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Strategies for the improvement of social skills in students with autism spectrum disorder: Intensive support for inclusive education

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Introduction. Students with Autism Spectrum Disorder (ASD) typically have impaired social skills, which makes it difficult for them to become independent adults. For this reason, it is essential that the development of social skills is one of the main objectives within inclusive schools, allowing children with ASD to benefit from both education and interaction with their peers without ASD. *Objective*. Therefore, the aim of the study is to analyze the strategies used in inclusive contexts to promote the development of social skills in students with as ASD. *Method*. Twenty students with ASD aged 6-11 years participated in the study. Direct observation and conducting interviews with their respective teachers allowed us to analyze teaching strategies that improved the social skills of students with ASD within the mainstream school. *Results*. The results show that social interaction is initiated mostly by teachers and peers, and when a child with ASD starts, it is preferably directed toward a support teacher. In addition, social interaction is strongly influenced by the activity developed in the classroom and by the role of the support teacher, who becomes a key player. *Conclusion***.** We concluded that the development of social skills in students with ASD depends on the degree of structuring of the spaces and activities where students with ASD participate, the role of the teacher, and the typology of curricular activities.

Keywords: social skills, autism spectrum disorder (ASD), inclusive education, teaching strategies, support teacher

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Introduction

According to the DSM-5-TR (Diagnostic and Statistical Manual of Mental Disorders), autism spectrum disorder (ASD) is a neurobiological developmental disorder that involves a set of persistent deficits in deficits of social communication and interaction, as well as restrictive and repetitive patterns of behavior, interests or activities causing clinically significant impairment in social or other important areas of current functioning (American Psychiatric Association, 2022). In this latest edition of the manual, the term 'spectrum' is key as it considers ASD as a continuum of difficulties and represents an advance in the development of more tailored diagnoses, including the level of support that children with ASD may need depending on their difficulties.

Undoubtedly, one of the most relevant characteristics of ASD is the great symptomatologic variability among people with ASD, as well as the need to detect early any of this symptomatology that could derive in an autism spectrum disorder in order to implement the most appropriate intervention program (Bejarano-Martín et al., 2020). The broad range of social deficits encompasses difficulties in the use of non-verbal behavior, initiating and responding to social interactions with both peers and adults in an effective and spontaneous way, sharing interests, and emotional and social reciprocity (Chan & Leung, 2022).

However, what is most important is the impact of these difficulties on the quality of life of students with ASD: impact on academic performance (Rabiner et al., 2016), maladaptive behavior (Øien & Eisemann, 2015), mental health problems related to loneliness and anxiety (Paula, 2015), or future quality of life (problems related to employment or higher education) (Øverland, et al., 2022).

Given the importance and impact of social relationships in ASD, there is abundant literature on intervention strategies and/or programs aimed at improving social skills both at early ages (Fuller & Kaiser, 2020) and in adolescence or adulthood (Atkinson-Jones & Hewitt, 2019). These social training programs aim to reduce social difficulties and facilitate interactions with peers and adults, promoting the participation of the person with ASD in their environment. Without claiming to be exhaustive, intervention programs or strategies could include: the TEACCH method (Mesibov & Howley, 2010), applied behavior analysis (ABA, Lovaas, 1987), social stories (Gray & Garand, 1993), modeling, methods and techniques with clear and structured instructions based on repetition, practice and reinforcement, and the use of augmentative and alternative communication systems when students have language difficulties (Hourcade et al., 2013).

To mitigate the impact of low social competence on the quality of life of people with ASD, it is essential to implement these intervention programs or strategies during their schooling process (Kylliäinen et al., 2020). However, there is controversy among researchers when it comes to implementing them in inclusive or more restrictive contexts (Reed, 2016). For Humphrey and

Symes (2013), schooling students with ASD in inclusive settings results in more isolation and loneliness as peers tend to spend time interacting with other peers, while students with ASD still experience a certain level of isolation, which may increase the risk of bullying and stigmatization. However, there is no doubt that inclusive environments increase the possibilities for social interaction, and the increased number of peers can lead to great variability of socially skilled behaviors to model (Rodríguez-Medina, 2016) and offer higher academic expectations. However, for the benefits of inclusive education for students with ASD to be evident, instructional processes need to be planned and sufficient support needs to be in place (Conn, 2019).

Local Context

Most education systems in Europe are guided by the principles of inclusive education, following the requirements derived from the Convention on the Rights of Persons with Disabilities (United Nations, 2006). In Spain, specifically in Catalonia where this article is contextualized, students with ASD have two options in their schooling: a special education school (schools for children with ASD and other forms of disabilities whose educational needs – and for very varied reasons – do not find an answer in mainstream school) and a mainstream school (school that provides learning opportunities for all people, regardless of whether or not they have ASD or other disabilities). With Decree 150/2017 of the Department of Education (Generalitat de Catalunya, 2017), it is assumed that education in mainstream schools will be based on the principles of inclusive education, so that schools must adopt universal, additional, and intensive measures and support to facilitate the learning and participation of all students.

One of the measures articulated as a resource for schools is Intensive Support for Inclusive Education (SIEI). The SIEI is a support measure for pupils with severe and permanent special educational needs, who may be enrolled in special education centers, which includes the provision of human and material resources for the school. Its aim is to ensure the comprehensive development of all pupils, which necessarily involves the development of collaborative processes between teachers, support teachers, families, and external psycho-pedagogical and social services. Support teachers are licensed teachers who acquire knowledge about autism with formal training, and their role is to develop actions that facilitate learning, socialization, and participation in a regular classroom and in a center for students with needs. Depending on the school, this support can be organized in two ways: either as support for pupils with special educational needs in a regular classroom or as support for pupils with special educational needs in a specific classroom.

Our aim is to analyze the methodological strategies used in inclusive contexts to promote the development of social skills in students with ASD.

In doing so, we aim to answer the following research questions: What kind of teaching strategies are commonly used at school? Are there differences between those used in the regular classroom with SIEI support and those used in the specific SIEI classroom? Our contribution will allow us to identify the use of teaching strategies for the development of social skills in inclusive contexts (more or less restrictive) as well as to promote their implementation taking into account the role that support can have in a mainstream school.

Method

This study was carried out under a constructivist worldview as individuals (teachers and students) develop subjective and multiple understandings or meanings of the phenomena in their experience (Lincoln et al., 2011). Likewise, these subjective understandings are constructed socially and historically. Constructivists pay attention to the participants' perspectives in specific contexts to inductively generate a theory (model), pattern, or interpretation.

On the other hand, qualitative research, which measures the thinking or viewpoint of the informant (Bisquerra, 2014), is to obtain an in-depth perspective and emphasize the individual views in order to understand the phenomenon (support and strategies to develop social interactions with students with ASD).

Participants

The participants belonged to three primary schools (A, B, and C) in the metropolitan area of Barcelona (Spain). The selection of the research sample was based on a non-probabilistic and intentional sampling, according to the following criteria: public primary schools linked to an inclusive project with the SIEI that had students with ASD.

In schools A and B, the SIEI provided support in the regular classroom. Each school had 50 teachers; two of them had the role of support teachers. Both had specific training in Special Education and ASD.

In school C, the SIEI provided support in the regular classroom and in a specific classroom, which was attended by four pupils with ASD and other pupils with other learning difficulties (for example, ADHD). Out of the total of 36 teachers in this school, two teachers played the role of support teachers: one exclusively for students with ASD and one for students with other learning difficulties. Both had specific training in special education and ASD.

Schools A, B, and C had seven, five, and eight pupils with ASD respectively, and the number of pupils per class ranged from 25 to 27.

To characterize the sample of the 20 students with ASD, they were administered the Autism Diagnostic Interview (ADI-R) (Le Couteur et al., 2006) to confirm their diagnosis, and the Wechsler Intelligence Scale for Children (WISC-IV) (Wechsler, 2005) to determine their IQ. In addition, the Social Communication Questionnaire

(SCQ, Rutter et al., 2019) was administered to the guardians of students with ASD to determine the level of severity of ASD symptoms.

It should be noted that families were previously informed that the present research would be carried out and were asked for their consent for their children's participation. Subsequently, students were also informed to participate in the study. Furthermore, they were informed that the data obtained would be treated anonymously, from an ethical perspective, and for research purposes.

Of the 20 pupils, 16 were boys and 4 were girls aged between 6 and 11. All the pupils with ASD attended the mainstream class corresponding to their age, and four of them regularly attended the SIEI classroom. According to the ADI-R, the students had a diagnosis of ASD, of which only 6 of them were high functioning, and according to the WISC-IV, the IQ of the 20 pupils ranged between 49 and 122. On the other hand, based on the Social Communication Questionnaire, except for four students, all students with ASD presented significant difficulties in communication and social functioning.

In relation to the participating teachers, of the ten teachers interviewed, four were support teachers (two from School C, one from School B, and one from School A), and six were tutor teachers in schools students with ASD attended (two per school). All were women aged between 29 and 43 with 4-19 years of teaching experience. All the teachers interviewed were trained in special educational needs (SEN), but only the support teachers had specific training in ASD. The criteria taken into account to define the purposive sample were (1) at least one support teacher per school; (2) they had at least three years of teaching experience in a regular classroom; (3) they currently teach students with ASD in a regular classroom and/or in the SIEI classroom. The adequacy of the sample was determined when theoretical saturation was reached, which occurred when no new or relevant data emerged for a category, and the categories were well developed in terms of their properties, dimensions, and variation.

Instruments

Firstly, to characterize the sample, the authors of the article administered the Autism Diagnostic Interview (ADI-R, Le Couteur et al., 2006) and the Wechsler Intelligence Scale for Children (WISC-IV, Wechsler, 2005) to the students with ASD. Then, the authors administered the Social Communication Questionnaire (SCQ, Rutter et al., 2019) to the guardians of students with ASD. Briefly, ADI-R is an interview useful for diagnosing autism; WISC-IV helps measure a child's intellectual ability; and SCQ can be helpful in treatment planning, educational intervention, and measurement of change over time.

In addition, the research data were obtained from interviews with teachers and direct observation of students with ASD in their classrooms.

The semi-structured interview consisted of 21 open-ended questions obtained after reviewing the literature about inclusive schools, students with ASD, and common methodological strategies used with students with ASD. Then, seven randomly

selected university professors specializing in ASD checked whether the questions were understood, whether they responded to the stated objective, and whether they were clear, coherent, and relevant (points from 1 to 5). Once the professors scored each question, an average was made that allowed establishing a continuum where the question could be framed from inadequate to very appropriate. Finally, the authors elaborated on the final interview, along with the categorization, coding, and description of the codes. The authors applied this interview to ten teachers and two external support services: both of them were members of the centers' psycho-pedagogical guidance and counseling team.

The interviews took place in each of the schools and were conducted by two of the authors over four months during school hours. They lasted an average of 52 minutes and were recorded with a tape recorder, with the participants' consent.

The observation was non-participatory and was carried out with the aim of, on the one hand, obtaining information on the methodological strategies used by the teachers and, on the other, corroborating, understanding, and complementing the information obtained in the interviews.

The 20 students with ASD were observed both in the regular classroom, with and without support teachers, and in the specific classroom of the SIEI (school C). They were recorded with a video camera, with the prior consent of the parents and the school. Each student with ASD was recorded for 2h30' in the classrooms, combining one or two teachers in the classroom, and 30' in the playground. In addition, students with ASD in school C were videotaped for 1h30' in the SIEI classroom. The video recordings were made by the authors over a period of five months.

Data analysis

Two matrices were created for the analysis of the data from the interview and observation, which included categories and subcategories linked to the objectives. In the case of the interview, the categories generated were professional data, teaching experience and specific training in ASD; their conception of inclusion and pupils with ASD; the organization of the center to cater for diversity; the development of language and social skills of pupils with ASD; teaching strategies and, finally, proposals for improvement. In relation to observation, the categories were: social interaction, behaviors, and emotions; communicative skills and discourse pragmatics; and teaching strategies.

The matrix created for the analysis of the interviews is presented in Table 1.

Table 1

Interviews: Categories and subcategories

Categories	Subcategories	Items
Personal and professional data	Age Gender Academic qualifications Years of teaching experience Specific training in ASD	Questions 1 to 7
Inclusion concept and students with ASD	Characteristics of Inclusion	
	Characteristics of students with ASD	Questions 8 to 10
Organization of the school to attend to diversity	Organization of support Role of the support teacher	Questions 11 to 14
Development of social skills of students with ASD and teaching strategies	Specification of classroom strategies for the development of social skills for students with ASD.	Questions 15 to 20
Proposals for improvement	Concretization of proposals for improvement in the intervention with students with ASD, according to their social skills.	Question 21

In Table 2, three categories were established in the matrix with the corresponding subcategories, with regard to observation.

The textual and visual data from the instruments were assigned to the categories and subcategories, and then a coding process of the former was carried out (Gibbs, 2012), using MAXQDA computer software (version 17) in the case of the interview.

Table 2

Observation: Categories and subcategories

Categories	Subcategories
Social interactions: behaviors and emotions	Proximity of the student with ASD to the adult and his or her peers
	Eye contact of the student with ASD with the adult and his or her peers
	Sharing (objects and activities)
	Bullying
	Emotional capacity (regulation, expression, and understanding)
	Inflexibility (inability to adopt the listener's perspective, to understand how others may feel or think. Inability to adapt behavior to the demands of the context)
	Use of non-verbal behaviors
	Establishment of social relations
	Enjoy
	Social-emotional reciprocity
	Spontaneous and varied imaginative social play
	Disruptive behavior with adults and peers
	Peer response to student behavior with ASD
	Absorbing concern or circumscribed pattern of interest
	Apparently compulsive adherence to non-functional routines or rituals
	Concerns about parts of objects and non-functional elements of materials
	Stereotyped and repetitive motor mannerisms
Communication skills: Pragmatics of discourse	Initiation of interaction with the adult and his or her peers
	Demand for problem-solving with adults and their peers
	Verbal communication with the adult and peers
	Non-verbal communication with the adult and peers
	Use of alternative and augmentative communication systems
	Respect for the right to speak
	Verbal language delay (lack or delay of spoken language and inability to compensate for this lack by gestures)
	Maintaining a conversation (relative ability to initiate or sustain a conversational exchange, or initiate or respond to a conversation)
	Stereotypical, repetitive and idiosyncratic speech

Categories	Subcategories
Teaching strategies	Groupings
	Visual aids
	Anticipation of activities
	Non-verbal communication
	Verbal communication
	Define goals and objectives
	Give them time
	Transition space
	Didactic structure
	Physical structure of the space
	Generalization of learning
	Disruptive behavior management
	Social stories
	Direct instruction
	Limiting sensory overload
	Modelling
	Clear rules and boundaries
	Clear openness and closures
	Active participation
	Role-playing
	Routines

Results

In accordance with the objectives, this results section analyses the characteristics of the social skills of pupils with ASD detected, as well as the teaching strategies used, with special emphasis on the role of teachers.

Students with ASD: Characteristics

From the observations and interviews, the presence of typical symptomatology and behaviors of this disorder was detected, although with great variability among students with ASD. Table 3 shows the number of subjects who showed some of the main characteristics recorded during the observation.

Table 3

Characteristics of students with ASD

Characteristics	School A	School B	School C
Establishing social relationships	7	5	8
Sharing	6	3	5
Beginning of interaction with adult and peers	3	4	3
Demand for problem-solving	4	4	6
Holds a conversation	7	7	6
Inflexibility	6	4	7
Disruptive behavior with adults and peers	0	1	1
Bullying*	0	0	0
Verbal communication	7	5	8
Delay in verbal language	7	5	8
Stereotyped, repetitive, and idiosyncratic speech	6	5	7
Respect for turn-taking	6	5	7
Use of non-verbal behaviors	7	5	5
Proximity of the student with ASD to adults and peers	7	5	8
Visual contact of the student with ASD with adults and peers	7	5	8
Use of alternative and augmentative communication systems	0	0	0
Emotional competence	5	5	5
Enjoyment	6	5	7
Social-emotional reciprocity	4	3	4
Engrossed preoccupation or circumscribed pattern of interests	1	1	2
Adherence to non-functional routines or rituals	2	1	2
Stereotyped and repetitive motor mannerisms	0	0	2
Preoccupations with parts of objects and non-functional elements of materials	3	3	4
Spontaneous and varied imaginative social play	2	1	2

* Note: Students with ASD experience bullying from their peers.

As can be seen in the table, students with ASD have difficulties in establishing social relationships when initiating interaction, asking for help or an object, showing something (e.g., the activity performed), and sharing information or material.

Both in the regular classroom and in the SIEI classroom, social interaction is mostly initiated by the support teacher or the tutor. However, only when there is a demand for problem-solving do 10 of the 20 students with ASD initiate interaction and mostly seek support from teachers, especially the support teacher. Furthermore, all students with ASD have difficulties interacting with their peers, especially when they have to initiate the interaction. However, if the interaction is initiated by their peers, students with ASD tend to maintain it. Only 4 out of 20 students initiate the interaction in time to make a request to their peers; however, even if the response given by peers to students with ASD is positive, if the support teacher is very close in this situation, the request is always directed to the referring adult.

Tutor 2 – School A: Interaction is much more with the adults in the class than with their classmates.

Both in the regular classroom and in the SIEI classroom, social interaction is heavily mediated by the activity they carry out with their peers and the role of the support teacher, although teachers tend to place the student with ASD in a group that favors social interaction and learning:

Support teacher 1 – School B: What we are interested in is that they help each other, that they also have opportunities to be helped, but at the same time they also have opportunities to help others [...] and that the groups facilitate interaction, that they help them and that they are receptive.

Likewise, there is a tendency on the part of students with ASD to be inflexible in the face of changes proposed by their peers, especially in unstructured contexts. Nevertheless, both in the regular classroom and in the SIEI classroom, it can be observed that they tend to accept changes in tasks proposed by the tutor or support teacher, although these changes may provoke disruptive behavior, as exemplified by the following quote.

Tutor 2 – School A: As it is a rigidity due to the disorder, ...it is difficult for him to change activities.

On the other hand, during the observation sessions, no bullying situations were detected, perhaps due to the greater presence of adults in the classroom. In this sense, the teachers point out that pupils with ASD tend to be overprotected by some classmates.

On the other hand, the language used in social interactions, both by students with ASD and by their peers and teachers, is verbal and non-verbal. However, in students with ASD, there is a clear predominance of non-verbal language over verbal language, as the latter tends to be altered, extremely brief, stereotyped, and repetitive. It should be added that structured environments

promote the use of verbal language, either because of the demands made by teachers on their pupils, the physical proximity of classmates in the classroom, or the need to collaborate in a specific task. This fact is also evident when it comes to having a conversation, respecting turns of speech and maintaining eye contact, which are more likely to be maintained with adults than with peers.

Support Teacher 1 – School A: She can talk, okay? The problem is... maintaining a dialogue... with her difficulties in expressing what she wants to say and trying this, establishing a dialogue with others...

On the emotional level, students with ASD do not particularly enjoy the activities proposed in the classroom, apart from those that are part of their stereotyped interests. Only one child engages in occasional, brief, and spontaneous imaginative play.

However, 15 of the 20 children with ASD are usually able to regulate their emotions in the classroom and maintain a generally positive emotional expression, although it is true that they have more difficulties than their peers in maintaining this state. However, the greatest difficulties are found in emotional understanding: only three pupils are able to ask for an explanation of what happens when they do not understand or do not agree with something.

Finally, it is observed that structured environments favor children with ASD to maintain less adherence to non-functional rituals and less preoccupation with non-functional elements of materials.

Teaching strategies: The role of the teacher

In relation to teaching strategies, teachers use a wide variety of resources and strategies that are generally used with these learners, especially the structuring of activities and space, the establishment of routines and visual aids. According to teachers, the strategies are applied in an inclusive setting following the principles of inclusive education. However, there are nuances. While all agree that inclusive education is about facilitating the participation and learning of all learners, the focus of intervention is on learners with special educational needs, especially in the case of support teachers. In Table 4, the methodological strategies were identified during the observations and interviews.

Table 4

Teaching strategies

Teaching strategies	School A	School B	School C (regular class)	School C (SIEI)
Groupings	Group-small group-peers	Group-small group-peers	Group-small group-peers	Small group
Visual aids	Yes	Yes	Yes	Yes
Anticipation of activities	Yes	Yes	Yes	Yes
Non-verbal communication*	Yes	Yes	Yes	Yes
Verbal communication**	Yes	Yes	Yes	Yes
Define goals and objectives	Teacher-support teacher	Teacher-support teacher	Teacher-support teacher	Support teacher
Give them time	No	No	No	Yes
Transition space	Yes	Yes	Yes	Yes
Didactic structure	Yes	Yes	Yes	Yes
Physical structure of the space	Yes	Yes	Yes	Yes
Generalization of learning	No	No	No	No
Disruptive behavior management	Teacher-support teacher	Teacher-support teacher	Support teacher (outside classroom)	Support teacher
Social stories	No	No	No	Yes
Direct instruction	Yes	Yes	Yes	Yes
Limiting sensory overload	No	No	No	Yes
Modeling	Teacher-support teacher-peers	Teacher-support teacher-peers	Teacher-support teacher-peers	Support teacher
Clear rules and boundaries	Yes	Yes	Yes	Yes
Clear openness and closures	Yes	Yes	Yes	Yes
Active participation	No	Yes	No	No
Role-playing	No	No	No	Yes
Routines	Yes	Yes	Yes	Yes

* Note: Example: use of gestures

** Note: For example: use of simple sentences, use of clear verbal instructions, explaining metaphors, etc.

Firstly, students with ASD have curricular adaptations in all curricular areas specifically designed to promote social development in a cross-cutting manner.

However, these adaptations are excessively designed for pupils with ASD to carry out different activities from the rest of their classmates, especially for pupils with low IQ.

In all the schools, it is observed that the teaching structure, both in the ordinary classroom and in the SIEI classroom, consists of three elements: 1) the explanation of the contents; 2) the carrying out of the activities; and 3) the evaluation of the activity. However, within each of them, teachers establish more specific sequences (i.e. step-by-step) in the case of students with ASD, and especially with those with low cognitive functioning, where functional and error-free learning is promoted. Sequencing is carried out by both the tutor and the support teacher in the regular classroom in schools A and B; however, in school C only the support teacher carries out the sequencing, mainly in the specific SIEI classroom, where individual reinforcement activities are carried out, which are usually more manipulative, visual and symbolic play activities.

In all three schools, clear routines, openings, and closings are established, and activities are anticipated during the school day, both in the morning and in the afternoon.

The routine is managed by both the tutor and the support teacher in all three schools. However, greater flexibility is observed in schools A and B when it comes to introducing changes in the dynamics of the activity.

Schools tend to use visual aids for students with ASD as well as for other students. However, in school C, these aids are especially aimed at students with ASD with low cognitive functioning, and the support teacher becomes a key player in their use. However, it can be observed that the use of visual aids is generalized in the regular classroom, but it is subordinated to the transmission of information through the oral language of the teacher, which is clear, concise, repetitive, and accompanied by non-verbal language.

In all three schools, the organization of the classrooms favors the limitation of spaces and activities, with structured, fixed, and predictable environments for students with ASD, and where a transition space is provided. However, only in the SIEI classroom is there a limitation of sensory overload.

Finally, it should be noted that within the regular classroom in schools A and B, the tutor and the support teacher manage the classroom, supervise and help all students, and tend to ensure that students with low-functioning ASD carry out the same activity as their peers, but always adapted within the regular classroom. On the other hand, in school C, the support teacher is the only referent for students with low-functioning ASD. Therefore, she is the one who manages, supervises, helps, and establishes their objectives, prioritizing different activities from those of their peers. In addition, there is a greater tendency to take students with low-functioning ASD out of the regular classroom so that they receive more individualized support in the SIEI classroom.

Discussion

As the results show, the diversification of educational needs related to social interaction in students with ASD is evident, so it is necessary to organize support to minimize its consequences on the comprehensive development of students with ASD from a holistic perspective. This variability in the characteristics of students with ASD implies the search for diversified methodological strategies on the part of teachers, which are often based on their criteria, wisdom, and experiences (Chorzempa et al., 2019). However, the implementation of these methodological strategies is influenced by the culture of the school and its own organizational structure. One aspect that is particularly relevant is the location of students with ASD in the school. While, for Maich and Belcher (2012), students with ASD in mainstream schools tend to be on the periphery of social networks within the regular classroom and have smaller social networks compared to their peers without ASD, for Lüddeckens (2021), the placement of students with ASD in the regular classroom not only facilitates their participation and interaction but also benefits the development of social relationships among the whole student body. We have evidence that the key is where the intervention process is focused: on the student with ASD or on the context. A change of perspective is needed, a kaleidoscopic focus, which contemplates different possibilities, since, based on our results, the placement in the specific classroom for students with ASD is not so much a function of the needs of the students as of the organization and culture of the center (Arnaiz, 2019; Iris Centre, 2023; Tynan & Davy, 2021; Young & Cleveland, 2022). Schools tend to use many of the methodological strategies described in the literature. In this sense, as the results show, schools usually have a wide range of strategies drawn from different specific programs for students with ASD (Barnett et al., 2020; Hersh & Elley, 2019). This eclecticism in intervention with students with ASD makes it difficult to understand its effectiveness (Reed, 2016) and social validity (Callender et al., 2020), but provides flexibility for teachers (Jordan, 2008) because teachers can use many strategies or methods, not just one. For Conn (2019) and Berghs et al. (2019), the use of different teaching strategies would be more related to the teachers (training and attitude) and to the inclusive philosophy of the school, where the voices of ASD students are included, than to the placement in a regular or specific classroom for students with ASD. However, we observed the intensity of the application of these methodological strategies is subject to three factors. On the one hand, it is related to the degree of structuring of the spaces and activities in which students with ASD participate both in regular and specific classrooms. It should be taken into account that, in educational settings, students with ASD face changing schedules, unstructured spaces such as the lunchroom or the playground, and unclear and unstructured transitions or lack of physical space for students who need a time out or break. However, authors such as Hume (2007) or Tola et al. (2021) highlight the

importance of structuring, predictability, and routine or transition spaces, to name a few, as we confirmed.

This leads to the need to provide explicit instruction, targeted interventions, and authentic opportunities that foster positive interactions of students with ASD with their peers, although according to Zeedyk et al. (2021), teacher efforts for supporting peer socialization do not have to be specialized ASD interventions to be effective. Nevertheless, we consider that explanation, modeling, and subsequent evaluation or reflection on the interaction are basic for learning in the case of students with ASD.

It is interesting to note that support teachers in the specific classroom can develop some specific strategies, such as giving time to students with ASD or limiting sensory overload because they have time to focus on all the characteristics and peculiarities of students with ASD, provide a more structured environment and invest time and effort that cannot be provided in the ordinary classroom. In addition, they can tell social stories or carry out role-playing to improve the social skills of pupils with ASD. As Flujas et al. (2023) point out, interventions for students with ASD must be intensive and include a large number of sessions, both weekly and extended over time, without forgetting that intervention in natural, every day, and functional contexts for children (not just structured ones) is widely necessary. Therefore, as we have observed, students with ASD should not have experiences only in the specific classroom, but it is crucial that they spend time in the regular classroom with their peers with the aim of generalizing their learning.

Finally, another factor to consider is the role of the teacher in the implementation of these methodological strategies. As we have observed, the social interaction of students with ASD is strongly influenced by the role of the adult, since the adult is the one who facilitates the students' inclusive experiences and determines their learning opportunities (Chou & Park, 2021). This affects not only the learning process but also the development of social competencies of students with ASD. The key is the role of the support teacher. If support is based on a dependency model (as we observed in School C), teachers tend to be more reactive than proactive to the educational needs of students. Although teachers feel that the presence of support teachers in the classroom increases student satisfaction, work efficiency, motivation, and attentiveness, there is increased contact with the support teacher, which may reduce the attention of students with ASD towards the tutor and be less independent (Rämä et al., 2020).

This dependence on support teachers is increased in the case of low-functioning students with ASD who attend specific classrooms (Farrell et al., 2010). This leads to less social interaction with peers, as, for them, students with ASD do not belong to their peer group. The solution is complex but undoubtedly requires a revision of the conception of support. Support should be conceived as support for learning rather than support for participation, that is, teachers

have to teach how to interact instead of intervening directly in participation, for example, through the formation of collaborative teams among teachers (Puigdellívol et al., 2019), fostering a positive environment that helps support and sustain students' social interaction (Boldsen, 2022). This implies that the tasks entrusted to support teachers are related to the design and adaptation of didactic material, curricular adaptation through Individual Plans, instruction, and problem-solving in the classroom (Echeita et al., 2013; Leytham et al., 2020). In this sense, the application of cooperative methodological strategies facilitates social interaction, where the role of the teacher becomes a mediator in the learning process and a reference for students with ASD. Therefore, it is necessary firstly to have well-trained teachers to work with them (Barnett et al., 2020; Van Der Steen et al., 2020). Secondly, team members need to be ready to share and work with all other professionals who are a part of the student's academic team (Sawchuk, 2019). Finally, it is necessary to play a crucial role in creating an effective, inclusive culture for students with ASD (DeMatthews et al., 2020).

Conclusions

It is evident that the variability of social behaviors of students with ASD implies the search for diversified methodological strategies on the part of teachers in primary schools. However, these strategies are mediated by the organizational structure of the school, so no option should be discarded as long as the principles of inclusive education are taken into account. Hence, the inclusive culture that is being developed in the school takes on special relevance.

Schools often use many of the methodological strategies described in the literature. However, their degree of implementation is subject to three factors. On the one hand, it is related to the degree of structuring of the spaces and activities in which students with ASD participate. Thus, for example, the structure of the SIEI classroom facilitates giving more time to students with ASD in the performance of activities or in limiting sensory overstimulation. Another factor to take into consideration is the role of the teacher in the implementation of these methodological strategies. As we have observed, the social interaction of students with ASD is highly influenced by the role of the adult. This affects not only the learning process but also the development of social competencies of students with ASD. The implementation of cooperative methodological strategies facilitates social interaction, where the role of the teacher becomes a mediator in the learning process and a reference for students with ASD. Finally, the typology of curricular activities also conditions the development of social interaction. In this sense, it would be appropriate to use more activities related to social stories and role-playing in the regular classroom to facilitate the generalization of learning for students with ASD.

Undoubtedly, the road is long and winding but the implementation of methodological strategies that facilitate the social interaction of students with ASD is beneficial and useful not only for these students but for all students in the regular classroom.

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Strategije za unapređivanje socijalnih veština kod učenika sa poremećajem iz spektra autizma: Intenzivna podrška za inkluzivno obrazovanje

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Uvod: Učenici sa poremećajem iz spektra autizma (PSA) obično imaju slabije razvijene socijalne veštine, što im otežava da postanu samostalni u odraslom dobu. Iz tog razloga neophodno je da razvoj socijalnih veština bude jedan od glavnih ciljeva u inkluzivnim školama, omogućavajući deci sa PSA da imaju koristi i od obrazovanja i od interakcije sa svojim vršnjacima bez PSA. *Cilj:* Stoga, cilj studije je da analizira strategije korišćene u inkluzivnim kontekstima za promociju razvoja socijalnih veština kod učenika sa PSA. *Metod:* U studiji učestvuje dvadeset učenika sa PSA uzrasta od šest do 11 godina. Direktno posmatranje i intervjui sa njihovim nastavnicima omogućili su analizu nastavnih strategija koje unapređuju socijalne veštine učenika sa PSA u redovnim školama. *Rezultati:* Socijalnu interakciju najčešće iniciraju nastavnici i vršnjaci, a kada dete sa PSA započne interakciju, ona je pretežno usmerena ka nastavniku koji pruža dodatnu podršku. Pored toga, socijalna interakcija je pod velikim uticajem aktivnosti u učionici i nastavnika koji pruža dodatnu podršku. *Zaključak:* Razvoj socijalnih veština kod učenika sa PSA zavisi od stepena strukturiranosti prostora i aktivnosti u kojima učestvuju učenici sa PSA, uloge nastavnika i vrste kurikularnih aktivnosti.

Ključne reči: socijalne veštine, poremećaj iz spektra autizma, inkluzivno obrazovanje, nastavne strategije, nastavnici koji pružaju podršku

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Examining the connections between teacher self-efficacy and parental involvement practices

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Introduction. Teacher self-efficacy and parental involvement are closely connected and can both have a significant impact on student success. *Objectives.* This article examines the connections between teacher self-efficacy and parental involvement practices. The idea that parental involvement and teacher self-efficacy have a positive influence on students' academic achievement is widely accepted. *Methods.* A quantitative study was conducted to examine the levels of self-reported self-efficacy and parental involvement of 600 special education teachers in Greece. *Results.* The results revealed that teacher self-efficacy is significantly positively correlated with parental involvement in pedagogical work. *Conclusion.* Overall, the research reviewed in this article suggests that special education teachers in Greece with a high level of self-efficacy involve parents in the education of their students more often. This is very important because high levels of parental involvement can contribute to better education of students with special needs.

Keywords: self-efficacy, parental involvement, special education teachers

Introduction

In recent years, there has been increasing recognition of the importance of parental involvement in children's education. Numerous studies have shown that when parents are actively involved in their children's education, it can have a positive impact on students' academic achievement and motivation (Hill & Taylor, 2004). One factor that has been found to play a crucial role in parental involvement is teacher self-efficacy. Teacher self-efficacy refers to a teacher's

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belief in their own ability to positively impact and engage students in learning. Research has shown that when teachers have high levels of self-efficacy, they engage more often in practices that promote parental involvement, such as regular communication with parents, involving parents in decision-making processes, and providing resources for parents to support their child's learning at home. The present research has aimed to contribute to the information and knowledge base regarding teachers' self-efficacy and how they view parental participation in the educational process, specifically in the context of special education.

Exploring Special Education Teacher's Self-Efficacy

Bandura (1997) introduced the construct of self-efficacy in his social cognitive theory. Teacher's self-efficacy refers to the capability of teachers to effectively handle the tasks, obligations, and challenges related to their work. It is perceived as the teachers' ability to positively influence a student's participation in the learning process and, therefore, get the desired outcomes (Tschannen-Moran & Woolfolk Hoy, 2001). Self-efficacy is a teacher's expectation of the results they will achieve in a specific learning environment (Ross et al., 2001). Therefore, it is a significant factor for both teachers and students (Hussain & Khan, 2022).

Teachers with high efficacy are able to complete their assignments and goals, manage their classrooms more effectively, and more easily adopt innovative teaching methods to meet the needs of their students (Artino, 2012). On the other hand, teachers with low levels of self-efficacy avoid difficult tasks and do not trust their own capabilities. Self-efficacy can also positively affect students' achievements, strengthen their learning motivation (Swarnalatha, 2019), and facilitate their achievement of goals (Hussain & Khan, 2022).

There is a growing number of studies that examine the important role of teachers' self-efficacy in the inclusion of students with special needs (Woodcock et al., 2022). It has been found that high levels of teacher self-efficacy contribute to a more positive view toward the inclusion of special needs students, and the probability of excluding students from learning is reduced (Savolainen et al., 2020; Woodcock & Jones, 2020). In the study of Woodcock et al. (2022), it is also mentioned that teachers with high self-efficacy employed teaching methods that made their classrooms more enjoyable and more inclusive, where all students are engaged in the learning process in a safe learning environment. In special education classes, the complexity of the different learning features that a teacher must deal with, as well as the limited support that a teacher can have in a special education classroom, can negatively affect the teachers' perception of self-efficacy (Anglim et al., 2018).

Examining the connections between teacher self-efficacy and parental involvement practices can provide valuable insights into understanding how

teachers perceive their own abilities and how this affects their engagement and collaboration with parents (Dussault et al., 2004).

The Role of Parental Involvement in Education

Parental involvement can take different forms, such as: assistance with homework, discussions with the child about school issues, visiting schools to discuss with teachers (Yang et al., 2023), participation of parents in the process of their children's educational experience (Pramanik et al., 2023), or parents' collaboration with teachers in order to enhance learning in the school or home environment (Fisher & Kostelitz, 2015). Since home and school are the main environments where learning occurs, this collaboration is vital for the benefit of children (Ihmeideh & Oliemat, 2015). Setting objectives, assessing results, and creating parent-teacher relationships are all necessary steps in the implementation of parental participation (Epstein & Sheldon, 2019). According to Epstein et al. (2011), the main framework for a child's educational experience comes from a combination of support activities from the community, school, and home. The advantages to the child's learning and development increase with the level of collaboration among those factors. Research suggests that when parents are actively involved in their child's education, improved academic outcomes, increased student engagement, and enhanced teacher self-confidence and self-efficacy can be created (Barger et al., 2019).

The impact of parental involvement on students with special needs or vulnerable groups that belong to minorities is a matter of ongoing research. Children from underprivileged families who experience lower levels of parental support are more likely to experience dropouts in school settings (Yang et al., 2023). Efforts to include parents of children from low socioeconomic households can help to lessen educational inequality (Neuenschwander, 2020). The purpose of the present study was to examine the relationship between the teacher's self-efficacy and parental involvement of children with special educational needs.

Connections Between Teacher Self-Efficacy and Parent Engagement

Many studies deal with the impact of the level of teacher self-efficacy on parent involvement. These studies indicate that effective parental engagement is connected with teacher self-efficacy. In general, more parental involvement has been linked to increased levels of teacher self-efficacy (Krizman, 2013). Teachers' perceptions of the role that parents play in their children's education are crucial. When teachers perceive parents as partners in children's education, they have more confidence in their work, leading to better educational outcomes (Pramanik et al., 2023). Another study found that elementary teacher self-efficacy and parental involvement self-efficacy are factors that contribute to the extent to which the teacher will be engaged with the family during the child's education (Davis, 2022). According to Davis (2022), many elementary

teachers lack the self-efficacy to impact their students' home environment. Teachers with higher levels of self-efficacy are more likely to believe in the importance and effectiveness of parental involvement, and as a result, they are more motivated and confident in their ability to engage parents in their child's education. There are also studies that examine the impact of parental involvement on teachers' self-efficacy. Parental involvement can also affect teachers' self-efficacy. Domina (2005), Lawson (2003), and E. Skaalvik & S. Skaalvik (2010) demonstrate in their studies that wrong parental participation may have a detrimental effect on teachers' efficacy if it does not give them the tools they need to make adjustments. That would guarantee a child's achievement and may incite resentment against parents due to their excessive involvement in social situations and their perceived authority.

These findings suggest that teacher self-efficacy plays a crucial role in fostering effective communication and collaboration between teachers and parents. Overall, the connections between teacher self-efficacy and parental involvement practices demonstrate the importance of building educators' confidence in their ability to effectively engage parents.

Method

Research design

This quantitative study was aimed at analyzing the relationship between teachers' self-efficacy and parental involvement practices. The quantitative approach uses self-report psychometric instruments to gather data from many individuals and then performs statistical analyses to answer research questions (J. W. Creswell & J. D. Creswell, 2022). Other studies have explored the topic of self-efficacy in the context of working in inclusive education environments. The questionnaire was chosen to explore the research questions. The current research used two academic scales: the Teacher Sense of Efficacy Scale (TSES) and the Parent-Caregiver Relationship Scale (PCRS). Specifically, teachers' self-efficacy was assessed using the Teacher Sense of Efficacy Scale (TSES, Tschannen-Moran & Hoy, 2001). Recognizing the conceptual and methodological problems of tools for measuring teacher self-efficacy, Tschannen-Moran & Hoy (2001) developed a self-report scale to explore teachers' sense of effectiveness. Based on the self-efficacy scale of Bandura (1997), the researchers used exploratory factor analysis and concluded that there are three factors of teachers' self-efficacy, relating to teacher self-efficacy for instructional strategies, classroom management, and student engagement. This scale has been translated and validated in the Greek language by Tsigilis et al. (2010), where the suitability of the TSES to assess teachers' efficacy within the Greek educational context is supported.

The views of the teachers regarding the extent of parental involvement were collected with the use of the Parent-Caregiver Relationship Scale (PCRS) by Elicker et al. (1997), adapted by Rentzou (2011). It includes 35 items that measure parental

involvement as a total score, as well as three separate dimensions of trust/confidence, collaboration, and affiliation (Elicker et al., 1997).

Sample

The sample included 600 special education teachers working in primary and secondary schools in Greece. The study utilized a sampling method that was convenient and non-probable based on the availability of suitable candidates to take part in the research (J. W. Creswell & J. D. Creswell, 2022). The sample contained 55% (N = 328) women, while 45% (N = 272) were men.

Results

Given the results of the normality tests, non-parametric Spearman rho correlations were performed between the dimensions and subscales of the study. Results, which are presented in Table 1, show that there were statistically significant small-sized correlations between teacher self-efficacy and its subscales, with parental involvement in pedagogical work and its subscales (all $p<.001$). Specifically, the dimension of teacher self-efficacy had significant positive correlations with parental involvement in pedagogical work (rho=.16), as well as with its subscales of trust/confidence (rho=.13), collaboration (rho=.24) and affiliation (rho=.14). The same was true for the dimension of parental involvement in pedagogical work which, apart from the low positive correlation with the dimension of teacher self-efficacy, had significant positive correlations with the self-efficacy subscales of teaching strategies (rho=.32), and involving students in the education process (rho=.30), as well as a significant negative correlation with classroom management (rho=-.343). In fact, the self-efficacy subscale of classroom management had significant negative correlations not only with the dimension of parental involvement in pedagogical work but also with all its subscales, trust/confidence (rho=-.34), collaboration (rho=-.32) and affiliation (rho=-.14).

Therefore, teachers' self-efficacy and parental involvement of children with special educational needs were statistically significantly correlated with low positive correlations, except for the subscale of teacher self-efficacy in classroom management, which had a significant and negative correlation with parental involvement in pedagogical work and all of its subscales.

Table 1

Non-parametric Spearman rho correlations between the dimensions and subscales of the study (teacher self-efficacy, parental involvement in pedagogical work-teacher responses)

		Parental involvement in pedagogical work (Total)	Trust/ Confidence	Collaboration	Affiliation
Teacher self-efficacy (Total)	rho	.157*	.129*	.237*	.142*
	p	.000	.002	.000	.000
Teaching strategies	rho	.319*	.275*	.376*	.200*
	p	.000	.000	.000	.000
Classroom management	rho	-.343*	-.339*	-.316*	-.144*
	p	.000	.000	.000	.000
Involving students in the educational process	rho	.299*	.283*	.364*	.237*
	p	.000	.000	.000	.000

* p<.001

Discussion

The results of this study supported Bandura's theory, suggesting that teachers with higher levels of self-efficacy engage in parental involvement practices more often and perceive themselves as more capable of including their students' families in the educational process. This study assessed the views of 600 special education teachers in Greece regarding their connections between teacher self-efficacy and parental involvement practices. There were small statistically significant correlations between the dimension and subscales of teacher self-efficacy (teaching strategies, involving students in the education process) with those of parental involvement in pedagogical work (trust/confidence, collaboration, affiliation). This result is consistent with other studies that demonstrate that high teacher self-efficacy positively affects teachers' perceptions of positive outcomes through parental involvement because instructors who are confident in their own skills are more comfortable involving parents in a child's education (Ekornes & Bele, 2022; Kim, 2009).

The remaining teacher's self-efficacy subscale of classroom management had statistically significant negative correlations with parental involvement in pedagogical work and its subscales. This result is contradictory to the assumption that high levels of parental involvement have positive effects in alleviating classroom management problems and, hence, enhancing the self-efficacy of a teacher in classroom management. Cheng and Chen, (2018) mention that parents should take an active role in their children's education by

participating in classroom management. In the long term, parental involvement in their children's education will be more potent the sooner it starts. In the field of special education, Salleh and Rosli, (2019) mention that school administrations should create initiatives that foster the cooperation between teachers and parents of children with learning disabilities in order for misbehavior and discipline problems to be handled more effectively.

Interpreting the negative correlation between classroom management and the other subscales is crucial. Based on the available literature, one possible explanation is that teachers who focus too much on classroom management may not have as much time or energy to devote to other aspects of teaching, such as student engagement and instructional strategies. By prioritizing classroom management, teachers may neglect other important areas of their practice, which could have negative consequences for overall teaching effectiveness. Alternatively, teachers who are less confident in their classroom management ability may overcompensate by emphasizing control and discipline rather than other more student-centered practices. This explanation aligns with the findings in one study (Freiberg et al., 2009), which noted that it is difficult for teachers to both control student behavior and provide for complex instruction; if there is a choice between the two, complex instruction often suffers. In summary, the negative correlation between classroom management and the other subscales suggests that there may be a trade-off between focusing on classroom control and other important aspects of teaching. This underscores the importance of a balanced and holistic approach to classroom management that also prioritizes student engagement, effective instruction, and other key elements of teaching effectiveness.

Teacher self-efficacy, or teachers' belief that they can be effective in the goals and tasks they set for themselves in their teaching career, is strongly determined by their adequacy of knowledge or competence, and by the existence of appropriate social support. These factors are important for teachers' sense of professional commitment (Minghui et al., 2018).

Limitations of the study: The field research can contribute to a better understanding of the factors that impact teacher self-efficacy and teachers' perceptions of parental involvement in children's education. More precisely, questionnaires collect the views and attitudes of individuals but cannot gather experimental data on people's actual behavior as they relate to self-efficacy and parental involvement in pedagogical work. Due to the difficulty of creating experimental methods for measuring self-efficacy and parental involvement in pedagogical work, future research can merge quantitative and qualitative data with observational data gathered in the classroom to triangulate the findings and uncover how they can be applied in real-world settings.

The present study did not examine parents' and children's perspectives on parental involvement in pedagogical work. In the future, comparing research to teachers' views could be beneficial.

Conclusion

The study concludes that teacher self-efficacy and teacher views on parental involvement in children's educational process are significantly correlated, which aligns with Meador's (2019) findings. Specifically, he reported that teachers' sense of self-efficacy is related to parental involvement when teachers with high self-efficacy are able to collaborate effectively and constructively with parents to support the child's learning (Meador, 2019). Teachers' self-efficacy at school is important for the sense of achievement and competence it inspires, where the teacher successfully sets and accomplishes academic goals while being able to adapt to change and be patient in the face of potential obstacles to education (Versland, 2018).

Parental involvement in pedagogical work, involving constructive communication with the teacher and the school, is important given that the family significantly shapes the child's learning and promotes their development (Epstein & Sheldon, 2019). Parental involvement enables parents to contribute to the decision-making processes regarding their child's education, which include the content of lessons and teaching methods. Determining the nature and level of parental involvement in special education can be a complex process as it involves diverse relationships and behaviors developed at both the school and home.

Furthermore, parental involvement in pedagogical work can have a positive impact on the cognitive, social, and emotional development of the child. The child's academic performance is based on their family history, their environment, as well as their school and educational system (Roy & Giraldo-García, 2018). According to Al-Dababneh (2016) and Koch (2016), parental involvement plays a significant role in the success of special education programs. Research has demonstrated the benefits of involving parents in pedagogical work since it can enhance the child's psychological health and academic performance (Park & Holloway, 2018).

Parental involvement in the pedagogical work of children with special educational needs is complicated by the fact that such parents may worry more about sharing knowledge about their child's health rather than being included in the decision-making processes at school (Alaluf et al., 2016). Teachers' perceptions and emotions toward parents influence their interactions and communication with them. Their attitudes towards their parents affect their relationships with the child and the family. Lastly, the teacher's attitude towards parents can affect their ability and motivation to be involved in their child's education (Herman & Reinke, 2016).

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Ispitivanje veza između samoefikasnosti nastavnika i prakse uključivanja roditelja

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Uvod: Samoefikasnost nastavnika i uključenost roditelja usko su povezani i oba mogu imati značajan uticaj na uspeh učenika. *Ciljevi*: Ovaj rad ispituje veze između samoefikasnosti nastavnika i prakse uključenja roditelja. Ideja da roditeljsko učešće i samoefikasnost nastavnika pozitivno utiču na akademska postignuća učenika široko je prihvaćena. *Metode*: Sprovedena je kvantitativna studija kako bi se ispitali nivoi samoefikasnosti i uključenosti roditelja 600 nastavnika specijalnog obrazovanja u Grčkoj. *Rezultati*: Rezultati su pokazali da je samoefikasnost nastavnika u značajnoj pozitivnoj korelaciji sa uključenošću roditelja u pedagoški rad. *Zaključak*: Sve u svemu, istraživanje prikazano u ovom članku sugeriše da nastavnici specijalnog obrazovanja u Grčkoj sa visokim nivoom samoefikasnosti češće uključuju roditelje u obrazovanje svojih učenika. Ovo je veoma važno jer visok nivo uključenosti roditelja može doprineti boljem obrazovanju učenika sa posebnim potrebama.

Ključne reči: samoefikasnost, uključenost roditelja, defektolozi

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Impact of teacher educational background on special education environment

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Introduction. Schools for students with disabilities are one of the essential programs that the government should pay attention to. There are many aspects to consider in providing special education services, including the quality of learning. Teachers play a crucial role in the quality of learning for students with special needs. The role of teachers can be measured through their level of work involvement. *Objective*. The purpose of this study is to determine the level of work involvement of teachers in special and inclusive schools concerning the quality of learning. *Method*. We used the quantitative research method with descriptive statistical data analysis. The sample included 64 teachers from special education schools and 46 teachers from inclusive schools. *Results*. The study results show that teachers' work involvement in schools for students with disabilities falls under the high category. In contrast, the work involvement of teachers in inclusive schools falls under the average category. *Conclusion*. It can be concluded that teachers in schools for students with disabilities are more optimal in fulfilling their roles in providing quality learning for children with special needs than teachers in inclusive schools.

Keywords: work engagement, quality of learning, special education, teacher performances

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Introduction

Schools for students with disabilities are educational services provided expressly for students with mental, intellectual, sensory, or physical disabilities which are grouped into various categories. The Indonesian government has ensured the right of education for children with disabilities through Article 32 Paragraph 1 of the National Education System Law. Special education services are provided to assist them in reaching their full potential as much as possible. In Indonesia, Schools for students with disabilities are divided into two special services for students with disabilities: segregated and inclusive. The segregated service system is generally referred to as schools for students with disabilities, which specifically provide education services for SWD (Students with Disabilities) and are separate from the regular education service system for children (Finnvold, 2019; Irawati, 2020).

Meanwhile, schools that accommodate regular children represent the education service that utilizes the inclusive system. Then, it provides inclusive education for SWD alongside other students within one educational environment (Pit-ten Cate et al., 2018; Wilson et al., 2019). This milestone is a significant breakthrough, and the government has made new changes regarding inclusive school policies, ranging from perspectives and attitudes to educational processes focusing on individual needs without discrimination. In Indonesia, inclusive schools have been implemented since 2001, where regular schools integrate SWD in the same school environment with two types based on their needs and academic abilities. First, this system is called pull-in, where SWD students with good learning readiness can study in class with non-SWD students. At the same time, pull-out is done by placing SWD with special needs services in different classes or special classes. Nevertheless, the success of implementing such programs is strongly related to the role of teachers in schools (Galaterou & Antoniou, 2017; Junaidi, 2020; Parey, 2019).

Teachers are responsible for the quality of the conducted learning process (J. Lee, 2018; S. W. Lee & Lee, 2020). Providing learning for students with disabilities requires specific competencies that teachers must possess. Such requirements are based on the fact that students with disabilities have diverse characteristics that impact their abilities and unique learning needs (Irvan & Dewi, 2018). Teachers are considered a source of learning, indicating that the role of teachers is to ensure the quality of the education provided to students. However, in Indonesia, the number of teachers with a background in special education is minimal. Based on the calculated data, the number of school-aged individuals with disabilities in Indonesia exceeds 2 million. In contrast, the number of teachers with a background in Special Education is relatively limited (Amka, 2019). Such inequality is certainly irrational, resulting in the involvement of teachers who lack the appropriate competencies. This situation refers to the phenomenon that only 14 universities in Indonesia have special

education study programs. They can only produce between 500 and 800 graduates of special education teachers each year. The situation triggered the importance of measuring the quality of learning involving special education teachers. This article is an initial step as a preliminary study to understand the extent of teachers' involvement in carrying out their duties and roles as teachers for students with disabilities. In the context of inclusive education, especially in Indonesia, there are two teachers with different roles. The Class Teacher plays a role in guiding learning classically, and the Special Assistant Teacher plays a role in providing individual assistance for SWD. This clear division of roles ensures that each student receives adequate attention and support according to their needs. Therefore, completing this study is essential as it is closely related to the impacts of learning quality. Teacher performance is one of the indicators that can be observed to assess the quality of the education provided, including whether it falls under the high-quality category (Setyosari et al., 2022; Widajati et al., 2020). If learning is conducted effectively, it can be ensured that the quality of education will continue to improve.

Method

This research investigates the involvement of teachers both in schools for students with disabilities and inclusive schools. This research utilizes a quantitative research method. Next, the data is presented in descriptive form based on the measurement criteria of the instrument. Data was collected by involving teachers in Malang City, Indonesia. Teacher participants were limited to those with significant roles during learning for students with disabilities, and this project included 64 special school teachers and 46 inclusive school teachers.

The instrument used was the Utrecht Work Engagement Scale (UWES-17) questionnaire (Schaufeli et al., 2003). There are three indicators measured by UWES, namely Vigor, Dedication, and Absorption, which aim to depict teachers' performance in delivering quality learning for students with disabilities (Irvan & Jauhari, 2023; Kristiana et al., 2019). The UWES-17 consists of 17 statement items, which include Vigor (6 items), Dedication (5 items), and Absorption (6 items) (see Table 1). Based on the reliability test results with Cronbach Alpha, it shows a score of .914, so this data can be interpreted as reliable (see Table 2). The data analysis method in this research utilizes quantitative descriptive analysis techniques. The data is then processed in numerical form and presented descriptively with statistical information according to the data. The results of the data analysis are used as a basis for considering new hypotheses regarding the quality of learning provided in the special education setting.

Table 1

Cronbach Alpha Statistic

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
v1.1	68.98	157.177	.728	.904
v1.2	69.24	161.830	.700	.906
v1.3	70.11	164.055	.460	.913
v1.4	69.85	161.065	.609	.908
v1.5	69.15	163.910	.623	.908
v1.6	69.33	164.402	.553	.910
d2.1	68.72	173.229	.300	.914
d2.2	68.87	160.294	.750	.905
d2.3	68.65	170.632	.474	.912
d2.4	68.52	170.744	.494	.911
d2.5	69.26	160.330	.600	.909
a3.1	69.35	164.499	.514	.911
a3.2	70.13	162.738	.558	.910
a3.3	69.15	161.021	.731	.905
a3.4	70.15	161.065	.676	.906
a3.5	69.78	155.329	.707	.905
a3.6	69.89	155.877	.652	.907

Table 2

Reliability Statistics

Cronbach's Alpha	N of Items
.914	17

Results

The collected data includes a tabulation of the work involvement scores among SWD teachers, accompanied by the demographic information of the questionnaire respondents. The data tabulation will be processed to obtain the level of work involvement among special needs and inclusive school teachers.

Table 3

Demographic data

Working institution	Education			Frequency
	SE	NSE	Unknown	
SPECIAL SCHOOL	36 (56.25%)	12 (18.75%)	16 (25%)	64
INCLUSIVE SCHOOLS	4 (25%)	35 (76%)	7 (15.3%)	46

SE: Special Education Background; NSE: Non-Special Education Background

The respondents' demographics in Table 3 show that the research respondents amounted to 110 individuals, consisting of various categories of workplaces and their highest level of education attained. In schools for students with disabilities, there were 36 respondents, representing 56.25% of the total sample, with their highest education being in SE. There were 12 respondents, representing 18.75%, with NSE. Additionally, there were 16 respondents, or 25%, whose highest education level was unknown. There were four respondents in inclusive schools, representing 8.7% of the total sample, with their highest education being SE. There were 35 respondents, or 76%, with NSE. Additionally, there were seven respondents, or 15.3%, whose highest education level was unknown. Teachers' work involvement refers to a state in which they are mentally and physically engaged in their work, resulting in optimal individual performance and the ability to achieve predetermined work targets. Teachers' work involvement is measured using the UWES-17, which consists of three indicators: Vigor (enthusiasm at work), Dedication (Dedication to work), and Absorption (absorption in position).

Here are the results of the descriptive analysis of the questionnaire data on work involvement per indicator distributed to schools for students with disabilities and inclusive school teachers.

Table 4

Special school teachers score

	N=64	Minimum	Maximum	Mean
VIGOR	64	16	32	24.95
DEDICATION	64	17	30	24.86
ABSORPTION	64	13	32	23.75

Overall, teachers in schools for students with disabilities are highly involved in their work (see Table 4). However, one indicator, absorption (immersion in work), obtained the lowest average score of 23.75 overall among the respondents of special school teachers. Based on the data (see Table 2), it can be seen that the average score of the absorption indicator is lower at 32% compared to the average scores of the vigor and dedication indicators. Therefore, it can be concluded that teachers in schools for students with disabilities have a lower level of absorption and dedication in their work compared to vigor.

Table 5

Inclusive school teachers score

	N= 64	Minimum	Maximum	Mean
VIGOR	46	6	33	25.52
DEDICATION	46	17	30	24.46
ABSORPTION	46	13	34	23.72

Based on Table 5, the aspect with the lowest average score overall is the absorption indicator, which represents the level of immersion in work. In summary, it can be concluded that teachers in schools for students with disabilities and inclusive schools have a lower level of absorption in their work compared to the aspects of vigor and dedication. Overall, inclusive school teachers are relatively involved in their work optimally. However, one indicator, absorption (immersion in work), obtained the lowest average score of 23.72 (see Table 5) overall among the respondents of inclusive school teachers. Absorption in work means that a worker is fully focused and enjoys their work, making it difficult for them to detach themselves from their work. Therefore, teachers in inclusive schools have a less optimal level of absorption in their work, which indicates that they are not fully immersed in their work when dealing with SWD.

After obtaining the results of the work involvement for each indicator, the researcher categorized the work involvement scores into five categories: Very High ($x > 94$), High ($80 < x \leq 94$), Average ($67 < x \leq 80$), Low ($53 < x \leq 67$), and Very Low ($x < 53$). These five categories will represent each level of work involvement that teachers of SWD in special and inclusive schools possess. Through this categorization, the researcher conducted quantitative descriptive data analysis to determine the frequency of samples and the percentage of respondents in each category of the teachers' work involvement questionnaire scores. Here are the results of the data analysis for the level of work involvement of teachers in schools for students with disabilities.

Table 6 shows that teachers in schools for students with disabilities, on average, have high work involvement. It means that teachers in schools for students with disabilities tend to have optimal levels of enthusiasm, dedication, and absorption in their work, resulting in their work involvement falling into the high category.

Table 6

The level of work involvement of special school teachers

	Frequency	Percentage	Valid percent
VERY LOW	6	9.4	9.4
LOW	12	18.8	18.8
AVERAGE	20	31.3	31.3
HIGH	23	35.9	35.9
VERY HIGH	3	4.7	4.7
TOTAL	46	100.0	100.0

The descriptive analysis results of the questionnaire data given to teachers in schools for students with disabilities indicate that work involvement is classified into the high category, with 36% (see Table 6) of the total. In this case, it means that teachers' work performance is also in the good category, indicating that the working institutions of teachers will continue to develop and adapt to the evolving educational landscape in the future.

Table 7

The level of work involvement of inclusive school teachers

	Frequency	Percentage	Valid percent
VERY LOW	3	6.5	6.5
LOW	10	21.7	21.7
AVERAGE	19	41.3	41.3
HIGH	12	26.1	26.1
VERY HIGH	2	4.3	4.3
TOTAL	46	100.0	100.0

Table 7 shows that teachers in inclusive schools have an average level of work engagement. This data indicates that teachers in inclusive schools have good enthusiasm, dedication, and absorption in their work. Still, it is not as optimal as individuals with work involvement in the high and very high categories. The descriptive analysis of the survey data provided to teachers in inclusive schools indicates that teachers' work involvement in inclusive settings is average. This

hypothesis means that teachers in inclusive schools demonstrate moderate enthusiasm, dedication, and absorption in their work, with a percentage of 41%. This explains that teachers in inclusive schools are reasonably engaged mentally and physically in their work, although not to the same extent as teachers in schools for students with disabilities. The opinion states that teachers with a good level of work involvement will have higher performance and productivity in their work, as well as healthier social relationships with their colleagues, compared to those who do not have good work engagement.

Discussion

Learning quality is the key to optimizing learning outcomes (Khamroev, 2021). Learning quality is one of the critical aspects that institutions must consider to provide education that meets the standards. Therefore, teachers need to be continuously evaluated as part of the support system. The educational background has long been studied in various sectors of employment associated with human resource performance (Carver et al., 2008). Such evaluation can be conducted through multiple means, such as classroom observations, teacher performance assessments, and the utilization of learning outcome data. Teacher work involvement can be defined as the level of motivation and dedication they possess in carrying out their duties and responsibilities. The higher the work involvement of teachers, the greater their motivation to contribute their best efforts in achieving educational goals (Minghui et al., 2018).

Teachers play a crucial role in the development of learning quality. They educate and guide students to achieve the set learning objectives. Such demands are justified as teachers are at the forefront, directly dealing with various challenges in the classroom learning process (Nugraha et al., 2022). The task of special school teachers is to facilitate learning quality adjusted to the needs and abilities of SWD (Septiana, 2017). The approach used by teachers is crucial in helping SWD understand and learn the given materials (Betts et al., 2013). However, these demands require specific skills that teachers generally do not possess. In Indonesia's education context, not all teachers know how to treat SWD. Specifically, Special Education study programs are available in several universities in Indonesia. This situation creates one of the challenges in realizing quality education (Mambela, 2010). Therefore, the level of teacher work engagement is considered an indicator of the learning quality they provide for students.

The work engagement of special school teachers plays a role in preparing and implementing the learning activities suitable for the needs and characteristics of each child with special needs (Irvan & Jauhari, 2023). In the process, teachers of students with disabilities (both in special and inclusive schools) have a heavier workload than general education teachers. Based on

their responsibilities, teachers are required to be able to conduct assessments and formulate learning content. Meanwhile, teachers in inclusive schools also need to be able to coordinate with homeroom or subject teachers (Dharma, 2020) so that the learning designs they develop are consistent with the content implemented in the classroom (Saloviita, 2020; Saloviita & Pakarinen, 2021). Of course, this situation is associated with their educational background, which generally relates to the skills they have acquired beforehand. Several cases have highlighted that educational background significantly influences student achievement (Carver et al., 2008; Delano et al., 2018; Pant & Srivastava, 2019).

The three dimensions of work engagement in the UWES-17 instrument measure teachers' performance in carrying out their professional roles (Carmona-Halty et al., 2019; Tran et al., 2020). Having high levels of the three indicators of work engagement, teachers can fulfill their roles as professionals (Klassen et al., 2012; Minghui et al., 2018). Theoretically, that statement strengthens the hypothesis that teacher work engagement impacts the quality of learning (Thaariq et al., 2023). The data analysis shows that most special education teachers in Malang have a high level of work engagement, representing 36% of the 64 respondents. From the three dimensions of the indicators, it is known that spirit and dedication have the same score, 34%, while appreciation has a slightly lower score, 32%. This indicates that although teachers in Malang's schools for students with disabilities have high work involvement, they have less work appreciation than spirit and dedication. These findings reinforce previous research results that experience is also associated with spirit and dedication in professional work (Arifin et al., 2014; Browning & Heinesen, 2007). Furthermore, the data presented earlier shows that respondents with SE have a more significant number than those without it. This reinforces the fact that the linearity of educational backgrounds influences the high level of work involvement among them (Perera et al., 2018; Topchyan & Woehler, 2021).

Meanwhile, inclusive school teachers are classified into the average or moderate category, representing 26%. This situation indicates that most inclusive teachers in Malang have suboptimal work involvement compared to special school teachers. The scores of each indicator dimension among inclusive teachers in Malang become important to consider. The score for spirit is 35%, dedication is 33%, and appreciation is 32%, which proves that inclusive school teachers have spirit and dedication in their work. However, the figures indicate they lack appreciation for their role as inclusive school teachers. These findings support the previous statement that educational linearity relates to teachers' work involvement scores. Therefore, this finding raises the suspicion that the scale of teacher engagement impacts the quality of learning. Previous literature reviews have highlighted the scale of teacher engagement that has implications for the quality of learning (Irvan et al., 2024).

By demonstrating high work involvement, teachers can prove their commitment to providing learning quality, meeting performance targets, and achieving desired end goals (Sancar et al., 2021). High work involvement can also positively influence teachers' work enthusiasm and provide them with comfort in accomplishing various tasks (Sims & Fletcher-Wood, 2021; Skinner et al., 2021). Such behavior can help create a more positive and productive work environment (Nugraha et al., 2022), ultimately enhancing the learning quality of SWD. However, several other studies concluded that work engagement produces a chain effect with other aspects. It does not directly affect the quality of learning and may intersect with aspects of job performance (Kuok et al., 2020) and self-efficacy (Rosyanti et al., 2021).

High work involvement in dedication, spirit, and appreciation can help teachers perform their professional roles to improve performance (Krismanto et al., 2023). Inclusive school teachers' mismatch in educational backgrounds contributes to assessing their professionalism in providing quality services for students with disabilities (Azizah, 2021; Yusuf, 2012). However, these findings serve as an important foundation for further research hypotheses. Moreover, this study supports relevant stakeholders in making informed decisions as follow-up actions to optimize educational services for children with disabilities.

Conclusion

Work involvement exhibited by teachers in several schools for students with disabilities in Malang falls into the high category. This finding indicates that teachers participate optimally, maximizing their full abilities to ensure their roles are effectively carried out. Meanwhile, the work involvement of inclusive school teachers in Malang is classified into the moderate category. This indicates that teachers in inclusive schools are sufficiently involved in their work but not as optimal as teachers in schools for students with disabilities. Educational institutions are advised to provide alternative solutions through training and other activities that can enhance teacher competence. Indeed, these alternatives also serve as solutions to address the limited availability of a workforce with relevant educational backgrounds. The various findings and results of this research analysis can be valuable as a foundation for further research. This study adds to the literature on human resource management in the context of inclusive and special education, as well as the importance of teachers' roles in supporting the learning of students with special needs. However, this study has not considered all factors that may influence teachers' work engagement, such as support from the principal, availability of resources, and workload. Future research is suggested to explore other factors that influence teachers' work engagement in inclusive schools, such as support from colleagues, school policies, or adequate availability of resources. In addition, evaluating the

effectiveness of recommended training and professional development programs can be an important step to understanding whether the solutions provided actually improve teachers' engagement and competence.

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Uticaj obrazovanja nastavnika na specijalno obrazovno okruženje

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Uvod: Specijalne škole su jedan od osnovnih vidova obrazovanja na koji vlada treba da obrati pažnju. Postoji mnogo aspekata koje treba razmotriti u pružanju usluga specijalnog obrazovanja, uključujući kvalitet učenja. Nastavnici imaju ključnu ulogu u kvalitetu učenja učenika sa teškoćama u razvoju i invaliditetom. Uloga nastavnika može se meriti kroz njihov nivo uključenosti u rad. *Cilj*: Svrha ove studije je da se utvrdi stepen radne uključenosti nastavnika u specijalnim i inkluzivnim školama u pogledu kvaliteta učenja. *Metod*: Korišćena metoda istraživanja je kvantitativna, sa deskriptivnom statističkom analizom podataka. Uzorkom su obuhvaćena 64 nastavnika zaposlenih u specijalnim školama i 46 nastavnika zaposlenih u inkluzivnim školama. *Rezultati*: Rezultati studije pokazuju da radna uključenost nastavnika u specijalnim školama spada u visoku kategoriju. Nasuprot tome, radna uključenost nastavnika u inkluzivnim školama spada u kategoriju proseka. *Zaključak*: Može se zaključiti da su nastavnici u specijalnim školama optimalniji u ispunjavanju svoje uloge u obezbeđivanju kvalitetnog učenja za decu sa posebnim potrebama od nastavnika u inkluzivnim školama.

Ključne reči: radno angažovanje, kvalitet učenja, specijalno obrazovanje, učinak nastavnika

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Empowering multilingualism in children with autism: Insights from parents and EFL teachers

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Introduction. In today's globalized world, the ability to use and understand more than one language, known as multilingualism, has become increasingly prevalent. Studies have demonstrated that children raised in multilingual environments can gain cognitive advantages, including improved problem-solving abilities, creativity, and cognitive flexibility. *Objectives.* This study aimed to explore the methods used by parents and teachers when teaching English as a Foreign language (EFL) to children with autism spectrum disorder (ASD), as well as the difficulties they face in this endeavor. *Methods*. The research methodology involved conducting interviews with a total of 14 participants, including parents and teachers of children with ASD. *Results*. The study showed that incorporating visual aids, repetition, and modeling into EFL instruction had positive outcomes for children with ASD. These strategies resulted in enhanced social skills and language abilities. Teachers faced challenges in creating effective teaching methods for children with ASD, yet they also recognized the impressive ability of these children to learn new languages. In addition, the study highlighted the significance of parents and teachers working together to create language learning programs that are effective for children with ASD. *Conclusion*. Additional research is necessary to develop a more comprehensive understanding of the difficulties that teachers encounter when instructing children with ASD in EFL. In order to further advance our understanding, it would be beneficial for future research to concentrate on developing and assessing inclusive language learning programs that cater to the specific requirements of children with ASD.

*Keywords***:** multilingualism, autism spectrum disorder, perspectives, English as a foreign language**,** qualitative research

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Introduction

Equality and equity in education are crucial for ensuring care and attention for all students, including those with special needs. Basic education is a right for all people, however, special needs children in Bali are often treated differently and isolated from average students. Countries have been recognizing special needs pupils more, but improved understanding and supportive school programs are needed. Schools and teachers lacked instructional abilities and material development to suit student demands (Padmadewi & Artini, 2017).

Multilingualism is becoming more common in today's globalized environment. According to research, multilingual youngsters have better problem-solving, creativity, and cognitive flexibility. The unique linguistic and cultural experiences that multilingual children are exposed to can lead to enhanced cognitive development (Coulmas, 2018; Shaaban et al., 2024).

Multilingualism may contribute to autistic symptomatology as a whole because multilingualism confers benefits on a wide range of cognitive and behavioral factors, and autism is characterized by difficulties in these factors. As a term, she used Multilingualism to describe participants who spoke more than two languages (Crockford, 2023).

Autism Spectrum Disorder (ASD) is presently understood as a neurodevelopmental disorder characterized by behavioral definitions, with symptoms that manifest in early childhood, endure throughout life, and occur in many contexts. Despite the genetic and neurological underpinnings of ASD, no biological markers have been discovered. Diagnostic determinations depend on direct observation, reported behaviors, and qualitative symptom descriptions, all of which are subjective assessments. Clinical competence is the sole guarantor of diagnostic accuracy, notwithstanding its perceived subjectivity (Kamp-Becker, 2024; Mohamed & Shaaban, 2024).

Multilingualism has numerous benefits, both in terms of academic success and social interaction. Children who are fluent in multiple languages excel in specific academic areas, possess a deep appreciation for cultural diversity, and are skilled at effective communication with individuals from various backgrounds. Although the impacts of multilingualism on cognitive development are intricate and influenced by multiple factors, it can pose challenges such as language mixing or interference. However, the study of multilingualism is a captivating field of research that offers insights into the connections between culture, cognition, and language (Aronin, 2018; Charamba, 2021; Shaaban et al., 2024).

Many years have been spent studying multilingualism. The number of bilingual people has grown with globalization. Speaking many languages improves cognition, academic performance, and cultural understanding. This multilingualism research is crucial because it reveals how the brain processes and stores language. Festman (2021), Higby et al. (2013), and Irgashevich et al.

(2022) noted that such knowledge can substantially aid language instruction and intervention programs.

Research Questions

R.Q.1: What effective teaching methods and strategies can support language learning for ASD?
R.Q.2.: How do parents of children with ASD support their child's language learning in English as a Foreign Language classes?
R.Q.3.: What are teachers' and parents' thoughts on technology's effectiveness for language learning for children with ASD?

Literature Review

Researching multilingualism in children with autism spectrum disorder has policy and practical consequences. Conner et al. (2021) found that encouraging a child's native language alongside the mainstream language in school can improve their social language skills and academic growth. ASD kids can improve their executive function and social skills by learning different languages. These benefits can help shape language education, cultural diversity, and ASD language learning practices. Thus, ASD youngsters need effective language learning and teaching methodologies. Switching languages may improve attentional control and behavioral regulation in typically developing bilingual children (Davis et al., 2024; Goodrich et al., 2022; Howard et al., 2024; Shaban et al., 2024). Therefore, multilingualism is important for both typically developing and ASD youngsters.

Multilingualism may offer cognitive and social benefits, requiring tailored evaluation and intervention strategies (Kroll & Dussias, 2017). Lorah et al. (2015) recommend a combination of applied behavior analysis, naturalistic teaching, and computer-assisted interventions as effective approaches for language intervention in individuals with ASD.

Kamp-Becke (2024) states that ICD-11 and DSM-5 autism definitions differ. The ICD-11 text has more symptom combinations than DSM-5, which may affect clinical practice, care, and research. Clinically, this approach cannot separate autism-like features from other mental diseases. An observable, behavioral, and neurodevelopmental dysfunction becomes an interior experience disorder. Many notions are subjective and non-falsifiable. This will increase false positives, prevalence, and ASD service access gaps. Reduced ASD specificity will increase heterogeneity, making replication challenging. Precision medicine hinders our understanding of ASD etiology and molecular mechanisms. The clinical ASD phenotype should be described and measured more precisely, quantitatively, and scientifically. Next, the core subtypes/endophenotypes should be established, and the symptoms should be described

precisely for ASD diagnosis. Neurobehavioral ideas must be integrated into a precise, objective clinical symptom classification.

It is widely acknowledged that children with ASD exhibit a wide range of language development abilities, making it imperative for many of them to receive speech therapy. Research conducted by Chu et al. (2020) has shown that while the development of expressive language in children with ASD follows a similar pattern to that of typically developing children, there is a noticeable delay. Therefore, it is crucial to provide these children with appropriate interventions to ensure they reach their full potential in terms of language acquisition.

Language, social communication, pragmatics, and generalization may be difficult for ASD kids. Due to language complexity, multilingual ASD children may need specialized language evaluation and intervention. Understanding and treating ASD children's language learning problems is essential to their language and social development. ASD EFL students need effective teaching methods tailored to their learning needs and challenges. Visuals, routines, tailored instruction, and adaptive materials and activities boost engagement and comprehension. Multimodal and chunking improve language acquisition. ASD children need constant language teaching and reinforcement (Alenezi, 2023; Chu, 2020; Shaaban & Mohamed, 2024; Shi, 2018).

Stokes et al. (2017) found little evidence of educational treatments for high-functioning autism spectrum disorder pupils. Research on specific methods can aid evidence-based practices. Principals and instructors found many effective methods, including organization and individual requirements. Misunderstanding, disorganization, and poor communication were detrimental. A consistent and reliable schedule is crucial for aiding ASD children studying EFL. They thrive in organized environments, which reduces unfamiliarity and discomfort. After a warm-up, language topics are introduced. Practice and a review follow. Visual schedules or checklists assist kids grasp activity sequence and length. Effective EFL teaching tactics for ASD children require a well-structured schedule (Brunstahler & Russo-Gleicher, 2015; Stokes et al., 2017).

Learning a new language takes dedication, focus, and determination. In foreign language (FL) instruction and study, emotions are always important (Krashen, 1981). Parental involvement is needed for ASD EFL language learning. Creating a language-rich home, speaking English, sharing books, and playing language-learning games work. Cooperate with the child's EFL teacher and model correct English. Motivation and engagement increase when accomplishments are recognized. Parents must help ASD children learn language and succeed in EFL. Several studies have underlined parental involvement (Mohamed, 2021; Mohamed & Shaaban, 2024; Shaaban et al., 2024; Yan, 2022).

In an EFL setting, instructors and parents must work together to help ASD children learn language. They can identify the child's weaknesses and strengths and build personalized learning techniques/strategies together. Teachers can also provide home language development tips. Parents' insights into their children's interests help teachers tailor language learning exercises. Language acquisition benefits from collaborative techniques, according to this study. By creating a helpful and encouraging environment, students can improve their language skills (Conner et al., 2020; Mohamed et al., 2024; Sakarneh, 2021; Stehle Wallace, 2022).

Speech therapy is highly effective in treating these delays (Chu et al., 2020). Parents' beliefs about bilingualism may not consistently match their linguistic actions. Training programs and online parent education have proven to help offer assistance to educators in this scenario (McDevitt, 2021). This study is valuable in the realm of teaching EFL to ASD children due to the little existing research. The aim is to develop influential interventions and offer efficient support measures.

Inclusive practices have been shown to improve ASD students' communication skills. Three studies have illuminated inclusive education. Tomić and Nikolić (2021) studied parental attitudes towards including children with disabilities. Parents were largely complimentary, regardless of gender, education, or location. However, significant developmental disorders, including autism and major intellectual impairments, were less well-liked. Sakarneh et al. (2021) examined the Jordanian general classroom inclusion of ASD students. The study illuminated ASD inclusion difficulties and potential from teachers' perspectives. In 2020, Conner et al. examined the exposure of ASD children from culturally and linguistically diverse backgrounds to multiple languages. Their research showed that inclusive educational programs must consider language diversity.

This study fills a research gap by asking parents and teachers how to best support multilingual ASD children's language development. In multilingual settings, ASD children can struggle with language delays and challenges. The study's findings can help create successful linguistic interventions for these ASD children, enhancing their quality of life and future prospects.

Method

Sample

While many children with ASD study EFL, the study used purposive sampling and had a limited sample size. The study aims and criteria are used to select individuals for purposeful sampling (Guest, 2014). This study sought to understand the teaching techniques and issues faced by parents and teachers of ASD children studying EFL. The study specifically selected people with direct expertise and knowledge in this area to

gather rich and detailed data that could provide important insights and understanding. The findings were limited by the small number of respondents, but the focus was on depth rather than breadth, allowing for a detailed evaluation of the research topics.

Tables 1 and 2 show five EFL teachers and nine multilingual ASD parents were purposively selected. This method ensured that participants were qualified to contribute full research insights (Guarte & Barrios, 2006). EFL teachers of ASD students may have specific language development skills. The challenges and pleasures of raising bilingual ASD children may be revealed by their parents.

Table 1

The Characteristics of EFL Teachers Involved in the Research

	Gender	Age	Teaching Experience	Qualifications
T 1	F	34	9	Master's degree in special education /TESOL
T 2	M	40	14	TESOL/Diploma in Special Education
T 3	F	27	4	TESOL/Diploma in Special Education
T 4	M	45	17	Master's degree in special education /TESOL
T 5	F	31	5	Bachelor's degree in special education/TESOL

Table 2

Characteristics of Parents Involved in the Study

	Gender	Age	Child's Age	Exposure to different languages
P1	F	39	10	Arabic, English
P 2	M	41	11	Hindi, English
P 3	F	31	7	Arabic, English
P 4	M	37	8	Pakistani, English
P 5	F	42	6	Arabic, English
P 6	M	38	9	Arabic, English
P 7	F	39	8	Arabic, English
P 8	M	37	10	Hindi, English
P 9	F	36	7	Arabic, English

Instrument

The study investigated EFL teaching tactics for ASD children's language learning. A structured interview methodology based on research questions (RQ1, RQ2, RQ3) ensured uniformity and standardization. Five EFL teachers with experience teaching or assisting ASD children and Nine parents were interviewed via email. The data was analyzed to find effective tactics, teacher and parent obstacles, and recommendations for assisting ASD children's EFL language development. To collect qualitative data on their experiences and thoughts supporting language acquisition for

ASD children in EFL, participants were asked nine open-ended questions. Questions were meant to acquire thorough information from EFL teachers and parents.

Procedure

Email interviews with parents and EFL teachers of children with ASD used a semi-structured guide of open-ended questions to assess language learning approaches and problems. To ensure clarity, a small group tested the guide. We recruited participants via email and required written responses within two weeks. Participants could decline questions or leave the research at any time. Investigative and follow-up questions were utilized to understand respondents' responses. Interview data was analyzed thematically. To find patterns, themes, and commonalities in EFL instruction for children with ASD, the data were coded and categorized. Subjective viewpoints have disadvantages, yet interviews reveal perceived effectiveness. Future studies could add quantitative measurements to validate and evaluate their efficacy.

Data Analysis

This study used a qualitative approach to examine EFL teaching techniques and problems for parents and teachers of children with ASD. Qualitative methods like interviews were used to acquire rich and detailed insights from a few direct experiences. The research issue was explored in depth, capturing nuanced opinions and experiences (Rana et al., 2023). Thematic analysis was used to analyze email interview data. Researchers examined participant replies to identify research questions-related themes and trends. The researchers then categorized and subcategorized the topics to understand parents' and teachers' views on teaching English as a foreign language to children with ASD.

Results

An Overview of the Perspectives of EFL Teachers

1 – How would you tailor your teaching methods to create a supportive language learning environment for children with ASD?

Experienced teachers say ASD children may learn English as a foreign language through several methods. Teacher 1 commented, "Incorporating hands-on activities and visual aids has been particularly helpful for children with ASD." Teacher 2 adds, "Breaking down language concepts into smaller, more manageable parts can help children with ASD better understand and retain new vocabulary and grammar rules." Another teacher promoted patience, understanding, and customizing lessons to individual learning styles and needs. Teacher 3 stated, "Utilizing social narratives and authentic scenarios can assist children in recognizing the practical application of language and enhance

their motivation to learn." Instructor 5 stated, "By stimulating their senses and integrating physical activity, students are more inclined to maintain focus and retain new information."

Language inclusion for ASD kids requires customizing lessons to their needs and learning styles. Teacher 4 underlined that every ASD child has distinct issues and strengths. Different teaching approaches, resources, and tempos can promote a more inclusive and helpful learning environment. This approach tailors lessons to ASD children's language development needs.

EFL educators must identify and respond to the needs of students with ASD to foster a supportive and inclusive classroom atmosphere. Teacher 1 emphasized the importance of recognizing sensory sensitivities in ASD students and adjusting teaching strategies accordingly. Another teacher, Teacher 2, pointed out that establishing routines and clear expectations can significantly enhance these students' confidence during lessons. Teacher 3 mentioned the necessity of providing a safe, nonjudgmental environment where children feel accepted and valued.

Additionally, Teacher 4 underscored the role of positive reinforcement and the importance of repeated practice in skill development. They noted, "Implementing positive reinforcement and offering frequent chances for students to hone new skills is crucial for creating supportive and inclusive learning space for children with ASD in EFL settings." Teacher 5 summarized that a truly inclusive and effective learning environment incorporates positive reinforcement, awareness, adaptability, safety, routine, and practice. These insights indicate that EFL instruction for ASD students requires a flexible approach to effectively address their unique needs.

2 – What are the challenges that EFL teachers typically face when teaching children with ASD, and how can they navigate these challenges?

The teachers explored ASD-related EFL difficulties and solutions. Teacher 1 suggested using visual aids because "visual support can aid comprehension and facilitate communication." ASD kids may have trouble communicating and learning new words and grammar. Teacher 2 advised, "It's important to understand each student's unique strengths and challenges and modify teaching strategies accordingly." Personalized instruction is possible with differentiated instruction.

Teacher 3 suggested "a supportive learning environment" and "multisensory techniques and hands-on activities" to help with sensory sensitivity and focus. To build social skills, Teacher 4 proposed "structured social interaction opportunities" and "practical applications of language concepts." Finally, Teacher 5 concluded by discussing the difficulties of working with experts and developing "SMART goals" for pupils. She said "special education professionals" can help create complete assistance plans. Teacher 5 stated, "Through collaboration, we

can furnish the accommodations and essential support to facilitate these students' success in learning English as a foreign language." Parents, schools, and therapists must collaborate to support students with ASD.

In conclusion, teachers must be flexible and collaborative to address each student's individual needs when teaching EFL to children with ASD.

3 – How can educators work together with parents to enhance the language development of children with ASD in EFL instruction?

EFL Teacher 1 highlights the significance of the collaboration between parents and EFL teachers in simplifying the language acquisition of ASD children. Parents play a crucial role in supporting their children's learning by identifying their strengths, interests, and hobbies. The educator emphasizes the need for ongoing communication to ensure that the children receive appropriate support both in school and at home. This partnership aims to create a nurturing and effective learning environment.

Teacher 2 suggested incorporating games, activities, and practice exercises as tools to assist in language learning at home. Engaging in these activities allows parents to actively participate in their child's education, helping them better understand their child's needs and promoting their overall.

To enhance ASD children's language development in EFL classrooms, Teacher 5 emphasizes building strong parent relationships. "Maintaining regular communication with parents is crucial, as it allows for updates on their child's progress and provides an opportunity to listen to their suggestions and concerns," 5 said. " Fostering a positive working relationship with parents and establishing trust is essential, as they may support significantly their child's language learning and overall growth."

Teacher 5 emphasizes the need to involve parents in language learning goal setting. "By collaborating with parents to establish practical and attainable goals, we can ensure a shared vision and commitment to the process," stated.

In conclusion, the teachers stressed the need for parent-teacher partnerships in helping ASD children's language development in EFL. Collaboration and sharing resources and methods can build a supportive and peaceful educational setting that helps ASD children succeed. Teacher 5 also stressed the significance of positive collaboration with parents, parent involvement in goal setting, and trust to help ASD children learn language during EFL education.

4 – What is the role of technology that may support language learning for ASD children in the classroom?

Teacher 1 states, "Technology can enhance engagement and motivation for ASD children, who may be attracted to interactive and visual resources." According to Teacher 2, technology may assist students in language acquisition

by offering engaging digital games and activities for skill practice, as well as applications and tools that deliver focused feedback and practice.

Teacher 3 asserts that technology facilitates autonomous learning. Digital resources and technologies assist students in managing their studies and advancing at their own speed. Teacher 4 emphasizes the significance of the educator in facilitating language learning for ASD children, asserting that technology should enhance classroom education.

Teacher 5 concludes that technology can help ASD students learn languages. Teacher 5 stresses the necessity of using it strategically and alongside other pedagogical methods. Teachers may provide an interesting and inclusive learning environment for all students, including those with ASD.

Overview of the Perspectives of Parents Who Have a Child with ASD

1 – What obstacles have you encountered as a parent of a child with ASD in promoting multilingualism?

Parent 1 of a child with ASD highlights that supporting multilingual development can be challenging due to various factors. They mention the struggle of finding suitable resources tailored for their child. The second parent adds that children with ASD may find it hard to communicate in a foreign language, which can complicate learning. They emphasize the importance of integrating creative methods to make language learning enjoyable, such as listening to music or watching shows with subtitles.

Parent 4 underscores the importance of collaboration with educators and therapists to promote multilingualism in their child's education. They advocate for working closely with the child's speech therapist to develop a customized plan that caters to their individual needs and interests. Additionally, Parent 5 suggests forming support groups to connect with other parents and share experiences. They reflect on how these interactions have shaped their approach to fostering multilingualism for their child.

Parent 7 and Parent 8 emphasize acknowledging progress, no matter how tiny. Since development is slow and discouragement is easy, they believe milestones should be celebrated. Parent 8 also stresses that making language learning fun for the child can make it more fun for everyone. They believe fun can make language learning more interesting and successful for children.

Finally, Parent 9 discussed how they overcame their ASD child's multilingualism challenges. They think like parent 1. The lack of resources and assistance for multilingual ASD youngsters was a major issue. Finding bilingual or multilingual ASD professionals was crucial. We actively sought out professionals who could advise and help our youngsters learn many languages. Parent 9 also noted the challenge of balancing primary and target languages. They stressed the significance of building a strong primary language foundation

while gradually introducing and reinforcing the target language. Parents stressed the need to tailor strategies and techniques to their child's communication and learning style. They said they overcame challenges and taught their ASD child multilingualism with drive and education.

2 – What strategies have you found to be most effective in supporting your ASD child in their language learning journey, particularly in the context of EFL instruction?

According to the experiences shared by the interviewed parents, promoting multilingualism for children with ASD can be challenging but rewarding. Parent 1 noted the difficulty in finding support and resources for teaching EFL to ASD children. Parent 2 highlighted that ASD children may have difficulty with social interaction and may not see the practical value of learning a foreign language. Parent 3 suggested that creativity and persistence can help in navigating the process of promoting multilingualism.

Parent 4 emphasized the value of collaboration with educators and therapists in creating customized EFL learning plans that address the unique interests and needs of the child. Parent 5 emphasized seeking out support and resources from online communities and support groups. Parent 6 believed that being flexible and adapting to the child's needs is key to promoting multilingualism.

Parents 7 and 8 noted the importance of celebrating progress, making language learning fun and enjoyable for the child, and using positive reinforcement to keep them motivated. Finally, Parent 9 felt that promoting multilingualism for children with ASD is difficult, but seeing the child improve and gain linguistic confidence is worth it. Parents can help their ASD children learn a foreign language by using these methods.

3 – What challenges do parents of ASD children face while learning EFL?

Parents of ASD children face several challenges in EFL education. Parent 1 noted, "Our child struggles with communication and social interaction, which affects their abilities to use English in social situations." Another parent, Parent 2, mentioned, "Our child often finds it hard to understand and follow complex instructions, making language learning activities difficult." Parent 3 highlighted the need to balance support for their child's first language while also creating opportunities for them to enhance their English language skills.

The challenges that may be faced by parents of ASD children can be quite different from those encountered by parents of neurotypical children. One parent noted that "children without developmental challenges often find it easier to acquire language." However, parents of children with ASD, such as Parent 5, have developed various strategies and resources to support their children's

language learning. For instance, Parent 6 incorporates photos and videos into their teaching methods, while Parents 7 and 8 link EFL learning to their children's favorite television English programs. Parent 9 expressed, "AS my child is engaged in language learning, it becomes a more enjoyable experience for everyone involved."

4 – What benefits have you seen in your child with ASD as a result of their language learning?

Reports from parents indicate that language acquisition is advantageous for children with ASD. Parent 1 said, "My child has gained confidence in communication," and further noticed an increased willingness to engage with others. This increased confidence has opened up new opportunities for social engagement and participation in group activities. Parent 2 highlighted, "Language learning has made my child more involved in the learning situations," allowing them to express their ideas and thoughts clearly. This clarity in expression has not only improved academic performance but also strengthened their ability to share personal experiences and emotions.

Parent 3 stated that language acquisition had enhanced their child's social skills and facilitated stronger relationships with classmates and adults. "My child's ability to understand and use language has made a significant difference in their social interactions," they shared. These enhanced social skills have led to more meaningful relationships and a greater sense of belonging.

Nonetheless, it is crucial to acknowledge that the advantages vary from those experienced by neurotypical children, as noted by Parent 4. Parent 5 stated, "Emphasizing functional communication skills is essential," highlighting the necessity for increased visual and tactile methods to facilitate their child's education. These customized approaches facilitate the connection between theoretical language ideas and real communication requirements.

Notwithstanding these disparities, language acquisition remains a beneficial instrument for ASD children, as Parent 6 noted, facilitating their academic, emotional, and social growth. They remarked on the remarkable increase in our child's communication skills, emphasizing the overall good influence.

Language learning can transform ASD children's lives. It improves communication, social ties, and well-being. Parents continue to report that their children are improving their speech and becoming more confident and involved in their communities.

5 – From your experience as a parent of a child with ASD, would you suggest language support for parents of children with ASD?

Participants agree that language support is essential for ASD children from various viewpoints. Parent 1 stresses the importance of being patient and proactive while seeking guidance from educators and therapists. Another parent, Parent 2, highlights the need for structured learning environments that enhance language development. Parents have shared diverse methods to aid their children's language acquisition. Parent 3 recommends incorporating language instruction into daily routines, while Parents 4 and 5 emphasize that parents should take an active role in promoting their children's communication skills in various situations, such as conversations and reading activities.

Parent 6 advises reducing language learning to smaller, more doable levels. "Starting with simple words and gradually increasing complexity helped my child feel more confident and less overwhelmed," said one. Parent 7 suggests using technology and multimedia to learn. "Using language learning apps and interactive videos made the process more engaging for my child," they said. Parent 8 stresses adaptability to the child's changing demands and abilities. "We continuously adjust our technique based on our child's progress and interests," they said. Parent 9, who supports the child's language rights, suggests working with therapists and educators to create a language development plan. "Working closely with our child's teachers and therapists ensured we were all on the same page and could provide consistent support," said one. ASD parents offer important language learning advice. Thus, parents must have the means and assistance to help their children learn and develop language.

Discussions

This section discusses parent and teacher EFL teaching strategies to improve ASD children's bilingual skills. This article discusses research findings and implications for helping parents and teachers improve language and social skills in multilingual ASD children. These stakeholders' viewpoints and experiences shed light on how to empower and support bilingualism in ASD children.

The study's first question centered around determining successful teaching methods for instructing EFL to ASD children. The study findings indicate that teachers who have experience teaching children with ASD recommend a range of teaching strategies. The strategies mentioned encompass a variety of effective teaching methods, such as incorporating visual aids, engaging in hands-on activities, simplifying language concepts, tailoring lessons to individual students, using real-life scenarios and social stories, implementing multisensory activities, and incorporating movement-based

games. Previous studies, including Shaaban and Mohamed (2024) and Stehle Wallace et al. (2022), have supported these strategies.

The study also emphasizes the significance of teachers being mindful of the distinct requirements of students with ASD. It is important to have a comprehensive understanding of the various challenges that students with ASD may encounter, such as communication difficulties, individual learning styles, behavior management, and social interaction challenges. Teachers who are attentive to these needs and adapt their teaching strategies accordingly can establish a supportive and inclusive learning environment that fosters success for all students.

The importance of acknowledging the unique needs of students with disabilities and adjusting teaching methods accordingly is reinforced by previous research in the field of special education. This text highlights the importance of implementing effective teaching strategies and considering the unique needs of students with ASD. It emphasizes the goal of creating an inclusive and supportive learning environment that fosters success for all students (Shaaban & Mohamed, 2023; Shaaban et al., 2024).

Effective cooperation between parents and EFL educators is vital for supporting students with ASD in achieving their full potential. Joint efforts can cultivate a conducive and efficient learning environment for these individuals. It is imperative for educators to employ diverse teaching strategies and develop a robust partnership with parents to build inclusive and nurturing settings for ASD children learning EFL. This approach enables teachers to facilitate the optimal development of these students. The results are consistent with the studies by Boyer and Lee (2001) and Mohamed and Shaaban (2024).

To teach EFL to ASD children, incorporate visual aids, engage in multimodal activities, and provide hands-on learning experiences, all while being mindful of their sensory sensitivities. Teaching, parenting, and therapy must work together to help build conducive learning environments. As Yan et al. (2022) showed, technology can help language acquisition by providing interactive language activities adapted to individual requirements and learning styles.

EFL teachers for ASD students should use a variety of methods, be aware of their needs, and collaborate with parents and therapists to establish a helpful learning environment. By using technology and other innovative ways, teachers can help these pupils succeed and fulfill their potential.

The second study question examines how ASD parents struggle to promote multilingualism. Parents often struggle to teach their kids languages. These include finding resources and support, motivating their child to study, and designing a personalized language learning plan. Parents can overcome these obstacles with persistence, ingenuity, and adaptability. Language learning in

daily life and collaboration with educators and therapists can assist in designing tailored strategies. Chu et al. (2020) and Conner et al. (2020) support this result.

Parents of children with ASD who are interested in fostering multilingualism encounter unique obstacles that can be overcome with ingenuity, adaptability, determination, and cooperation with educators and therapists. Parents can greatly support their children's language learning by seamlessly integrating it into their daily routines and personalizing their language learning strategies. This will empower children to excel and unlock their maximum capabilities.

Developing language skills in ASD children can be challenging, but it is essential for boosting their confidence, engagement, social abilities, and cognitive understanding. For these children, the focus is often on practical communication skills rather than abstract concepts. Parents suggest being patient and persistent in finding the right approaches, creating a supportive environment that caters to the child's unique needs and interests, and actively participating in their language development.

The final question of the study posits that technology can improve language development and communication abilities for ASD children in the EFL context. Interactive multimedia technologies, instructional software, and computer-based instruction provide tailored and multisensory learning experiences that facilitate language acquisition. Technology can provide supportive and inclusive educational environments for ASD children by providing personalized learning experiences tailored to their specific requirements.

This study suggests that using technology to teach ASD youngsters language can enhance their learning outcomes. Previous studies show that technology can boost these students' engagement, motivation, and language acquisition. Technology is critical for language learning for ASD children (Desideri, et al., 2020; Mohamed & Shaaban, 2024; Mohamed, 2023).

EFL teachers for children with ASD must be attentive, use varied methods, and collaborate with parents and EFL instructors to create helpful learning environments. ASD children might be challenging to teach EFL, including finding materials, motivating them, and creating a tailored study schedule. Flexible and personalized strategies are needed for these students.

Language learning has several benefits for ASD children's communication, socialization, and well-being. Thus, educators, parents, and therapists must collaborate to help ASD children develop language. Using appropriate teaching methods and technology, educators can assist ASD students succeed in language learning.

This study has given parents and teachers valuable information about EFL instruction for ASD children, notwithstanding its disadvantages. First, this study's small sample size may limit its application to ASD kids. Self-reported data may be biased and inaccurate, reducing reliability. No ASD children were

involved in this study, limiting its views. This study focused on EFL instruction; hence, its conclusions may not apply to other language learning scenarios. To address these issues, future research should incorporate larger and more diverse samples, multiple data sources, and ASD patients' perspectives. We will better understand ASD learners' language learning needs and experiences.

Future studies may increase the sample size for applicability. Self-reported data and firsthand observations could help researchers comprehend parents', teachers', and ASD children's viewpoints. Future research could examine ASD children's perspectives to better understand their needs. Language intervention programs for ASD children should be tested in different language learning scenarios.

Conclusions

This study provides useful insights into instructional practices to help ASD youngsters learn English as a foreign language. Specific solutions are needed for sensory sensitivity, social engagement, communication, and generalization concerns. The participating teachers have proved that visual aids, personalization, social skill development, and a supportive learning environment work. According to the findings, ASD youngsters have outstanding language acquisition skills. The study emphasizes the need for parents and teachers to work together to design effective and customized language learning programs for ASD children. EFL teachers can improve language learning outcomes for ASD students by building inclusive and supportive learning environments and using effective ways to address these problems.

The study emphasizes the role of parents and educators in helping ASD children learn several languages. We need to recognize multilingualism in young children to build appropriate learning strategies to improve language acquisition. This study stresses the need for more research to understand the challenges educators have when creating lesson plans and language-learning curricula for ASD pupils.

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Osnaživanje višejezičnih sposobnosti kod dece sa poremećajem autističnog spektra: Uvidi roditelja i nastavnika o podučavanju engleskog kao drugog jezika

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Uvod: U današnjem globalizovanom svetu sposobnost korišćenja i razumevanja više od jednog jezika, poznata kao višejezičnost, postaje sve prisutnija. Studije su pokazale da deca odrasla u višejezičnim sredinama mogu steći kognitivne prednosti, uključujući poboljšane sposobnosti rešavanja problema, kreativnost i kognitivnu fleksibilnost. *Cilj*: Ova studija imala je za cilj da istraži metode koje koriste roditelji i nastavnici u podučavanju engleskog kao drugog jezika (EFL) dece sa poremećajem iz autističnog spektra (PAS), kao i poteškoće sa kojima se u tome suočavaju. *Metod*: Metodologija istraživanja podrazumevala je sprovođenje intervjua sa ukupno 14 učesnika, uključujući roditelje

i nastavnike dece sa PAS. *Rezultati*: Studija je pokazala da je uključivanje vizuelnih pomagala, ponavljanja i modeliranja u EFL instrukcije imalo pozitivne rezultate za decu sa PAS. Ove strategije rezultirale su poboljšanim društvenim veštinama i jezičkim sposobnostima. Nastavnici su se suočili sa izazovima u kreiranju efikasnih metoda nastave za decu sa PAS, ali su takođe prepoznali impresivnu sposobnost ove dece da uče nove jezike. Pored toga, studija je istakla značaj zajedničkog rada roditelja i nastavnika na kreiranju programa učenja jezika koji su efikasni za decu sa PAS. *Zaključak*: Dodatna istraživanja su neophodna da bi se razvilo sveobuhvatnije razumevanje poteškoća sa kojima se nastavnici susreću prilikom podučavanja dece sa PAS u EFL. Da bismo dalje unapredili naše razumevanje, bilo bi korisno da se buduća istraživanja koncentrišu na razvoj i procenu inkluzivnih programa učenja jezika koji zadovoljavaju specifične zahteve dece sa PAS.

Ključne reči: višejezičnost, poremećaj autističnog spektra, perspektive, engleski kao drugi jezik, kvalitativna istraživanja

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The voice of visually impaired students: Differentiated mathematics instruction in an inclusive class

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Introduction. Previous research showed that inclusive education faces several barriers, especially among Visually Impaired (VI) students in mathematics learning. Teachers can use students' voices to increase student engagement and provide new perspectives on learning. *Objective.* This study aimed to explore the voices of students with Visual Impairment (VI) about differentiated mathematics instruction in inclusive classes. *Method*. This study is phenomenological research, with interviews as a data collection method. The participants were selected using purposive sampling, consisting of four low-vision students and six blind students aged 16-18 years. The data were analyzed through data reduction, data presentation, and drawing conclusions. *Results.* The results showed that VI students understand the concept of Differentiated Instruction (DI). They argued that good mathematics learning is achieved through detailed explanations from the teacher and hands-on activities. VI students need process differentiation but do not need content differentiation. Several things that must be considered in differentiated mathematics instructions are: 1) using the learning media that can help understand material related to graphics, 2) the teacher's ability to explain material related to graphics, including making mathematics content simpler, and 3) conditioning of the learning environment to ensure class safety and VI students sitting next to sighted peers. *Conclusion.* The findings affirm conclusions from several previous studies that students with VI show high self-efficacy in differentiated mathematics instruction. This is shown by students' confidence in their abilities so that they do not require content differentiation. The findings also affirm previous research regarding the need for learning media for VI students' hands-on activities.

Keywords: students' voice, visually impaired, differentiated instruction, inclusive class, mathematics

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Introduction

Research Background

Inclusion can be described as a program that helps schools adapt to the student's diversity. Students with special needs must be placed in regular schools and allowed to participate, which is why inclusive education is currently one of the main issues in many countries in reducing segregated education for students with special needs (Hardy & Woodcock, 2015). Nevertheless, it is not limited to providing relevant education for students with special needs but is also concerned with improving the quality of education for all children (Qu, 2022a, 2022b). Many researchers' findings indicate that inclusive education faces several barriers, so studies on inclusive education are still important (Göransson & Nilholm, 2014; Nilholm, 2021; Putranto et al., 2024a).

Through an inclusive education policy, an increasing number of Visually Impaired (VI) students attend public schools. Visual impairment refers to significant vision loss, even though corrective lenses are used. The latest findings from the International Agency for the Prevention of Blindness (IAPB) in 2020 showed that 32 million children or adolescents worldwide experience visual impairment, either blindness or low vision, from moderate to severe conditions. In line with that, data in Indonesia shows that the most common type of disability is VI, which is 63.7% of all people with disabilities (Bappenas, 2021).

The field of mathematics education has long recognized the importance of inclusive education (Roos, 2019), including that for VI students (Baykaldı et al., 2023; Klingenberg et al., 2020). Mathematics is one of the essential subjects that must be learned in school (Bacolod-Iglesia et al., 2021; Sevindir et al., 2014; Skagerlund et al., 2019) and an important component of science, technology, and engineering (Rozgonjuk et al., 2020). It helps develop creativity, reasoning, critical thinking, and problem-solving (Bilal, 2017). It is a well-known fact that VI students and their sighted peers can both follow the regular curriculum, but the VI students' visual problem is affecting their learning ability in mathematics. This is because many basic mathematical concepts are related to visual phenomena (Jones, 2018; Smith & Smothers, 2012). Vision is one of the primary senses that can support the development of students' mathematical concepts and procedures (Emerson & Anderson, 2018). Additionally, many mathematics learning practices have not optimally accommodated VI students' needs (Rosenblum et al., 2018). Also, the vast majority of teachers experience difficulties in managing heterogeneity in inclusive classes (Costello & Boyle, 2013; Webster & Blatchford, 2015). It can be challenging for teachers to be able to address the diverse needs of each student in the mathematics class (Hackenberg et al., 2021; Maulana et al., 2020).

In order to develop mathematical competence and facilitate heterogeneity in inclusive classes, including VI students, teachers can use Differentiated Instruction (DI). DI is one of the pedagogical frameworks that has promoted equitable education for a more cohesive society (Griful-Freixenet et al., 2021). In Indonesia, DI has been mandated in the national curriculum, Kurikulum Merdeka (Merdeka Curriculum), stated in The Ministry of Education, Culture, Research, and Technology Regulation in 2022. DI refers to student-centered learning that uses student differences as the basis for lesson planning (Hunter et al., 2020) and teaching processes guided by a constructivist approach (Wan, 2017). It is an approach that provides students with multiple options to receive and process information to make learning happen. Differentiation adapted content, process, and product according to students' interests, readiness, and learning profile (Jarvis, 2013; Tomlinson, 2001; Tomlinson et al., 2013). The key to success in differentiation includes a positive learning environment, a high-quality curriculum, tiered tasks, scaffolding, adaptive learning materials, and enhancing flexibility in classrooms (Guay et al., 2017; Jarvis, 2013; Tomlinson et al., 2013; Ziernwald et al., 2022).

In the current era, DI in mathematics classes is one of the important strategies to implement (Bal, 2023; Kokkinos & Gakis, 2021). Previous research has proven that differentiated mathematics instruction (DMI) supports the needs of diverse students (Hackenberg et al., 2021), serves as an effective approach to a solution to students' difficulties (Papanthymou & Darra, 2022), and has many benefits in improving students' academic achievement (Afilin, 2023; Bobis et al., 2021; Jamil et al., 2024; Lai et al., 2020). DMI makes students try to utilize their abilities to learn mathematics. This makes students more confident in expressing their opinions, being more persistent, and more actively involved in mathematics tasks and projects (Putranto et al., 2024b).

To optimize DMI, teachers must consider students' voices because they have different experiences in the class (Parr & Hawe, 2022). Students' voices can increase their engagement and provide new perspectives for teachers (Charteris & Thomas, 2017; Keddie, 2015), which has an impact on improving the class's learning quality (Ferguson et al., 2011; Graham et al., 2018; Messiou & Ainscow, 2020). However, previous studies have shown that many countries do not commonly use students' voices in educational practices (Forde et al., 2018; Simmie et al., 2019). Based on this condition, the researcher considered it important to explore VI students' voices regarding DMI. The study is essential to develop student-centered learning practices (Baroutsis et al., 2016). Therefore, it can develop the engagement of VI students and provide opportunities for them to improve their mathematics competence.

Aim

This study aimed to explore the voices of students with Visual Impairment (VI) about differentiated mathematics instruction in inclusive classes.

Research Question

Students' voices are not a common research topic since previous studies have focused on teachers' perspectives. This study is realized with an aim to answer two research questions.

1. How do VI students perceive and understand differentiated mathematics instruction?
2. How good is differentiated mathematics instruction from the perspective of VI students?

Method

This is qualitative research with a phenomenological design. The choice of research type is based on the argument that qualitative research is best used to provide feedback on data about group perceptions, beliefs, and experiences (McDuffie & Scruggs, 2008). Phenomenology was chosen with the argument that this approach allows researchers to develop impartial views and detailed rationale (Husserl, 1970). This study aimed to explore VI students' voices of perception and understanding of DMI.

Sample

This study involved ten VI students at an inclusive Madrasah Aliyah (Senior High School) in Yogyakarta, Indonesia. The participants were selected using purposive sampling. The sample consists of four low-vision students and six blind students aged 16-18 years. The main information about the participants is presented in Table 1.

Table 1

Research Participants

No	Initial Name	Gender	Grade	VI Category
1	AL (Subject 1 – S1)	Female	X	Low Vision
2	TK (Subject 2 – S2)	Female	X	Low Vision
3	FMSN (Subject 3 – S3)	Female	XI	Totally Blind
4	FAR (Subject 4 – S4)	Female	XI	Low Vision
5	IKh (Subject 5 – S5)	Male	XI	Totally Blind
6	IM (Subject 6 – S6)	Male	XI	Low Vision
7	NK (Subject 7 – S7)	Male	XI	Totally Blind
8	WIM (Subject 8 – S8)	Male	XI	Totally Blind
9	NES (Subject 9 – S9)	Male	XII	Totally Blind
10	WA (Subject 10 – S10)	Male	XII	Totally Blind

Instruments and Procedures

This study used interviews to collect data. Interviews are a key element of data collection in phenomenological research (Creswell, 2007; Kvale & Brinkman, 2009). Semi-structured interviews were used because of their flexibility, which allows the researcher to add questions during the interview and provide more in-depth data (Creswell, 2007). The students involved in the research were interviewed to gain an in-depth understanding of their perceptions and understanding of DMI. Three experts evaluated the key questions in the interviews. Table 2 lists the key questions used in this study.

Table 2

Interviews Key Question

No	Research Question	Interviews Question
1	RQ 1	Do you get math lessons that are different from your friends in general?
2		Can you explain the meaning of differentiated and adapted instruction to the needs of the students?
3		Explain how you can learn well (listening to explanations, simple physical activities, kinesthetics, or others), and has the teacher provided learning facilities that suit your learning needs?
4		Do you feel the material you learn is helpful in your life? Can you explain?
5	RQ 2	Does the teacher present the material in various ways to help you study more effectively? Do you think it is necessary to differentiate?
6		Does the teacher present a different level of material difficulty than what you get with your friends? Do you think it is necessary to differentiate?
7		Does the teacher conduct assessments differently according to your needs? Do you think it is necessary to differentiate?
8		Are you used to solving mathematical problems related to daily life? Does it help your study (solving mathematical problems in daily life helps students learn mathematics during school classes)?
9		How do you feel about your learning environment, and what do you want?
10		Are there any deficiencies in the learning process that have occurred? What enhancement should be undertaken?

Interviews were conducted alternately for each participant. The interviews took 25 to 45 minutes via face-to-face, telephone, or WhatsApp voice notes. Before the interview was conducted, the researcher explained the purpose of the research and

informed the participants that the interview would be recorded. The recording results will not be used other than for research results and will not be shared with anyone other than researchers.

Data Analysis

Phenomenological research begins with identifying the phenomenon (Moustakas, 1994). The data were analyzed by adapting the Miles et al. (2014) procedure. The analysis begins with data reduction by selecting, focusing on simplification, abstraction, and transformation of raw data from the interview results. The data is presented as structured information that allows conclusions to be drawn, for example, in the form of a table. In the final stage, conclusions are drawn.

The credibility of this study was carried out using member checking (Creswell & Miller, 2000). The transcribed data were sent to participants for confirmation and feedback. On the other hand, detailed descriptions of the data collection procedures and data analysis are used to demonstrate transferability and confirmability (Algolaylat et al., 2023). Meanwhile, an internal audit of the entire research process was conducted to demonstrate the dependability.

Results

This research explored VI students' understanding and needs regarding differentiated mathematics instruction. Apart from that, it will also explore what can be made to improve differentiated mathematics instructions from VI students' perspective. Therefore, three main themes are this research's findings: 1) VI Students' Perspective on DI; 2) DI Dimensions of VI Students; and 3) Improving Differentiated Mathematics Instructions.

VI Students' Perspective on DI

VI students provided varied perspectives and definitions of DI. Besides that, they understood and could identify how they learned. They state that DI provided benefits in developing mathematical abilities. The first and the second question gather general information about the VI concept of DI. There were three perceptions about DI. S1, S6, and S8 defined DI as "learning adapted to the needs of students". While S3 and S5 explained DI as "learning adapted to the abilities of students". The other subjects (S2, S4, S7, S9, and S10) described DI as a "different learning process". Table 3 shows how VI students understood differentiated mathematics instruction.

Table 3

VI students' understanding of DI

Concept of DI	Frequency
Learning based on students' need	30 %
Learning based on students' ability	20 %
Differentiation learning process	50 %

The third question was designed to determine whether students know their learning styles and whether they can identify appropriate instruction. All VI students explained that the best way to learn was by listening to the detailed explanations from the teacher. Moreover, S9 and S10 revealed they could also understand mathematics well through hands-on activities. Some of the VI students also learned by looking for additional references. For instance, S6 and S7 explained that they would look for supplementary online material.

The fourth question relates to students' perceptions of DI and whether it is beneficial. All participants agreed that DI helped them in learning mathematics. However, VI students argued whether DI makes it easier for them to associate mathematics with their daily lives. There are two opinions: some of them said that math materials were related to their daily lives, while others said they were not.

DI Dimensions of VI Students

Questions 5 to 7 explore the required dimensions of differentiation in mathematics instruction from VI students' perspective. The result is shown in Table 4. All of the participants said that teachers must differentiate the learning process between students with VI and their sighted peers. S3 revealed, "If mathematics material has many visuals, I think the teacher must explain more detail for VI students. Thus, I can understand the material."

Table 4

The need for DI from the perspective of VI students

Differentiated Instructions	Agree	Disagree
Process Differentiation	100 %	0 %
Content Differentiation	10 %	90 %
Evaluation and Product Differentiation	70 %	30 %

Further findings explain that most of the participants agreed that content should not be differentiated between VI and sighted students. S3 revealed, "As long as it is accessible, I do not need to be differentiated because the cognitive abilities of blind people are similar to others". In addition, S6 stated, "The material does not have to be differentiated. It shows equality in learning". For the evaluation dimension, VI students explained that several things needed to be

appropriate to their needs, including 1) the teacher minimized problems using graphics (S3); 2) the collection of answers was also differentiated (students with disabilities were given questions, and the answers were sent on WhatsApp, while the other friends wrote on paper) (S2 and S6); 3) the questions used for VI students were multiple-choice since the process of answering and submitting answers becomes easier for them this way (S6).

Improving Differentiated Mathematics Instructions

Questions 8 to 10 explored well-differentiated instruction from the perspective of VI students. At the beginning of the interview, all participants agreed that they felt comfortable with the mathematics learning process in the class. S3 stated, "It has been very comfortable; everyone gave me full support". In addition to teachers, the sighted students in inclusive classes also provided support for VI students. In line with this, S2 expressed, "I feel happy when learning mathematics because teachers are very supportive". The results of the interviews revealed that teachers and sighted students often provided positive affirmations for VI students. In addition, VI students were encouraged to participate in group tasks.

Question number 10 could reveal three main themes that must be considered to make DI more effective for VI students (Table 5). First, it needed to develop media that can help understand graphics materials. S1 revealed, "For materials that use graphics, the media is still limited". On the other hand, S2 said, "What is still difficult to understand is when it comes to graphic material. It isn't easy to understand because we do not know what it looks like. Media should be provided that can make VI students understand graphics". VI students most frequently mentioned the availability of media for hands-on activities. They said that this media helped them understand the material better. This becomes necessary to differentiate in mathematics learning, especially material related to graphics, geometry, etc.

Table 5

The need to improve DMI from VI students' perspectives

The VI students' needs	Frequency
Increasing the availability of learning media for hands-on activities	80 %
Improving teachers' ability to communicate and facilitate VI students	30 %
Improving class management	50 %

The second point is that teachers' ability to teach VI students needs to be improved. All participants agreed that the teachers had a positive attitude toward learning mathematics. However, on several occasions, the teacher had difficulty explaining graphics-related materials, including making mathematics

more straightforward. S4 revealed, ”Teachers sometimes find difficulties explaining mathematical figures or graphics in simple language”. S6 revealed, ”Teachers need to be able to provide appropriate support. Sometimes teachers assist even though VI students don’t need help. This has a negative impact on us because we become dependent”. This indicates the importance of teachers providing appropriate scaffolding in DMI for VI students.

The third aspect is class management. All participants agreed that they were happy with the mathematics learning environment, but, nevertheless, some of them gave several opinions, such as S6, who explained, ”There is something that still lacks, for example, students with disabilities seated with other disabled. It will have a negative effect because they have difficulties discussing the materials they do not understand, especially if the images are used. Besides that, one non-disabled friend will help one to four children with disabilities. The position where they sit should be mixed with non-disabled friends so that they can improve their social interaction”. Meanwhile, S3 stated, “Hopefully, the discipline can be improved so that the learning process can be better”. This is based on the fact that some students make noise when completing math tasks or projects in the class.

Discussion

This study describes VI students’ voices about DMI in inclusive classes. This can be a starting point for future educational development (Skerritt et al., 2021). Students’ voices must be considered when developing learning practices, and be sensitive to the local context (Pearce & Wood, 2019). Every student has unique backgrounds, personal designs, and aptitudes for learning in an educational environment. Even if they are the same age and gender, they have different learning styles (Tomlinson, 2001). Hence, the teacher must facilitate their uniqueness, for instance, by designing learning materials appropriate to student’s needs to motivate them to participate in class (Baines & Slutsky, 2009). The interview results show that VI students understood their best learning style for mathematics, and DI allows them to learn according to their needs. It is beneficial because they can improve their competence by knowing their learning styles (Bosman & Schulze, 2018).

These findings show that VI students refused content differentiation when learning mathematics. They said that they have the same cognitive abilities as their sighted peers. In addition, giving them the same content shows equality between VI and their sighted peers. VI students explain that they can learn mathematics well through detailed explanations from the teacher and hands-on activities. The aforementioned activities are important because many visual concepts in mathematics are difficult for VI students to comprehend (Sahin & Yorek, 2009). In addition, hands-on activities provide opportunities for VI

students to explore real objects to develop conceptual understanding (Kizilaslan et al., 2021). Also, they can improve learning and achievement in mathematics not only for VI students but also for general students (Savelsbergh et al., 2016). Sighted students can involve more senses through hands-on activities, so that the brain's ability can process information optimally.

In-depth interviews showed that all participants felt comfortable learning mathematics. One of the reasons is that teachers have shown a positive attitude toward learning mathematics in inclusive classes. Teachers can provide good responses and positive attitudes to each student, especially VI students, because learning is differentiated according to their needs. In some parts of the lesson, the teacher also provides an individual approach to assisting VI students. Previous research has proven that teachers are the main factors in implementing inclusive education (Avramidis & Norwich, 2002; Loreman et al., 2013; Specht et al., 2016).

The joyful differentiated mathematics class is not only affected by the teacher's positive attitude but also by students' positive attitude. VI students explained that teachers and their friends often give positive affirmations such as "You can solve this problem" or "It is easy, let's finish it". These findings indicate that sighted students in inclusive classes must have the awareness to be able to communicate and help VI students. In group activities, VI students must be encouraged to take part in completing the tasks. Meanwhile, if they face barriers, sighted students can assist as needed.

During interviews, VI students revealed that they could learn better because mathematics learning was suitable to their needs. They feel more confident and comfortable learning mathematics because the teacher's scaffolding and guidance suit their needs, especially when providing individual assistance. This is predicted to make DI effective in improving students' mathematical abilities. As effective learning, DI ensures equity and fairness in educational practice (Lindner & Schwab, 2020; Valiandes & Neophytou, 2018). This effective learning has a positive impact on student progress and motivation.

The first finding related to improving the quality of differentiated mathematics instruction is providing learning media used for a hands-on activity for VI students. This media is necessary for understanding the concept of graphics and other visual materials. Through the media used for hands-on activities, VI students will learn more actively and involve more senses in the learning process. By using them, the brain's ability will work optimally because other senses are involved (Shams & Seitz, 2008). The existence of multisensory media is useful for VI students and their sighted peers in inclusive classes (Hayes & Proulx, 2023) for developing collaboration between them because sighted students can easily communicate and assist VI students through this media.

The availability of mathematics learning media for hands-on activities can make math lessons more accessible to VI students. The availability of this

media is also a form of equity for VI students to engage in mathematics. In DI, this media becomes an important part of the accommodation, modification, assistive technology efforts, and instructional support. An important aspect to consider in designing and developing learning media to increase VI students' active participation in learning mathematics is to enable close collaboration between teachers, students, parents, and experts in the field (Kizilaslan et al., 2021). It is also important to consider the materials that should be taught using media. In addition, mapping also determines what materials can be taught using the same media. Some adaptations to the activities and teaching approaches outlined in the learning media must be made so that the learning needs of VI students can be met and the material is delivered optimally. Therefore, close collaboration with experts to develop sustainable solutions for teaching and learning mathematics for VI students is essential.

Increasing the teachers' competencies to teach mathematics in inclusive classrooms also needs to be conducted consistently and continuously. This is a response to some of the barriers experienced by VI students when they were learning mathematics. This capability includes classroom management so VI and sighted students can learn optimally. Classroom management is the teachers' competence to create and maintain optimal learning conditions so that learning activities can take place as expected. Previous study emphasizes the positive impact of well-managed classrooms on student engagement, academic performance, and socio-emotional development (Li et al., 2023). Managing the classroom is part of creating a conducive climate for students to fully engage in learning, engage voluntarily, or work on more challenging tasks. This finding aligns with several previous studies recommending that teachers receive training to equip students with knowledge and teaching skills (Hayes & Proulx, 2023; Maguvhe, 2015). This condition is strengthened by the fact that in Indonesia, the majority of mathematics teachers who teach in inclusive classes do not receive an inclusive education curriculum during their undergraduate studies.

Conclusion

This phenomenological study explores VI students' perceptions and understanding of differentiated mathematics instruction in an inclusive class. VI students identified differentiated mathematics instruction, even though it was simpler. They feel that good mathematics learning is through detailed explanations from the teacher and hands-on activities. In inclusive classes, VI students need process differentiation but do not need content differentiation. Several things that must be considered in learning differentiated mathematics in the classroom, from the perspective of VI student, are 1) using the learning media that can help understand graphics-related material, 2) the teacher's ability to explain graphics-related material, including making mathematics simpler,

and 3) conditioning of the learning environment to ensure class safety and VI students sitting next to sighted peers.

Today's teachers must be future-oriented and improve learning and curricula that focus more on individual needs. The education system must accommodate the needs of VI and adjust accordingly to provide better educational services for students. Future research is expected to reveal the perspectives of VI students at lower levels (elementary and junior high schools) and university levels. This is expected to provide a more comprehensive picture, making learning mathematics more accessible to VI students. In addition, future studies should explore students' perspectives on other problems related to mathematics learning. This will create more inclusive mathematics learning practices.

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Glas učenika sa oštećenjem vida: Instrukcije iz diferencirane nastave matematike na inkluzivnom času

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Uvod: Prethodna istraživanja pokazala su da se inkluzivno obrazovanje suočava sa nekoliko prepreka, posebno među učenicima sa oštećenjem vida (OV), u učenju matematike. Nastavnici mogu da koriste glasove učenika kako bi povećali njihovo angažovanje i pružili im nove perspektive učenja. *Cilj*: Ova studija imala je za cilj da istraži glasove učenika sa oštećenjem vida (OV) o diferenciranoj nastavi matematike u inkluzivnim odeljenjima. *Metod*: Istraživanje je fenomenološko, sa intervjuima kao ključnim elementom u prikupljanju podataka. Učesnici su odabrani korišćenjem namenskog uzorkovanja, a uzorak su činili četiri slabovida učenika i šest slepih učenika starosti 16–18 godina. Podaci su analizirani kroz redukciju podataka, njihovu prezentaciju i izvođenje zaključaka. *Rezultati*: Rezultati su pokazali da učenici sa OV razumeju pojam diferencirane nastave (DN). Oni su tvrdili da dobro učenje matematike postižu kroz detaljna objašnjenja nastavnika i praktične aktivnosti. Učenicima sa OV potrebna je diferencijacija procesa, ali im nije potrebna diferencijacija sadržaja. Nekoliko stvari koje se moraju uzeti u obzir u diferenciranoj nastavi iz matematike su: 1) učenje o medijumima koje može pomoći u razumevanju materijala koji se odnosi na grafičke prikaze, 2) sposobnost nastavnika da objasni materijal koji se odnosi na grafičke prikaze, uključujući i pojednostavljenje matematičkih sadržaja i 3) uslovljenost okruženja za učenje radi obezbeđenja bezbednosti na času i adekvatnog mesta u razredu na kojem učenici sa OV sede, poželjno pored vršnjaka koji vide. *Zaključak*: Nalazi potvrđuju zaključke nekoliko prethodnih studija da učenici sa OV pokazuju visoku samoefikasnost u diferenciranoj nastavi matematike. To pokazuje da učenici imaju poverenje u svoje sposobnosti, tako da ne zahtevaju diferencijaciju sadržaja. Dobijeni nalazi takođe potvrđuju rezultate prethodnih istraživanja u kojima je istaknuta potreba za korišćenjem medijuma za učenje i praktičnih aktivnosti za učenike sa OV.

Ključne reči: glas učenika, oštećenje vida, diferencirana nastava, inkluzivno odeljenje, matematika

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Odnos fonološke svesnosti i fine motorike kod dece mlađeg školskog uzrasta

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Uvod: Iako je povezanost motoričkog i jezičkog razvoja analizirana kroz različita istraživanja, povezanost fonološkog razvoja i fine motorike kod dece mlađeg školskog uzrasta nije dovoljno istražena. *Cilj:* Cilj rada bilo je utvrđivanje povezanosti fonološke svesnosti i vizuomotorne koordinacije kod dece mlađeg školskog uzrasta. *Metod:* Istraživanjem je obuhvaćeno 60 dece trećeg razreda osnovnih škola iz Beograda. Kod 27 dece uočen je razvojni poremećaj koordinacije, dok je 33 dece bilo bez smetnji u koordinaciji. Za utvrđivanje razvojnog poremećaja koordinacije korišćen je Upitnik za razvojni poremećaj koordinacije. Fonološka svesnost procenjena je Testom fonološke svesnosti srpskog jezika, dok su za procenu fine motorike korišćeni Akadija subtestovi razvojnih sposobnosti – Vizuomotorna koordinacija i mogućnost sleda i Crtanje oblika. *Rezultati:* Kod dece sa razvojnim poremećajem koordinacije uočavaju se značajna ispodprosečna postignuća u vizuomotornoj koordinaciji, crtanju oblika i fonološkoj obradi u odnosu na decu bez smetnji u koordinaciji. Primenom regresione analize na celokupnom uzorku dece utvrđeno je da vizuomotorna koordinacija statistički značajno predviđa sve elemente fonološke obrade, dok u grupi dece sa razvojnim poremećajem koordinacije crtanje oblika objašnjava 26.3% varijabilnosti fonemske segmentacije i 20.8% identifikacije početnog fonema. *Zaključak:* Rezultati studije su pokazali da se kod dece mlađeg školskog uzrasta vizuomotorna koordinacija izdvaja kao prediktor postignuća na svim nivoima fonološke obrade. Slabija ovladanost fonološkom svesnošću i finom motorikom kod dece sa razvojnim poremećajem koordinacije dovodi do ispodprosečnih postignuća, koja ovu decu prate od najranijeg školovanja. Kako se različite komponente fine motorike izdvajaju kao značajni prediktori fonološke obrade, može se zaključiti da nisu svi aspekti fine motorike podjednako značajni za razvoj fonologije.

Ključne reči: fonološka svesnost, fina motorika, mlađi školski uzrast, razvojni poremećaj koordinacije

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Napomena: Uzorak ovog istraživanja je deo uzorka koji je formiran za potrebe šireg projekta u cilju izrade doktorske disertacije pod nazivom „Specifičnosti usvajanja stranog jezika kod dece sa razvojnim poremećajem koordinacije".

Uvod

Povezanost motoričkog i jezičkog razvoja je, u najširem smislu, analizirana kroz različita istraživanja.

Počev od najranijeg uzrasta, istraživanja koja su ispitivala vezu između gestova i razvoja jezika pokazala su prisustvo pozitivne korelacije i značaj motoričkog gesta za budući jezički razvoj (Bates, 1980; Bates & Dick, 2002; Goodwyn et al., 2000; Iverson & Thelen, 1999; Meier & Willerman, 1995; Thal & Tobias, 1994).

S druge strane, značajno manji broj istraživanja ispitivao je ulogu grube motorike u jezičkom razvoju dece, posebno tokom njihovog ranog razvoja (Alcock & Krawczyk, 2010; Karasik et al., 2014; He et al., 2015; Houwen et al., 2016; Walle & Campos, 2014; Muluk et al., 2016). Ideja o povezanosti motoričkog i jezičkog razvoja i njihovom međusobnom uticaju najbolje je opisana kroz istraživanja motoričkog i jezičkog razvoja kod dece sa specifičnim jezičkim poremećajem (Bishop, 2002; Hill & Bishop, 1998), kao i dece sa razvojnim poremećajem koordinacije (Deng et al., 2013), naročito u domenu fonologije (Fletcher-Flinn et al., 1998; Janjić i sar., 2019), vizuelnog dekodiranja reči (Harrowell et al., 2018), pravopisnih postignuća (Janjić i sar., 2021), kao i ovladavanja stranim jezikom (Janjić et al., 2021; Janjić 2022).

Motorički razvoj nije nužan činilac u razvoju jezika zbog činjenice da razvojne jezičke smetnje nisu prisutne kod svih osoba sa motoričkim smetnjama (Iverson, 2010). Međutim, smetnje na nivou prijema, obrade i izvršavanja složenih motoričkih aktivnosti mogu biti skriveni faktori lošijeg razvoja pojedinih jezičkih funkcija kod dece bez primarnih neuroloških ili senzornih smetnji.

Svest o povezanosti motorike i jezika (Bishop, 2002; Iverson, 2010) dovela je do pojave novijih studija koje ističu značaj fine motorike za razvoj različitih jezičkih veština kod dece mlađeg školskog uzrasta (Buha i sar., 2023; Gonzales et al., 2019; Iverson, 2010; Mohamed & O'Brien, 2022; Oudgenoeg-Paz et al., 2012; Suggate, et al., 2018; Suggate et al., 2019; Walle, 2016). Iako neke studije izdvajaju pojedinačne domene fine motorike kao značajne činioce određenih jezičkih postignuća, čitanja na primer (Buha i sar., 2023), ostaje nejasno koji domeni motoričkih aktivnosti pokazuju veći nivo povezanosti sa jezičkim postignućima.

Teorija motorne konstelacije (Motor Constallation Theory; Ekström, 2022) ukazuje na postojanje neuronskih veza između motoričkih pokreta i zadataka fonološke svesnosti, sugerišući zajedničku ili preklapajuću neuronsku osnovu za ove sposobnosti.

Nudeći novi ugao posmatranja i istraživanja međusobnog uticaja motoričkih veština i fonološke svesnosti tokom ranog razvoja i procesa opismenjavanja, ovo istraživanje usmereno je na ispitivanje da li vizuomotorna

koordinacija može biti snažan prediktor fonoloških postignuća dece mlađeg školskog uzrasta.

Cilj

S obzirom na to da se prve godine školovanja izdvajaju kao kritičan period za ovladavanje čitanjem i pisanjem, ali i za dijagnostikovanje različitih specifičnih smetnji koje pogađaju domene jezičkog razvoja i motorike (disleksija, disgrafija, razvojni poremećaj koordinacije, specifične smetnje u učenju), osnovni cilj ovog istraživanja bilo je utvrđivanje povezanosti fine motorike, odnosno njenih elemenata (vizuomotorne koordinacije i mogućnosti sleda i crtanja oblika) i fonemskog razvoja kod dece mlađeg školskog uzrasta.

Metod

Uzorak

Šezdesetoro dece trećeg razreda iz nekoliko osnovnih škola u Beogradu činilo je uzorak ovog istraživanja, koji predstavlja deo uzorka formiranog za potrebe šireg projekta u cilju izrade doktorske disertacije. Za svu decu uključenu u studiju pribavljena je pismena saglasnost roditelja za testiranje i korišćenje rezultata za potrebe istraživanja.

Kriterijumi za uključivanje dece u uzorak bili su izostanak dijagnostikovane disleksije, neurološkog ili senzornog oštećenja i prosečno intelektualno funkcionisanje. Dobijeni podaci preuzeti su iz pedagoško-psihološke službe ustanova obuhvaćenih istraživanjem.

Tokom razgovora sa decom nisu primećene druge smetnje u njihovom govorno-jezičkom razvoju, a ranije evidentirane artikulacione smetnje korigovane su pre polaska u školu.

Instrumenti i procedura prikupljanja podataka

Instrumenti primenjeni u studiji su instrumenti koji su bili odabrani za izradu doktorske disertacije. Razlog uključivanja Upitnika za procenu razvojnog poremećaja koordinacije (Developmental Coordination Disorder Questionnaire – DCDQ; Wilson et al., 2000) bilo je otkrivanje dece koja pokazuju ispodprosečna postignuća i smetnje u planiranju, organizaciji i izvršavanju složenih motoričkih aktivnosti. Upitnik procenjuje opštu koordinaciju, kontrolu tokom pokreta i finu motoriku. Niži skorovi (do 58 bodova) ukazuju na prisustvo razvojnog poremećaja koordinacije (RPK), dok rezultat od 59 do 75 bodova upućuje na uredan razvoj koordinacije. Upitnik je validiran na populaciji dece u Srbiji sa visokom pouzdanošću ($\alpha = .94$) (Golubović i sar., 2018).

Deca sa ispodprosečnim postignućima na Upitniku za procenu razvojnog poremećaja koordinacije u ovom istraživanju činila su grupu dece sa RPK.

Za procenu fine motorike odabrana su dva Akadia subtesta – Vizuomotorna koordinacija i mogućnost sleda (A2) i Crtanje oblika (A4) – koji ispituju kvalitet grafomotornog izraza kroz trasiranje i precrtavanje figura različite složenosti. U obradi podataka korišćeni su standardizovani bodovi dobijeni prema opisanoj proceduri u priručniku testa (Acadia Test of Developmental Abilities; Atkinson et al., 1972). Standardizovani bodovi koji ne pokazuju smetnje u vizuomotornoj koordinaciji i mogućnosti sleda za kalendarski uzrast ukupnog uzorka dece iznose 52 i više bodova, dok za subtest Crtanja oblika donja granica standardizovanih bodova koji se odnose na izostanak smetnji iznosi 51 bod.

Fonološka svesnost ispitana je kroz zadatke spajanja slogova, slogovnu segmentaciju, identifikaciju početnog fonema, prepoznavanje rima, fonemsku segmentaciju, identifikaciju završnog fonema, eliminaciju fonema i fonemsku supstituciju. Na uzrastu od devet godina postignuća dobijena na Testu za procenu fonološke svesnosti dele se na prosečna i ispodprosečna (Subotić, 2011).

Upitnik za utvrđivanje razvojnog poremećaja koordinacije popunjavali su učitelji, procena vizuomotorne koordinacije i mogućnosti sleda i crtanja oblika procenjena je grupno, dok je fonološku svesnost individualno procenjivao logoped.

Obrada podataka

Dobijena postignuća ispitanika prikazana su deskriptivnom statistikom (aritmetičkom sredinom, standardnom devijacijom, minimumom i maksimumom). Za analizu statističkog zaključivanja korišćeni su Hi-kvadrat test i Man–Vitnijev *U* test. Za procenu korelacije korišćeni su Pirsonov koeficijent korelacije i Kendalov tau-b koeficijent korelacije. Za procenu postojanja veze i određivanja njene jačine između fine motorike i razvoja pojedinačnih aspekata fonologije korišćena je višestruka linearna regresija, imajući u vidu da parametrijske metode tolerišu odstupanja od normalnosti raspodele podataka usled svoje robusnosti (Rasch & Guiard, 2004).

Rezultati istraživanja

Prosečna starost celokupnog uzorka dece iznosila je devet godina i tri meseca (AS = 9.36, SD = 0.46). U istraživanju je učestvovao 31 dečak i 29 devojčica. Uzorak je bio ujednačen prema polu ($\chi 2 = 0.67$, df = 1, $p = .79$) i uzrastu (t (58) = -1.51, $p = .13$).

Prema proceni učitelja koji su popunjavali Upitnik za razvojni poremećaj koordinacije, 27 dece (19 dečaka i osam devojčica) pokazalo je postignuća koja odgovaraju karakteristikama razvojnog poremećaja koordinacije (AS = 48.67, SD = 8.32). Iako je kod dece sa RPK raspon postignuća varirao od 29 do 58 bodova, najveći procenat dece sa RPK (62.9 %) imao je blaže smetnje u koordinaciji.

Poređenjem postignuća vizuomotorne koordinacije i mogućnosti sleda, crtanja oblika i fonološke obrade dece sa RPK i dece bez smetnji u koordinaciji, uočavaju se značajna statistička odstupanja u postignućima među poređenim grupama dece (Tabela 1).

Tabela 1

Mere deskriptivne statistike u testiranim postignućima celokupnog uzorka dece, kao i razlike među testiranim grupama dece

	Grupa u celini		Deca sa RPK		Deca bez smetnji		*U* (60)
	Min.-Max.	Mdn.	Min.-Max.	Mdn.	Min.-Max.	Mdn.	
Upitnik za RPK	29–75	51	29–58	51	57–75	70	6.5**
A2	19–63	34	19–47	34	46–63	59	1.5**
A4	25–67	36	25–57	36	38–67	53	63.5**
Font test	25–48	35	25–45	35	44–48	48	6**
Spajanje slogova	4–6	6	3–6	6	6	6	330**
Slogovna segmentacija	4–6	4	3–6	4	5–6	6	137.5**
Identifikacija početnog fonema	3–6	5	3–6	5	5–6	6	195**
Prepoznavanje rima	3–6	5	2–6	5	5–6	6	208.5**
Fonemska segmentacija	0–6	5	0–6	5	5–6	6	72**
Identifikacija završnog fonema	0–6	4	0–6	4	4–6	6	37**
Eliminacija fonema	0–6	4	0–6	4	4–6	6	118**
Fonemska supstitucija	0–6	3	0–6	3	3–6	6	60.5**

Legenda: **p < .001; RPK – razvojni poremećaj koordinacije; A2 – vizuomotorna koordinacija i mogućnost sleda; A4 – precrtavanje oblika; Font test – test za procenu fonoloških sposobnosti; AS – aritmetička sredina; SD – standardna devijacija; *U* – Man–Vitnijev *U* test

U odnosu na pol, u celokupnom uzorku dece devojčice su pokazale značajno bolja postignuća u spajanju slogova ($U(60) = 348$, $p = .007$), identifikaciji početnog fonema ($U(60) = 301$, $p = .008$), slogovnoj segmentaciji ($U(60) = 303$, $p = .011$), vizuomotornoj koordinaciji i mogućnosti sleda ($U(60) = 288.5$, $p = .017$), kao i na ukupnim skorovima Upitnika za procenu RPK ($U(60) = 303.5$, $p = .030$) i Font testa ($U(60) = 310$, $p = .033$) (Tabela 2).

Tabela 2

Mere deskriptivne statistike u testiranim postignućima celokupnog uzorka dece u odnosu na pol

	Dečaci		Devojčice		*U* (60)	*p*
	Min.-Max.	Mdn.	Min.-Max.	Mdn.		
Upitnik za RPK	29–75	55	41–75	63	303.50	.03
A2	19–63	37	26–63	52	288.5	.017
A4	25–66	42	29–67	45	368	.227
Font test	25–48	41	29–48	46	310	.033
Spajanje slogova	4–6	5	6–6	6	348	.007
Slogovna segmentacija	4–6	5	4–6	6	6.53	.013
Identifikacija početnog fonema	3–6	6	4–6	6	303	.011
Prepoznavanje rima	3–6	6	4–6	6	301	.008
Fonemska segmentacija	2–6	5	0–6	6	346.5	.092
Identifikacija završnog fonema	0–6	5	2–6	6	333.5	.065
Eliminacija fonema	0–6	5	0–6	6	388.5	.328
Fonemska supstitucija	0–6	5	0–6	6	363	.170

RPK – razvojni poremećaj koordinacije; A2 – vizuomotorna koordinacija i mogućnost sleda; A4 – precrtavanje oblika; Font test – test za procenu fonoloških sposobnosti; AS – aritmetička sredina; SD – standardna devijacija; *U* – Man–Vitnijev *U* test

Korelacionim analizama na celokupnom uzorku dece uočena je snažna pozitivna povezanost između testiranih dimenzija fine motorike i svih elemenata fonološke svesnosti (Tabele 3 i 4).

Tabela 3

Korelaciona analiza celokupnog uzorka dece i dece sa RPK u odnosu na procenu vizuomotorne koordinacije i mogućnosti sleda

	A2	
	Ceo uzorak (τ)	Deca sa RPK (τ)
Spajanje slogova	.45**	.37
Slogovna segmentacija	.62**	.12
Identifikacija početnog fonema	.57**	.23
Prepoznavanje rime	.55**	.25
Fonemska segmentacija	.67**	.28
Identifikacija završnog fonema	.73**	.27
Eliminacija fonema	.59**	.15
Fonemska supstitucija	.66**	.08

Napomena: ** $p < .01$, * $p < .05$

Tabela 4

Korelaciona analiza celokupnog uzorka dece i dece sa RPK u odnosu na procenu crtanja oblika

	A4	
	Ceo uzorak (τ)	Deca sa RPK (τ)
Spajanje slogova	.37**	.29
Slogovna segmentacija	.60**	.33
Identifikacija početnog fonema	.56**	.45*
Prepoznavanje rime	.44**	.16
Fonemska segmentacija	.63**	.51**
Identifikacija završnog fonema	.63**	.35
Eliminacija fonema	.52**	.31
Fonemska supstitucija	.54**	.07

Napomena: ** $p < .01$, * $p < .05$

S druge strane, primenom regresione analize na celokupnom uzorku dece može se uočiti da vizuomotorna koordinacija statistički značajno predviđa sve elemente fonološke obrade, dok se na dimenziji slogovne segmentacije, pored vizuomotorne koordinacije i mogućnosti sleda, takođe kao značajan prediktor izdvaja i uzrast (Tabela 5). Kako se tokom analize podataka dobio visok stepen korelacije između vizuomotorne koordinacije i svih elemenata fonološke obrade (Tabela 3), u rezultatima je predstavljena proporcija varijanse u pojedinačnim dimenzijama fonološke obrade koja se može objasniti nezavisnim promenljivim, vizuomotornom koordinacijom i, jednim delom, uzrastom (Tabela 5).

Pregledom rezultata na celokupnom testiranom uzorku dece uočava se da vizuomotorna koordinacija i mogućnost sleda objašnjava 54.7% varijabilnosti kod identifikacije završnog fonema ($F(1.58)=69.96$, $p < .0005$, $R^2 = .547$), 45.9% varijabilnosti kod fonemske segmentacije ($F(1.58)=49.12$, $p < .0005$, $R^2 = .459$), 43.5% u fonemskoj supstituciji $F(1.58)=44.66$, $p < .0005$, $R^2 = .435$), 34% varijabilnosti u eliminaciji fonema ($F(1.58)=31.43$, $p < .0005$, $R^2 = .340$), 33.5% u identifikaciji početnog fonema ($F(1.58)=29.23$, $p < .0005$, $R^2 = .335$), 31.1% u prepoznavanju rima ($F(1.58)=26.20$, $p < .0005$, $R^2 = .311$) i 20.4% u spajanju slogova ($F(1.58)=14.89$, $p < .0005$, $R^2 = .204$).

Za razliku od prethodno navedenih elemenata fonološke svesnosti, 44% varijabilnosti varijanse u slogovnoj segmentaciji, pored vizuomotorne koordinacije i mogućnosti sleda, objašnjava i uzrast ($F(2.57)=22.36$, $p < .0005$, $R^2 = .440$).

Drugim rečima, u celokupnom uzorku dece, deca koja su imala razvijeniju vizuomotornu koordinaciju i mogućnost sleda, odnosno preciznije trasiranje i koordinaciju oko–ruka, imala su i uspešniju fonološku obradu i precizniju manipulaciju fonemama. S druge strane, precrtavanje oblika nije se pokazalo kao značajan prediktor nijedne od testiranih dimenzija fonološke svesnosti na celokupnom uzorku dece.

Tabela 5

Analiza multivarijantne povezanosti između fine motorike i elemenata fonološke svesnosti kod sve testirane dece

	t	*p*	*β*	F	*Df*	*p*	Adj.R^2
Spajanje slogova							
A2	3.86	.000	.452	14.89	58	.000	.452
Slogovna segmentacija							
A2	6.12	.000	.626	37.46	58	.000	.382
Uzrast	2.19	.033	.219	22.36	57	.000	.420
Identifikacija početnog fonema							
A2	5.40	.000	.579	29.23	58	.000	.324
Prepoznavanje rime							
A2	5.11	.000	.558	26.20	58	.000	.299
Fonemska segmentacija							
A2	7.01	.000	.677	49.12	58	.000	.449
Identifikacija završnog fonema							
A2	8.36	.000	.739	69.96	58	.000	.539
Eliminacija fonema							
A2	5.60	.000	.593	31.43	58	.000	.340
Fonemska supstitucija							
A2	6.68	.000	.660	44.66	58	.000	.425

t – standardna greška procene; p – statistička razlika; β – beta koeficijent; F-test; Df – stepen slobode; p – statistička razlika; R^2 – korelacioni koeficijent; A2 – vizuomotorna koordinacija i mogućnost sleda

Kod dece sa RPK uočavaju se odstupanja kako u domenu fine motorike, tako i u fonološkoj obradi informacija (Tabela 1). Ispodprosečna postignuća u finoj motorici i fonološkoj obradi dece sa RPK upućuju na povećan rizik u ovoj grupi dece za ovladavanje složenim veštinama kao što su čitanje i pisanje, ali i za izvršavanje složenih motoričkih zadataka koji podrazumevaju opažanje, planiranje i izvršavanje motoričkih sekvenci.

U odnosu na pol, deca sa RPK nisu pokazala statistički značajno razlikovanje u postignućima u svim primenjenim testovima (Tabela 6).

Tabela 6

Mere deskriptivne statistike u testiranim postignućima dece sa RPK u odnosu na pol

	Dečaci		Devojčice		*U* (60)	*p*
	Min.-Max.	Mdn.	Min.-Max.	Mdn.		
Upitnik za RPK	29–60	51	41–55	52	68.50	.687
A2	19–47	34	26–44	33	67.50	.647
A4	25–57	36	29–41	36	53.50	.225
Font test	25–45	34	29–43	36	63.50	.505
Spajanje slogova	4–6	6	6–6	6	48.00	.053
Slogovna segmentacija	4–6	4	4–6	5	62.50	.446
Identifikacija početnog fonema	3–6	5	4–6	6	45.50	.087
Prepoznavanje rima	3–6	5	4–6	5	75.00	.956
Fonemska segmentacija	2–6	5	0–5	5	68.00	.655
Identifikacija završnog fonema	0–5	4	2–5	4	68.00	.662
Eliminacija fonema	0–6	4	0–5	5	73.50	.892
Fonemska supstitucija	0–6	3	0–5	3	64.00	.517

Kvalitet grafomotornog izraza kroz trasiranje i precrtavanje figura različite složenosti, u grupi dece sa RPK, izdvaja se kao dominantna nezavisna varijabla koja utiče na varijabilnost jednog dela testiranih zavisnih (Tabela 7).

Kod dece sa RPK samo dva elementa fonološke svesnosti mogu se objasniti proporcijom varijanse nezavisne promenljive, u ovom slučaju precrtavanjem figura različite složenosti. Zadatak crtanja oblika, koji ispituje kvalitet grafomotornog izraza kroz trasiranje i precrtavanje figura različite složenosti, objašnjava 26.3% varijabilnosti fonemske segmentacije ($F(1.25)=8.93$, $p < .006$, $R^2 = .263$) i 20.8% identifikacije početnog fonema ($F(1.25)=6{,}56$, $p < .017$, $R^2 = .208$). Dobijene vrednosti ostalih varijabli fonološke svesnosti u uzorku dece sa RPK nisu pokazale statistički značajnu povezanost sa varijablama fine motorike (Tabele 3 i 4) i samim tim nisu ispunile kriterijum za primenu multifaktorijalne analize varijanse.

Za razliku od dece sa RPK, u celokupnom uzorku dece vizuomotorna koordinacija i mogućnosti sleda i precrtavanje oblika zauzimaju značajan udeo varijanse kod svih elemenata fonološke obrade.

Tabela 7

Analiza multivarijantne povezanosti između fine motorike i elemenata fonološke svesnosti kod dece sa RPK

	t	*p*	*β*	F	*Df*	*p*	Adj.R^2
Identifikacija početnog fonema							
A4	2.56	.017	.456	6.56	25	.017	.176
Fonemska segmentacija							
A4	2.98	.006	.513	8.93	25	.006	.234

t – standardna greška procene; p – statistička razlika; β – beta koeficijent; F-test; df – stepen slobode; p – statistička razlika; R2 – korelacioni koeficijent; A4 – crtanje oblika

Diskusija

Kako se malo zna o povezanosti fine motorike i fonološke svesnosti, kao što je razvojni poremećaj koordinacije, posebno kod dece sa specifičnim motoričkim smetnjama, dobijeni rezultati o povezanosti i uticaju fine motorike na fonološki razvoj dece mlađeg školskog uzrasta ujedno su i prvi rezultati koji povezuju pomenute oblasti.

Na celokupnom uzorku dece rezultati dobijeni primenom višestruke linearne regresije pokazuju da se vizuomotorna koordinacija izdvaja kao dominantan činilac kompletne fonološke obrade.

S obzirom na činjenicu da istraživanja o uticaju fine motorike na fonološku razvijenost kod dece mlađeg školskog uzrasta izostaju, za šire tumačenje rezultata biće korišćene studije koje su ispitivale povezanost fine motorike i jezika, kao i studije koje su ispitivale povezanost fine motorike i veštine čitanja kod dece predškolskog i mlađeg školskog uzrasta.

Pregledom literature i ovim istraživanjem potvrđen je značaj vizuomotorne koordinacije u različitim domenima razvoja jezika. Dobijena povezanost između vizuomotorne koordinacije i svih elemenata fonološke obrade kod dece mlađeg školskog uzrasta upućuje na mogući uticaj motorne konstelacije glasova tokom formiranja fonemskih jedinica.

Tokom govorne percepcije na kortikalnom nivou dolazi do aktiviranja različitih zona koje omogućavaju paralelno formiranje fonemskih reprezentacija, s jedne strane, te artikulacionih reprezentacija u somatosenzornom motornom korteksu, kroz kortikalno senzorno mapiranje larinksa, jezika, vilice i usana, s druge (Brown et al., 2008, 2021; Dichter et al., 2018; Penfield & Boldrey, 1937; Penfield, 1954; Simonyan & Horwitz, 2011).

Iako se u izolovanoj percepciji glasova nalazi formirano fonemsko i artikulaciono obeležje u kontekstu motoričke organizacije larinksa, nepca,

vilice, jezika i usana, glasovi unutar reči, usled koartikulacije, zahtevaju ne samo precizno fonemsko dekodiranje već i odgovarajuće vizuomotorno procesiranje. Ovo procesiranje zahteva koordinisanje pokreta oralne muskulature, kojima se obezbeđuje odgovarajuća vizuelna segmentacija glasova u izgovorenoj reči, i uz fonemsku segmentaciju, formira odgovarajuća fonemsko-fonetska prezentacija produkovane reči.

Smetnje na nivou vizuomotornog procesiranja i koordinacije pokreta oralne muskulature neretko mogu dovesti do pogrešnog formiranja artikulacionih šema i pored adekvatnog fonemskog razvoja, što upućuje na pogrešno vizuelno opažanje i sekvenciranje izgovorenih reči.

Autori studije koji su ispitivali odnos fine motorike i jezika kod dece koja su imala 21 mesec (Alcock & Krawczyk, 2010) utvrdili su značajnu povezanost fine motorike, receptivnog i ekspresivnog rečnika. Ista studija nije pokazala povezanost između fine motorike i formiranja rečenica, u smislu gramatičke upotrebe reči u rečenici, nakon kontrole varijabli koje su merile grubu motoriku, oralnu motoriku i gestove (Alcock & Krawczyk, 2010).

U sledećoj studiji, u okviru koje su uzorak činila deca nešto starijeg uzrasta (od trećeg do 36 meseca), takođe su dobijeni slični rezultati (Houwen et al., 2016). Autori su uočili da fina motorika predstavlja značajan činilac razvoja receptivnog i ekspresivnog govora i pored kontrole kognitivnih nivoa testirane dece.

Studije koje su uključivale decu starijeg uzrasta (od treće godine do polaska u školu) takođe su istakle povezanost fine motorike i jezika (Cameron et al., 2012; Muluk et al., 2014). Analizom odnosa jezika i fine motorike, kroz vizuomotornu koordinaciju, kod dece na uzrastu od tri godine istaknuta je značajna povezanost između aktivnosti koje zahtevaju fine motoričke veštine i jezik. Na uzrastu od tri godine dobijeni rezultati ukazuju na postojanje veze između veština fine motorike i razumevanja do četiri pojedinačna pojma, imenovanja pojmova u nizu dužem od tri i upotrebe množine. Dobijeni rezultati na testiranom uzorku dece, takođe, ukazuju da se, pored fine motorike, na ovom uzrastu testirana gruba motorika izdvaja kao značajan prediktor jezičkog razvoja u domenu upotrebe množine i razumevanju predloga. Povezanost ovih veština zadržava se i na starijem uzrastu, od četvrte do šeste godine. Naime, od četvrte do šeste godine fina motorika bila je u korelaciji sa upotrebom i razumevanjem složenijih jezičkih elemenata, imenovanjem šest i više reči, kao i odgovarajućom upotrebom objekata i opozita (Muluk et al., 2014).

Na predškolskom uzrastu fina motorika se, između ostalog, pokazala i kao značajan činilac razvoja rečnika (Suggate & Stoeger, 2014). U istraživanju koje je imalo za cilj da proceni buduće opismenjavanje dece predškolskog uzrasta, fina motorika ispitivana je kroz zadatke građenja kule, precrtavanja i crtanja ljudske figure (Cameron et al., 2012). Rezultati ove studije pokazali su da deca sa razvijenom finom motorikom imaju bolja postignuća u razumevanju

pročitanog pasusa, identifikovanju glasa/reči i razvijeniju fonemsku svesnost, što predstavlja neke od elemenata buduće uspešne pismenosti.

Imajući u vidu da je fonološka svesnost dominantan prediktor dekodiranja reči, što je u osnovi početnog ovladavanja čitanjem i pisanjem (Bird et al., 1995; Golubović i Ječmenica, 2019; Milošević, 2017; Čolić, 2018), studije koje su ispitivale čitalačka postignuća kroz prizmu vizuomotorne koordinacije kod dece predškolskog (Becker et al., 2014) i mlađeg školskog uzrasta (Buha et al., 2023; Chung et al., 2018; Pienaar et al., 2014; Pitchford et al., 2016; Suggate et al., 2019;) iznose zapažanja o povezanosti fine motorike i čitalačkih postignuća testirane dece (Becker i sar., 2014; Chung et al., 2018). Buha sa saradnicima ističe da, uz kontrolu inteligencije i bazičnih izvršnih funkcija, vizuomotorna koordinacija objašnjava 5.2% varijanse u čitalačkim postignućima dece mlađeg školskog uzrasta (Buha i sar., 2023).

Iako se RPK svrstava u najučestalije specifične poremećaje karakteristične za školski uzrast (Zwicker et al., 2012), pri čemu neretko biva udružen sa disleksijom, disgrafijom i disortografijom, tek se nekoliko studija bavilo razvojem fonologije kod dece sa RPK (Fletcher-Flinn et al., 1998; Janjić et al., 2019; Janjić, 2022). Dobijena ispodprosečna postignuća u fonološkoj obradi dece sa RPK upućuju na značajno kašnjenje u fonološkom razvoju ove grupe dece, kao i na povećan rizik za smetnje u ovladavanju čitanjem i pisanjem (Janjić, 2021; Janjić, 2022; Nišević, 2016).

Smetnje na nivou vizuelnog sekvenciranja i integrisane koordinacije pokreta koji su vođeni prethodno dobijenim vizuelnim informacijama, na osnovu opažanja dela i celine i njihovih međusobnih odnosa, predstavljaju jednu od najčešćih smetnji kod dece sa RPK. Dobijeni rezultati u uzorku dece sa RPK pokazuju da zadatak koji zahteva trasiranje ili precrtavanje figura različite složenosti značajno predviđa postignuća u fonemskoj segmentaciji i identifikaciji početnog fonema. Dobijene vrednosti mogu se razmatrati u kontekstu do kog stepena dete može postići automatizam u zadacima crtanja i grafomotorike, kako bi deo radne memorije moglo usmeriti na druge ciljeve učenja. Nasuprot tome, deca sa RPK koja imaju smetnje u koordinaciji oka i ruke, što ih ograničava u formiranju brzih, automatizovanih, specifičnih pokreta potrebnih za formiranje crteža ili slova, teže koordiniraju manipulacijom glasova kroz fonemsku rotaciju, analizu ili sintezu. Takođe, nivo perceptivne stabilnosti utiče na dobijena postignuća dece sa RPK. Naime, bilo kakva redukcija perceptivne stabilnosti može inhibirati procese koji zahtevaju obradu vizuelne informacije, destabilišući kapacitet radne memorije. To je posebno istaknuto u složenim zadacima koji zahtevaju paralelnu obradu vizuelnih i auditivnih sadržaja, kao što je, na primer, diktat.

Veza između fine motorike i fonologije može se objasniti i sa neurološkog aspekta, aktivacijom malog mozga tokom obe aktivnosti. Naime, pored ključne uloge cerebeluma u preciznom fokusiranju, koordinaciji oko–ruka, verbalnoj

radnoj memoriji i koordinaciji oko–glas (Mariën et al., 2014), aktivacijom određenih neurona (*mirror* neuroni) mali mozak ostvaruje značajnu ulogu i u govornom procesiranju (Arbib, 2005; Gentilucci & Corballis, 2006; prema Schwartz et al., 2012; Rizzolatti & Arbib, 1998) usled prevođenja akustičkih karakteristika glasova u motoričke gestove nakon auditivnog enkodiranja (Liberman & Whalen, 2000; prema Janjić, 2022).

Kontekstualno zavisna, koartikulacija glasova tokom izgovorenih reči ne menja samo akustička svojstva glasova već aktivira i prethodno formirane motoričke predstave o izgovorenim glasovima, dobijene koordinisanim vizuelnim opažanjem (Janjić, 2022).

Ograničenja

Iako je uzorak zadovoljavao statističke kriterijume, podaci dobijeni u ovom istraživanju ne mogu se generalizovati na celokupnu populaciju dece mlađeg školskog uzrasta usled relativno uskog uzrasnog raspona. Naime, uticaj fine motorike na fonološki razvoj bilo bi poželjno ispitati na široj populaciji dece kroz različite uzrasne kategorije. U tom smislu bi u narednim istraživanjima bilo dobro ispitati ne samo decu predškolskog uzrasta i širi uzorak dece u prvim godinama školovanja, već i decu tokom ranog razvoja, imajući u vidu dinamiku razvoja ne samo fine motorike već i fonologije.

Takođe, u narednim istraživanjima bilo bi poželjno uključiti izvršne funkcije, na prvom mestu inhibitornu kontrolu kao kontrolnu varijablu, imajući u vidu njen posredni uticaj na radnu memoriju kako dece mlađeg školskog uzrasta, tako i dece sa RPK.

Zaključak

Rezultati studije pokazali su da se kod dece mlađeg školskog uzrasta vizuomotorna koordinacija izdvaja kao prediktor postignuća na svim nivoima fonološke obrade. Slabija ovladanost fonološkom svesnošću i finom motorikom kod dece sa razvojnim poremećajem koordinacije dovodi do ispodprosečnih postignuća koja ovu decu prate od najranijeg školovanja. Kako se različite komponente fine motorike izdvajaju kao značajni prediktori fonološke obrade, može se zaključiti da nisu svi aspekti fine motorike podjednako značajni za razvoj fonologije. I pored naznačenih ograničenja, rezultati istraživanja ukazuju na postojanje povezanosti dva značajna razvojna domena – fine motorike i fonologije, pa bi naredni korak, nesumnjivo, zahtevao opsežnija istraživanja na ovu temu.

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The relationship between phonological awareness and fine motor skills in younger school-age children

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Introduction. Although the correlation between motor and language development has been analyzed through various studies, the correlation between phonological development and fine motor skills in younger school-age children has not been sufficiently investigated. *Objective*. The aim of the study was to determine the relationship between phonological awareness and visuomotor coordination in younger school-age children. *Methods*. The study included 60 children attending the third grade of primary schools in Belgrade. Developmental coordination disorder was observed in 27 children, while 33

children were without this disorder. The Questionnaire for Developmental Coordination Disorder was used to determine its presence. Phonological awareness was assessed by the Test of Phonological Awareness, and fine motor skills by subtests of the Acadia Test of Developmental Abilities – Visuomotor Coordination and Sequencing and Figure Copying. *Results*. The results show significant below-average achievements in visuomotor coordination, figure copying, and phonological awareness in children with developmental coordination disorder. Regression analysis showed that visuomotor coordination significantly predicts all elements of phonological awareness in children. In children with developmental coordination disorder, figure copying explains 26.3% of the variance in phonemic segmentation and 20.8% of the variance in initial phoneme identification. *Conclusion*. In younger school-age children, visuomotor coordination is an independent predictor of all levels of phonological processing. From the earliest school age, poor phonological awareness and fine motor skills follow children with developmental coordination. Different regression analysis results in children with and without developmental coordination disorder indicate that not all aspects of fine motor skills are equally important for phonological awareness.

Keywords: phonological awareness, fine motor skills, younger school age, developmental coordination disorder

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Odnos između sposobnosti fonemske diskriminacije i artikulacije kohlearno implantirane dece predškolskog uzrasta

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Uvod: Usvajanje maternjeg jezika ostvaruje se savladavanjem glasovnog sistema, koje počiva na razvoju fonemske diskriminacije i artikulacije. *Cilj:* Istraživanje je imalo za cilj da ispita odnos između fonemske diskriminacije i artikulacije u periodu intenzivnog govorno-jezičkog razvoja kod dece oštećenog sluha predškolskog uzrasta. *Metode:* Istraživanjem je obuhvaćeno 20 dece sa kohlearnim implantom uzrasta između 36 i 77 meseci. Razvijenost fonemske diskriminacije i artikulacije ispitana je Testom za ispitivanje razlikovanja fonema i Globalnim artikulacionim testom. *Rezultati* istraživanja pokazuju da deca koja uspešnije razlikuju foneme imaju statistički značajno bolje rezultate na Globalnom artikulacionom testu, kao i da postoji međusobna povezanost između fonemske diskriminacije i artikulacije ispitanika. Rezultati takođe ukazuju na bolja postignuća u nivou razvijenosti fonemske diskriminacije i artikulacije u grupi dece čije je učešće u auditivnom treningu svakodnevno, u odnosu na decu koja su u auditivni trening uključena dva puta nedeljno. Faktori hronološki, slušni uzrast i dužina auditivnog treninga nisu bili statistički značajno povezani sa artikulaciono-fonološkim sposobnostima ispitanika. *Zaključak:* Analizom rezultata istraživanja zaključuje se da su sposobnost fonemske diskriminacije i artikulacije kohlearno implantirane dece predškolskog uzrasta međusobno povezane. Faktori hronološki, slušni uzrast i dužina auditivnog treninga nisu utvrđeni kao indikatori koji se dovode u vezu sa artikulaciono-fonološkim sposobnostima ispitanika. Učestalost auditivnog treninga utvrđena je kao jedini faktor koji je povezan sa sposobnostima fonemske diskriminacije i artikulacije predškolaca sa kohlearnim implantom.

Ključne reči: artikulaciono-fonološke sposobnosti, kohlearna implantacija, predškolski uzrast

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Uvod

Govor predstavlja sposobnost ljudi da pomoću artikulacije glasova i njihovih kvantitativnih pratilaca ostvare akustički organizovanu i govorno osmišljenu poruku kojom se izražavaju misli (Galeković, 2023; Kostić, 1980; Punišić, 2012). Za razumevanje i produkciju govora podjednako su važni akustički utisci i artikulacioni pokreti, a pažljivim izborom akustičkih elemenata i parametara artikulacije formira se jezik kao osnovno sredstvo komunikacije (Galeković, 2023; Subotić, 2005).

Skladan razvoj govora i jezika, osim očuvanosti sluha u smislu auditivne percepcije, podrazumeva razvijenost fonemske diskriminacije, koja omogućava diskriminaciju akustički sličnih zvukova (Couvee, 2022; Golubović i sar., 2019).

Mogućnost prepoznavanja više zvučnih stimulusa kao istih – rekognicija i više zvučnih stimulusa kao različitih – diskriminacija osnovna su svojstva auditivne percepcije. Za razliku od auditivne percepcije, osnovno svojstvo fonemske diskriminacije je funkcionalno jezičke prirode i iziskuje specifičniju auditivnu oštrinu, usled čega je zahtevniji proces od auditivne diskriminacije (Defektološki leksikon 1999; Vuković i Ćalasan, 2022). Zahvaljujući fonemskoj diskriminaciji mnogi akustički različiti zvukovi mogu se prepoznati kao isti, a različitim se prepoznaju samo oni glasovi koji imaju funkciju fonološke diskriminacije (Defektološki leksikon 1999; Đoković i Ostojić 2010). Sposobnost fonemske diskriminacije omogućava stvaranje auditivne predstave o fonemi kao apstraktnom jezičkom simbolu, koji se konkretno realizuje kao glas, i njegovu diferencijaciju (Couvee, 2022; Lurija, 1983; Punišić, 2012). Autori smatraju da se u periodu između druge i pete godine deca osposobljavaju da razlikuju sve glasove govornog sistema, iako neke od njih mogu pravilno izgovoriti tek kasnije (Dimić, 2003; Milankov i sar., 2021; Vuletić, 1987). Za adekvatan razvoj fonemske diskriminacije važna je funkcionalna očuvanost svih slušnih struktura od najranijeg uzrasta, jer oštećenje na bilo kom nivou auditivnog puta može uzrokovati njenu disfunkciju (Lurija, 1983; Marn, 1994; Schönhuber, 2019; Wu et al., 2022). Nemogućnost fonemske diskriminacije javlja se kod svih oštećenja sluha, najzastupljenija je u grupi afrikata i frikativa, a najmanje u grupi vokala (Couvee 2022; Vladisavljević, 1997).

Sticanje precizne percepcije akustičkih utisaka neophodno je za formiranje pravilne artikulacije (Couvee 2022; Dimić, 2003; Narančić, 2001). Kod dece se prvo javlja auditivna diferencijacija glasova, a potom artikulacija, koja obezbeđuje izgovaranje i istovremenu autopercepciju. Navedeni procesi omogućavaju izoštravanje percepcije glasova, na osnovu koje se upravlja procesom artikulacije (Couvee, 2022; Dimić, 2003; Golubović i sar., 2019; Punišić, 2012). Artikulacija dece oštećenog sluha zbog nemogućnosti adekvatne percepcije zvukova iz spoljašnje sredine ne sadrži sve karakteristike pravilne artikulacije i ispoljava se kao otogena dislalija (Ching et al., 2023; Dimić,

2003; Dobrota, 2017; Sfakianaki, 2018). Glasovi mogu biti distorzovani u zavisnosti od stepena oštećenja sluha, a kvalitet i mogućnost upotpunjavanja i nadograđivanja adekvatnih izgovornih navika zavise od kvaliteta amplifikacije, dužine i učestalosti auditivnog treninga (Narančić, 2001; Ostojić, 2004; Zeqiri & Miloseva, 2023).

Fonetsko-fonološki sistem formira se i stabilizuje do osme, a neki autori smatraju i do desete godine života (Đoković i Ostojić, 2010; Mihajlović i sar., 2015; I. Vuković i M. Vuković, 2009). Jasnu starosnu granicu nije moguće striktno postaviti, ali se sa sigurnošću može tvrditi da se s godinama slušne i izgovorne navike jasnije uspostavljaju i sve teže nadograđuju i upotpunjuju. Iz svega toga proizilazi cilj istraživanja, koji je bio usmeren da ispita razvijenost artikulaciono-fonoloških sposobnosti – prvenstveno odnos fonemske diskriminacije i artikulacije kod dece koja koriste kohlearni implant (u daljem tekstu KI) i aktivno učestvuju u auditivnom treningu. Međusobna veza fonemske diskriminacije i artikulacije potvrđena je u ranijim istraživanjima (Augst & Frick, 1964; Narančić, 2001; Stitt & Huntington, 1969; Yantis et al., 1966), a naučni i praktični značaj ovog replikativnog istraživanja je u težnji da ispita odnos dva prožeta procesa u periodu njihovog intenzivnog razvoja u populaciji dece sa KI. Ispitivanje u periodu predškolskog uzrasta naročito je značajno jer je tada prisutna najveća fleksibilnost nadograđivanja i upotpunjavanja deficita u domenu artikulaciono-fonološkog razvoja. Shodno tome, predškolski uzrast predstavlja period u kom su deca sa KI najčešće uključena u auditivni trening, te ishodi ovakvih istraživanja mogu značajno nadograditi i osavremeniti njegove sadržaje i surdološku praksu shodno dobijenim rezultatima.

Ispitivanje artikulaciono-fonoloških sposobnosti i njihovog odnosa, osim provere dosadašnjih rezultata, produbljuje i one aspekte koji do sada nisu ispitivani na navedeni način u sadašnjem trenutku u populaciji predškolaca sa KI. Osim toga, u istraživanju je ispitano postojanje povezanosti faktora hronološkog i slušnog uzrasta, te dužine i učestalosti auditivnog treninga sa fonemskom diskriminacijom i artikulacijom ispitanika.

Metode

Uzorak je obuhvatao 20 predškolaca uzrasta od 36 do 77 meseci (M = 59.95, SD = 12.54). Činilo ga je 12 dečaka (60%) i osam (40%) devojčica. Prosečan slušni uzrast ispitanika je 41.65 meseci (min = 14; max = 69), dok prosečno učešće u auditivnom treningu iznosi 40.05 (min = 10; max = 70) meseci. Selekcioni kriterijumi podrazumevali su da sva deca svakodnevno, veći deo dana, koriste KI, kao i da učestvuju u auditivnom treningu u institucijama u kojima se sprovodi rehabilitacija sluha, govora i jezika. Ispitanici su učestvovali u auditivnom treningu najmanje dva puta nedeljno (N = 7) ili svakodnevno (N = 13). Ispitivanje je obavljeno u Kliničkom centru Srbije na Odseku za audiološku rehabilitaciju dece pri Klinici za otorinolaringologiju i maksilofacijalnu hirurgiju, u Centru za ranu dijagnostiku i terapiju dece sa oštećenjem sluha „Dečija

kuća" i u Školi za oštećene sluhom – nagluve „Stefan Dečanski". Istraživački uzorak je prigodan, a isključujući kriterijumi pri formiranju bili su prisustvo udruženih smetnji i dvojezičnost (paralelna upotreba znakovnog i govornog jezika). Istraživanje je realizovano u periodu od januara do avgusta 2023. godine.

Radi ispitivanja odnosa između razvijenosti fonemske diskriminacije i artikulacije predškolaca sa KI korišćena su dva testa: Test za ispitivanje razlikovanja fonema (u daljem tekstu TRF) i Globalni artikulacioni test (u daljem tekstu GAT) (Kostić i sar., 1983). TRF je korišćen za ispitivanje razvijenosti fonemske diskriminacije dece sa KI i sastoji se od 40 fonetski izbalansiranih parova reči uz koje postoji isti broj slika. Parovi reči ujednačeni su prema akcentu, broju glasova i slogova, kao i prema redosledu identičnih fonema. Jedina razlika koja postoji jeste u jednoj fonemi, koja predstavlja diferencijalni znak na osnovu kog se reči razlikuju po značenju. Ispitivač postavlja parove slika ispred deteta imenujući jednu od njih, a od deteta zahteva da pokaže imenovanu sliku. Postupak se ponavlja za sve reči u testu, a redosled imenovanja slika varira kako ne bi dolazilo do automatskog pokazivanja. Tačni odgovori ocenjivani su jednim poenom, nesigurni odgovori doprinosili su ukupnom skoru 0.5 poena, dok netačni odgovori nisu bili bodovani. Maksimalan broj poena koji je bilo moguće ostvariti na testu je 40.

GAT predstavlja test za procenu kvaliteta izgovora svih 30 glasova srpskog jezika. Svi glasovi, osim vokala, ispitivani su u inicijalnoj poziciji, dok je kvalitet izgovora vokala ispitivan u medijalnoj poziciji. Procedura ispitivanja vršena je davanjem instrukcija ispitaniku da ponavlja zadate reči onako kako ih ispitivač izgovara. Kvalitet izgovora glasova zatim je vrednovan ocenama od 1 do 7. Dobar izgovor ocenjivan je od 1 do 3 u zavisnosti od stepena njegovog kvaliteta i vrednost tih odgovora iznosila je jedan poen. Granični glasovi koji se nisu mogli svrstati u grupu dobro izgovorenih, a koji su bili razumljivi, ocenjivani su ocenom 4 i vrednost tih odgovora iznosila je 0.5 poena. Značajno distorzovani glasovi (obezvučeni, umekšani, nazalizovani, interdentalni) ocenjivani su ocenom 5, dok glasovi koji su distorzovani u meri u kojoj nije moguće njihovo jasno razumevanje ocenom 6. Omitovani i supstituisani glasovi ocenjivani su ocenom 7. Odgovori koji su ocenjeni od 5 do 7 nisu bodovani, niti su doprinosili ukupnom skoru na GAT-u. Maksimalan broj poena na testu je 30.

Podaci ispitanika o hronološkom i slušnom uzrastu, te dužini i učestalosti auditivnog treninga, dobijeni su uvidom u zdravstvenu dokumentaciju, za čiji je uvid dobijena saglasnost roditelja i rukovodilaca ustanova, kao i za sprovođenje ispitivanja.

Dobijeni podaci obrađeni su u statističkom programu JASP (*Jeffrey's Amazing Statistic Program 0.16*). Za opisivanje uzorka korišćene su mere deskriptivne statistike. Provera uniformnosti distribucije uzorka utvrđena je primenom Hi-kvadrat testa. Radi utvrđivanja postojanja razlika u razvijenosti artikulacije u odnosu na razvijenost fonemske diskriminacije ispitanika korišćen je Man–Vitnijev *U* test, a za utvrđivanje povezanosti između postignuća na TRF i GAT primenjena je Spirmanova rang korelacija. Za testiranje i utvrđivanje postojanja veze između faktora (hronološki uzrast, slušni uzrast i dužina auditivnog treninga) i sposobnosti fonemske diskriminacije i

artikulacije takođe je korišćena Spirmanova rang korelacija. Prilikom ispitivanja postojanja razlika u razvijenosti artikulaciono-fonoloških sposobnosti ispitanika u odnosu na učestalost auditivnog treninga korišćen je Man–Vitnijev *U* test.

Rezultati

Tabela 1

Prikaz deskriptivnih statističkih podataka na TRF (N = 20)

	Min	Max	M	Mdn	SD	IQR
Frikativi	4.00	6.00	5.50	6.00	0.63	1.00
Vokali	6.00	9.00	8.18	8.00	0.89	1.00
Plozivi	5.50	9.00	7.85	8.00	0.99	1.63
Sonanti	6.00	9.00	7.45	7.50	1.11	2.13
Afrikati	2.00	4.00	3.13	3.25	0.78	1.50
Različite glasovne grupe	1.00	3.00	2.30	2.00	0.61	1.00
Ukupan skor	28.00	39.00	34.40	34.00	2.94	4.13

Napomena: Maksimalni mogući skorovi u okviru glasovnih grupa: frikativi 6, vokali 9, plozivi 9, sonanti 9, afrikati 4, različite glasovne grupe 3. Maksimalan mogući skor na testu je 40.

U Tabeli 1 prikazana su postignuća ispitanog uzorka na TRF, koja ukazuju da je prosečan rezultat na testu 34.40 (86%) od maksimalno mogućeg skora 40. Fonemska diskriminacija je najrazvijenija u grupi frikativa (91.7%) i vokala (90.8%), zatim kod ploziva (87.2%) i sonanata (82.8%), dok je najmanje razvijena u grupi afrikata (78.1%). Uspešnost prilikom razlikovanja fonema različitih glasovnih grupa manja je u odnosu na sve zadatke koji su zahtevali razlikovanje fonema u okviru istih glasovnih grupa (76.7%). Dobijeni rezultati nadilaze nivo nedoslednosti i time odražavaju razvijenost fonemske diskriminacije.

Tabela 2

Prikaz deskriptivnih statističkih podataka na GAT-u (N = 20)

	Min	Max	M	Mdn	SD	IQR
Vokali	1.50	5.00	3.85	4.00	1.05	1.25
Plozivi	2.50	6.00	4.58	4.75	1.04	1.63
Sonanti	2.00	8.00	4.45	4.00	1.58	2.00
Frikativi	0.50	6.00	2.95	3.25	1.92	4.00
Afrikati	0.00	4.00	1.68	1.75	1.39	2.63
Ukupan skor	8.50	26.50	17.50	16.50	6.06	10.13

Napomena: Maksimalni mogući skorovi u okviru glasovnih grupa: vokali 5, plozivi 6, sonanti 8, frikativi 6, afrikati 5. Maksimalan mogući skor na testu je 30.

U Tabeli 2 prikazani su rezultati ispitanog uzorka na GAT-u. Prosečna postignuća iznose 17.50 (58.3%) od maksimalno mogućeg skora koji je 30. Ostvareni rezultati u okviru pojedinačnih glasovnih grupa ukazuju da je uzorak bio najuspešniji prilikom artikulacije vokala (77%). Sledeća grupa glasova prema redosledu uspešnosti izgovora jesu plozivi (76.3%). Znatno manja uspešnost izgovora uočava se u grupi sonanata (55.6%) i frikativa (49.2%), dok se najlošija postignuća uviđaju prilikom artikulacije afrikata (33.5%).

Tabela 3

Prikaz postignuća na GAT-u u odnosu na uspešnost ispitanika na TRF

	Uspešnost na TRF	N	M	Mdn	SD	SEM	IQR
Vokali	Do 85%	11	3.32	3.50	1.03	0.31	1.00
	Više od 85%	9	4.50	4.50	0.66	0.66	0.50
Plozivi	Do 85%	11	3.91	4.00	0.86	0.26	0.75
	Više od 85%	9	5.39	5.50	0.55	0.18	1.00
Sonanti	Do 85%	11	3.59	3.50	0.99	0.30	1.00
	Više od 85%	9	5.50	5.50	1.56	0.52	2.00
Frikativi	Do 85%	11	2.09	1.50	1.59	0.48	2.50
	Više od 85%	9	4.00	5.00	1.82	0.61	1.50
Afrikati	Do 85%	11	0.91	0.50	0.94	0.28	1.75
	Više od 85%	9	2.61	3.00	1.29	0.43	1.00
Ukupan skor	Do 85%	11	13.82	13.50	4.05	1.22	5.00
	Više od 85%	9	22.00	24.00	5.03	1.68	4.50

Napomena: Maksimalni mogući skorovi u okviru glasovnih grupa: vokali 5, plozivi 6, sonanti 8, frikativi 6, afrikati 5. Maksimalan mogući skor na testu je 30.

Postignuća ispitanog uzorka na GAT-u u odnosu na uspešnost postignuća ispitanika na TRF prikazana su u Tabeli 3. Prema uspešnosti postignuća na TRF uzorak je podeljen na ispitanike koji su ostvarili do 85% uspešnosti na testu (55%) i na one koji su ostvarili više od 85% uspešnosti (45%). Opažena razlika u distribuciji ispitanika u okviru grupa nije bila statistički značajna ($\chi^2 = .20$, $df = 1$ $p = .66$). Kako bi se ispitao odnos fonemske diskriminacije i artikulacije dece sa KI predškolskog uzrasta i preciznije odgovorilo na pitanje da li postoje razlike u razvijenosti artikulacije u odnosu na razvijenost fonemske diskriminacije ispitanika, primenjen je Man–Vitnijev *U* test. Rezultati ukazuju da postoji statistički značajna razlika u postignućima na GAT-u između grupa ispitanika koji su se razlikovali u pogledu postignuća na TRF. Grupa dece koja je ostvarila bolja postignuća na TRF imala je statistički značajno bolja postignuća u odnosu na grupu dece koja su sa manje uspešnosti vršila fonemsku diskriminaciju ($U = 11.50$, $p = .004$, $r = .6$). Statistički pokazatelji ukazuju na umerenu do veliku veličinu efekta.

S obzirom na uočene razlike, rezultati sugerišu da se razvijenija sposobnost fonemske diskriminacije može dovesti u vezu sa artikulacionim sposobnostima predškolaca koji koriste KI.

Radi ispitivanja postojanja povezanosti između razvijenosti fonemske diskriminacije i artikulacije predškolaca sa KI korišćena je Spirmanova rang korelacija. Rezultati ukazuju da postoji statistički značajna povezanost između ukupnih postignuća na TRF i GAT-u (r_s = .79, p < .001).

Tabela 4

Prikaz deskripcije faktora i ukupnih skorova na TRF i GAT-u (N = 20)

	Min	Max	M	Mdn	SD	IQR
Hronološki uzrast	36.00	77.00	59.95	61.00	12.54	21.75
Slušni uzrast	14.00	69.00	41.65	41.50	15.67	20.50
TRF ukupan skor	28.00	39.00	34.40	34.00	2.94	4.13
GAT ukupan skor	8.50	26.50	17.50	16.50	6.06	10.13

Napomena: Maksimalni mogući skorovi: TRF 40; GAT 30.

U Tabeli 4 prikazana je deskripcija faktora hronološkog i slušnog uzrasta i ukupnih postignuća na TRF i GAT-u. Rezultati dobijeni ispitivanjem povezanosti hronološkog uzrasta i sposobnosti fonemske diskriminacije i artikulacije ukazuju da između hronološkog uzrasta i ukupnih postignuća na TRF ne postoji statistički značajna povezanost (r_s = .02, p = .94). Isti odnos faktora i zavisne varijable uočava se i analizom rezultata koji sugerišu da ni između hronološkog uzrasta ispitanika i ukupnih postignuća na GAT-u nema statistički značajne povezanosti (r_s = .22, p = .35). Na ispitanom uzorku hronološki uzrast se nije pokazao kao značajan faktor koji se dovodi u vezu sa fonemskom diskriminacijom i artikulacijom predškolske dece sa KI.

Analizom rezultata koji prikazuju odnos između slušnog uzrasta i fonemske diskriminacije i artikulacije uočava se da slušni uzrast nije povezan sa ukupnim postignućima na TRF (r_s = .19, p = .43), ni sa postignućima na GAT-u (r_s = .46, p = .06), te se ni slušni uzrast nije istakao kao faktor koji je povezan sa artikulacionim i fonemsko diskriminativnim sposobnostima ispitanika.

Tabela 5

Prikaz deskripcije dužine auditivnog treninga i ukupnih skorova na TRF i GAT-u (N = 20)

	Min	Max	M	Mdn	SD	IQR
Dužina AT	10.00	70.00	40.05	40.00	15.86	20.00
TRF ukupan skor	28.00	39.00	34.40	34.00	2.94	4.13
GAT ukupan skor	8.50	26.50	17.50	16.50	6.06	10.13

Napomena: Maksimalni mogući skorovi: TRF 40; GAT 30. AT – auditivni trening

Statistička deskripcija dužine auditivnog treninga i ukupnih skorova na TRF i GAT-u prikazana je u Tabeli 5. Radi provere postojanja povezanosti dužine auditivnog treninga i fonemske diskriminacije i artikulacije, primenom Spirmanove rang korelacije, uviđa se da dužina auditivnog treninga nije povezana sa ukupnim postignućima ispitanika na TRF (r_s = .13, p = .60), kao ni sa postignućima na GAT-u (r_s = .35, p = .13).

Tabela 6

Prikaz rezultata na TRF u odnosu na učestalost auditivnog treninga

	Učestalost AT	N	M	Mdn	SD	SEM	IQR
Frikativi	2 × nedeljno	7	5.21	5.00	0.81	0.31	1.25
	Svakodnevno	13	5.65	6.00	0.47	0.13	1.00
Vokali	2 × nedeljno	7	8.00	8.50	1.26	0.48	1.75
	Svakodnevno	13	8.27	8.00	0.67	0.18	1.00
Plozivi	2 × nedeljno	7	7.36	7.00	1.22	0.46	1.50
	Svakodnevno	13	8.12	8.00	0.77	0.21	1.00
Sonanti	2 × nedeljno	7	6.57	6.50	0.61	0.23	1.00
	Svakodnevno	13	7.29	8.50	1.04	0.29	1.00
Afrikati	2 × nedeljno	7	2.71	2.50	0.81	0.31	1.25
	Svakodnevno	13	3.35	3.50	0.69	0.91	1.00
Različite glasovne grupe	2 × nedeljno	7	1.93	2.00	0.61	0.23	0.25
	Svakodnevno	13	2.50	2.50	0.54	0.15	1.00
Ukupan skor	2 × nedeljno	7	31.79	32.50	2.09	0.79	2.50
	Svakodnevno	13	35.81	36.50	2.31	0.64	3.00

Napomena: Maksimalni mogući skorovi u okviru glasovnih grupa: frikativi 6, vokali 9, plozivi 9, sonanti 9, afrikati 4, različite glasovne grupe 3. Maksimalan mogući skor na testu je 40. AT – auditivni trening

U Tabeli 6 prikazani su rezultati na TRF u odnosu na učestalost auditivnog treninga, a rezultati prema istom faktoru na GAT-u nalaze se u Tabeli 7. Uzorak je prema učestalosti auditivnog treninga bio podeljen na grupu dece čija je učestalost učešća svakodnevna (65%) i na one čija je učestalost dva puta nedeljno (35%). Opažena razlika u broju ispitanika nije bila statistički značajna (χ^2 = 1.80, df = 1 p = .18).

Radi provere postojanja razlika u razvijenosti artikulaciono-fonoloških sposobnosti ispitanika u odnosu na učestalost auditinog treninga, primenom Man–Vitnijevog U testa uočena je statistički značajna razlika između grupa ispitanika na TRF (U = 81.50, p = .005, r = .6), kojom se ističu bolja postignuća dece koja učestvuju svakodnevno u auditivnom treningu.

Analizom rezultata koji ispituju postojanje razlika u razvijenosti artikulacije ispitanika u odnosu na učestalost auditivnog treninga uviđa se da statistički značajno bolja postignuća na GAT-u takođe ostvaruju ispitanici čije je učešće u auditivnom treningu svakodnevno (U = 73.50, p = .03, r = .5).

Tabela 7

Prikaz rezultata na GAT-u u odnosu na učestalost auditivnog treninga

	Učestalost AT	N	M	Mdn	SD	SEM	IQR
Vokali	2 × nedeljno	7	3.07	3.50	1.02	0.39	1.00
	Svakodnevno	13	4.27	4.50	0.83	0.23	1.00
Plozivi	2 × nedeljno	7	3.93	4.00	0.93	0.35	0.75
	Svakodnevno	13	4.92	5.00	0.95	0.27	1.00
Sonanti	2 × nedeljno	7	3.21	3.50	0.91	0.34	1.25
	Svakodnevno	13	3.39	4.50	2.04	0.57	4.00
Frikativi	2 × nedeljno	7	2.14	2.50	1.46	0.55	2.50
	Svakodnevno	13	3.39	4.50	2.04	0.57	4.00
Afrikati	2 × nedeljno	7	0.79	0.50	1.04	0.39	2.00
	Svakodnevno	13	2.15	2.50	1.35	0.37	2.50
Ukupan skor	2 × nedeljno	7	13.14	13.00	3.72	1.41	6.00
	Svakodnevno	13	19.85	22.00	5.85	1.62	10.00

Napomena: Maksimalni mogući skorovi u okviru glasovnih grupa: vokali 5, plozivi 6, sonanti 8, frikativi 6, afrikati 5. Maksimalan mogući skor na testu je 30. AT – auditivni trening

Shodno prikazanim rezultatima uviđa se da faktor učestalost auditivnog treninga utiče na različitost postignuća u domenu artikulaciono-fonoloških sposobnosti predškolaca koji koriste KI. Deca koja svakodnevno učestvuju u auditivnom treningu postižu statistički značajno bolje rezultate i vršeći fonemsku diskriminaciju i artikulaciju, a dobijeni statistički pokazatelji ukazuju na umerenu do veliku veličinu efekta.

Diskusija

Usavršavanje svesne glasovne percepcije zahteva postepeno uviđanje veze zvuk–značenje, koje teče paralelno sa sazrevanjem (Morgan et al., 2023). Tokom sazrevanja usvajanje maternjeg jezika ne predstavlja prostu imitaciju, već podrazumeva složen, postepeni razvoj i usklađivanje slušnog i govornog sistema. Za adekvatno uviđanje veze zvuk–značenje neophodna je povezanost fonemske diskriminacije i artikulacije, a ne samo očuvanost auditivne percepcije (Couvee, 2022; Dimić, 2003; Posokhova, 1999).

Analizom rezultata utvrđeno je da postoji povezanost između fonemske diskriminacije i artikulacije dece sa KI predškolskog uzrasta. Ovakvi rezultati saglasni su sa rezultatima pređašnjih istraživanja koja su sprovedena na gluvim i nagluvim i čujućim ispitanicima starijeg uzrasta od ispitanog uzorka (Augst & Frick, 1964; Lapko & Bankson, 1975; Narančić, 2001; Stitt & Huntington, 1969; Yantis et al., 1966). Uprkos periodu u kom se artikulaciono-fonološke sposobnosti intenzivno razvijaju, specifičnosti auditivnog iskustva ispitanog uzorka, koje ne podrazumeva samo kraći slušni u odnosu na hronološki uzrast već i ovladavanje prijemom specifičnih elektrostimulacija kakvu omogućava

KI, veza fonemske diskriminacije i artikulacije ispitanog uzorka je uočljiva i zadržava isti odnos kao i kod čujućih osoba. Dobijeni rezultati usaglašeni su sa rezultatima čujućih osoba starijeg uzrasta od ispitanog uzorka, ali nedosledno i sa rezultatima dece predškolskog uzrasta. Naime, u istraživanju Golubović i saradnika (2019) nije uočena povezanost fonemske diskriminacije i artikulacije predškolske dece, dok su Harnšou i saradnici (2018), koji su merili i sposobnosti diskriminacije kod predškolaca sa teškoćama u percepciji, motornoj produkciji i fonološkoj reprezentaciji, utvrdili povezanost govorne percepcije i produkcije na zadacima.

Rezultati istraživanja implicitno ukazuju da razvoj fonemske diskriminacije može doprineti poboljšanju artikulacije, te i da predškolska deca sa KI uspešno uočavaju vezu zvuk–značenje, odnosno da kvalitet njihovog izgovora ne teče izolovano u odnosu na fonološku organizaciju. Ovakvi rezultati značajni su iz razloga što je percepcija glasova i njihovo oponašanje moguće i bez sposobnosti svesnog diferenciranja fonema, koje je funkcionalno jezičke prirode i ono se može javiti i kao akustičko-motorna nužnost, koja je prisutna u prelingvalnom periodu govorno-jezičkog razvoja (Simić-Jovanović i sar., 2018).

Osvrtom na postignuća ispitanog uzorka na TRF uviđa se da je fonemska diskriminacija razvijena u meri visoke diskriminativnosti (M = 34.40, SD = 2.94) budući da rezultati prevazilaze 85% uspešnosti. Dobijeni rezultati niži su u odnosu na postignuća čujućih predškolaca (Golubović i sar., 2019). Poredeći rezultate istraživanja sa postignućima dece oštećenog sluha uviđa se da deca sa KI poseduju značajno razvijeniju fonemsku diskriminaciju u odnosu na decu koja koriste slušne aparate (Đoković i Ostojić, 2010).

Fonemska diskriminacija najrazvijenija je u grupi frikativa, a njihova visoka diskriminativnost može se objasniti postojanjem triju zaliha artikulaciono-akustičkih informacija na osnovu kojih se percipiraju frikativi (vrsta prepreke fonacionoj struji, mesto artikulacije i uloga glasnica), te je njihova visoka diskriminativnost opravdana. Zanimljiv ishod predstavlja rezultat koji ukazuje da je sledeća prema uspešnosti fonemske diskriminacije grupa vokala. Uprkos tome što je za vokale karakteristična veoma mala akustična razlika među glasovima (Kašić, 2003), deca sa KI predškolskog uzrasta pokazala su visok stepen razvijenosti njihove diskriminacije. Sledeće dve grupe glasova prema redosledu uspešnosti fonemske diskriminacije jesu grupa ploziva i sonanata. Uspešnija diskriminacija glasova u grupi ploziva takođe se može objasniti prisustvom triju artikulaciono-akustičkih zaliha, u odnosu na sonante koji poseduju samo dva jer su svi glasovi zvučni, te uloga glasnica ne omogućava podršku u fonemskoj diskriminaciji sonanata. Kvalitet fonemske diskriminacije najmanje je razvijen za afrikate, iako kao glasovna grupa poseduju izražena fonetsko-fonološka obeležja značajna za jasnu diskriminaciju. Dobijeni rezultati usklađeni su sa rezultatima sličnih istraživanja sprovedenih na populaciji dece oštećenog sluha (Đoković i Ostojić, 2010; Narančić, 2001).

Analizom ostvarenih rezultata na GAT-u (M = 17.50; SD = 6.06) uviđa se da je artikulacija slabije razvijena od fonemske diskriminacije. Ovakvi rezultati potvrđuju stav autorke Vladisavljević (1997) da deca uspešno mogu auditivno razlikovati i one glasove koje još uvek ne mogu pravilno da izgovaraju. Postignuti rezultati dece sa KI značajno su niži u odnosu na razvijenost artikulacije čujuće dece (Dimić, 2002; 2003; Golubović i sar., 2019). Najuspešnija artikulacija prisutna je prilikom izgovaranja vokala. Ovakav rezultat proizilazi iz činjenice da su vokali, osim što predstavljaju grupu glasova koja je dobro vidljiva (Dobrota, 2017), takođe glasovi visoke sonornosti sa jasnom tonskom strukturom (Subotić i sar, 2012), koji se jednostavno artikulišu. Njihov izgovor uključuje blage pokrete pri oblikovanju usana, otvaranju vilice i pokretanju jezika (Vasić, 1971). Sledeća grupa prema razvijenosti kvaliteta izgovora jesu plozivi. Ova grupa takođe predstavlja glasove koji se lako usvajaju (Vasić, 1971), a pokreti jezika gotovo da uopšte ne utiču pri formiranju većine ploziva, osim prilikom formiranja glasova *t* i *d*. Sledeće dve grupe glasova koje su ispitanici izgovarali sa manje uspešnosti jesu glasovi iz grupe sonanata i frikativa, dok su afrikati najlošije artikulisani. Dobijeni rezultati su u skladu sa zaključcima Kolarić i Liker (2023), koji ističu da kod gluvih postoji oslabljena artikulacija vokala i konsonanata, a da je najproblematičnija kod frikativa i afrikata (Horga i Liker, 2006; Mildner i Liker, 2008, prema Kolarić i Liker 2023). Navedeni redosled uspešnosti artikulacije usklađen je sa zaključkom autorke Vasić (1971), koja smatra da se glasovi iz ovih grupa teže uče i usvajaju. Ovakav redosled uspešnosti artikulacije potvrđen je i u drugim istraživanjima (Đurić-Zdravković i sar., 2017; I. Vuković i M. Vuković, 2009) i on odgovara redosledu javljanja glasovnih grupa (Miletić, 1952; Vasić, 1971; Vladisavljević, 1997; Vuletić, 1987).

Analizom rezultata koji su ispitivali povezanost faktora hronološkog i slušnog uzrasta sa fonemskom diskriminacijom i artikulacijom uviđa se da hronološki uzrast nije povezan sa artikulaciono-fonološkim sposobnostima, iako je njegov uticaj potvrđen u drugim istraživanjima (Dimić, 2003; Đoković i Ostojić, 2010; Narančić, 2001; Wong et al., 2023). Dobijeni rezultat može se objasniti manjim brojem ispitanika u uzorku, ali i eventualnom potrebom za pomeranjem gornje starosne granice pri uključivanju ispitanika, kako bi se uočila veća disperzija artikulaciono-fonoloških sposobnosti koja između dece predškolskog uzrasta u ispitanoj populaciji nije uspela jasno da se odrazi.

Kada je u pitanju faktor slušni uzrast, takođe se ne uočava njegova veza sa fonemskom diskriminacijom i artikulacijom. Netipičan rezultat potrebno je podrobnije istražiti u narednim istraživanjima i time prevazići ograničenja ovog istraživanja. Dobijeni rezultat može govoriti o činjenici da sama dužina slušnog iskustva nije nužno povezana sa sposobnostima fonemske diskriminacije i izgovora glasova, već da je za njihovo razvijanje neophodno ovladavanje glasovnom strukturom u funkcionalno-jezičkom smislu (Defektološki leksikon, 1999; Vuković i Ćalasan, 2022).

Povezanost između artikulaciono-fonoloških sposobnosti ispitanika i auditivnog treninga ispitivana je u kontekstu njegove dužine i učestalosti. Rezultati ukazuju da dužina auditivnog treninga ne pokazuje značajnu povezanost sa artikulaciono-fonološkim sposobnostima predškolaca sa KI. Suprotno tome, učestalost auditivnog treninga pokazuje značajnu povezanost – deca koja svakodnevno učestvuju u auditivnom treningu pokazuju bolje rezultate u fonemskoj diskriminaciji i artikulaciji u odnosu na decu koja u auditivnom treningu učestvuju samo dva puta nedeljno. Ovakav rezultat može se objasniti činjenicom da za ostvarivanje delotvornosti efekta auditivnog treninga nije dovoljno njegovo trajanje, jer ono može biti i diskontinuirano. Za adekvatno podsticanje govorno-jezičkog razvoja neophodno je dugoročno i kontinuirano podsticanje (Stropahl et al., 2020). Ovu činjenicu potkrepljuje dobijeni rezultat u kom se učestalost auditivnog treninga pokazala kao jedini od ispitanih faktora koji se dovodi u vezu sa razvijenošću fonemske diskriminacije i artikulacije.

Zaključak

Rezultati istraživanja navode na zaključak da su sposobnosti fonemske diskriminacije i artikulacije predškolaca sa KI međusobno povezane. Faktori hronološki uzrast, slušni uzrast i dužina auditivnog treninga nisu se pokazali kao značajni indikatori povezani sa artikulaciono-fonološkim sposobnostima ispitanika. Učestalost auditivnog treninga utvrđena je kao jedini faktor koji se pozitivno povezuje sa sposobnostima fonemske diskriminacije i artikulacije. Ovakav rezultat veoma je značajan, jer od svih faktora čija je veza ispitana jedino učestalost auditivnog treninga može da se menja, modifikuje i prilagođava shodno potrebama govorno-jezičkog razvoja.

Dobijeni rezultati nedosledno potkrepljuju rezultate sličnih istraživanja i produbljuju ispitivanje teme artikulaciono-fonoloških sposobnosti i njihovog odnosa kod dece kod koje su prisutni govorno-jezički deficiti od najranijeg uzrasta, te oni nemaju težnju da opišu aktuelno stanje, već i da na osnovu njih produbе sadržaje onog faktora čija je veza potvrđena ovim istraživanjem, a to je učestalost auditivnog treninga.

Rezultati istraživanja, shodno početnoj ideji, trebalo bi da predstavljaju osnovu u formiranju sadržaja koji bi omogućili nadogradnju dosadašnjeg surdološkog delovanja na populaciju dece sa KI. Nadogradnju dosadašnje surdološke prakse treba da prate dublja ispitivanja ove teme, koja će težiti da prevaziđu ograničenosti ovog istraživanja, koja se odnose na mali broj ispitanika i nerazmatranje uticaja faktora poput stanja orofacijalne muskulature, karakteristika primarne dentacije, kvaliteta govora okruženja i govornih uzora, koji takođe mogu uticati na ishod zaključene povezanosti.

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Relationship between phonemic discrimination ability and articulation in cochlear implanted preschool children

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Introduction. The acquisition of the native language is achieved through mastering the phonological system, which relies on the development of phonemic discrimination and articulation. *Objective*s. The aim of this study was to examine the relationship between phonemic discrimination and articulation during the period of intensive speech-language development in preschool children with hearing impairment. *Methods*. The study involved 20 children with cochlear implants aged between 36 and 77 months. The development of phonemic discrimination and articulation was assessed using the *Phoneme Discrimination Test* and the *Global Articulation Test*. *Results*. The results of the study indicate that children who better distinguish phonemes have statistically significantly better results on the Global Articulation Test, and that there is an interrelation between phonemic discrimination and articulation in the participants. The results also show better achievements in phonemic discrimination and articulation in the group of children who participated in auditory training daily, compared to children who participated in auditory training twice a week. Chronological age, auditory age, and the duration of auditory training were not statistically significantly related to the participants' articulation and phonological abilities. *Conclusion*. Analysis of the study results concludes that the ability to discriminate phonemes and articulation in preschool children with cochlear implants are interrelated. Chronological age, auditory age, and the duration of auditory training were not found to be indicators associated with the participants' articulation and phonological abilities. The frequency of auditory training is the only identified factor related to phonemic discrimination and articulation abilities in preschoolers with cochlear implants.

Keywords: phonemic discrimination, articulation, cochlear implant, preschool age

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Faktori koji utiču na primenu augmentativne i alternativne komunikacije

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Augmentativna i alternativna komunikacija (AAK) kao oblast obuhvata različite metode, strategije i tehnike, kao i uređaje i sredstva koji se primenjuju u cilju unapređenja komunikacione kompetentnosti osoba sa govorno-jezičkim poremećajima. Intervencija u augmentativnoj i alternativnoj komunikaciji podrazumeva pažljivo isplaniran proces odabira i implementacije sredstva AAK, kao i precizno definisanje ishoda i metoda njihove evaluacije radi unapređenja učestvovanja osobe u procesu komunikacije. Cilj ovog rada je da ukaže na mnoštvo različitih faktora (lični i sredinski) koji potencijalno predstavljaju facilitatore ili barijere koji utiču na primenu augmentativne i alternativne komunikacije. Lični faktori od značaja uključuju individualne karakteristike korisnika, set sposobnosti i veština, osobine ličnosti i motivaciju, kao i lične preferencije. U domenu sredinskih faktora od uticaja sreću se fizičko i kulturološko okruženje, socioekonomski status, znanja, informisanost i stavovi okruženja, kompetencije stručnjaka, ali i faktori povezani sa tehnologijom. Navedene faktore neophodno je uzeti u obzir prilikom implementacije intervencije u AAK kao efikasne strategije podrške za osobe sa težim oblicima govorno-jezičkih poremećaja.

Ključne reči: augmentativna i alternativna komunikacija, komunikacija, govorno-jezički poremećaji, lični faktori, sredinski faktori

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Uvod

Augmentativna i alternativna komunikacija (AAK) predstavlja oblast kliničke prakse koja obuhvata različite metode, strategije i tehnike, kao i uređaje i sredstva koji se primenjuju u cilju unapređenja komunikacione kompetentnosti osoba sa težim govorno-jezičkim poremećajima (Dada et al., 2021). U oblasti AAK sreću se dva značajna termina: potpomognuta i nepotpomognuta komunikacija. Nepotpomognuta komunikacija ne zahteva spoljašnju opremu i/ili tehnologiju (izvan korisnikovog tela), dok potpomognuta zahteva neki oblik opreme ili tehnologije (Reichle et al., 2019). Nepotpomognuta AAK uključuje gest, znakove (znakovni jezik), facijalnu ekspresiju, mimiku (npr. treptanje u cilju signalizacije odgovora) i sl. Potpomognuta komunikacija obuhvata čitav niz tehnoloških sredstava, počevši od komunikacionih tabli sve do složenih softverskih rešenja, čime se uvodi još jedna podela AAK – u odnosu na stepen tehničko-tehnološke složenosti. Ova podela uglavnom podrazumeva jednostavnu i visoku tehnologiju. Jednostavne tehnološke opcije obuhvataju sredstva poput pomenutih komunikacionih tabli, sistema fotografija ili simbola poput PECS (Picture Exchange Communication System) sistema, dok u visokotehnološka rešenja spadaju primeri poput kompjuterski generisanog govora i različite vrste mobilnih tehnologija i aplikacija (Crowe et al., 2022).

Procenjeno je da bi oko 97 miliona ljudi širom sveta imalo koristi od primene augmentativne i alternativne komunikacije (Beukelman & Light, 2020). Potencijal intervencija u AAK značajno je porastao u poslednjih nekoliko decenija i omogućio pružanje inovativnih rešenja širokom spektru korisnika. Ovakav vid intervencije namenjen je osobama sa težim oblicima govorno-jezičkog poremećaja, koje, generalno govoreći, nisu u stanju da se govornim jezikom služe na konvencionalan način, uključujući osobe sa teškoćama u razvoju ili stečenim oštećenjem govora i jezika, autizmom, cerebralnom paralizom, ili, pak, osobe sa višestrukim smetnjama. Primena AAK intervencija kod osoba sa autizmom, osim značajnih efekata u domenu komunikacije, dovodi do napretka u domenu socijalnih i akademskih veština, kao i ponašanja (Ganz et al., 2012), te omogućava njihovo uspešno zapošljavanje (Richardson et al., 2019). Takođe, naglašava se uloga AAK u pripremi osoba sa afazijom i njihovih porodica za posthospitalni period (Gormley & Light, 2019), a efekti primene uključuju povećan nivo motivacije za komunikaciju, participacije u životnim događajima i otkrivanje novih socijalnih uloga (Dietz et al., 2020). Prednosti korišćenja AAK u bolničkim uslovima uključuju veći stepen funkcionalne nezavisnosti i stimulaciju, ili vežbanje izvan terapijskih sesija (Fager & Burnfield, 2014). Upotreba sredstava AAK kod osoba sa amiotrofičnom lateralnom sklerozom dovodi do poboljšanja raspoloženja i kvaliteta njihovog života, istovremeno redukujući opterećenje negovatelja (Maresca et al., 2019). Takođe, primena vizuelnih sredstava AAK, poput vizuelnih scena ili slika situacije, predstavlja efikasan

način reprezentacije koncepata za osobe sa poremećajima u komunikaciji kao posledicama traumatskih povreda mozga (Thiessen et al., 2019). Evidentirane su i prednosti korišćenja AAK u populaciji osoba sa Locked-in sindromom, koje uključuju redukciju anksiozne i depresivne simptomatologije i poboljšanje kvaliteta života i pacijenata, i negovatelja (Corallo et al., 2017). Intervencije u AAK poput primene memorijskih pomagala u formi podsetnika različitih nivoa tehničko-tehnološke složenosti (beleške, kartice sa ispisanim rečima, elektronski podsetnici na mobilnim uređajima) dovode do redukcije repetitivne, kao i nejasne i neproduktivne verbalizacije, te poboljšavaju kvalitet verbalnih interakcija osoba sa demencijom i njihovih komunikacionih partnera (Swan et al., 2018). Osim toga, pozitivni ishodi u domenu socijalne participacije u ovoj grupi korisnika povezani su sa primenom kompjuterizovanih tehnologija AAK (Yu et al., 2019). Uprkos dokazanim prednostima primene AAK u cilju unapređenja participacije osoba sa teškim oblicima poremećaja govora i jezika (Babb et al., 2020; Gilroy et al., 2023; O'Neill et al., 2018), veliki broj njih nema pristup sredstvima AAK (Kleinert, 2019), dok kod određenog broja korisnika postoji tendencija ka prestanku njihovog korišćenja – između 30 i 50% korisnika nakon godinu dana ne koristi dodeljeno sredstvo AAK (Johnson et al., 2006; Moocroft et al., 2019).

Kako bi uspešno predviđanje ishoda upotrebe AAK bilo moguće, neophodno je sagledavanje složene interakcije između ličnih i sredinskih faktora koji su značajni za njenu primenu. Međunarodna klasifikacija funkcionisanja, onesposobljenosti i zdravlja (MKF) (WHO, 2001) nudi okvir sa holističko sagledavanje pojedinca, sa naglaskom na specifičnosti funkcionisanja, konteksta i njihove međusobne interakcije. Ova klasifikacija sastoji se od dva glavna dela: *funkcionisanje i invaliditet* i *kontekstualni faktori.* Deo koji se odnosi na *funkcionisanje i invaliditet* nadalje obuhvata telesne strukture i funkcije i komponente aktivnosti i participacije, dok deo koji podrazumeva *kontekstualne faktore* obuhvata faktore okruženja i lične faktore. U oblasti sprovođenja AAK intervencije ovakav pristup omogućava identifikaciju faktora od značaja za procenu, korišćenje i evaluaciju uspešnosti primene AAK, a koji se mogu podeliti na faktore povezane sa pojedincem i sredinske faktore. Postoje izvesna neslaganja među autorima u pogledu toga šta podrazumevaju lični faktori u okviru MKF (Karhula et al., 2021), a što je posebno naglašeno u okviru intervencije u AAK. Za razliku od detaljno obrađenih subkomponenata koje se odnose na deo pod nazivom *Funkcionisanje i invaliditet*, subkomponenta lični u okviru dela *Kontekstualni faktori* nije precizno definisana, u čemu brojni autori vide prostor za usavršavanje klasifikacije (Mitra & Shakespeare, 2019; Nguyen et al., 2018). Cilj ovog rada je da ukaže na mnoštvo različitih faktora (lični i sredinski) koji potencijalno predstavljaju facilitatore ili barijere koji utiču na primenu augmentativne i alternativne komunikacije.

Lični faktori u kontekstu AAK intervencije – faktori povezani sa korisnikom

Analizom dostupnih klasifikacija Miler i Gejh (Müller & Geyh, 2015) izdvajaju dvanaest grupa faktora u cilju bližeg definisanja ličnih faktora: sociodemografski faktori, faktori ponašanja i način života, kognitivno-psihološki faktori, društveni odnosi, iskustva i biografija, suočavanje, emocionalni faktori, zadovoljstvo, druga zdravstvena stanja, biološki/fiziološki faktori, ličnost i motivacija. Navedeni lični faktori imaju snažan uticaj kako na izbor, tako i na uspeh u korišćenju sredstava AAK i čine srž sveobuhvatnog sagledavanja pojedinca u cilju maksimiziranja pozitivnih ishoda, zbog čega će najznačajniji biti bliže razmotreni.

Karakteristike korisnika – uzrast, pol i prisustvo komorbiditeta

Godine starosti, pol i prisutni komorbiditeti (posebno fizičke prirode) značajni su činioci u kontekstu upotrebe savremenih sredstava asistivne tehnologije, uključujući i sredstva za komunikaciju (Puaschitz et al., 2021). Polne razlike pronađene su u smislu preferencija ka određenom tipu instrukcija tokom obuke za korišćenje AAK (Thiessen & Beukelman, 2019), kao i pri odabiru setova simbola i slika koji će se koristiti, na način da najpribližnije reprezentuju korisnika (Beukelman et al., 2021). Uzrast kao faktor ima uticaj na sadržaj poruka (Gormley & Fager, 2021), kao i odabir sistema reprezentacije pojmova koji će se koristiti (Beukelman et al., 2021). Ukoliko simboli bliže predstavljaju korisnika, njegov pol, uzrast i fizičke karakteristike, utoliko je veća šansa za njihovo prihvatanje, kao i veća motivacija za korišćenje. Prisustvo komorbiditeta u vidu drugih razvojnih poremećaja ima snažan uticaj na ishode primene AAK intervencija (Ganz et al., 2014), te zahteva modifikaciju pristupa proceni individualnog seta sposobnosti korisnika u cilju kreiranja ostvarivih ciljeva intervencije.

Sposobnosti i veštine korisnika

Sposobnosti i veštine korisnika značajni su faktori od uticaja na celokupan proces AAK intervencije. Sveobuhvatna procena podrazumeva funkcionalnu procenu korisnika u oblasti motorike, kognicije, komunikacije, govora i jezika, socioemocionalnog funkcionisanja, senzornih funkcija, ali i adaptivnih sposobnosti. Ona rezultira odabirom sredstva koje odgovara korisnikovim sposobnostima i nastoji da poboljša njegovo funkcionisanje u svim aspektima svakodnevnog života. Kognitivne sposobnosti korisnika imaju ključnu ulogu pri odabiru i dizajniranju sredstva AAK (Thistle & Wilkinson, 2015). Procena pažnje, pamćenja i egzekutivnih funkcija neophodna je u cilju kreiranja profila sposobnosti i uparivanja sa odgovarajućim sredstvom AAK (Clarke et al., 2016). Kao značajne varijable izdvajaju se i nivo receptivnog i ekspresivnog jezičkog

razvoja i sposobnost komunikacije upotrebom potpomognutog sredstva AAK (Lund et al., 2017). Među fizičkim (motoričkim) sposobnostima najznačajnije su one koje se odnose na mogućnost pristupa uređaju (sredstvu) (Lund et al., 2017; Webb et al., 2019).

Kompetencije za korišćenje AAK

Kako bi se obezbedio odgovarajući nivo obuke za korišćenje sredstava AAK, ali i što veća funkcionalnost upotrebe u svakodnevnim situacijama, potrebno je razmotriti i različite aspekte kompetencija korisnika. S tim u vezi Lajt i Meknjuton (Light & McNaughton, 2014) definišu nekoliko njenih domena.

1. Lingvistička kompetencija podrazumeva posedovanje znanja o lingvističkim kodovima, standardnim i onima korišćenim u okviru sistema AAK. Imajući u vidu različite mogućnosti AAK i stepen sličnosti sa standardnim jezičkim kodom, lingvistička kompetentnost najčešće se stiče kroz specifičnu obuku namenjenu budućim korisnicima sistema AAK (Holyfield et al., 2019).

2. Operativna kompetencija odnosi se na tehničke veštine u vezi sa sistemima AAK (uključivanje/isključivanje, različita podešavanja – zvuk, displej, tehnike odabira i sl.), bilo da se radi o sistemima jednostavne ili visoke tehnologije, i jedini su domen specifičan isključivo za augmentativnu i alternativnu komunikaciju. Veštine rukovanja softverskim programima za komunikaciju koje se stiču kroz obuku pozitivno utiču na motivisanost korisnika za korišćenje AAK (Broomfield et al., 2022).

3. Socijalna kompetencija predstavlja znanje o komunikacionom činu „u akciji" – kada komunicirati, sa kim, o čemu, gde i na koji način, uključujući i veštine poput smenjivanja u komunikacionom činu, pokretanja i prekidanja razgovora, održavanja i razvijanja teme i sl., kao i veštine izražavanja različitih komunikacijskih funkcija: traženje, postavljanje pitanja, odbijanje, potvrđivanje itd. (Tsai, 2016).

4. Strateška kompetencija odnosi se na veštine korisnika sistema AAK da prevaziđe i/ili kompenzuje barijere u njegovoj primeni u različitim kontekstima (King & Soto, 2022). Pružajući višedimenzionalnu perspektivu ovaj okvir prepoznaje složenu prirodu ljudske interakcije i raznovrsne veštine koje su neophodne za ostvarivanje efikasne komunikacije. Adekvatna procena korisnikovih sposobnosti i veština, kao i projekcija njihove promene u vremenu, predstavljaju neke od najznačajnijih koraka procesa inicijalne procene i periodične evaluacije.

Osobine ličnosti i motivacija korisnika

Na ostvarivanje uspešne komunikacije pojedinaca koji se oslanjaju na upotrebu AAK utiču kako sposobnosti i veštine iz različitih domena, tako i niz psihosocijalnih faktora, uključujući motivaciju, stavove, samopouzdanje

i rezilijenciju (Light & McNaughton, 2014). Motivacija korisnika ključna je za razvoj komunikativnih veština, poput inicijacije komunikacije, zahtevanja i zajedničke pažnje (Worms, 2018). Pri donošenju odluke o primeni AAK stručnjaci motivaciju korisnika percipiraju kao moderatora ishoda intervencije (Sievers et al., 2020) te donose ambicioznije odluke u pogledu primene AAK sredstava kada su korisnici motivisaniji (Webb et al., 2019). Mentalni sklop, kao set osobina i stavova korisnika, povezan je sa prihvatanjem sredstva AAK (Connolly et al., 2023). Korisnici su skloniji da upotrebljavaju sredstva AAK ukoliko imaju pozitivne stavove prema ovoj vrsti podrške u komunikaciji – ukoliko korisnik percipira asistivnu tehnologiju kao korisnu i vrednu, veći je stepen njegovog angažovanja u primeni sredstva (Bromfield et al., 2022). Jedan od glavnih zadataka stručnjaka jeste odabir motivišućeg sredstva AAK u cilju podsticanja angažovanja korisnika i razvoja pozitivnih stavova prema AAK.

Lične preferencije korisnika

Džadž i Taunend (Judge & Townend, 2013) identifikuju važne faktore povezane sa ishodima upotrebe AAK, među kojima su i lične preferencije u vezi sa tehničkim karakteristikama sredstava AAK, kao što su zvuk sintetizovanog govora, glasnoća, nedostatak mogućnosti personalizacije, snižena brzina komunikacije i dr. U kontekstu prezentacije poruka nedovoljna mogućnost personalizacije uređaja, kao i brzina govora i razumljivost ispod očekivanih, mogu predstavljati razloge za ređe korišćenje, ali i napuštanje uređaja AAK (Beukelman & Light, 2020). Unapređenje komunikativne kompetencije u različitim životnim kontekstima zahteva uzimanje u obzir korisnikovih želja, preferencija i interesovanja, uključujući i potencijalne teme za razgovor i različite oblike interakcija (humor, pričanje priča i događaja), a u cilju postizanja višeg stepena nezavisnosti na način koji podržava korisnikovu individualnost (Kane et al., 2017).

Sredinski faktori u kontekstu AAK intervencije – faktori povezani sa okruženjem

Svaki čovek je individua za sebe, sa svim svojim ličnim karakteristikama, ali i socijalno biće koje svakodnevno teži socijalizaciji i kontaktu sa okruženjem. Komunikacija na bilo kom nivou jeste potreba svakog pojedinca, međutim u njoj moraju da učestvuju minimum dva aktera. U kontekstu AAK to podrazumeva da i komunikacioni partner mora posedovati određene veštine koje će mu omogućiti funkcionalnu komunikaciju sa osobom koja koristi sredstvo AAK. Stoga je, prilikom proučavanja funkcionalnosti upotrebe augmentativne i alternativne komunikacije, osim ličnih karakteristika korisnika, važno razmotriti i različite faktore okruženja. Čak i ako sredstvo AAK u potpunosti zadovoljava lične kriterijume korisnika, faktori okruženja mogu uticati na to da izostane njegova funkcionalna upotreba (Romano & Yu Shon Chun, 2018).

Fizičko, kulturološko okruženje i socioekonomski status

Pre svega važno je sagledati širu sliku koja se odnosi na fizičko, ali i na kulturalno okruženje. Fizičko okruženje je, u kontekstu AAK, najčešće povezano sa tim da li se sredstvo može implementirati u postojeće fizičke karakteristike okruženja u kojem korisnik boravi (McNaughton et al., 2008), ili se pak postavlja pitanje dostupnosti odgovarajućih servisa u okviru kojih korisnici i njihove porodice mogu dobiti potrebne informacije, pomoć i podršku prilikom korišćenja, ali i popravke sredstva ukoliko dođe do kvarova. S druge strane, uticaj kulturalnog okruženja doseže znatno dublje, te se ogleda u prihvatanju sredstva od korisnika, ali i od šire zajednice, što je posledica mogućnosti informisanja, svesti, ali i stavova o AAK. To je značajno upravo zbog mogućnosti korišćenja sredstva u različitim okruženjima, poput porodičnog, školskog, vršnjačkog i sl., te je potrebno senzibilisati osobe iz okruženja po pitanju prihvatanja korisnika sa sredstvom AAK, ali i po pitanju uključivanja i podsticanja učešća u društvenim tokovima (Lund & Light, 2007). Na primer, u nekim kulturama deca nisu ravnopravni sagovornici sa odraslima, bilo da je u pitanju neformalna konverzacija u svakodnevnim situacijama, ili pak formalna, npr. u školi. S tim u vezi, stručnjak koji uvodi AAK mora biti upoznat sa kulturnom pozadinom svakog korisnika, jer osećanje nelagodnosti kod deteta prilikom komunikacije pomoću sredstva u navedenim situacijama može predstavljati barijeru za njegovu upotrebu (Fannin, 2016). Kulturološke razlike, pored uticaja na svest i stavove o AAK, mogu predstavljati barijeru i kada se radi o razvoju setova i sistema na različitim jezicima, posebno ukoliko je korisnik bilingvalan, te kod kuće komunicira na maternjem, a u vrtiću, školi ili poslu na drugom jeziku (Fannin, 2016; Lund & Light, 2007). Uz kulturološke faktore i iskustvo, nizak socioekonomski status takođe može predstavljati barijeru za upotrebu sredstava AAK (Pampoulou & Fuller, 2020). Naime, značajan broj osoba sa invaliditetom nema pristup asistivnoj tehnologiji usled nižeg socioekonomskog statusa i posledičnog nedostatka tehnološke pismenosti (Vollmer Dahlke & Ory, 2020). Takođe, ukoliko dete koristi jedno sredstvo, npr. u školi, pri čemu nema mogućnost da ga iz škole iznese i koristi i kod kuće, veoma je teško razviti funkcionalnost u korišćenju u različitim okruženjima (Fannin, 2016). Pored barijere za početak upotrebe AAK, nizak socioekonomski status može dovesti do prestanka njenog korišćenja usled nemogućnosti da se ispune finansijski zahtevi i nedostatka institucionalne podrške (Moorcroft et al., 2020). Navedene faktore Sivers (Sievers et al., 2018) svrstava u prediktore ishoda intervencije u AAK s obzirom na to da se u maloj meri mogu menjati pod njenim uticajem. Imajući to u vidu, neophodno je kreirati detaljan plan intervencije koji sadrži sve neophodne informacije o korisniku koje mogu biti od uticaja na izbor adekvatnog sredstva, obuku i trajno korišćenje, a kako bi se otklonile potencijalne barijere pri njegovoj primeni i smanjile mogućnosti za odustajanje.

Znanja, informisanost i stavovi okruženja

Često se pominju znanja, informisanost i stavovi prema AAK, pre svega porodice, zatim vršnjaka i šire društvene zajednice, a potom i stručnjaka koji su, na različitim nivoima i u različitim sistemima, u kontaktu sa detetom ili osobom koja je korisnik sredstva AAK. Veoma je važno da se porodica informiše o samom sredstvu augmentativne i alternativne komunikacije i načinima njegove implementacije u okviru različitih svakodnevnih situacija, a potom osvesti da je ono legitiman način na koji korisnik komunicira. Međutim, pored toga, upotrebu ne treba svesti samo na komunikaciju „licem u lice", već i na ostale aspekte funkcionisanja, u različitim okruženjima, u skladu sa korisnikovim uzrastom i interesovanjima (Lund & Light, 2007). Negativni stavovi najčešće proizilaze iz manjka informisanosti, a potom iz niskih očekivanja, te se javljaju takozvani mitovi o AAK sa kojima se susrećemo kada se radi o upotrebi ovih sredstava kod dece. U njih spadaju verovanja da je uvođenje sredstva AAK poslednje rešenje i način za postizanje komunikacije deteta te da je mogućnost za njegov dalji govorno-jezički razvoj zaustavljena, pogotovo ukoliko se sredstvo uvede na što ranijem uzrastu. Potrebno je znati da AAK nije poslednje rešenje kada su sva druga iscrpljena, već odličan temelj za dalji razvoj govora i jezika, te da je ovu vrstu komunikacije potrebno uvesti što je ranije moguće u cilju stimulacije razvoja sposobnosti komunikacije (Dada et al., 2021). Nadalje, učvršćena su ubeđenja da dete mora imati usvojen određen dijapazon veština da bi moglo funkcionalno da upotrebljava sredstvo, kao i da sredstva visokotehnološke izrade mogu da upotrebljavaju samo deca prosečnih intelektualnih sposobnosti, međutim razvoj tehnologije doprineo je da postoje mnoga sredstva koja su pogodna za primenu bez obzira na uzrast i nivo sposobnosti deteta. Takođe, navodi se i da deca ne mogu da nauče sve simbole, već samo one koji se odnose na realne predmete, što se, naravno, u korak sa razvojem deteta menja, te će im u početku biti korisniji ikonički simboli, a onda, kako se simbolizacija razvija, i oni manje ikonični (Romsky & Sevick, 2005). S druge strane, postoje i visoka očekivanja koja se odnose na uverenje da je uvođenje sredstva rešenje svih korisnikovih problema, te je onda ono u fokusu, a ne korisnik i njegove funkcionalne sposobnosti (Lund & Light, 2007; Romano & Yu Shon Chun, 2018). Bitno je naglasiti da su sredstva augmentativne i alternativne komunikacije samo način na koji se osoba uključuje u svakodnevne životne aktivnosti (Lund & Light, 2007). S tim u vezi, usled nedostatka informacija, znanja ili pak negativnih stavova, u porodici izostaje podsticanje korisnika na izražavanje želja, potreba i postavljanje pitanja uz pomoć sredstva AAK. U tom slučaju dešava se da članovi porodice preuzimaju ulogu interpretatora i tumača u komunikacionim situacijama u porodičnom, ali i u širem okruženju. To tumačenje se uglavnom odnosi na sagledavanje drugih vidova komunikacije, poput izraza lica, pokreta

i slično, ali i završavanje rečenice umesto korisnika, uz ostavljanje po strani sredstava AAK.

Kompetencije i pristup stručnjaka

Na sve navedeno stručnjaci za AAK imaju veliki uticaj, koji se pre svega ogleda u njihovom načinu rada i saradnje sa porodicom (Romano & Yu Shon Chun, 2018). Naime, ukoliko stručnjaci detaljno procene celokupno okruženje korisnika, a potom ga aktivno uključe kao partnera u proces razmatranja upotrebe, odabira, a zatim i načina korišćenja sredstva, dijapazon situacija njegove primene postajaće sve širi (Parette et al., 2000). Naravno, saradnja je obostrana, te je potrebno da porodica bude spremna da aktivno učestvuje, a potom i preduzima jasne korake vezano za upotrebu AAK. Pored saradnje sa porodicom, važno je da postoji saradnja među stručnjacima, ali i među sistemima u koje je dete uključeno, te da se neguje timski pristup u okviru kog se dešava stalni protok informacija o stvarima relevantnim za korisnika i njegovo korišćenje AAK (Lund & Light, 2007). Ne sme se zanemariti ni adekvatnost obavljene procene korisnika od stručnjaka, jer ukoliko ona nije adekvatna, ni sredstvo nije upareno sa korisnikovim sposobnostima i okruženjem, te izostaje funkcionalna upotreba (McNaughton et al., 2008). Nedostatak obuke stručnjaka različitih usmerenja navodi se kao jedna od glavnih barijera za uspešnost korišćenja AAK u različitim situacijama. U istraživanjima se navode i različiti dijapazoni nivoa kompetencija logopeda, pri čemu oni ističu da nemaju dovoljno znanja i veština u okviru ove oblasti (Wormanes & Malek, 2004). Prema istraživanju Tsai, svega 12% logopeda poseduje visok nivo znanja za primenu viskotehnoloških sredstava AAK, dok je oko 60% ispitanika svoja znanja u domenu sredstava jednostavne tehnologije rangiralo visoko (Tsai, 2018). Barijeru ka upotrebi AAK u školskom okruženju predstavlja nedostatak edukovanosti nastavnog kadra o načinima upotrebe visokotehnoloških sredstava u postizanju ishoda predviđenih planom i programom (Soto et al., 2001). Nedovoljna obuka može da proizilazi iz više razloga, a neki od njih su nedostatak materijalnih sredstava za kupovinu opreme, nedovoljne količine resursa i vremena za organizovanje većih obuka, ali i nemogućnost da se bude u toku sa stalnim razvojem i promenama u tehnologiji (Smith et al., 2009). Rezultati istraživanja sprovedenog u Srbiji (Arsenić et al., 2022) govore u prilog tome da nastavno osoblje zaposleno u školama za decu sa smetnjama u razvoju ima viši nivo kompetentnosti u korišćenju i implementaciji AAK u nastavi od nastavnog osoblja zaposlenog u redovnim školama. To se može objasniti time da nastavno osoblje u školama za decu sa smetnjama u razvoju uglavnom čine defektolozi, a oni su u toku školovanja upoznati sa prednostima pomagala u pogledu funkcionisanja dece sa smetnjama u razvoju. Takođe, može se povezati i sa opremljenošću škola tehnologijom, jer, prema podacima, veoma mali broj škola poseduje asistivnu tehnologiju. U istraživanju koje su

sproveli Atanga i sar. istaknuto je da nastavno osoblje u osnovnim i srednjim školama svoja znanja o primeni tehnologije ocenjuje kao vrlo ograničena, što implicira potrebu za organizovanjem obuka kako bi se sredstva što relevantnije implementirala u nastavni plan i program (Atanga et al., 2019).

Faktori u vezi sa tehnologijom

Kao jedna od grupa faktora koji utiču na upotrebu augmentativne i alternativne komunikacije izdvajaju se i oni vezani za samu tehnologiju. Jedan od motivišućih faktora jeste raznovrsnost načina na koje se AAK može koristiti, pri čemu do izražaja dolazi kreativnost stručnjaka i porodice, od simbola predstavljenih na papiru, pa sve do simbola koji su predstavljeni na tabletu, računaru i sl. Međutim, to sa sobom povlači i visoku cenu sredstava AAK, posebno kada su u pitanju visokotehnološka sredstva, ali navodi se i cena materijala potrebnih za izradu sredstava jednostavne tehnologije (Romano & Yu Shon Chun, 2018). Lakoća upotrebe sredstva takođe se navodi kao faktor koji utiče na njegovo korišćenje, posebno ako je u pitanju visokotehnološko sredstvo, te postoje posebni načini za pokretanje i ažuriranje sistema. U ovom slučaju potrebno je voditi računa da li je barijera zaista to što je sredstvo komplikovano za upotrebu, ili su u pitanju veštine osoba koje ga koriste (Bailey et al., 2006; Smith & Conolly, 2008). Istraživanja govore da su roditelji koji imaju više iskustva sa osnovnom tehnologijom, poput računara, pokazali bolju snalažljivost i sa sredstvima AAK. Takođe, navodi se i važnost njihove spremnosti da istražuju načine upotrebe i rukovanja sredstvima AAK putem internet stranica, priručnika, ali i pohađanja kurseva, jer i komunikacioni partneri moraju posedovati znanja o tehničkim mogućnostima sredstva i veštine za upravljanje njime (McNaughton et al., 2008; Rackensperger et al., 2005). Međutim, prema rezultatima istraživanja koje su sproveli Nornburn i saradnici, a u koje je bilo uključeno školsko osoblje, uspešnost korišćenja AAK u različitim situacijama umnogome zavisi i od samih setova i/ili sistema koje dete ili osoba koristi. U skladu sa tim, navodi se da je visokotehnološke uređaje i komunikacione sisteme za razmenu slika (PECS) najteže implementirati u sve rutine, a prirodni gest najlakše (Nornburn et al., 2016). Prema podacima iz literature, postoji tendencija da se sredstva visokotehnološke izrade upotrebljavaju kada je potrebno preneti kompleksniju poruku, dok se prilikom prenosa jednostavne poruke upotrebljavaju gest i sredstva jednostavne izrade (Ripat et al., 2019). Sledeći faktor jeste i veličina sredstava i uređaja, zbog mogućnosti prenosa i transporta, s obzirom na to da se, kao što je naglašeno, radi potpune funkcionalnosti korisnika sredstvo mora koristiti u okviru svih konteksta u kojima on funkcioniše. S tim u vezi, prema istraživanjima, iako su sredstva više tehnološke složenosti skuplja, zbog veličine i lakšeg transporta bila su lakše upotrebljavana u različitim situacijama od sredstava niže tehnološke složenosti (Romano & Yu Shon Chun, 2018). Interesantno je da se kao barijera

za upotrebu navodi i usporavanje komunikacije posredstvom uređaja AAK, vodeći se teorijom da ni jedan uređaj, bez obzira koliko sofisticirane softvere posedovao, ne može da obezbedi brzinu protoka informacija jednaku brzini misli. Stoga komunikacioni partneri, zbog vremena koje iziskuje formulisanje i prenos poruke putem sredstva za AAK, radije biraju druge načine za komunikaciju (Lund & Light, 2007). Česti kvarovi takođe predstavljaju problem za korisnike i njihove porodice, bilo da je u pitanju kvar sredstva ili softvera, ili brzo pražnjenje baterija (Cooper et al., 2009). To onemogućava napredak u funkcionalnom korišćenju sredstva, jer njihova popravka iziskuje vreme (Rackensperger et al., 2005).

Pažljivo isplaniran proces odabira i implementacije sredstva AAK, kao i precizno definisanje ishoda i metoda njihove evaluacije, srž je kompetentnog donošenja odluka u oblasti AAK. Na funkcionalnu upotrebu sredstava AAK utiču brojni faktori, grupišući se u facilitatore i barijere jedinstvene za svakog korisnika. Podela faktora od uticaja na lične i sredinske omogućava fokusiranje na snage pojedinca na kojima će intervencija biti bazirana, sveobuhvatnu analizu potencijalnih barijera, jasnu podelu odgovornosti u okviru tima, kao i precizno definisanje strategija za njihovo prevazilaženje. Sveobuhvatna procena potencijalno značajnih faktora rezultira predupređivanjem nastanka, otklanjanjem i/ili ublažavanjem barijera u primeni AAK, doprinoseći time efikasnosti i efektivnosti intervencije, a što se postiže senzibilizacijom stručnjaka i komunikacionih partnera te formulisanjem jasnih smernica i vodiča. Ovakav model intervencije omogućava kreiranje plana podrške u različitim okruženjima, čime se postiže pun potencijal AAK sistema i omogućava socijalna participacija osoba sa kompleksnim komunikacionim potrebama u svim životnim sferama.

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Factors influencing the use of augmentative and alternative communication

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Augmentative and alternative communication (AAC) includes various methods, strategies, and techniques as well as devices and means developed with the aim of imroving the communication competence of people with speech and language disorders. AAC intervention implies a carefully planned process of selection and implementation of AAC means, as well as a precise definition of outcomes and methods of their evaluation to improve an indiidual's participation in the communication process. This paper aims to point out factors (personal and environmental) which potentially represent facilitators or barriers that influence the application of augmentative and alternative communication. Personal factors of importance include the user's individual characteristics, ability and skill set, personality traits and motivation, as well as personal preferences. The environmental factors include physical and cultural environment, socioeconomic status, knowledge, information and attitudes of the environment, experts' competence, and technology-related factors. Reported factors must be taken into account when implementing the AAK intervention as an effective support strategy for people with severe forms of speech and language disorders.

Keywords: augmentative and alternative communication, speech-language disorders, communication, personal factors, environmental factors

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