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Teachers' Views on Types of Support Provided for Pupils with Learning Disabilities

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Abstract

The article presents the types of help provided for pupils with learning disabilities in mathematics in Slovenian primary schools. We have carried out research into the implementation of different types of help in reference to the Working Concept: Learning Disabilities in Primary Schools, assuming that schools provide individual support work plans for pupils with learning disabilities. A questionnaire was used to assess the implementation of assistance provided to pupils with learning disabilities during lessons and out of regular mathematics instruction as well as the satisfaction of teachers with the efficiency of different forms of assistance for pupils with learning disabilities in mathematics. Respondents were asked to evaluate through different assessment scales the frequency of the implementation of various forms of assistance in and out of classes (1-never, 2-rarely, 3-often, 4-always), as well as their satisfaction with the effectiveness of types of assistance provided for pupils with learning disabilities in mathematics through different assessment scales (1-not satisfied with efficiency at all, 2-barely satisfied with efficiency, 3- neither satisfied nor dissatisfied with efficiency, 4-quite satisfied with efficiency, 5-very satisfied with efficiency). The results of the empirical study have shown that teachers most often choose remedial classes, assistance to pupils within extended stay and additional individual assistance out of regular instruction; and during regular classes they tend to adapt their delivery of the syllabus, they adapt the knowledge consolidation models and they adapt the application of adequate learning tools. As regards the teaching process, teachers' highest assessment is given to the satisfaction of effective adaptation of the knowledge consolidation model and to the promotion of the use of effective teaching materials.

Key words: *additional individual help; learning disabilities; mobile special pedagogues; pupils with learning disabilities; types of assistance.*

Introduction

Pupils' school performance may be affected by several factors: cognitive, social and emotional factors, home circumstances, school environment, etc. Among school elements an important role is played by class organisation as well as teachers' actions during instruction. Such actions are closely linked with their knowledge of reasons behind and the main features of learning disabilities as well as with their knowledge of methodology of teaching pupils with learning disabilities.

Due to the lack of motivation, absence of an insight into the logic of learning mathematics, inadequate approaches to learning and teaching, unidentified learning disabilities along with several other reasons, pupils quite often learn mathematics without understanding it. As a result, mathematics is not interesting to them or they do not feel any affection towards it. In the way it is delivered and in the contents they do not see any practical applicability or any connection with everyday life. Many pupils have a dislike of mathematics or even fear it. From this point there is only a small step towards learning disabilities.

In order to reduce the number of pupils with poor academic performance we need to take measures that combine several elements within the school as well as outside it. Effective strategies for improving learning performance must be a part of all the aspects of teaching and learning, i.e. in the curriculum contents and organisation, and in the teaching methods, as well as a part of teachers' education and training. In addition, such an all-inclusive strategy should also include measures that are adequate for all pupils, and above all for those with the worst performance; it should also cover assistance measures for those pupils with individual needs, either during classes or out of them (Mathematical Education in Europe: Challenges and National Policies, 2012).

Following the provisions of the Law on Primary Schools, each pupil with learning disabilities is entitled to modified methods and forms of work and the right to organised remedial classes and other forms of individual and team assistance provided by the school. Article 12 of the Law on Primary Schools stipulates that pupils with learning disabilities are those who have difficulties in reaching the expected standards of knowledge within regular instruction, unless the methods and forms of work are modified for them. Thus, schools adapt the methods and forms of work for such students within regular classes, and also provide remedial classes and other forms of individual and team assistance (Official Gazette of the RS, No. 87/11).

The principal guidelines for work with pupils with learning disabilities are outlined in the document The Concept of Work in Primary Schools, Learning Disabilities in Primary Schools (Magajna et al., 2008a), also officially approved by the Council of Experts for General Education of the Republic of Slovenia in 2007. Among others, the concept defines a continuum of help to pupils with learning disabilities in terms of support to teachers in implementing adaptations for pupils

with learning disabilities. The selection of the methods and forms of work with pupils having learning disabilities during classes should follow the principle "good teaching practices"; teachers are supposed to apply them in their work with all pupils, however, they should be applied unconditionally when working with pupils with learning disabilities, as they are of key (life) importance for their learning performance.

Types of Support Provided for Pupils with Learning Disabilities

At the primary school level, individual help or help within small groups is provided for Slovenian pupils within regular classes or at the end of a school day; learning assistance is given by teachers of mathematics equipped with complementary expert knowledge or by specialised teachers (special and rehabilitation pedagogues).

Types of assistance that are provided out of regular classes may be diverse: remedial classes, group consultation hours for pupils outside instruction, assistance to pupils during extended stay at school and additional individual help outside regular classes, carried out by specialist teachers, school counselling experts or other experts. Learning in small groups outside regular classes can also be provided in cooperation with specialist teachers, with the school counselling service, with other experts or help provided by classmates or team learning with peers.

The data taken from national curricula (Mathematical Education in Europe: Challenges and National Policies, 2012) indicate that in half of the European countries the mathematics syllabus is the same for all pupils regardless of the level of their abilities. Despite that, several countries have envisaged differential teaching, more often in lower secondary education rather than in primary education. This indicates that the same syllabus is taught at different levels of difficulty, which happens to be a general practice in half of the European countries. And several countries have also envisaged different syllabus (Mathematical Education in Europe: Challenges and National Policies, 2012) in lower secondary education.

The French ministry for example prescribed two hours of personalised work per week at the level of primary education with pupils who had negative scores at the national examination in mathematics. In Greece, pupils may have up to six weekly hours of individual classes at the primary level. In Romania, this model is applied mostly in countryside schools through special programmes aiming at the improvement of knowledge (Mathematical Education in Europe: Challenges and National Policies, 2012).

In Spain, pupils in the last two grades of primary education and the first three grades of secondary education are helped in a way that they are ranked into groups of 5-10 pupils and up to four hours of classes per week after regular courses are organised for them. Such remedial classes are led by university students and regular teachers. In Ireland, remedial courses are managed by teachers providing help in

learning; pupils are usually taken out of their classes and taught in smaller groups; but increasingly, additional support is being provided during regular classes. It has been recommended that this type of help should last for one school semester, i.e. from 13 to 20 weeks and it should not extend over two or three years (Mathematical Education in Europe: Challenges and National Policies, 2012).

Among the forms of help being applied during regular classes for pupils with learning disabilities we may classify differentiation by abilities, individualised teaching or participation of teachers' assistants, as well as various teaching methodology approaches such as: modified teaching preparations (assuming learning disabilities in advance); modifying the presentation of new learning contents and the method of knowledge consolidation; adapting examinations and assessment of knowledge; adapting learning environment (seating order, silent corner …) and teaching materials; and ensuring the application of adequate learning tools (pocket calculator, numeric tape …) etc.

One of the most important elements in the process of successfully teaching children with learning disabilities is to take into account children's' strong areas, knowledge and strategies in order to individualize and differentiate the requirements regarding their children's special needs (Kavkler, 2008, as cited in Magajna et al., 2008b, p. 78).

Not only in the case of pupils' learning disabilities, but also in general, teachers should, when planning and implementing teaching process, take into consideration various pupils' needs: teachers should offer different activities, instruction should be accessible to pupils with different learning styles, capabilities and needs, etc. They should consider measures that could be effective for the type of difficulty.

Depending on pupils' specific learning disabilities, the teachers' decisions regarding the adaptation of the delivery of the syllabus and the consolidation of knowledge should be based on the judgement of what objectives and contents are of key importance for pupils to understand, and which may be simplified, modified or even skipped. Furthermore, it is important that teachers give meaning to the content presented to pupils and link it as much as possible with its applicability in real-life situations.

As a principle, pupils with learning disabilities are able to acquire mathematical concepts, procedures and to solve tasks only with the help of adequate support. The types of help given by teachers may be quite diverse: learning procedures with the help of support and learning tools (tables, cards); learning how to organise notes, support in learning steps in procedures; inclusion of pictures and sketches as a support to understanding and solving process; and multi-level guidelines for structured exercises, etc. In the first triennial, while developing numerical concepts the following activities may be effective: putting down symbols and numbers in colours; searching for associations (to mathematical concepts); writing down numbers on a bigger surface; sorting objects into a simple table; sorting with the

help of moving; tables drawn on the ground; placing toys into diagrams; conveying guidelines in separate parts (cards); designing a mindset with the most frequent expressions that are connected with particular concepts (e.g., addition: sum, adding, bring … and subtraction: less, take away, sell…); picture presentation of numbers and production of personal didactic tools, etc.

Teaching materials have to be practical, they have to serve pupils effectively as support in illustrating concepts and relations, help in pupils' understanding, and support the learning process by acting as an aide-memoire for problem-solving, etc.

In order to decide on the teaching materials, teachers take into account pupils' needs. They teach pupils how to use teaching materials, and how to make them by themselves, for example cards with formula to help them in recollection and by writing down step by step solutions to procedures. Thus, teaching materials may have a twofold advantage – firstly, when pupils produce them and secondly, when they apply them during classes as part of the overall approach to learning the syllabus.

It is also essential that teachers carefully consider when pupils apply teaching materials or when teaching materials are reasonable and effective. A pocket calculator, for example, may be an effective tool for calculating percentages if a person is weak in calculation procedures, but not if he/she does not understand the concept of percentage (Žakelj, 2012).

It is urgent to identify pupils' learning disabilities in time, to recognise their causes and to identify the main traits of learning disabilities in order to enable schools to provide and implement adequate support measures. Early detection of difficulties and the planning of adequate types of assistance can do a great deal to further a child's intellectual and social progress.

After recognising the presence of disabilities, we identify the most appropriate processes and organisation of classroom teaching methods regarding the teaching and didactic approaches as well as the organisation of work during instruction. Examples of effective didactic environments from the perspective of pupils with learning disabilities include: modifications to the syllabus itself, and the method by which it is passed on to pupils, as well as changes to knowledge testing (Jereb, 2011). Teachers implement various methods of teaching enabling pupils to be active during classes, allowing them to learn in different ways and taking into account pupils' strong areas both in the type of their learning and in proving their knowledge. Good teaching practice includes teachers' positive and supportive attitudes, encouragement and ensuring active learning as well as clear structured teaching and learning.

Types of Support for Pupils with Learning Disabilities in Mathematics in Terms of Empirical Research

Aim of the Study and Research Question

Different schools and different teachers make different decisions as regards the identification and recognition of learning disabilities as well as in providing help. The results of international and other studies have shown that bad results in mathematics are a complicated phenomenon (Wilkins et al., 2002; Mullis et al., 2008; Chudgar & Luschei, 2009; OECD, 2009). At the national level, the collection of information on trends in success, on elements that have an impact on bad results as well as on effective methods for improving learning performance, may influence the direction of national policies.

The core research question was to study the forms of assistance provided to pupils with learning disabilities in mathematics for which schools have prepared individual working programmes of help and also the satisfaction of teachers with the effectiveness of different types of help for pupils with such learning disabilities.

Methodology

Research Sample

This paper is the result of the research "Support to teachers in implementing adaptation for pupils with learning difficulties in mathematics", carried out by the Institute of Education of the Republic of Slovenia (2010-2012), in collaboration with 20 primary schools in the Republic of Slovenia. The sample covered 179 classroom teachers and 84 maths teachers of these 20 schools.

Instruments

A questionnaire was used to assess the implementation of help provided to pupils with learning disabilities during lessons and out of regular instruction of mathematics as well as the satisfaction of teachers with the efficiency of different forms of help for pupils with learning disabilities in mathematics. Respondents were asked to evaluate, through different assessment scales *(1–never, 2-rarely, 3-often, 4–always),* the frequency of implementation of various forms of assistance in and out of classes, as well as their satisfaction with the effectiveness of the forms of assistance provided for pupils with learning disabilities in mathematics through different assessment scales (*1-not satisfied with efficiency at all, 2-barely satisfied with efficiency, 3- neither satisfied nor dissatisfied with efficiency, 4-quite satisfied with efficiency, 5–very satisfied with efficiency)*. The questionnaire did not measure any latent trait or achievement and therefore we did not explore its metric characteristics. It consisted of separate questions that did not sum up to any score but were used in the analysis independently.

Data Processing

The data from the survey questionnaires were statistically processed according to the purposes and objectives of the study by applying the tool R for Windows. Considering the data features, the following methods were applied:

- Frequency classification for the display of the answers to closed questions,
- Mann Whitney's test of ranks sum in order to assess the differences between the two groups of teachers: classroom teachers and teachers of mathematics.
- Data obtained came mostly from answers to questions where different scales (for example, never/rarely/often/always) were used. Since interval properties of such scales cannot be assumed, a non-parametric (ordinal) test was used to address ordinal data.

Results and Interpretation

Implementation of Different Forms of Assistance outside Regular Instruction of Mathematics

Regarding the first research question our interest was focused on the following:

- how often do teachers at classroom level and teachers of mathematics implement a certain type of help for pupils with learning disabilities out of regular instruction of mathematics as follows: remedial classes, team consultative hours for pupils out of regular classes, individual consultative hours for pupils out of regular classes, help for pupils during extended stay at school, additional individual help out of regular instruction, work within smaller groups out of regular classes, as well as help provided by classmates out of regular instruction and
- whether there are any differences between them regarding the frequency in selection and implementation of particular types of assistance.

Results are given in Table 1 below.

The results of the empirical study have shown that teachers most often choose remedial classes (*R* classroom teachers 141.2; *R* teachers of mathematics 108.8), assistance for pupils during extended stay (*R* classroom teachers 155.6; *R* teachers of mathematics 55.2) and additional individual help out of regular classes (*R* classroom teachers 191.3; *R* teachers of mathematics 147.3).

Remedial classes are implemented often or always by more than 90% of classroom teachers and more than 75% of teachers of mathematics.

Assistance for pupils during extended stay is often or always practiced by more than 80% of classroom teachers. Teachers of mathematics practice this type of assistance very little, i.e., 77% of teachers of mathematics said never.

On the contrary, more than 75% of teachers of mathematics quite often or always implement additional individual help out of regular classes carried out by specialist teachers, school counselling staff or other experts. The latter is also practiced by classroom teachers, but at a lower percentage: 55% of classroom teachers quite often or always practice additional individual help out of regular classes.

Table 1

Types of help out of regular classes of mathematics

		f% never	f% rarely	f% often	f% always	*n*	M	SD	R	W	P
Remedial classes	Classroom teacher	2.8 %	1.7 %	11.2 %	84.4 %	179	3.8	0.6	141.2	9163	0.00*
	Mathematics teacher	7.3 %	6.1 %	26.8 %	59.8 %	82	3.4	0.9	108.8		
Team consultation hours for pupils out of regular classes	Classroom teacher	34.9 %	44.2 %	14.5 %	6.4 %	172	1.9	0.9	122.5	6190	0.05*
	Mathematics teacher	26.2 %	40.5 %	26.2 %	7.1 %	84	2.1	0.9	140.8		
Individual consultation hours for pupils out of regular classes	Classroom teacher	17.8 %	42.0 %	30.8 %	9.5 %	169	2.3	0.9	117.6	5506	0.00*
	Mathematics teacher	7.2 %	33.7 %	45.8 %	13.3 %	83	2.7	0.8	144.7		
Help for pupils during extended stay[1]	Classroom teacher	5.6 %	12.4 %	50.8 %	31.1 %	177	3.1	0.8	155.6	11790.5	0.00*
	Mathematics teacher	77.0 %	12.2 %	6.8 %	4.1 %	74	1.4	0.8	55.2		
Additional individual help out of regular classes[2]	Classroom teacher	15.7 %	28.5 %	37.8 %	18.0 %	172	2.6	1.0	119.3	5648	0.00*
	Mathematics teacher	4.8 %	16.7 %	57.1 %	21.4 %	84	3.0	0.8	147.3		
Work in smaller groups out of regular classes[3]	Classroom teacher	34.9 %	34.9 %	23.1 %	7.1 %	169	2.0	0.9	121.6	6181.5	0.32
	Mathematics teacher	31.9 %	29.0 %	30.4 %	8.7 %	69	2.1	0.9	130.8		
Help given by classmates out of regular instruction	Classroom teacher	26.6 %	43.4 %	26.0 %	4.0 %	173	2.1	0.8	116.9	5180	0.00*
	Mathematics teacher	2.4 %	51.2 %	46.3 %	0.0 %	82	2.4	0.5	151.3		

**p≤0.05*

Legend: *n –number of teachers, M- arithmetic mean of replies (Replies are ranked on the scale from: 1 – never to 4 – always), SD – standard deviation, R- average rank, W –* Mann Whitney's test of rank sum, *p– risk in making conclusions on statistical significance in differences (difference is statistically significant at p<0.05).*

Classroom teachers and mathematics teachers very rarely practice team consultative hours for pupils out of regular classes and work in smaller groups out of regular classes, carried out by specialist teachers 66% of classroom teachers and 57% of mathematics teachers never or rarely select team consultative hours for pupils out of regular classes, and 68% of classroom teachers as well as 61% of mathematics teachers never or rarely select work in smaller groups out of regular classes.

[1] (help providers: teachers of extended stay)

[2] (help providers: special pedagogue, school advisory expert, other expert)

[3] (help providers: special pedagogues, school advisory expert, other expert)

The results of the study have also shown that there are certain differences between classroom teachers and mathematics teachers in the frequency of implementing a particular type of assistance.

Classroom teachers statistically significantly more often implement remedial classes (R classroom teachers 141.2; *R* teachers of mathematics 108.8, p=0.00) and help for pupils during extended stay (*R* classroom teachers 155.6; *R* teachers of mathematics 55.2, p=0.00).

Teachers of mathematics statistically significantly more often implement individual consultation hours for pupils out of regular classes (*R* classroom teachers 117.6; R mathematics teachers 144.7, p=0.00), additional individual assistance out of regular classes (R classroom teachers 119.3; *R* mathematics teachers 147.3, p=0.00) and assistance by classmates out of regular instruction (*R* classroom teachers 116.9; *R* teachers of mathematics 151.3, p=0.00).

It is slightly surprising that the remedial classes, which are in principle selected quite often by all, are statistically significantly practiced more often by classroom teachers rather than teachers of mathematics. We may assume that the reasons may be found in the organisation of regular instruction since classroom teachers perform most of the lessons at the class level and it is thus much easier for them to modify any type of help. It is similarly true that classroom teachers statistically significantly more often select assistance for pupils during extended stay compared to mathematics teachers. Also in this case we may assume that the reasons may be found in the fact that extended stay is organised at the classroom level and it is thus by rule carried out by classroom teachers.

The types of help that teachers of mathematics statistically significantly more frequently select than classroom teachers are as follows: individual consultative hours for pupils outside regular classes, additional individual help out of regular classes carried out by specialist teachers, school advisory experts and other experts as well as help provided by classmates out of regular classes.

Depending on the decision of teachers regarding the selection of the type of assistance we have found out that they, by far, most often chose the traditional forms of help as for example remedial classes and help during extended stay. On the other hand, we have established that mathematics teachers, in particular, far more often chose individual approaches rather than those involving team work, which seems logical from the point of view of the needs of pupils with disabilities. We may also assume that pupils' learning disabilities increase at the second stage of primary schools and that difficulties become more specific (e.g. spatial conceptions or disabilities with calculation algorithms), which gives teachers the possibility to identify the need for individual help more swiftly than classroom teachers. Even the findings of the research "What helps pupils with disabilities in mathematics?" indicate that measures which address the *disabilities of each individual child are much more effective* (Dowker, 2004). And, it is obvious that mathematics teachers, in particular, are highly aware that individual help may be considered as the most effective approach.

Assessment of Expert Professionals Regarding the Efficiency of Different Types of Help Outside Regular Mathematics Classes

Our main interest focused on:

- how satisfied classroom teachers and mathematics teachers are with the efficiency of different types of assistance outside regular classes; and
- whether there are any differences regarding satisfaction with the efficiency of help outside regular classes.

The tested candidates gave their assessments on individual items using the five grade descriptive scale.

Results are given in Table 2 below.

Table 2

Efficiency of different types of help out of regular classes of mathematics

Types of help	Group	*n*	*M*	*SD*	*R*	*W*	*p*
Remedial classes	Classroom teacher	80	4.2	0.8	67.7	2179.5	0.00*
	Mathematics teacher	38	3.5	0.8	42.1		
Team consultation hours for pupils out of regular classes	Classroom teacher	63	3.3	1.0	50.8	1184	0.71
	Mathematics teacher	36	3.3	0.9	48.6		
Individual consultation hours for pupils out of regular classes	Classroom teacher	72	3.9	1.0	55.3	1350.5	0.71
	Mathematics teacher	36	3.8	1.0	53.0		
Help for pupils during extended stay in cooperation with the teacher of extended stay	Classroom teacher	76	4.0	0.8	52.1	1036	0.00*
	Mathematics teacher	18	3.1	1.0	27.9		
Additional help out of regular classes[4]	Classroom teacher	70	3.8	1.0	54.6	1334	0.44
	Mathematics teacher	35	3.7	1.0	49.9		
Work in smaller groups out of regular classes[5]	Classroom teacher	63	3.3	1.1	47.0	944.5	0.79
	Mathematics teacher	31	3.4	1.0	48.5		
Help for pupils out of regular classes	Classroom teacher	69	3.3	1.0	53.5	1279	0.61
	Mathematics teacher	35	3.3	0.8	50.5		

**p≤0.05*

***Legend**: n–number of teachers, M–arithmetic mean of teachers' replies (Replies are in the scale from: 1-not satisfied with efficiency at all, 2-little satisfied with efficiency, 3- neither satisfied nor dissatisfied with efficiency, 4-quite satisfied with efficiency, 5–very satisfied with efficiency), SD – standard deviation, R- average rank, W–*Mann Whitney's test of ranks sum, *p–risk in making conclusions on statistical significance of differences (difference is statistically significant at p<0.05).*

[4] providers of help: special pedagogues, school advisory expert, other expert

[5] providers of help: special pedagogues, school advisory expert, other expert

Statistically significant differences have been identified among classroom teachers and mathematics teachers regarding their satisfaction with the efficiency of particular types of help. Classroom teachers are statistically significantly more satisfied with the efficiency of remedial classes (*R* classroom teachers 67.7; R mathematics teachers 42.1; p=0.00) and with the efficiency of help for pupils during extended stay in cooperation with the teacher of extended stay (*R* classroom teachers 52.1; *R* mathematics teachers 27.9; p=0.00).

Regarding satisfaction with the efficiency of team consultative hours for pupils outside regular classes, individual consultative hours for pupils outside regular classes, additional individual help out of regular classes, work in small groups as well as help for pupils out of regular classes, the results have shown that there are no statistically significant differences between classroom teachers and mathematics teachers. On average, their satisfaction is ranked as 'average'. It is also interesting that maths teachers, in nearly all the items, expressed slightly lower satisfaction with the efficiency of different types of help than classroom teachers. Hence, we can assume that at this level assistance is already more demanding. However, it is also possible that mathematics teachers are slightly more critical of the impact of assistance and that they expect faster results.

Teachers' assessments regarding satisfaction with the efficiency of certain types of assistance and the frequency of the implementation of certain types of assistance are related to each other. The results have indicated that teachers are most satisfied with the efficiency of remedial classes, which they also consider as an important element of help for pupils with learning disabilities. Authors of other studies have also found that individual help has demonstrated a significant influence on pupils' performance at school. In this context, authors of similar studies (Tieso, 2001, 2005; Lawrence-Brown, 2004) concluded that taking into account children's interests and their individual learning features has a positive influence on their school performance and their engagement in mathematics. This is equally true for other researchers (Tomlinson, 2003; Tomlinson & Strickland, 2005), who point out that teachers should take into account the common learning needs of all pupils in the class, and special attention should be paid to the individual needs of pupils and their learning styles and teaching should be adapted accordingly. Dowker (2009) also speaks of the advantage of an individual approach and concludes that those types of help which are personalised, and directed towards the needs of an individual are most effective. Besides that, the author underlines the importance of early identification of learning disabilities and consequently providing different types of assistance which are focused on specific points of weaknesses.

The results also indicate that the satisfaction of a particular group of school experts is linked to the question of whether they provide a certain type of help by themselves or not. Classroom teachers are, for example more satisfied with the efficiency of help for pupils during extended stay compared to teachers of mathematics since it is a fact that teachers of extended stay are at the same time quite often classroom teachers.

The results also give an idea that there is not enough mutual cooperation and consultation between teachers and school experts. There may be various reasons

for that which may involve ignorance about the possibilities of mutual cooperation, in problems with the organisation of work at school, in the absence of the ability to work as a team or in the ignorance about the work of other school experts, etc. In order to put in place an effective programme of assistance for pupils with learning difficulties it is of key importance to have strong mutual cooperation among teachers at school, a sound transfer of good teaching practice in the network of schools, an on-going evaluation of their own work as well as permanent education and training of teachers in identifying and overcoming learning disabilities.

The Implementation of Different Types of Help within Mathematics Classes

Concerning this research question our interest focused on:

- how often do classroom teachers and mathematics teachers implement or select certain types of help for pupils with learning disabilities during math classes: by modifying learning content delivery, by modifying methods of knowledge consolidation, by adapting the learning environment (seating order, silent corner …), by adapting teaching materials and by giving opportunities to use learning tools (pocket calculators, numeric tape …), by providing help of floating specialist teachers, school advisory expert, or by the help of other experts, and
- whether there are any differences among them regarding the frequency in selecting and implementing a certain type of help.

The results are shown in Table 3 bellow.

The results of the study have shown that teachers most frequently adapt learning contents delivery, followed by consolidation of knowledge as well as examination and assessment of knowledge. For pupils with learning disabilities teachers furthermore modify their learning materials and the use of suitable learning tools (pocket calculators, numeric tapes …). They less often adapt the learning environment (seating order, silent corner …) or take advantage of having a school floating specialist teacher in the classroom.

The study results are as follows:

- 88% of classroom teachers and 84% of mathematics teachers often or always modify learning contents delivery for pupils with learning disabilities.
- 93% of classroom teachers and 86% of mathematics teachers often or always adapt methods of knowledge consolidation for pupils with learning disabilities.
- 61% of classroom teachers and 81% of mathematics teachers often or always adapt ways of examination and knowledge testing for pupils with learning disabilities.
- 83% of classroom teachers and 63% of mathematics teachers often or always adapt teaching materials for pupils with learning disabilities.
- 94% of classroom teachers and 74% of teachers of mathematics often or always provide opportunities to use adequate learning tools (pocket calculators, numeric tape …) for pupils with learning disabilities.

Table 3

Types of help during mathematics classes

		Never f%	Rarely f%	Often f%	Always f%	N	M	SD	R	W	P
By modifying learning contents delivery	Classroom teacher	0.6 %	10.6 %	62.6 %	26.3 %	179	3.1	0.6	137.4	8480	0.05*
	Mathematics teacher	1.2 %	14.3 %	69.0 %	15.5 %	84	3.0	0.6	120.5		
By adapting methods of knowledge consolidation	Classroom teacher	0.6 %	6.1 %	62.2 %	31.1 %	180	3.2	0.6	138.1	8572.5	0.04*
	Mathematics teacher	0.0 %	13.1 %	65.5 %	21.4 %	84	3.1	0.6	120.4		
By adapting ways of examination and knowledge testing	Classroom teacher	5.6 %	32.8 %	42.4 %	19.2 %	177	2.8	0.8	119.5	5402.5	0.00*
	Mathematics teacher	1.2 %	16.7 %	46.4 %	35.7 %	84	3.2	0.7	155.2		
By extending the time of writing the examination	Classroom teacher	1.2 %	14.3 %	69.0 %	15.5 %	180	3.0	0.8	121.4	5848	0.01*
	Mathematics teacher	0.6 %	6.1 %	58.2 %	35.1 %	84	3.3	0.9	146.5		
By modifying learning environment (seating order, silent corner…)	Classroom teacher	3.4 %	24.3 %	40.1 %	32.2 %	177	3.0	0.8	138.5	8686.5	0.05*
	Mathematics teacher	4.7 %	29.4 %	48.2 %	17.6 %	85	2.8	0.8	119.8		
By adapting teaching materials	Classroom teacher	1.7 %	15.3 %	59.7 %	23.3 %	176	3.0	0.7	140.6	9166	0.00*
	Mathematics teacher	2.4 %	34.1 %	54.9 %	8.5 %	82	2.7	0.7	105.7		
By giving opportunity to use adequate learning tools (pocket calculator, numeric tape …)	Classroom teacher	0.6 %	5.6 %	41.6 %	52.2 %	178	3.5	0.6	151.2	10983	0.00*
	Mathematics teacher	2.4 %	23.5 %	60.0 %	14.1 %	85	2.9	0.7	91.8		
Help in classroom by mobile special pedagogue	Classroom teacher	40.2 %	32.2 %	21.8 %	5.7 %	174	1.9	0.9	136.9	8594	0.0*
	Mathematics teacher	58.8 %	30.0 %	10.0 %	1.3 %	80	1.5	0.7	107.1		
Help in classroom by school advisory expert	Classroom teacher	40.2 %	32.2 %	22.8 %	4.7 %	174	1.8	0.9	135.8	8399	0.01*
	Mathematics teacher	58.8 %	30.0 %	10.0 %	1.3 %	80	1.5	0.6	111.3		
Help in classroom by other expert	Classroom teacher	40.2 %	33.2 %	22.8 %	3.7 %	174	1.7	0.9	110.6	5669	0.01*
	Mathematics teacher	61.8 %	27.0 %	10.3 %	1.0 %	80	1.5	0.7	90.8		

**p≤0.05*

Legend: *n –number of teachers, M– arithmetic mean of teachers replies (Replies are ranked on the scale as follows: 1 – never to 4 – always), SD – standard deviation, R- average rank, W –* Mann Whitney's test of ranks' sum, *p– risk in making conclusions on statistical significance of differences (difference is statistically significant at p <0.05).*

During regular classes, teachers very rarely seek help from floating specialist teachers. More than 70% of classroom teachers and 88% of mathematics teachers replied that they never or rarely asked for the help of a floating specialist teacher during regular classes. We may assume that the help of a floating specialist teacher is mostly provided for pupils specially directed into the implementation of adapted programme and additional expert help, and who have, by way of an official state decision on direction, also the right to benefit from extra hours of expert assistance to address their learning disabilities, or to remove other barriers in learning (Official Journal of RS, No., 3/2007, UPB-1). And for other pupils with learning disabilities for whom schools prepare individual support work plans according to the Concept of work: Learning disabilities at School, the help of floating specialist teachers is used to a much smaller extent or schools provide additional help via other school experts (primarily school advisory experts), or schools provide for them individualisation and differentiation of work during regular classes as well as remedial classes.

Classroom teachers statistically significantly more often adapt the methods of consolidating knowledge (*R* classroom teachers 138.1; *R* mathematics teachers 120.4; p=0.04), they adapt teaching materials (*R* classroom teachers 140.6; R mathematics teachers 105.7; p=0.00) and application of learning tools (*R* classroom teachers 151.1; *R* mathematics teachers 91.8; p=0.00). All those activities are very often practiced by mathematics teachers, and in terms of statistical significance, classroom teachers apply them more often than mathematics teachers.

Mathematics teachers statistically significantly more often adapt methods of examinations and assessment of knowledge (*R* classroom teachers 119.5; *R* mathematics teachers 155.2, p=0.00) as well as the time allocated for writing examinations (*R* classroom teachers 121.4; *R* mathematics teachers 146.5; p=0.01) compared to classroom teachers. This could partly be explained by the fact that teachers at subject level are already slightly more burdened with attaining curriculum objectives and with the external examination of knowledge which is due at the end of 6^{th} and 9^{th} grade.

Following the results of the study on the frequency of providing different types of assistance for pupils with learning disabilities during regular classes of mathematics we could draw the conclusion that teachers' awareness regarding the necessity of providing adapted support to pupils with learning disabilities is high. On the basis of teachers' replies concerning their approaches to the types of assistance for pupils with learning disabilities we can say that they encourage the development of different methods of assistance for pupils with learning disabilities. However, evidence on teachers' cooperation with other school experts, who could also assist pupils with learning disabilities, is less encouraging.

The impact of teaching approaches on school performance has already been investigated in a number of studies. One of the most acclaimed was the mathematical study of Slavin from 1987, the results of which point out that regular classes can only

be efficient if the teaching methods and the teaching materials are adapted to pupils' needs. This leads to the conclusion that adapting the methods and the type of work to pupils with specific needs is even more important. Only grouping pupils into teams without adequate changes to teaching methods does not provide positive results.

Assessment of Expert Professionals Regarding the Efficiency of Different Types of Assistance during Regular Mathematics Classes

Our main interest focused on:

• whether classroom teachers and mathematics teachers were satisfied with the efficiency of different types of help within the regular mathematics classes, and

• whether there are any differences between them regarding their satisfaction with the efficiency of different types of help during regular classes of mathematics.

The results are given in Table 4 below.

The survey respondents themselves mostly applied those approaches that they found the most satisfactory regarding their effectiveness, as follows: adaptation of knowledge consolidation methods, adapted learning materials and provision of opportunities to use adequate learning tools. We may assume that teachers really consider themselves the most qualified for them; this can also be concluded from the results of the study by Žakelj (2013) who found out that teachers, when applying assistance for pupils with learning disabilities, feel themselves to be the most qualified to adapt knowledge consolidation methods and the application of learning tools.

The respondents expressed the lowest confidence in the effectiveness of help provided by other experts in the classroom. We may assume that this was due to discomfort teachers felt because of another person's presence in the classroom, or for reasons of insufficient mutual cooperation. One can feel in the background that particular groups of experts at school were concentrating mostly on their professional work and less on cooperation with other educational staff at school. As a consequence, we have a weak insight into the work of other experts at school.

We have identified statistically significant differences among classroom teachers and mathematics teachers regarding their satisfaction with the efficiency of particular types of help. Our findings point to the following:

Classroom teachers are statistically significantly more satisfied with the efficiency of adapted working preparations for regular classes (R classroom teachers 60.7; R mathematics teachers 48.0; p=0.03), with the provision of opportunities to use adequate learning tools (R classroom teachers 62.2; R mathematics teachers 45.0; p=0.01), with an adapted learning environment (R classroom teachers 60.6; R mathematics teachers 46.4; p=0.02), with the help of floating specialist teachers (R classroom teachers 48.5; R mathematics teachers 29.8; p=0.00) as well as with the adapted learning materials (R classroom teachers 59.5; R mathematics teachers 47.0; p=0.03) compared to teachers of mathematics. Higher satisfaction of classroom

Table 4

Efficiency of different types of help during regular classes of mathematics

Types of help	Group	*n*	*M*	*SD*	*R*	*W*	*p*
Adapted preparations for instruction (anticipation of learning disabilities)	Classroom teacher	75	3.8	0.7	60.7	1700.5	0.03*
	Mathematics teacher	37	3.5	0.7	48.0		
Adapted delivery of learning content	Classroom teacher	75	3.8	0.7	58.9	1564	0.22
	Mathematics teacher	37	3.6	0.7	51.7		
Adapted methods of knowledge consolidation	Classroom teacher	75	4.1	0.7	58.9	1564.5	0.22
	Mathematics teacher	37	3.9	0.8	51.7		
Adapted methods of examinations and knowledge assessment	Classroom teacher	75	3.9	0.9	59.3	1597.5	0.16
	Mathematics teacher	37	3.7	0.7	50.8		
Adapted learning environment (seating order, silent corner …)	Classroom teacher	75	3.9	0.9	60.6	1695	0.02*
	Mathematics teacher	36	3.4	1.0	46.4		
Adapted learning materials	Classroom teacher	75	4.0	0.7	59.5	1611	0.03*
	Mathematics teacher	35	3.7	0.8	47.0		
Application of adequate learning tools (pocket calculators, numeric tape …)	Classroom teacher	75	4.2	0.7	62.2	1811.5	0.01*
	Mathematics teacher	37	3.8	0.7	45.0		
Help provided in the classroom by mobile special pedagogue	Classroom teacher	60	3.7	1.2	48.5	1081	0.00*
	Mathematics teacher	25	2.8	0.9	29.8		
Help provided in the classroom by school advisory expert	Classroom teacher	55	3.3	1.2	45.4	957	0.06
	Teacher of mathematics	28	2.9	0.8	35.3		
Help provided in the classroom by other expert	Classroom teacher	46	3.0	1.3	37.3	633	0.08
	Mathematics teacher	22	2.5	1.0	28.7		
Extended time of writing knowledge examination/ assessment tests	Classroom teacher	74	3.9	0.8	59.4	1617.5	0.05*
	Mathematics teacher	36	3.6	0.7	47.6		
On-going cooperation with parents	Classroom teacher	73	3.9	1.1	59.2	1618.5	0.08
	Mathematics teacher	37	3.6	1.0	48.3		
On-going cooperation with external institutions	Classroom teacher	61	2.9	1.3	45.7	896	0.71
	Mathematics teacher	28	2.7	1.2	43.5		

**p≤0.05*

***Legend**: n – number of teachers, M – arithmetic mean of teachers' replies (Replies are given on the scale from: 1-not satisfied with efficiency at all, 2- little satisfied with efficiency, 3- neither satisfied nor dissatisfied with efficiency, 4- quite satisfied with efficiency, 5 – very satisfied with efficiency), SD – standard deviation, W –* Mann Whitney's test of ranks sum, *R- average rank; p– risk in making conclusions on statistical significance of differences (difference is statistically significant at p <0.05)*

teachers may be the result of the fact that classroom teachers practice those approaches (learning corners, learning tools, etc.) more often, even on a daily basis, and have more experience with them compared to mathematics teachers, as it is a fact that the nature of their work requires a wider range of teaching experiences. It is also possible that mathematics teachers are more critical towards efficiency and

become satisfied at a later stage. They are slightly more burdened by attaining the curriculum objectives and by external examinations of knowledge.

And there were no statistically significant differences between classroom teachers and mathematics teachers regarding their satisfaction with the efficiency of different types of assistance in case of the following items: adapted preparations for regular instruction (anticipating learning disabilities), adapted knowledge consolidation methods, the help of school advisory experts or other school experts. They all rate their satisfaction levels with these approaches as 'average' or 'quite'.

There have been several studies on the impact of teaching approaches on learning performance. Shieeld (2005, adapted from Kavkler, 2010) emphasises that in order to successfully implement adaptations for pupils with learning disabilities it is necessary to take into account that pupils' anxiety is caused by five factors: pupils' and their teachers' attitude to mathematics; the curriculum; teaching strategies' classroom culture; and assessment. All these factors demand changes in learning, and in teaching of pupils with learning disabilities: changes in conceptualisation and understanding of what is fundamental knowledge; sense and applicability of knowledge in life; changes in understanding and carrying out regular teaching and changes in understanding the roles of all participants in regular mathematics classes.

Conclusion

The research work we are presenting in this article was focused on studying the application of different types of assistance for pupils with learning disabilities in mathematics both within the regular teaching of mathematics and beyond.

The study on the frequency and effectiveness of different types of assistance for pupils with learning disabilities in mathematics has indicated that classroom teachers and mathematics teachers most frequently select remedial classes as the type of assistance provided out of regular classes and additional individual help. Quite often, classroom teachers provide help within extended stay together with teachers of extended stay; on the other hand, mathematics teachers often organise individual consultation hours for pupils with learning disabilities. They never or very rarely select group consultation hours for pupils out of regular instruction or work in smaller groups out of regular classes carried out by specialist teachers.

Teachers' assessments regarding their satisfaction with the efficiency of different types of assistance closely match the frequency of the implementation of that particular type of help. The results of the study have shown that teachers are most satisfied with the efficiency of remedial classes, which are also the method most frequently applied, and with the efficiency of additional individual help which also has been mentioned very often as an important element of help for pupils with learning disabilities. In the same way that teachers in our research have expressed their high satisfaction with the efficiency of individual types of help, so the author of the study "What works for children with mathematical difficulties" (Dowker, 2009)

emphasises the effectiveness of those types of assistance which are personified and concentrated on the needs of an individual, adding also that it is important to start with assistance early enough and that the types of assistance should be focused on an individual's specific weak points. Also, Williams (2008) points to the importance of a timely response to pupils' various needs. He underlines that the first two years of schooling are essential to build a strong base for further education in mathematics. Identifying difficulties at this stage can prevent children from getting used to false strategies or picking up wrong ideas, since they may develop into long term barriers in learning. Children who are susceptible to such risks have to be treated separately, already in the preschool period, through preventive programmes. Early action prevents the growth of anxiety which, amongst senior pupils, is one of the most serious causes of academic failure.

The study on the frequency and effectiveness of different types of support for pupils with learning disabilities in mathematics has shown that teachers most frequently adapt delivery of learning contents for regular classes of mathematics, methods of knowledge consolidation, learning materials and application of adequate learning tools (pocket calculator, numeric tape…). Slightly less regularly, but still quite often, they adapt methods of examination and assessment of knowledge. Even less frequently, they adapt the learning environment (seating order, silent corner…) and benefit from the help of floating specialist teachers in the class.

Teachers' satisfaction with the efficiency of adapting methods of knowledge consolidation and their satisfaction with the effectiveness of the application of adequate learning tools are ranked the highest. Those two approaches, ranked the highest regarding their efficiency, are also the most frequently implemented.

Last but not least, we should point at another, most important link in the process of education and in providing help for pupils with learning disabilities. This is the importance of well-educated, sovereign, competent and autonomous teachers, who show empathy with their pupils. Thus, Mr. Darling Hammond (2005, adapted from European Commission, 2007) demonstrates that such well-rounded, well-educated teachers represent a more important factor in the school environment and have an important impact on pupils' school performance. He, furthermore, underlines that those influences are much more significant than the influences of the school, the school leadership or the actual financial situation.

Following the results of the survey it is suggested to continue with the development and research work in the field of working with pupils with learning difficulties in mathematics. From the methodological and didactic point of view, this research is also supposed to be based on direct observation of lessons, on systematic work with teachers, e.g. through carefully planned small-scale action research projects, which would include a team of mathematics teachers and interdisciplinary team of researchers (e.g. special didactic, special rehabilitation teacher, didactic, psychologist, etc.). And, substantive initiatives are related to the detection and elimination of the

causes of learning difficulties of students, to the adaptation of teaching methods towards increasing accountability and motivation for learning, to promote formative assessment and timely response to the needs of students and to promote self-regulation of learning skills and metacognitive strategies, by experts classified among the fundamental skills of the 21st century (e.g. Instances & Dumont, 2013).

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Stajališta nastavnika o oblicima pomoći za učenike s poteškoćama u učenju

Sažetak

Ovaj rad prikazuje oblike pomoći za učenike s poteškoćama u učenju matematike u osnovnim školama u Sloveniji. Provedeno istraživanje vezano je uz primjenu različitih vrsta potpore po preporuci Radnog koncepta: Poteškoće u učenju u osnovnim školama, uz pretpostavku da škole nude podršku putem individualnih planova rada za učenike s poteškoćama u učenju. Kako bi procijenili primjenu pomoći koja se nudi učenicima s poteškoćama u učenju za vrijeme sata i nakon redovite nastave matematike koristili smo se upitnikom kao i za procjenu zadovoljstva nastavnika s učinkovitošću različitih oblika pomoći za učenike s poteškoćama u učenju matematike. Od ispitanika se tražila procjena putem različitih skala: mjerenje učestalosti implementacije različitih oblika pomoći za vrijeme i izvan nastave (od : 1 – nikada, 2 – rijetko, 3 – često, 4 – uvijek), kao i procjena učinkovitosti s određenim oblicima pomoći za učenike s poteškoćama u učenju matematike kroz skalu procjene (od: 1 – nezadovoljan s učinkovitošću, 2 – jedva zadovoljan s učinkovitošću, 3 – osrednje zadovoljan s učinkovitošću, 4 – dosta zadovoljan s učinkovitošću, 5 – vrlo zadovoljan s učinkovitošću. Rezultati empirijskog istraživanja pokazali su da se nastavnici najčešće koriste dopunskom nastavom, pomažu učenicima u produženom boravku i dodatno im individualno pomoći izvan redovite nastave; za vrijeme redovite nastave uglavnom prilagođavaju izvedbeni plan rada, prilagođavaju model konsolidacije znanja te prilagođavaju primjenu prikladnih alata za učenje. Vezano uz proces poučavanja najviša ocjena dana je zadovoljstvu s učinkovitim prilagođavanjem modela konsolidacije znanja te poticanju korištenja materijala za učinkovito poučavanje.

Ključne riječi: *dodatna individualna pomoć; poteškoća u učenju; „leteći" specijalni pedagozi; oblici pomoći; učenici s poteškoćama u učenju.*

Uvod

Na postignuće učenika u školi može utjecati nekoliko čimbenika: kognitivni, društveni i emocionalni čimbenici, okolnosti u vlastitom domu, školsko okruženje itd. Među elementima škole važnu ulogu imaju organizacija u razredu, kao i

aktivnosti nastavnika za vrijeme poučavanja. Te radnje vrlo su tijesno povezane s njihovim znanjem o razlozima nastajanja poteškoća u učenju i njihovim glavnim značajkama, kao i s poznavanjem metodike poučavanja učenika s poteškoćama u učenju.

Zbog nedostatka motivacije, odsutnosti uvida u logiku učenja matematike, neprimjerenih pristupa učenju i poučavanju, neidentificiranih poteškoća u učenju, ali i nekolicine drugih razloga, učenici često uče matematiku bez razumijevanja. Rezultat toga je matematika koja im nije zanimljiva ili matematika prema kojoj ne osjećaju naklonost. U načinu na koji se matematika prenosi, te iz sadržaja, učenici ne vide nikakvu praktičnu primjenu ili povezanost sa svakodnevnim životom. Mnogi učenici razvijaju odbojnost prema matematici, pa čak i strah. Od te točke tek je malen korak prema razvijanju poteškoće u učenju.

Da bi se smanjio broj učenika sa slabim akademskim postignućem, potrebno je primijeniti mjere koje kombiniraju nekoliko elemenata u školi i izvan nje. Učinkovite strategije za poboljšanje postignuća u učenju moraju biti dijelom svih oblika poučavanja i učenja, tj. u kurikulu i u organizaciji, u metodama poučavanja, kao i u dijelu obrazovanja i osposobljavanja nastavnika. Nadalje, takva sveobuhvatna strategija trebala bi sadržavati i mjere koje su prikladne za sve učenike, a poglavito za one s najlošijim postignućima; trebala bi uključiti i mjere pomoći za one učenike s individualnim potrebama, za vrijeme ili izvan nastave (Mathematical Education in Europe: Challenges and National Policies, 2012).

Prateći propise Zakona o osnovnim školama, svaki učenik s poteškoćama u učenju ima pravo na izmijenjene metode i oblike rada, kao i pravo na organizirane dodatne satove te ostale oblike individualne ili skupne pomoći koje osigurava škola. Članak 12 Zakona o osnovnim školama propisuje da su učenici s poteškoćama u učenju oni učenici koji imaju poteškoća u dostizanju očekivanih normi znanja unutar redovite nastave, osim ako im se metode i oblici rada ne modificiraju. Prema tome, škole prilagođavaju metode i oblike rada za takve učenike unutar redovite nastave, ali nude i dodatne satove i ostale oblike individualne i skupne pomoći (Official Gazette of the RS, No. 87/11).

Osnovne smjernice za rad s učenicima s poteškoćama u učenju priopćene su u dokumentima Koncept rada u osnovnim školama, Poteškoće u učenju u osnovnim školama (Magajna i sur., 2008a), koji su i službeno potvrđeni od Vijeća stručnjaka za opće obrazovanje u Republici Sloveniji u 2007. Između ostalog, koncept definira i kontinuum pomoći učenicima s poteškoćama u učenju u vezi s podrškom nastavnicima u implementaciji izmjena za učenike s poteškoćama u učenju. Odabir metoda i oblika rada s učenicima s poteškoćama u učenju za vrijeme nastave trebao bi pratiti princip „dobre prakse poučavanja"; nastavnici ih trebaju primjenjivati u radu sa svim učenicima, međutim ta primjena treba biti bezuvjetna kada je riječ u učenicima s poteškoćama u učenju, jer je to od ključne (životne) važnosti za njihovo postignuće u učenju.

Oblici pomoći za učenike s poteškoćama u učenju

Na razini osnovne škole individualna pomoć ili pomoć unutar manjih skupina ponuđena je učenicima u Sloveniji u sklopu redovitih sati ili na kraju školskoga dana; pomoć u učenju nudi nastavnik matematike koji ima prateće stručno znanje ili nastavnik stručnjak (specijalni pedagozi i edukacijski rehabilitatori).

Oblici pomoći koji se nude izvan redovite nastave mogu biti raznoliki: dopunski sati, grupni konzultativni sati za učenike izvan redovite nastave, pomoć učenicima u produženom boravku u školi i dodatna individualna pomoć izvan redovite nastave koju provode specijalni pedagozi, stručni tim nastavnika i drugi stručnjaci. Učenje u manjim grupama izvan redovite nastave može se omogućiti u suradnji sa specijalnim pedagozima, sa školskim stručnim timom, s ostalim stručnjacima ili uz pomoć vršnjaka iz razreda ili skupnog učenja s vršnjacima.

Podaci preuzeti iz nacionalnog kurikula (Mathematical Education in Europe: Challenges and National Policies, 2012) ukazuju na to da je u pola europskih zemalja plan i program matematike jednak za sve učenike, neovisno o njihovu stupnju mogućnosti. Unatoč tome, nekoliko zemalja razmotrilo je diferencijalno učenje koje je učestalije u nižem srednjoškolskom obrazovanju, nego u osnovnom obrazovanju. To znači da je isti plan i program poučavan na različitim stupnjevima složenosti, što je zapravo uobičajena praksa u pola europskih zemalja. Nekoliko je zemalja razmotrilo različite planove i programe (Mathematical Education in Europe: Challenges and National Policies, 2012) u nižim razredima srednjoškolskog obrazovanja.

Francusko ministarstvo, primjerice, propisalo je dva sata individualnog rada tjedno na razini osnovnog obrazovanja s onim učenicima koji su imali negativne rezultate iz nacionalnih testova iz matematike. U Grčkoj učenici mogu imati do šest sati tjedno individualne nastave u osnovnom obrazovanju. U Rumunjskoj se taj model primjenjuje u većini ruralnih škola putem posebnih programa s ciljem poboljšanja znanja (Mathematical Education in Europe: Challenges and National Policies, 2012).

U Španjolskoj učenici u posljednj dva razreda osnovne škole i prva tri razreda srednje škole imaju pomoć tako da se za njih organizira grupni rad u skupinama od 5 do 10 učenika, četiri sata tjedno nakon redovite nastave. Takve dodatne sate izvode sveučilišni studenti i redoviti nastavnici. U Irskoj dodatne satove izvode nastavnici koji pomažu u učenju; učenici se obično povlače iz razreda i poučava ih se u manjim skupinama. Međutim, sve češće se pomoć ostvaruje i za vrijeme trajanja redovite nastave. Preporuka je da spomenuti oblik pomoći traje jedno polugodište (semestar), odnosno od 13 do 20 tjedana te da se ne bi trebao produžiti na više od dvije ili tri godine (Mathematical Education in Europe: Challenges and National Policies, 2012).

Oblike pomoći koje možemo primijeniti za vrijeme redovite nastave za učenike s poteškoćama u učenju možemo razlikovati prema mogućnostima učenika, individualiziranom poučavanju ili uključivanju nastavnika asistenta, kao i prema različitim metodama poučavanja: modificiranje nastavne pripreme (podrazumijevaju unaprijed postojanje poteškoće u učenju); modificiranje

prezentacije novoga sadržaja za učenje i metode konsolidacije znanja; prilagodba testova i provjere znanja; prilagodba okoline za učenje (raspored sjedenja, tihi kutak …) i materijala za poučavanje; osiguranje primjene prikladnih pomagala za učenje (džepnih kalkulatora, brojevne vrpce …) itd.

Jedan od važnijih elemenata u procesu uspješnog poučavanja djece s poteškoćama u učenju jest uzimanje u obzir onih područja u kojima su djeca jaka, znanja i strategija kako bi se individualizirali i definirali uvjeti za djetetove posebne potrebe (Kavkler, 2008 u Magajna i sur., 2008b, str. 78).

Ali nastavnici bi, kada planiraju i izvode nastavu, trebali ne samo u slučaju učenika s poteškoćama u učenju, nego i općenito, uzeti u obzir različite potrebe učenika: nastavnici bi trebali ponuditi raznolike aktivnosti, poučavanje bi trebalo biti dostupno učenicima različitih stilova učenja, mogućnosti, potreba itd. Morali bi uzeti u obzir mjere koje bi bile učinkovite za određeni oblik poteškoće.

Ovisno o specifičnoj poteškoći učenika u učenju odluka nastavnika o prilagođavanju plana i programa i konsolidaciji znanja trebala bi biti utemeljena na procjeni ciljeva i sadržaja koji su od ključne važnosti i koje učenici trebaju razumjeti, a mogu biti pojednostavljeni, modificirani, pa čak i izostavljeni. Nadalje, važno je da nastavnici prezentiranome sadržaju daju i značenje koje učenici u što većoj mjeri mogu povezati sa svakodnevnim, životnim situacijama.

U pravilu, učenici s poteškoćama u učenju samo uz odgovarajuću podršku mogu usvojiti matematičke koncepte, procedure te riješiti zadatke. Oblici pomoći koje mogu ponuditi nastavnici su različiti: procedure u učenju uz podršku i pomagala za učenje (stolovi, kartice); učenje kako organizirati bilješke, podrška u učenju koraka kod procedura; uvođenje crteža i slika kao podrška u razumijevanju i u procesu rješavanja zadataka; smjernice na više razina za strukturirane zadatke itd. U prvoj trijadi, kada se razvijaju numerički koncepti, sljedeće aktivnosti mogle bi biti učinkovite: prikazivanje simbola i brojeva kroz boje; traženje asocijacija (za matematičke koncepte); pisanje brojeva na većim površinama; razvrstavanje s pomoću izmicanja; iscrtavanje tablica na zemlji; uvrštavanje igračaka u dijagrame; iznošenje smjernica u dijelovima (kartice); stvaranje misaonog sklopa s najučestalijim izrazima koji su povezani s određenim konceptima (npr. zbrajanje: zbroj, zbrojiti, prenijeti… i oduzimanje: manje, oduzeti, prodati…); prezentacije brojeva putem slika i kreiranje osobnih didaktičkih alata itd.

Nastavni materijali moraju biti praktične prirode i moraju učinkovito služiti učenicima kao podrška u razumijevanju koncepata i odnosa, kao alat za prisjećanje kod rješavanja problema itd.

Kod odabira nastavnih materijala nastavnik mora uzeti u obzir potrebe učenika. Oni poučavaju učenike kako se koristiti nastavnim materijalima ili kako ih sami izraditi, primjerice kartice s formulama koje će im pomoći u prisjećanju, kao i kod pisanja koraka u pronalaženju rješenja za neki problem. Prema tome, nastavni materijali imaju dvostruku prednost – prvo, kada ih učenici sami stvaraju, a drugo, kada ih primjenjuju za vrijeme nastave kao dio cjelovitog pristupa učenju.

Vrlo je važno da nastavnici pažljivo promotre kada se učenici koriste nastavnim materijalima ili kada nastavni materijali postaju prihvatljivi i učinkoviti. Džepni kalkulator, primjerice, može biti učinkovit alat za izračunavanje postotaka ako je osoba slaba u računanju, ali ne kada osoba ne razumije koncept postotka (Žakelj, 2012).

Nužno je prepoznati poteškoću u učenju na vrijeme kako bi se prepoznao uzrok i kako bi se identificirale glavne značajke poteškoće u učenju i kako bi škole mogle ponuditi i implementirati odgovarajuće mjere podrške. Rano otkrivanje poteškoća i planiranje prikladnih oblika pomoći može biti od velike koristi za daljnji intelektualni i društveni napredak djeteta.

Nakon uočavanja poteškoća, potrebno je identificirati prikladne procese i organizaciju metoda poučavanja, što se odražava na didaktičke pristupe i poučavanje kao i na organizaciju rada za vrijeme poučavanja. Primjeri učinkovitih didaktičkih okolina iz perspektive učenika s poteškoćama u učenju su: modificiranje plana i programa i metode kojom se prenosi učenicima, kao i promjena u načinu provjere znanja (Jereb, 2011). Nastavnici primjenjuju različite metode poučavanja kako bi aktivno potaknuli učenike omogućujući im učenje na različite načine i uzimajući u obzir jake strane učenika u njihovu načinu učenja i u dokazivanju njihova znanja. Dobra praksa poučavanja uključuje pozitivne stavove i podršku, poticanje i osiguravanje aktivnog učenja kao i jasnu strukturu u poučavanju i učenju.

Oblici pomoći za učenike s poteškoćama u učenju u matematici gledano empirijskim istraživanjem

Cilj istraživanja i pitanja

Različite škole i različiti nastavnici donose različite odluke kada je riječ o identifikaciji i prihvaćanju poteškoće u učenju i o pomoći koju pružaju. Rezultati međunarodnih i inih istraživanja pokazali su da su loši rezultati u matematici prilično složen fenomen (Wilkins i sur., 2002; Mullis i sur., 2008; Chudgar i Luschei, 2009; OECD, 2009). Na nacionalnoj razini prikupljanje informacija o uspješnim trendovima, elementima koji imaju učinak na loše rezultate i učinkovite metode za poboljšanje postignuća u učenju mogu utjecati na usmjeravanje nacionalne politike.

Osnovno pitanje u istraživanju bilo je proučiti oblike pomoći koji su ponuđeni učenicima s poteškoćama u učenju u matematici za koje su škole osigurale individualne planove rada i zadovoljstvo nastavnika s učinkovitošću različitih oblika pomoći za učenike s takvim poteškoćama u učenju.

Metodologija

Uzorak ispitanika

Ovaj rad rezultat je istraživanja pod naslovom „Podrška nastavnicima u primjeni prilagođene nastave za učenike s poteškoćama u učenju matematike“ koje je

proveo Institut za obrazovanje Republike Slovenije (2010. – 2012.), u suradnji s 20 osnovnih škola u Republici Sloveniji. Uzorak je uključio 179 učitelja i 84 nastavnika matematike iz 20 škola.

Instrumenti

U istraživanju je korišten upitnik kako bismo došli do informacije o oblicima podrške učenicima s poteškoćama u učenju za vrijeme nastave i izvan redovite nastave matematike te do informacije o zadovoljstvu nastavnika s učinkovitošću različitih oblika podrške učenicima s poteškoćama u učenju matematike. Ispitanici su svoje odgovore morali procijeniti na skali procjene *(od: 1 – nikada, 2 – rijetko, 3 – često, 4 – uvijek)* za učestalost primjene različitih oblika pomoći za vrijeme i izvan nastave, kao i njihovo zadovoljstvo s učinkovitošću oblika pomoći za učenike s poteškoćama u učenju matematike na skali procjene (*od: 1 – potpuno nezadovoljan s učinkovitošću, 2 – neznatno zadovoljan, 3 – prosječno zadovoljan , 4 – dosta zadovoljan, 5 – vrlo zadovoljan s učinkovitošću)*. Upitnik nije mjerio nikakve latentne karakteristike ili postignuća pa tako nismo ni istraživali njegove mjerne karakteristike. Upitnik se sastojao od odvojenih pitanja koja nisu dala nikakav ukupan rezultat, ali su se u analizi koristili odvojeno.

Obrada podataka

Podaci iz anketnog upitnika statistički su obrađeni s obzirom na svrhu i ciljeve istraživanja koristeći se alatom R za Windows. S obzirom na karakteristike podataka primijenili smo sljedeće metode:

Klasifikacija učestalosti za prikaz odgovora na pitanja zatvorenoga tipa,

Mann Whitney test sume rangova kako bi se procijenile razlike između dviju grupa nastavnika: učitelja razredne nastave i nastavnika matematike.

Dobiveni podaci dolaze uglavnom od odgovora na pitanja u kojima su korištene skale (npr. nikada/rijetko/često/uvijek). S obzirom na to da ne možemo pretpostaviti karakteristike intervala takvih skala, koristili smo se neparametrijskim (ordinalnim) testom za obradu ordinalnih podataka.

Rezultati i interpretacija

Implementacija različitih oblika pomoći izvan redovitog poučavanja matematike

U vezi s prvim pitanjem u istraživanju usredotočili smo se na sljedeće:

Koliko često učitelji i nastavnici matematike implementiraju određeni oblik pomoći za učenike s poteškoćama u učenju izvan redovitog poučavanja matematike kako slijedi: dopunska nastava, timske konzultacije za učenike izvan redovite nastave, individualni konzultativni sati za učenike izvan redovite nastave, pomoć za učenike za vrijeme produženog boravka u školi, dodatna individualna pomoć izvan

redovite nastave, rad u manjim skupinama izvan redovite nastave, kao i pomoć koju nude vršnjaci iz razreda izvan redovite nastave, i

Postoje li razlike među njima s obzirom na učestalost odabira i implementacije određenog oblika pomoći.

Rezultati su prikazani u tablici 1.

Tablica 1

Rezultati empirijskog istraživanja pokazali su da se nastavnici najčešće koriste dodatnim satima (*R* učitelji 141,2; *R* nastavnici matematike 108,8), pomažu učenicima za vrijeme produženog boravka (*R* učitelji 155,6; *R* nastavnici matematike 55,2) i pružaju im dodatnu individualnu pomoć izvan redovite nastave (*R* učitelji 191,3, *R* nastavnici matematike 147,3).

Dopunska nastava primjenjuje se često ili uvijek kod 90 % učitelja i više od 75 % nastavnika matematike.

Pomoć za učenike u produženom boravku često ili uvijek prakticira 80 % učitelja. Nastavnici matematike prakticiraju tu vrstu pomoći vrlo rijetko, tj. 77 % nastavnika matematike odgovorilo je da to nikada ne radi.

Suprotno tome, više od 75 % nastavnika matematike često ili uvijek uvrštava dodatnu individualnu pomoć izvan redovitih sati matematike koju vode specijalni pedagozi, školski stručni tim ili drugi stručnjaci. Potonje također rade i učitelji, ali u manjem postotku: 55 učitelja često ili uvijek nudi dodatnu individualnu pomoć izvan redovite nastave.

Učitelji i nastavnici matematike vrlo rijetko prakticiraju konzultacijske sate u timu za učenike izvan redovite nastave i rad u manjim skupinama izvan redovite nastave koju izvode specijalni pedagozi. 66 % učitelja i 57 % nastavnika matematike nikada ili rijetko odabire konzultacije u timu za učenike izvan redovite nastave, a 68 % učitelja, kao i 61 % nastavnika matematike nikada ili rijetko bira rad u manjim skupinama izvan redovite nastave.

Rezultati istraživanja također su ukazali na određene razlike između učitelja i nastavnika matematike u učestalosti primjene određenog oblika pomoći.

Učitelji statistički značajno više primjenjuju dopunsku nastavu (R učitelji 141,2; *R* nastavnici matematike 108,8, p=0,00) i pomoć za učenike za vrijeme produženog boravka (*R* učitelji 155,6; *R* nastavnici matematike 55,2, p=0,00).

Nastavnici matematike statistički se značajno češće koriste individualnim konzultacijama za učenike izvan redovite nastave (*R* učitelji 117,6; R nastavnici matematike144,7, p=0,00), dodatnom individualnom pomoći izvan redovite nastavi (R učitelji 119,3; *R* nastavnici matematike 147,3, p=0,00) i pomoć od vršnjaka u razredu izvan redovite nastave (*R* učitelji 116,9; *R* nastavnici matematike 151,3, p=0,00).

Pomalo iznenađuju satovi prema dopunskoj nastavi, koju, u pravilu, svi odabiru vrlo često, ali statistički značajnije ih više prakticiraju učitelji nego nastavnici matematike. Možemo pretpostaviti da razlozi mogu biti u organizaciji redovite nastave s obzirom

na to da učitelji izvode većinu sati u razredu i jednostavnije im je modificirati bilo koju vrstu pomoći. Slično je i u slučaju da učitelji statistički značajnije više odabiru pomoć za učenike za vrijeme produženoga boravka od nastavnika matematike. U tom slučaju također možemo pretpostaviti da je produženi boravak organiziran na razini razreda (odjela) i da ga u pravilu provode učitelji.

Oblici pomoći koje nastavnici matematike statistički značajnije više odabiru od učitelja jesu sljedeći: individualne konzultacije za učenike izvan redovite nastave, dodatna individualna pomoć izvan redovite nastave koju izvode nastavnici stručnjaci, školski stručni tim ili drugi stručnjaci, kao i pomoć od vršnjaka u razredu izvan redovite nastave.

Ovisno o odluci nastavnika u vezi s odabirom oblika pomoći saznali smo da se oni najčešće ipak koriste tradicionalnim oblicima pomoći poput dopunske nastave i pomoći za vrijeme produženoga boravka. S druge strane, utvrdili smo da nastavnici matematike češće odabiru individualne pristupe u odnosu na one koji uključuju timski rad, što se čini logičnim iz perspektive potrebe učenika s potrebama. Također možemo pretpostaviti da se učeničke poteškoće u učenju povećavaju u drugom dijelu osnovne škole i da poteškoće postaju specifične (npr. koncepti prostora ili poteškoće u računanju algoritama), što nastavnicima daje mogućnost identificiranja potrebe za individualnom pomoći brže nego kod učitelja. Čak rezultati iz istraživanja „Što pomaže učenicima s poteškoćama u matematici?" upućuju na to da su učinkovitije mjere koje se izravno usmjeravaju na *poteškoće svakog djeteta posebno* (Dowker, 2004). Također, očito je da su posebno nastavnici matematike vrlo osviješteni o tome da je individualna pomoć jedan od najučinkovitijih pristupa.

Procjena stručnjaka povezana s učinkovitošću različitih oblika pomoći izvan redovite nastave matematike

Naš glavni interes jest odgovoriti na ova pitanja:

- Koliko su učitelji i nastavnici matematike zadovoljni s učinkovitošću različitih oblika pomoći izvan uobičajene nastave;
- Postoje li razlike vezane uz zadovoljstvo učinkovitošću pomoći izvan redovite nastave.
- Ispitanici su dali svoje procjene odgovarajući na zasebna pitanja koristeći se deskriptivnim skalama s pet stupnjeva.

Rezultati su prikazani u tablici 2.

Tablica 2

Uočili smo statistički značajne razlike među učiteljima i nastavnicima matematike u vezi s njihovim zadovoljstvom učinkovitošću određenih oblika pomoći. Učitelji su statistički značajno više zadovoljni s učinkom dopunske nastave (*R* učitelji 67,7; R nastavnici matematike 42,1; p=0,00) i s učinkom pomoći učenicima za vrijeme produženoga boravka u suradnji s učiteljem u produženom boravku (*R* učitelji 52,1; *R* nastavnici matematike 27,9; p=0,00).

U vezi sa zadovoljstvom učinkom timskih konzultacija za učenike izvan redovite nastave, individualnih konzultacija za učenike izvan redovite nastave, dodatne individualne pomoći izvan redovite nastave, rada u manjim skupinama i pomoći učenicima izvan redovite nastave, rezultati ukazuju na to da ne postoji statistički značajna razlika između učitelja i nastavnika matematike. U prosjeku je njihovo zadovoljstvo ocijenjeno kao „prosječno". Također je zanimljivo da su nastavnici matematike, u gotovo svim pitanjima, iskazali neznatno manje zadovoljstvo s učinkom nekih oblika pomoći za razliku od učitelja. Iz toga možemo pretpostaviti da je već na toj razini pomoć znatno zahtjevnija. Međutim, također je moguće da su nastavnici matematike nešto kritičniji kada se govori o utjecaju pomoći i da očekuju brže rezultate.

Procjene nastavnika vezane uz zadovoljstvo s učinkovitošću određenih oblika pomoći i učestalost primjene određenih oblika pomoći su povezane. Rezultati su pokazali da su nastavnici zadovoljni s učinkovitošću dopunske nastave, koju također smatraju važnim elementom pomoći za učenike s poteškoćama u učenju. Autori drugih istraživanja također su otkrili da je individualna pomoć značajno utjecala na postignuća učenika u školi. U tom su kontekstu autori istraživanja (Tieso, 2001, 2005; Lawrence-Brown, 2004) zaključili da uzimanje u obzir interesa djeteta i njihovih individualnih karakteristika učenja ima pozitivan utjecaj na njihovo postignuće u školi i njihovo sudjelovanje u učenju matematike. Isto zaključuju i ostali istraživači (Tomlinson, 2003; Tomlinson i Strickland, 2005) koji upućuju na to da bi nastavnici trebali uzeti u obzir zajedničke potrebe za učenjem svih učenika u razredu, a posebnu pozornost obratiti na individualne potrebe učenika i njihove stilove učenja pa onda primjereno prilagoditi poučavanje. Dowker (2009) također govori o prednostima individualnog pristupa kada donosimo zaključke da su određeni oblici pomoći koji su osobni, i usmjereni na potrebe individue, najučinkovitiji. Nadalje, autor naglašava važnost ranog otkrivanja poteškoće u učenju i posljedično osiguravanje različitih oblika pomoći koji se usredotočuju na one specifične slabe točke.

Rezultati također upućuju na zadovoljstvo s određenom skupinom školskih stručnjaka koja je povezana s pitanjem nude li oni određeni oblik pomoći sami ili ne nude. Učitelji su, primjerice, zadovoljniji učinkovitošću pomoći učenicima za vrijeme produženoga boravka od nastavnika matematike, jer činjenica je da su nastavnici u produženom boravku zapravo često i sami učitelji.

Rezultati su također ukazali na to da ne postoji suradnja ni razgovor među nastavnicima i školskim stručnim timom. Za to su mnogi razlozi, a mogu uključivati neupućenost u mogućnost zajedničke suradnje, organizacijske problema rada u školi, nedostatak sposobnosti za rad u timu, neupućenost u rad školskih stručnjaka itd. Da bi se ostvario učinkovit program pomoći za učenike s poteškoćama u učenju, od ključne je važnosti postojanje jake suradnje među nastavnicima u školi, jasan prijenos dobre prakse poučavanja u mreži škola, neprekidna evaluacija njihova rada, kao i stalnog stručnog osposobljavanja nastavnika u prepoznavanju i prevladavanju poteškoća u učenju.

Primjena različitih oblika pomoći za vrijeme nastave matematike

Vezano uz to pitanje naš je interes bio usmjeren na pitanja:

- Koliko često učitelji i nastavnici primjenjuju ili odabiru određene oblike pomoći za učenike s poteškoćama u učenju za vrijeme nastave matematike: modificiranje poučavanja sadržaja, modificiranje metoda konsolidacije znanja, prilagođavanje okoline za učenje (raspored sjedenja, tihi kutak…), prilagođavanje materijala za poučavanje ili pružanje prilike za korištenjem alata za učenje (džepni kalkulatori, brojevna crta…), pomoć „letećih" specijalnih pedagoga,[6] školskog stručnog tima ili drugih stručnjaka
- Postoje li razlike među njima s obzirom na učestalost biranja i primjene određenog oblika pomoći.

Rezultati su prikazani u tablici 3.

Tablica 3

Rezultati istraživanja pokazali su da učitelji najčešće prilagođavaju poučavanje sadržaja, zatim konsolidaciju znanja, testiranje i provjeru znanja. Za učenike s poteškoćama u učenju nastavnici nadalje modificiraju materijale za učenje i koriste se prikladnim pomagalima za učenje (džepni kalkulator, brojevna vrpca…). Nešto manje prilagođavaju okolinu za učenje (raspored sjedenja, tihi kutak…) ili iskorištavaju „leteće" specijalne pedagoge u razredu.

Rezultati istraživanja su sljedeći:

- 88 % učitelja i 84 % nastavnika matematike često ili uvijek prilagođava poučavanje sadržaja za učenike s poteškoćama u učenju.
- 93 % učitelja i 86 % nastavnika matematike često ili uvijek prilagođava metode konsolidacije znanja za učenike s poteškoćama u učenju;
- 61 % učitelja i 81 % nastavnika matematike često ili uvijek prilagođava metode testiranja i provjere znanja za učenike s poteškoćama u učenju;
- 83 % učitelja i 63 % nastavnika matematike često ili uvijek prilagođava nastavne materijale za učenike s poteškoćama u učenju;
- 94 % učitelja i 74 % nastavnika matematike često ili uvijek daje priliku učenicima s poteškoćama u učenju da se koriste pomagalima za učenje (džepni kalkulator, brojevna vrpca…).

Za vrijeme redovite nastave učitelji rijetko traže pomoć od „letećeg" specijalnog pedagoga. Više od 70 % učitelja i 88 % nastavnika matematike odgovorilo je da nikada ili rijetko traže pomoć „letećeg" specijalnog pedagoga za vrijeme redovite nastave. Možemo pretpostaviti da je pomoć „letećeg" specijalnog pedagoga ili stručnjaka uglavnom osigurana za učenike koji su usmjereni u posebne prilagođene programe za koje postoji službena odluka i koji imaju pravo iskoristiti dodatne sate sa stručnom pomoći kako bi se obratila pažnja na njihovu poteškoću u

[6] Specijalni pedagozi/nastavnici koji po potrebi idu iz razreda u razred, iz sata u sat i pomažu učenicima s poteškoćama u učenju.

učenju ili kako bi se isključile ostale prepreke u učenju (Official Journal of RS, No., 3/2007, UPB-1). Za ostale učenike s poteškoćama u učenju za koje škola priprema individualne planove rada prema Konceptu rada: Poteškoće u učenju u školi, pomoć nastavnika „letećeg" specijalnog pedagoga koristi se u puno manjem omjeru ili škole osiguravaju pomoć putem ostalih školskih stručnjaka (uglavnom stručnih timova u školi) ili im omogućuje individualizaciju i diferencijaciju rada za vrijeme redovite nastave kao i dopunsku nastavu.

Učitelji statistički značajno više prilagođavaju metode konsolidacije znanja (*R* učitelji 138,1; *R* nastavnici matematike 120,4; p=0,04), prilagođavaju nastavne materijale (*R* učitelji 140,6; R nastavnici matematike 105,7; p=0,00) i primjenu pomagala u učenju (*R* učitelji 151,1; *R* nastavnici matematike 91,8; p=0,00). Međutim, te aktivnosti vrlo često primjenjuju i nastavnici matematike, ali gledajući statističku značajnost učitelji ih primjenjuju češće od nastavnika matematike.

Nastavnici matematike statistički značajno više prilagođavaju metode testiranja i provjere znanja (*R* učitelji 119,5; *R* nastavnici matematike 155,2, p=0,00), kao i vrijeme dodijeljeno za pisanje testova (R učitelji 121,4; *R* nastavnici matematike 146,5; p=0,01) u usporedbi s učiteljima. To se djelomično može objasniti činjenicom da predmetni nastavnici imaju nešto veći pritisak za dostizanjem zadanih kurikularnih ciljeva i za vanjskim vrednovanjem znanja koje se primjenjuje na kraju 6. i 9. razreda.

Promatrajući rezultate istraživanja vezane uz učestalost osiguravanja različitih oblika pomoći za učenike s poteškoćama u učenju za vrijeme redovitih sati matematike, možemo zaključiti da su nastavnici osviješteni da je potreba osiguravanja pomoći, odnosno prilagodbe za učenike s poteškoćama u učenju vrlo velika. Na osnovi odgovora nastavnika vezanih uz njihove pristupe oblicima pomoći za učenike s poteškoćama u učenju, možemo reći da oni potiču razvoj metoda za pomoć učenicima s poteškoćama u učenju. Međutim, dokaz o suradnji nastavnika s drugim stručnjacima u školi, koji bi također mogli pomoći učenicima s poteškoćama u učenju, prilično je slabo potaknuta.

Utjecaj pristupa u poučavanju na uspjeh u školi predmet je mnogih istraživanja. Jedno od priznatih jest i istraživanje Slavina iz 1987. čiji rezultati ukazuju na to da redovita nastava može biti učinkovita samo ako se metode poučavanja i nastavni materijali prilagode potrebama učenika. To dovodi do zaključka da je prilagodba metoda i oblika rada od iznimne važnosti za učenike s posebnim potrebama. Puko grupiranje učenika u timove bez prikladne promjene metoda poučavanja ne daje pozitivne rezultate.

Procjena stručnjaka vezana uz učinkovitost različitih oblika pomoći za vrijeme redovite nastave matematike

Naš je glavni interes bio usmjeren na sljedeće:

– Jesu li učitelji i nastavnici matematike zadovoljni s učinkovitošću različitih oblika pomoći za vrijeme redovite nastave matematike i
– Postoje li neke razlike među njima u vezi s njihovim zadovoljstvom s učinkovitošću različitih oblika pomoći za vrijeme redovite nastave matematike.

Ispitanici su procijenili svoje odgovore na deskriptivnoj skali procjene od pet stupnjeva. Rezultati su prikazani u tablici 4.

Tablica 4

Ispitanici u anketi uglavnom su primijenili one pristupe koje su smatrali zadovoljavajućima u vezi s učinkovitošću i to kako slijedi: prilagodba metoda konsolidacije znanja, prilagodba materijala za učenje i davanje prilika za korištenje prikladnih pomagala u učenju. Možemo pretpostaviti da se nastavnici osjećaju kao najviše kvalificirani za njih; isto možemo zaključiti iz rezultata istraživanja koje je ukazalo na to da nastavnici, kada osiguravaju pomoć učenicima s poteškoćama u učenju, smatraju da su najkvalificiraniji u prilagodbi metoda konsolidacije znanja i primjeni pomagala u učenju (Žakelj, 2013).

Ispitanici su iskazali najnižu pouzdanost u učinkovitost pomoći koju nude drugi stručnjaci u razredu. Možemo zaključiti da je to zbog nelagode koju nastavnici osjećaju zbog prisutnosti druge osobe u razredu ili zbog nedovoljne suradnje. U pozadini toga stoje naznake da se određene skupine stručnjaka u školi fokusiraju uglavnom na vlastiti profesionalni rad, a manje na suradnju s ostalim nastavničkim kadrom u školi. Posljedica toga je slab uvid u posao stručnjaka u školi.

Identificirali smo statistički značajne razlike među učiteljima i nastavnicima matematike s obzirom na njihovo zadovoljstvo s učinkovitošću određenih oblika pomoći. Naši pronalasci ukazuju na sljedeće:

Učitelji su statistički značajno više zadovoljniji učinkom prilagodbe priprema za rad u redovitoj nastavi (*R* učitelji 60,7; *R* nastavnici matematike 48,0; p=0,03), davanjem prilike za korištenje prikladnih pomagala u učenju (*R* učitelji 62,2; *R* nastavnici matematike 45,0; p=0,01), prilagođavanjem okoline za učenje (*R* učitelji 60.6; *R* nastavnici matematike 46,4; p=0,02), pomoći od „letećih" specijalnih pedagoga (*R* učitelji 48,5; *R* nastavnici matematike 29,8; p=0,00) kao i prilagodbom materijala za učenje (*R* učitelji 59,5; *R* nastavnici matematike 47,0; p=0,03) u usporedbi s nastavnicima matematike. Veće zadovoljstvo učitelja razredne nastave mogao bi biti rezultat činjenice da učitelji prakticiraju te pristupe (kutići učenja, pomagala za učenje itd.) češće, pa čak i svakodnevno, te s njima imaju više iskustva u usporedbi s nastavnicima matematike. Činjenica je da priroda njihova posla nalaže širi opseg iskustva u poučavanju. Također je moguće da su nastavnici matematike više kritični prema učinkovitosti i da postaju zadovoljniji tek u kasnijem razdoblju. Nešto su više opterećeni dostizanjem ciljeva iz kurikula i vanjskim vrednovanjem znanja.

Nisu uočene statistički značajne razlike među učiteljima razredne nastave i nastavnika matematike u vezi s njihovim zadovoljstvom s učinkovitošću različitih oblika pomoći za sljedeće primjere: prilagođena priprema za redovitu nastavu, (pretpostavljanje poteškoća u učenju), prilagođene metode konsolidacije znanja, pomoć stručnog tima i ostalih stručnjaka u školi. Svi procjenjuju svoje zadovoljstvo tim pristupima kao „prosječno" ili „prilično".

Postoji nekoliko istraživanja o utjecaju pristupa poučavanju na uspjeh u učenju. Shieeld (2005, prilagođeno iz Kavkler, 2010) naglašava da uspješna primjena prilagodbe za učenike s poteškoćama u učenju nalaže uzimanje u obzir anksioznosti učenika koju stvara pet čimbenika: stavovi učenika i nastavnika prema matematici, kurikul, strategije poučavanja kulture razreda i provjera znanja. Svi ti čimbenici nalažu promjene u učenju i poučavanju učenika s poteškoćama u učenju: promjene u konceptu i razumijevanju onoga što čini osnovno znanje, smisao i primjenjivost znanja u životnim situacijama, promjene u razumijevanju i izvođenju redovite nastave i promjene u razumijevanju uloga svih dionika u redovitoj nastavi matematike.

Zaključak

Istraživanje koje smo prikazali u ovome radu usmjereno je na proučavanje primjena različitih oblika pomoći za učenike s poteškoćama u učenju matematike unutar redovite nastave i izvan nastave.

Istraživanja učestalosti i učinkovitosti različitih oblika pomoći za učenike s poteškoćama u učenju matematike ukazala su na to da učitelji i nastavnici matematike najčešće odabiru dopunsku nastavu kao pomoć izvan redovite nastave i te individualnu dodatnu pomoć. Učitelji razredne nastave često pružaju pomoć tijekom produženog boravka zajedno s nastavnicima u produženom boravku; s druge strane, nastavnici matematike često organiziraju individualne sate za učenike s poteškoćama u učenju. Oni nikada ili vrlo rijetko organiziraju grupne konzultacije za učenike izvan redovite nastave ili rad u manjim skupinama izvan redovite nastave, a koje provode nastavnici stručnjaci.

Procjene nastavnika vezane uz njihovo zadovoljstvo učinkovitošću različitih oblika pomoći prilično se podudaraju s učestalošću primjene određenog oblika pomoći. Rezultati istraživanja pokazali su da su nastavnici najviše zadovoljni učinkom dopunske nastave, koja je zapravo najčešće primjenjivana metoda i učinkom dodatnih individualnih sati, metodom koja je isto tako spomenuta kao vrlo važan element kod pomaganja učenicima s poteškoćama u učenju. Na isti način na koji su nastavnici u našem istraživanju izrazili svoje zadovoljstvo učinkovitošću individualnih oblika pomoći, autor istraživanja "Što pomaže djeci s poteškoćama u matematici" (Dowker, 2009) naglašava učinkovitost onih oblika pomoći koji su osobni i usredotočeni na potrebe individue. Dodaje da je osobito važno pomoć ponuditi u ranoj fazi te da bi pomoć trebala biti usredotočena na slabe točke pojedinca. Williams (2008) također ukazuje na važnost vremenski primjerenog odziva na različite potrebe učenika. On ističe da su prve dvije godine obrazovanja u školi ključne za stvaranje jake osnovice za daljnje matematičko obrazovanje. Prepoznavanje poteškoća u tom razdoblju može spriječiti naviku stvaranja krivih strategija ili pogrešnih ideja kod djece, jer one se mogu pretvoriti u dugoročne prepreke u učenju. Djeca koja su podložna takvim rizicima zahtijevaju

drukčije postupanje, već i u razdoblju predškole, putem preventivnih programa. Rano djelovanje sprečava stvaranje straha koji je, među starijim učenicima, jedan od najozbiljnijih uzroka akademskog neuspjeha.

Istraživanje učestalosti i učinkovitosti različitih oblika pomoći za učenike s poteškoćama u učenju matematike pokazalo je da učitelji najčešće prilagođavaju izvedbu sadržaja u redovitoj nastavi matematike, metode konsolidacije znanja, materijala za učenje i primjenu odgovarajućih pomagala u učenju (džepni kalkulator, brojevnu vrpcu…). Nešto manje redovito, ali još uvijek često, prilagođavaju metode testiranja i provjere znanja. Rijetko prilagođavaju okolinu za učenje (raspored sjedenja, tihi kutić…) i oslanjaju se na pomoć „letećih" specijalnih pedagoga u razredu.

Zadovoljstvo nastavnika učinkovitošću prilagodbe metoda konsolidacije znanja i njihovo zadovoljstvo učinkovitošću primjene odgovarajućih pomagala za učenje ocijenjeni su najvišom ocjenom. Ta dva pristupa rangirana su kao najviša u učinkovitosti te su najčešće i primjenjivana.

Na kraju, moramo spomenuti još jednu bitnu kariku u procesu obrazovanja i u osiguravanju pomoći za djecu s poteškoćama u učenju. To je važnost dobrog obrazovanog, djelotvornog, kompetentnog i autonomnog nastavnika koji je empatičan sa svojim učenicima. Darling Hammond (2005, prilagođeno iz European Commission, 2007) ukazuje na to da tako dobro oblikovani, dobro obrazovani nastavnici predstavljaju važniji čimbenik u školskom okruženju i da imaju vrlo važan utjecaj na postignuće učenika u školi. On, nadalje, ističe da su ti utjecaji puno važniji od utjecaja škole, vodstva škole, pa čak i financijske situacije.

Prema rezultatima ovoga istraživanja preporuča se nastavak razvoja i istraživačkoga rada u području rada s učenicima s poteškoćama u učenju matematike. Iz perspektive metodike i didaktike ovo istraživanje je bilo utemeljeno na izravnom promatranju nastave, na sustavnom radu s nastavnicima, npr. preko pomno planiranog projekta istraživanja koji bi uključivao tim nastavnika matematike i interdisciplinarni tim istraživača (npr. didaktičara, defektologa, psihologa itd.). Također, brojne su inicijative povezane s prepoznavanjem i eliminacijom uzroka poteškoća u učenju, s prilagodbom nastavnih metoda koje povećavaju odgovornost i motivaciju za učenjem, za promicanjem formativnog vrednovanja i vremenski odgovarajućeg odgovora na potrebe učenika, kao i za promidžbom samoregulacije za vještinu učenja i metakognitivne strategije, koje su stručnjaci klasificirali među osnovne vještine 21. stoljeća (npr. Instances i Dumont, 2013).