical material is another tool that students have processed and collected qualitative data for their learning process through video and photographic material, as well as written documents. Finally, the daily recording form was used to assess the performance of

STUDENT LEVELS	STUDENT NAME GRADE:	AGE: SEMIESTER:	DATE OF INITIAL INFORMAL PEDAGOGICAL ASSESSMENT (BLACK LINE):		DATE OF INTERMEDIATE INFORMAL PEDAGOGICAL ASSESSMENT (BLUE LINE):		DATE OF FINAL INFORMAL PEDAGOGICAL ASSESSMENT (RED LINE):		NEURODEVELOPMENTAL AREAS OF LEARNING READINESS				BASIC ACADEMIC SKILLS				SOCIAL SKILLS		CREATIVE ACTIVITIES		PROFESSIONAL READINESS	
			GRADE (G)/ SEMESTER (S)	SEM ESTER NO.	COGN. /SOCIAL SKILLS	PSYCHOM OR SKILLS	MENTAL ABILITIES	EMOTIONAL ORGANIZATION	READING	COMPREH ENSION	WRITING	MATHEM ATICS	AUTOREGUL ATION IN THE ENVIRONMENT	SOCIAL BEHAVIOR	SOCIAL ADAPTA TION	FINE ARTS	ARTS	PROFES SIONAL SKILLS	VOCATION AL GUIDANCE			
																				1	2	3
C High E/C' Sem	26																					
C High E/a' Sem	25																					
B High E/b' Sem	24																					
B High E/a' Sem	23																					
A High E/b' Sem	22																					
A High E/a' Sem	21																					
C Middle E/b' Sem	20																					
C Middle E/a' Sem	19																					
B Middle E/b' Sem	18																					
B Middle E/a' Sem	17																					
A Middle E/b' Sem	16																					
A Middle E/a' Sem	15																					
E Primary E	14																					
D Primary E	13																					
C Primary E	12																					
B Primary E	11	11	10	11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
A Primary E	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
D Primary E	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
C Primary E	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
B Primary E	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
A Primary E	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
D Primary E	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
C Primary E	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
B Primary E	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
A Primary E	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
D Primary E	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Figure 2. Table of EXCEL.

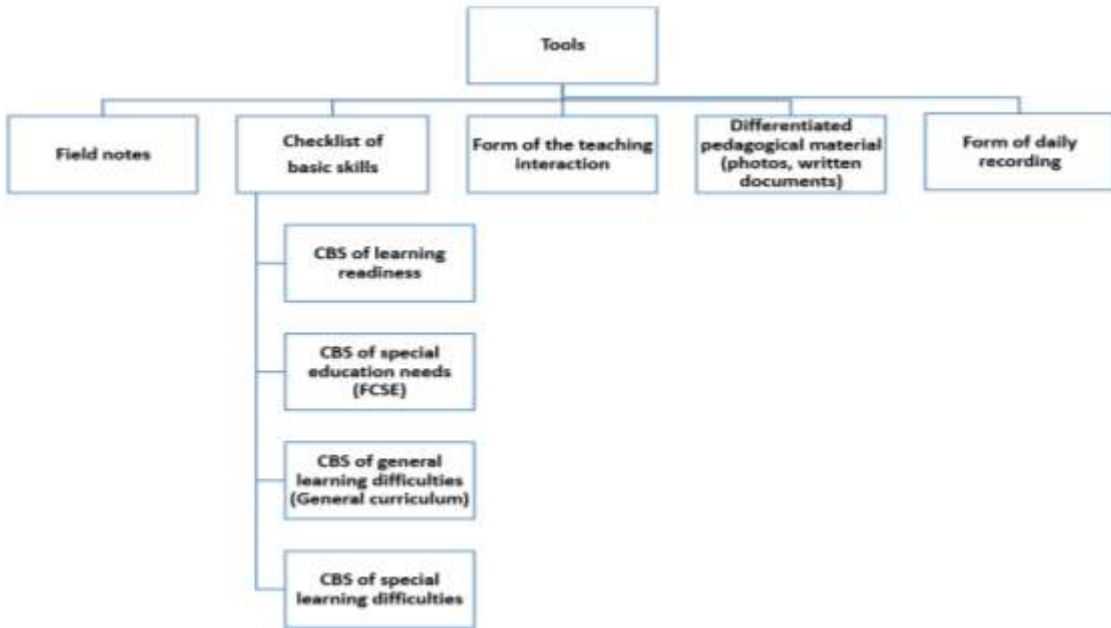


Figure 3. Tools used based on the TISIPfSEns to collecting quality data.

language skills with certain success criteria, such as the adequacy and completion of the teaching step in 15 minutes, the students' autonomy in carrying out activities without assistance, with a little help, with or without help,

as well as the verbalization and visualization of students' feelings after the end of the teaching interventions (Figure 3).

In terms of quantitative research, a questionnaire was

Based on your experience, determine (outline) with the five-point scale (Likert: 1 = not at all, 2 = very little, 3 = moderate, 4 = very much, 5 = Too much) the corresponding answer box to the following questions:
1. How much do you think that the individualization of the educational program for reading skills empowers students with SEN to participate in the educational process?
2. How much do you think that building it in phases of an educational program for reading skills empowers students with SEN to participate in the educational process?
3. How much do you think the assessment tool "Teaching Interaction Form" empowers students with SEN to participate in the educational process for reading skills?
4. How much do you think the connection of the teaching goal of reading skills with the Curriculum empowers students with SEN to participate in the educational process?
5. How much do you think that the cooperation of school staff with parents strengthens students with SEN to participate in the educational process for reading skills?
6. How much do you think that the cooperation of school staff empowers students with SEN to participate in the educational process for reading skills?
7. How much do you think the analysis of the teaching goal of reading skills in steps helps students with SEN to achieve it?
8. How much do you think that an informal form of pedagogical assessment in students with SEN helps the teacher to set functional teaching goals of reading skills?
9. How much do you think that an informal form of pedagogical assessment in students with SEN helps the teacher to evaluate his / her educational work in reading skills?
10. How much do you think the activities of clear and accurate oral expression of students with SEN enhance their reading skills?
11. How much do you think the dialogue activities of students with SEN enhance their reading skills?
12. How much do you think the focus activities on students with SEN enhance their reading skills?
13. How much do you think reasoning activities on students with SEN enhance their reading skills?
14. How much do you think time management activities for students with SEN enhance their reading skills?
15. How much do you think spatial guidance activities for students with SEN enhance their reading skills?
16. How much do you think activities to increase the interest in learning in students with SEN enhance their reading skills?
17. How much do you think self-awareness activities for students with SEN enhance their reading skills?
18. How much do you think text differentiation enhances the reading skills of students with SEN?
19. How much do you think the use of visual aids enhances the reading skills of students with SEN?
20. How much do you think the structured reading machine (like a shoebox) enhances the reading skills of students with SEN?
21. How much do you think the structured reading machine (work folder) enhances the reading skills of students with SEN?

Figure 4. Questionnaire.

compiled for adults, which is not weighted but structured for the needs of the present study, in order to extract some quantitative data. It consists of two groups of questions. The first part of the questionnaire includes the questions that outline the social profile of the participants. More specifically, these elements are their gender, socioeconomic status and place of work. The second part consists of 21 questions, based on which the opinions of the adults on whether the authorities governing TISIPfSENs contribute to their smooth transition and adaptation to the general order of secondary education were investigated (Figure 4).

Procedure

The process of data collection through action research lasted five years in the general classes of secondary education. The researcher is specialized in special education and training and supported students with neurodevelopmental disorders during the course

according to the institution of co-teaching. The research was carried out in accordance with the five phases of TISIPfSENs. For each student, the intervention lasted ten months for the duration of one school year. The first phase of SADEPEAE lasts two weeks, the second phase took place over the next two weeks. Then, the third phase took place in a week. The fourth phase lasted 8 months and the fifth phase lasted one month.

According to the first phase of TISIPfSENs, through its empirical systematic observation, we collected information about students with neurodevelopmental disorders by recording field notes on their individual, school and family history. During the second phase of TISIPfSENs, we collected data through the initial informal pedagogical assessment based on CBSs. Specifically, we made a participatory observation of the students' behavior inside and outside the classroom. We gathered information about their knowledge and skills, identified the pedagogical problem of each student and set teaching priorities based on the smallest and largest deviations from the baseline, as recorded in the CBSs.

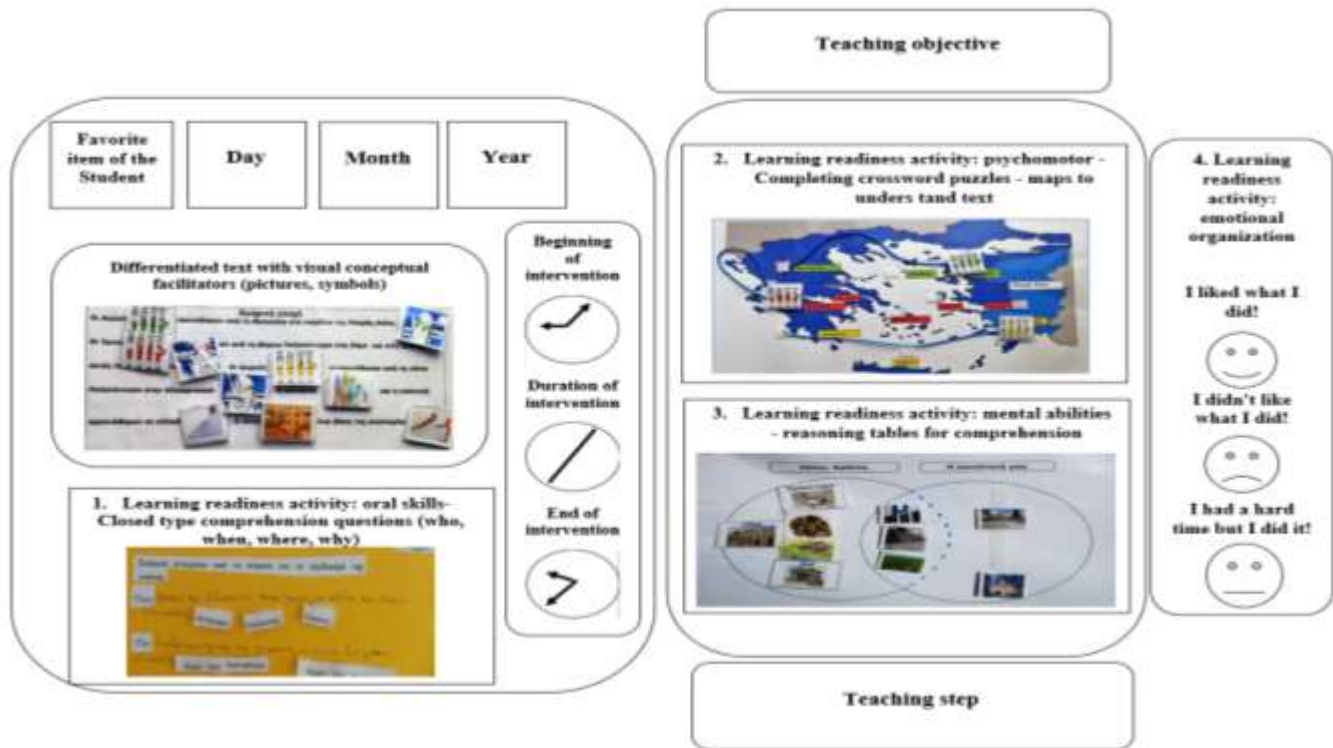


Figure 5. Differentiated pedagogical material of reading skills (work folder).

Then, we designed the curriculum for each student according to the third phase of TISIPfSEs. Utilizing the recorded data from the first and second phases of TISIPfSEs through the construction plan of the educational program, we proceeded to the definition of realistic teaching-research objectives. Then, in the fourth phase of TISIPfSEs, we implemented the teaching interventions in the context of direct teaching. The students received the following instructions: (a) Explore the differentiated pedagogical material of reading skills (locating the cover of the textbook, showing the location of your desk in the classroom, as well as the teaching time according to the weekly schedule program), (b) write down your personal details, (c) set the day, month and year of the teaching intervention, (d) locate the start time of the teaching intervention, (e) read the text with visual facilitators without help, with a little help, with the help or with a lot of help from the researcher-teacher, (g) carried out the activities of language skills enhancement and the activities of escalating difficulty of oral speech, psychomotor, mental disability and emotional support with a little help, with help or with a lot of help from the researcher-teacher, (h) evaluate your effort by choosing the feeling that expresses you (Figure 5). Finally, according to the fifth phase of TISIPfSEs and the completion of the educational program, we collected data from the final informal pedagogical assessment for each student based on the CBSs, as well as from the research tools for data quality collection, extracting results on

whether or not the teaching is achieved for each student.

In terms of the course and process of collecting quantitative data, the questionnaire took its final form after a sample study on a small sample of 28 people. The Cronbach- α questionnaire reliability index was also investigated. This indicator gave a result of 0.88, for the 30 variables. Following the sampling survey, the same process of data distribution and collection followed in the school units of the prefectures where the action survey took place. After collecting the data, we proceeded to their statistical analysis. Data analyzes were supplemented by inductive statistical methods, through parametric and non-parametric controls. The analysis of the statistical data was done with the help of the statistical package SPSS (v. 20), while the value of the statistical significance level of the controls was defined as $\alpha = 0.05$ (Papanastasiou and Papanastasiou, 2016).

RESULTS

The performance of students with SEN in the curriculum

After a thorough study of the data collected through the methodology of observation and intervention, as well as the special teaching methodology with active research and educational action in 10 students with neurodevelopmental disorders with an average age of 15.4 years, positive results

Table 3. The performance of students in the courses of the curriculum.

N (Students)	Semester in which students study	Initial observation (Semester)	Final observation (Semester)	School lesson/Skills
(1)	13 (6 th primary S./ a' Semester)	9	10	Literacy/ Comprehension
(2)	22 (1 st High S./ b' Semester)	15	16	Ancient Greek Language (Thucydides)/ Comprehension
(3)	16 (1 st Middle S./ b' Semester)	11	12	Ancient Greek Language (Euripides)/ Comprehension- writing
(4)	19 (3 rd Middle S./ a' Semester)	3	5	Homer's Odyssey/ Reading-Comprehension
(5)	17 (2 nd Middle S./ a' Semester)	8	10	Ancient Greek Language/ Reading-Grammar rules
(6)	21 (1 st High S./ a' Semester)	11	12	Literacy/ Comprehension
(7)	21 (1 st High S./ a' Semester)	15	16	Greek Language/ Comprehension
(8)	21 (High S./ a' Semester)	15	16	History/ Comprehension-writing
(9)	21 (1 st High S./ a' Semester)	17	17	History/ Comprehension
(10)	23 (2 st High S./ a' Semester)	15	16	Greek Language/ Comprehension

are obtained for special teaching methodology of their language skills. This becomes clear in the CBSs of the informal pedagogical assessment, as it was recorded during the teaching interventions in literary courses, such as "Ancient Greek Language", "Literature", "Ancient Greek Texts (from translation)", "History" and "Greek language". The specific teaching methodology contributed to the students' progress mainly in the "Ancient Greek Language" and "Homer's Odyssey" courses, while no improvement was recorded in the "History" course, of the 1st grade of high school (Table 3).

The performance of students with SEN in learning readiness skills, special educational needs, as defined by Framework Curriculum of Special Education (FCSE), general learning difficulties as defined in the curriculum and special learning difficulties

Participants had an average of formal and compulsory education at CBSs, in the 19th semester corresponding to the third grade of the

first semester of high school. During the initial informal pedagogical evaluation, it was observed that the average of the students' skills in the CBS of the learning readiness corresponded to the 12th semester of the study (with the 6th grade of the Primary School, the 2nd semester of the study). A similar picture was pointed out in the CBS of the special educational needs, as they are recorded in the FCSE, but also the CBS of the general learning difficulties. In the CBS of the special learning difficulties, the part of the condition of the students' performance was recorded in the 11th semester of study (in the first grade of elementary school, in the second semester of study) (Table 3).

A significant increase in learning readiness seems to be due to students' oral skills, such as listening skills, engaging in cognitive dialogue, and clear and precise language skills. Regarding the special educational needs, as defined by FCSE, the performance of the participants was considered to be improved, mainly in reading comprehension skills of texts with a simple syntactic and grammatical structure. In the area of special learning needs, the greatest progress has

been made in semantic skills, understanding the simple content of a text by complementing graphic organizers. Finally, in terms of general learning difficulties, it appears that students improved in comprehension skills of differentiated texts with visual conceptual facilitators, thus having access to the content of school textbooks (Table 4).

The attitudes of adults towards TISIPfSENS

Regarding the quantitative data that reflect the perceptions of adults about TISIPfSENS and reading skills, the results of two groups, general education teachers and EAE teachers (including special auxiliary staff and special teaching staff) were compared. According to the answers to the questionnaire, the groups of adults are positive in terms of teaching reading skills through the pedagogical tool "TISIPfSENS" to students with neurodevelopmental disorders. More specifically, Table 4 captures the results of the statistical control of independent groups, t-test, for the comparison of the averages of general education teachers and special education teachers, in terms

Table 4. Student performance based on CBS 2.

CBSs	Students (N)	Average age	Average Semester	Average Initial deviations (semester)	Average final deviations (semester)	Skills
LR	10	15.4	19	12	14	Clear and precise expression skills
SEN- FCSE	10	15.4	19	12	13	Comprehension
SLD	10	15.4	19	11	13	Semantics
GLD	10	15.4	19	11	12	Comprehension

Table 5. The attitudes of adults towards TISIPfSENs.

Factor	Job title	Host	Average	Standard deviation	T	Df	p-value
TISIPfSENs and reading skills	Teachers of general education	83	4.21	0.48	-4.460	118	0.000
	Teachers of special education	37	4.60	0.37			

of their opinion on the relationship of TISIPfSENs with the reading skills of students with neurodevelopmental disorders. Both groups are positive about TISIPfSENs's relationship with reading skills, averaging more than 3.50. The result of the t-test is statistically significant ($t = -4.460$, $df = 118$, $p < 0.05$), which suggests that their differentiation occurs in the population, with a probability of 95%. The value t is negative, as the average of the second group is higher than that of the first, which means that the second group appears more positive (average = 4.21) in terms of the relationship of TISIPfSENs with the reading skills of students with mental disabilities (average = 4.60) (Table 5).

DISCUSSION AND CONCLUSIONS

The special teaching methodology, proposed through the application of the pedagogical tool "TISIPfSENs", contributes to the support of reading skills based on qualitative data for each case study of a student. The student population with neurodevelopmental disorders, moving from primary to secondary general education and from middle school to high school, faces greater academic difficulties as the requirements of the general education curriculum are increased. In the present study, however, it is demonstrated that TISIPfSENs functioned as a "bridge" so that these students could meet certain learning objectives using differentiated pedagogical material (Panopoulos and Drossinou-Korea, 2019). The individualized curriculum, such as the one implemented through TISIPfSENs is considered a prerequisite for the smooth transition and adaptation of students with neurodevelopmental disorders in secondary education (Strnadova *et al.*, 2016).

According to the adult participants in this study, the pedagogical principles of TISIPfSENs which help the students of the target group to go and adapt to the

secondary educational level, are the following: the personalization and construction of the educational program in five phases, the implementation of informal pedagogical evaluation, the realistic wording of the teaching goal according to the curriculum of general education and FCSE. In addition, the adult participants stated that the smooth transition and adaptation of students to the secondary educational level contributes to cooperation at the school level but also between school staff and parents, the analysis of the teaching objective in teaching steps and the use of differentiated teaching method. Learning-ready activities aimed at cultivating the neurodevelopmental areas of oral speech, psychomotor, mental abilities and emotional organization.

The results of the research are confirmed by Pitt, Dixon and Vialle (2019), who in their study report that students with difficulties had a positive experience during their transition to secondary education. According to the same researchers, students can adapt to secondary education when educational programs are based on their needs and abilities and provide differentiated activities without being assigned extra workload. It is also necessary to differentiate curricula so that there is flexibility in teaching objectives and activities, while the positive attitude of teachers in the institution of inclusive education is an additional factor that promotes the adaptation of students to secondary education. Lemons *et al.*, (2016) emphasize that a special language skills training program needs to be governed by preconditions. These include assessing students' abilities and needs, defining realistic short-term goals, implementing instantaneous teaching, using differentiated teaching, and the method of goal analysis in teaching steps.

Furthermore, Brawand and King-Sears (2017) highlight some elements that need to be addressed in the specific teaching methodology applied to students with general secondary education difficulties, such as the presentation of teaching content according to students' needs, use

examples when they want to teach concepts that students are unfamiliar with, differentiate teaching material, define classroom teaching angles to teach students individualized programs, set teaching goals by monitoring students' progress with skills checklists, or organizing the teachers' curriculum together, implementing collaborative teaching and taking advantage of training opportunities on the part of teachers throughout their careers TISIPfSENS in the present research, is a tool for the teacher through which the cooperation between the teachers is promoted, has a personalized character and utilizes the informal pedagogical evaluation with pushed checklists. Similarly, Brum *et al.* (2019) report that supports for students with neurodevelopmental disorders in secondary education needs to use informal pedagogical assessment with CBSs to properly differentiate pedagogical material, such as textual with the addition of visual aids, limiting the length of sentences and simplifying vocabulary. Finally, differentiated teaching is considered a reliable method for teaching students with neurodevelopmental disorders. Also, in a study by Strogilos *et al.*, (2017), co-teaching teachers in the general classroom were positive about differentiated teaching and acknowledged its contribution to special teaching methodology, as long as inhibitory factors, such as limited collaboration between teachers, the large number of students per class and lack of space, fear of stigmatizing students and the pressure they feel to meet the objectives of the curriculum. In previous research by Panopoulos and Drossinou-Korea (2018), it is shown that the pedagogical tool "TISIPfSENS" promotes differentiated teaching by offering teachers of special education and training a plan of teaching strategy on how to differentiate the learning environment, the process content, the content of the course. and how to evaluate based on students' learning history, learning readiness and interests (Sousa and Tomlinson, 2011).

RECOMMENDATIONS FOR FUTURE PRACTICE

Teachers of special education and training can use the pedagogical tool "TISIPfSENS" in their teaching routine by taking the following steps:

1. Gather information about students' school, family and personal history to gather information about their abilities and weaknesses.
2. Record their performance according to certain basic skills checklists that will be based on curricula.
3. Design of the curriculum defining long-term, medium-term and short-term teaching objectives. They can also use the "task analysis" method.
4. Implementation of differentiated activities that enhance the neurodevelopmental areas of learning readiness (oral speech, psychomotor skills, mental abilities, emotional organization) in order to cultivate students' language skills.

5. Evaluation of the educational program.

Limitations

In the present study, we applied and evaluated the pedagogical tool "TISIPfSENS" regarding the smooth transition of students to the secondary educational level. Future research could be conducted to investigate the validity of this tool by comparing two groups of students with neurodevelopmental disorders, one of which will apply TISIPfSENS and the other not.

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