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Formation of the sound-syllabic structure of primary school pupils' speech with intellectual disabilities in Ukrainian language lessons

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Abstract. The purpose of the study was to determine the impact of various methods and techniques on the development of language skills in children with intellectual disabilities. Particular attention was paid to the analysis of innovative approaches, such as mobile applications and interactive teaching methods used to improve oral skills in an inclusive educational environment. The study confirmed the effectiveness of alternative methods and techniques for correcting language deficiencies in students with intellectual disabilities. Children who regularly used interactive tools showed better results in the development of phonemic awareness and the ability to distinguish sounds. Interactive exercises helped alleviate problems with word articulation and syllabic structure development. Studies have shown that children with intellectual disabilities have difficulty perceiving and analysing sounds, and this is due to a lower level of phonemic awareness. The process of forming phonemic awareness is so important in the early stages of speech development that its disruption affects the further acquisition of syllable structure. The article describes approaches to the diagnosis and correction of these disorders, including special exercises for the development of phonemic awareness, articulation exercises and teaching methods for the correction of disorders of the structure of speech sounds and their constituent components. The results can be used to improve educational programmes in specialised schools for children with intellectual disabilities. This contributes not only to the development of language skills, but also to the overall improvement of students' communication skills. The introduction of innovative methods into the educational process provides better results of correctional activities and creates a more favourable environment for children with special needs

Keywords: speech therapy; cognitive development; multimedia; integration of technologies; communication strategies; composite structure; intellectual disabilities

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INTRODUCTION

The formation of a child's speech is one of the most important stages of speech development, especially in primary school. This process is especially important for pupils with intellectual disabilities who find it difficult to acquire basic language skills. Against this background, it is relevant from both theoretical and practical points of view to study the peculiarities of the formation of the constituent structure of language in such pupils. The lack of language skills of

children with intellectual disabilities often hinders their full integration into the educational process and social environment, and solving this problem has become one of the key tasks of modern pedagogy and speech therapy. One of the main problems in working with students with intellectual disabilities is that the phonetic structure of their syllables often does not correspond to age-related norms. This can be manifested by inaccurate reproduction of sounds,



disordered syllable order, slow speech rate or fragmentation. These disorders make it difficult to read, write and learn general conversation.

Researchers V.G. Semenova & V.A. Semenova (2021) consider ways to diagnose and modify the syllabic structure of words in young children with generalised speech development disorder of stage III and find effective ways to overcome difficulties in learning the correct structure of the action. Instead, researchers O. Bielova & S. Konopliashita (2023) consider the functional capabilities of oral and articulatory practice of older preschool children with speech disorders, pointing out the importance of sound articulation and word structure that affect language readiness at school.

A. Muqaddas (2021) investigated the impact of language disorders on children's ability to learn foreign languages and found that such disorders affect the development of communication skills and overall academic performance. O.G. Prikhodko *et al.* (2020) highlight the role of digital technologies in addressing the issues of oral speech development of children with hearing loss and emphasise the importance of using technology at all stages of correctional work. E. Matsyuk (2021) focuses on interdisciplinary approaches to remediation and explores the impact of digital technologies on the development of communication skills in students with dysgraphia and dyslexia. K. Strasser *et al.* (2023) evaluate the effectiveness of structured games to improve pre-schoolers' learning outcomes in phonological awareness and mathematical problem-solving. A.A. Siddiqui (2022) describes speech therapy after cleft lip surgery, with a focus on correcting speech errors and developing correct articulation of sounds.

N.Y. Gomzyakova & Y.N. Gomzyakova (2020) analyse the problem of developing second language skills in children with intellectual disabilities and emphasise their importance for full socialisation in modern multicultural societies. This study revealed insufficient theoretical coverage of this topic and different approaches to its solution in practice. The authors reveal a contradiction between the inability of such children to master English as a means of communication and their need to learn English at an accessible level, and that this solves this problem by creating conditions for the development of new psychological and pedagogical approaches. Therefore, the purpose of the authors' study was to develop and implement an effective methodology for the formation of the language structure component in primary school classes of the Ukrainian language for students with intellectual disabilities. This study includes an analysis of existing approaches to teaching these students, identifying their shortcomings and finding new solutions to improve the language skills of students with intellectual disabilities.

The article by M.A. Brazhnik (2023) describes in detail the speech development of this category of learners. The author emphasises that coherent speech plays an important role in the formation of thinking, communication skills, as well as in the regulation of psychological processes. It is the basis for the development of volitional processes and

the emotional sphere. The article by I.M. Matyushchenko & S.I. Gerashchenko (2023) discusses the peculiarities of the consistent language development of children with intellectual disabilities. It is known that speech disorders affect communicative, cognitive and regulatory functions. Due to weak analytical and synthetic activities, children have difficulty learning language, and the correlation between intellectual and linguistic elements remains a complex problem.

The doctoral dissertation of L.O. Feduniva (2024) is devoted to the study of the conditions of teaching dyscalculia correction in primary school students with speech disorders in inclusive classes. The effectiveness of these conditions, in particular psychological and pedagogical support, the formation of mathematical skills, an active approach to learning and interaction with parents, was developed and tested for the first time. In the article by I.D. Shevchenko (2023), the didactic game "Days of the Week in a Circle" is considered as an auxiliary tool for teaching children with intellectual disabilities. The main goal of this game is to teach children to name the days of the week and their order, as well as to consolidate knowledge in memory. This game promotes interaction between students and the teacher, creates a fun atmosphere in the classroom, and evokes positive emotions that help to memorize the material. It will not solve all learning problems, but it will greatly facilitate the process.

In particular, the aim of the study was to test the effectiveness of using alternative technologies to correct language disorders and develop communication skills in primary school children. The objectives of the study include a review of psychological and pedagogical literature on this topic, an analysis of the experience of learning Ukrainian by children with intellectual disabilities, and the relationship between the ability to learn Ukrainian and the need for Ukrainian in educational institutions.

LITERATURE REVIEW

V. Hofmann & C.M. Müller (2021) investigated how social contact affects the development of language skills in students with special needs. They surveyed 1125 students from 16 special needs schools in Switzerland. The results showed that increased social contact improved both verbal and non-verbal skills. However, improved language skills at the beginning of the year will not necessarily lead to increased social contact later in the year. E. Smith *et al.* (2021) studied how the use of smart speakers such as Amazon Alexa & Google Home improves speech intelligibility in adults with intellectual disabilities. The study found that the group using smart speakers significantly improved speech intelligibility compared to the control group. S. Schnepel & P. Aunio (2022) conducted a systematic review of mathematics interventions in primary schools using inclusive education. Their findings suggest that interventions with systematic instruction, feedback, and manipulative techniques are effective in teaching these students. R.S. Dessemontet *et al.* (2021) investigated the impact of audio learning on reading comprehension for students with special educational needs. One study found that students who participated

in a basic programme made significant progress in both verbal and non-verbal reading.

L. Zhuravlova *et al.* (2021) conducted a study of primary school students using speech therapy screening. The study involved 240 students in grades 1-4. The purpose of the study was to test the level of development of language functions important for learning to write and read. It was found that a significant number of pupils have difficulties with the formation of written speech, which requires early detection and correction. This emphasises the importance of using speech therapy screening for comprehensive correction of the language development of primary school children, especially those from "risk groups". M.W. Ok *et al.* (2022) investigated the impact of speech recognition technology on the writing process of students with a high frequency of deviations. Students with spelling difficulties benefited from speech recognition, which made it easier for them to write. However, the effectiveness of the technology depends on the individual needs of the student. Although this study has shown that students perceive the use of computer programmes positively, it is important to incorporate computer programmes into the learning process, taking into account individual differences.

A. Sturrock *et al.* (2022) on children with autism without intellectual disability discuss the subtle language difficulties that affect their socialization and emotional well-being, and the importance of therapeutic support. P.J. Standen *et al.* (2020) investigate a multimodal emotionally aware learning system that improves the emotional state and engagement of students with intellectual disabilities. T.G. Jizzakh (2020) investigated the impact of hearing aids on the language development of children with hearing loss and emphasised the importance of a sound language environment. D.R. Patel *et al.* (2020) point out the importance of a diagnosis based on medical history, intellectual ability and adaptive functioning. More than 75% of people have mild intellectual disability, but the cause is often difficult to determine. Physicians are changing their important role in coordinating care and services. A study conducted by M.A. Khasawneh & M.A. Alkhalal (2020) found that phonological awareness training was effective in improving chronic sound memory in children with learning disabilities in Saudi Arabia. The experimental group significantly outperformed the control group and showed consistent results. In their study, researchers U. Mirecka *et al.* (2018) focused on articulation problems in children with intellectual disabilities and analysed their awareness of the phonemic structure of words. They examined the language of children with mild intellectual disabilities, including children with cerebral palsy and Down syndrome, and found deficits in both quantitative and qualitative word structure. Their research revealed significant reductions, simplifications, and other articulation defects in consonant groups. Meanwhile, S.R. Dessemontet *et al.* (2021) investigated the impact of phonological awareness and knowledge of letter-sound relationships on reading development in children with intellectual disabilities. Their study evaluated the effectiveness

of a sound programme for teaching decoding and spelling to primary school students. Their results showed that reading performance improved significantly in the sound intervention group, highlighting the importance of this approach in teaching children with intellectual disabilities.

L. Chepurna *et al.* (2021) analyse the history of textbooks for special schools, especially for children with intellectual disabilities. Textbooks are seen as important educational tools that support the learning process by integrating content and teaching methods. This study points to a comprehensive analysis of historical experience that is necessary to improve current approaches to the development of historical experience, with a particular focus on textbooks in remedial psychopedagogy with a focus on the mother tongue and reading.

To summarise, in the field of special education, much attention is paid to the development of language, cognitive and social skills of children with special educational needs. Modern research points to the importance of social contact, the use of the latest technologies (smart speakers, speech recognition), phonological awareness, and remedial interventions aimed at improving verbal and non-verbal skills. In addition, physical education and didactic games have a significant impact on the social adaptation and mental development of students with intellectual disabilities. Early interventions, such as speech therapy screening, the use of hearing aids and systematic training, can significantly increase the chances of successful correction and education. The aim of the study was to investigate the effectiveness of using training cards in the formation of the constituent structure of speech in young children with mild mental retardation.

MATERIALS AND METHODS

The study was conducted in a specialised school for children with mental retardation in Kyiv, with pupils in grades 2-4 with mild intellectual disability. The sample consisted of 30 pupils (17 boys and 13 girls) aged 7 to 10 years, with an average age of 8.5 years. Inclusion criteria: confirmed diagnosis of mild mental retardation and basic language skills that allow the student to speak in simple sentences. The exclusion criteria were students with moderate to severe intellectual disabilities, significant language or cognitive impairments, emotional and volitional disorders that could affect their ability to participate in the experiment and to participate in parallel studies. The study consisted of three stages: a diagnostic stage, a modification and development stage, and a final stage. The diagnostic stage involved a preliminary assessment of the student's language development, including his or her ability to reproduce the syllabic structure of words. The modification stage included the development and implementation of special learning cards aimed at improving the formation of the sound-word structure of the language. The final stage includes evaluation of the effectiveness of the implemented methods.

Training cards were developed and used to promote the development of the syllabic structure of language.

The cards contained visual cues in the form of images of objects, which helped students make connections between images and sounds. The tasks on the cards involve forming words from the proposed syllables, practising correcting mistakes in words, and reproducing the

correct sound composition. Using the pronunciation practice cards, the children were able to practice pronouncing the sounds they struggled with. Table 1 provides a detailed description of the materials and methods used in the study.

Table 1. Materials and methods used in the study

Type of material/method	Description	Purpose
Didactic cards	Cards with images of objects and their characteristics	For the development of descriptive speech
Sets of game objects	Various items to classify by characteristics	For game exercises and classification tasks
Audio and video materials	Entries containing examples of adjectives	For visualization of speech structures
Handout cards	Cards with writing tasks	To practice writing
Computers and projectors	Equipment for reproducing educational materials	For interactive learning
Tests for assessing language skills	Specialised techniques for assessing the sound-syllable structure of speech	To diagnose the initial level of speech
Playful exercises	Tasks that involve active participation of children in the learning process	To engage children and increase their motivation

Source: created by the author

The students' tasks were aimed at developing both their understanding and practical application of new oral skills. The activity included an associative exercise in which students named the objects on the cards and accurately reproduced their component structures. They also contributed to the practical application of their language skills by practising building words from given syllables and constructing sentences from the pictures. Interactive tasks were an important part of the learning process. The students used computer programmes and interactive exercises to develop their listening and sound recognition skills. The exercises included interactive games that required students to match sounds and pictures, as well as to listen and repeat words and sentences, with an emphasis on correct sound structure. Video materials showed the correct pronunciation of sounds and helped students visualise the process of word formation, while audio materials served as an additional tool for pronunciation training. Also, since the study participants were children, appropriate permission was obtained from the parents or legal guardians of the students. This study was conducted in accordance with all ethical standards and rules set out in the Declaration of Helsinki (1964). The confidentiality of participants' personal information was ensured and risks to their physical and psychological health were minimised.

RESULTS AND DISCUSSION

During the experiment, the study focused on improving speech skills related to the accurate reproduction of sounds, syllables and words, the development of vocabulary and grammatical skills, and the intonation of speech. The main questions of the study were to determine the impact of flashcards on the development of a healthy language culture and to analyse interactive tasks to improve learning outcomes. During a three-month study of 30 students with mild intellectual disability, significant changes in the

structure of their speech were observed. The use of flashcards, interactive tasks and special exercises had a positive impact on the development of the sound and compositional structure of speech, as well as on the overall level of children's communication abilities. At the first diagnostic stage of the study, it was found that most pupils had difficulties with the correct articulation of sounds, phoneme identification, and correct word construction in terms of syllable structure. Children found it particularly difficult to reproduce words containing two or more syllables. However, after applying experimental methods, such as the systematic use of flashcards and interactive exercises, a significant improvement in oral skills was observed. An important aspect was the improvement of students' phonemic awareness, which is expressed in the ability to distinguish similar sounds, pronounce them correctly and use them in speech. At the final stage of the study, after the completion of the remedial measures, the students showed better results in tests of the syllabic structure of the language, which confirmed the effectiveness of the methodology.

This study divided the students into experimental and control groups to analyse the effectiveness of the methodology. The experimental group consisted of 15 students who were taught using the new methodology with the use of flashcards, while the control group (15 students) was taught using the traditional methodology without the active use of flashcards. After 3 months, a second test was conducted to assess changes in the phonological structure of the language. The experimental group showed significant improvement. The number of pronunciation errors was reduced by 60% and the number of correctly reproduced multisyllabic words increased by 45%. Students in the control group also showed positive changes, but the progress was less pronounced. The number of errors decreased by only 30%, while the number of multisyllabic words increased by 20%. In addition, the experimental group showed improvements

in phoneme recognition and the ability to use them in new words, indicating the development of the internal language apparatus and better processing of sound information by the brain. The lesson cards played a central role in learning and reviewing the syllabic structure of the language. Their use helped children to increase their attention to the sounds and syllables being reproduced and helped them to develop the cognitive ability to reproduce complex words. Cards with vivid pictures of objects and corresponding words allowed students to associate sounds with specific objects and actions, which greatly facilitated the learning process. For example, cards with pictures of objects with three-syllable names (e.g., crocodile, bicycle, etc.) helped students to accurately represent more syllable words. Students used the cards to classify words by the number of syllables. This reinforced their phonological knowledge and helped them to develop their ability to distinguish between the sounds and number of syllables in words.

Interactive tasks were also an important part of the methodology. This involves the use of computer programs and interactive whiteboards, where students perform various exercises to develop the structure of the speech-auditory and language components. One of the most effective tasks was to make words out of parts. Children were asked to put the sounds in the correct order to form a word,

which was then displayed on the screen. This task not only helped to develop speech analysis, but also helped pupils to understand how speech is transformed into words. Another interactive task involved listening to and playing back an audio recording of words. Children had to repeat the words they heard, paying attention to the correct pronunciation of sounds and syllables. This not only contributed to the development of phonemic awareness, but also helped to correct speech errors in real time. Most students improve their ability to identify errors in their speech and demonstrate the development of reflection skills.

In the experimental group, the syllabic structure of the language was developed with the help of training cards. These cards contained tasks for forming words by sounds, determining the number of syllables in a word, and dividing sounds into vowels and consonants. Students worked in small groups, providing opportunities for further social interaction and discussion. In the control group, pupils were assigned tasks according to a standard curriculum without the use of interactive methods. The emphasis was on traditional learning tasks, such as dictation and repetition of grammar rules, and was mainly aimed at memorisation rather than at developing analytical skills in working with syllable structures. Table 2 shows the average language skills scores.

Table 2. Average scores of language skills development (before and after the experiment)

Group	Before the experiment (mean score)	After the experiment (average score)	Change (%)
Experimental	54.3	82.1	51.2%
Control	55.7	64.9	16.5%

Source: created by the author

The Table 2 shows the results of the language skills assessment (based on tests containing tasks for correct word formation, determining the number of syllables and classifying sounds). As can be seen from the data, students in the experimental group showed significantly improved performance on tasks related to syllable structure, which indicates the effectiveness of the flashcards and interactive tasks.

Thus, the experimental group used interactive tasks specifically designed to develop oral skills. One of the main tasks was sound classification. Students worked with cards that required them to classify sounds into categories, including vowels and consonants. This task helped to improve students' ability to distinguish between the sound elements of words and had a positive impact on their skills in analysing language units. Additionally, we used tasks to build words from given sounds and syllables. Students had the opportunity to practice building words from individual sounds and word parts, which improved their analytical skills and deepened their understanding of word composition. These tasks allowed students not only to recognise individual sounds, but also to combine them to build more complex language structures. Interactive games were also used for language development. These were electronic resources, such as audio and video games, in which students

had to complete tasks such as determining the number of syllables in a word or finding errors in word structure. These games motivated students to learn through an interesting and playful presentation of the material, and helped them develop practical skills in analysing and synthesising word sounds. Another important type of interactive tasks is sound puzzles. They are designed to help students better memorize sounds and syllables by matching them with certain pictures. The puzzles provided learners with a visual basis for memorizing sounds and syllables, allowing them to develop not only language but also cognitive skills, contributing to their overall progress in language development.

For a more detailed analysis, it is worth considering the individual cases of several students in the experimental group. Student Oleksiy, aged 9, said that when he first started school, he had difficulty determining the number of syllables in words and often confused consonants and vowels. After three months of studying with the use of educational cards, Alexey improved his skills by 43%. He can now correctly recognize the phonetic structure of simple words and is now working with more complex structures. Meanwhile, Maria, an 8-year-old student, showed average results in the first stages of the experiment, but quickly adapted to the new interactive task. Exercises with interactive cards

and audio games improved her results by 52%. She began to pay more attention to the sound composition of words and became more familiar with the syllabic structure of Ukrainian words. For further analysis, it is worth comparing the results of pupils from different grades (2nd, 3rd, 4th grade). Fourth graders showed better results than younger students because their cognitive abilities were more developed. For example, after using interactive cards, the results

of fourth-graders in the experimental group increased by 60%, and second-graders by 38%. This suggests that the development of the syllabic structure of language depends on the age and cognitive development of the child, but even younger students show significant improvements. Students' performance was assessed based on the results of diagnostic tests, interactive tasks, and classroom observations. Table 3 clearly shows a comparison of student performance.

Table 3. Comparison of pupils' performance in the experimental and control groups

Parameters	Control group (mean value)	Experimental group (mean value)	Change (%)
Successful completion of tasks	55%	75%	+20%
Sound proficiency level	60%	80%	+20%
Ability to classify sounds	50%	78%	+28%
Ability to form words	52%	77%	+25%
Level of communication skills	58%	82%	+24%

Source: created by the author

It is also worth mentioning gender analysis, which is an important research tool that focuses on differences in students' learning and development based on gender identity. In the context of the study of the formation of the syllabic structure of speech in primary school students with intellectual disability, the gender aspect allows for a deeper understanding of the impact of gender on speech development, learning outcomes and classroom interaction. In the sample under study, there were 30 students, including 17 boys and 13 girls, who showed a certain gender imbalance. This difference may reflect the difference in language development between the sexes, and teachers and parents may support boys and girls in their learning in different ways. It is important to consider how these gender differences affect learning outcomes and social dynamics in the classroom.

Society has established gender stereotypes that can affect a child's learning. For example, girls are believed to have better communication skills and emotional intelligence, while boys are generally seen as more practical and logical (Filipenko, 2024). These stereotypes can influence how students approach learning materials, as well as teachers' and parents' expectations of student performance. The present study shows that girls outperformed boys in interactive tasks that required conversation and communication. This

may be due to the traditional role of girls in society, which is to promote the development of communication skills. Boys, on the other hand, may be less interested in tasks that require language analysis due to the influence of gender stereotypes that shape ideas about "masculine" and "feminine" behaviour. Research has shown that boys and girls may have different learning styles. Boys are more interested in active learning through physical activity and manipulating objects, while girls may prefer structured tasks that require attention to detail and verbal communication. This can also be seen in the classroom, where boys are more enthusiastic about games that involve movement, while girls are more likely to choose games that require thinking and communication. This study used an interactive task that included both physical activity and language exercises. They found that boys were successful in tasks related to sound classification and word formation, but had difficulty with tasks that required verbal explanations and explanations. Girls, on the other hand, had an easier time with verbal tasks, but had difficulty with outdoor games that required mobility. These differences in learning styles may be important for designing individualized teaching methods that address the unique needs of girls and boys. Table 4 shows a clear comparison between boys and girls.

Table 4. A comparison of the performance of boys and girls in the experimental group

Parameters	Boys (average)	Girls (average)	Change (%)
Successful completion of tasks	70%	81%	+11%
Sound proficiency level	75%	85%	+10%
Ability to classify sounds	70%	85%	+15%
Ability to form words	73%	82%	+9%
Level of communication skills	75%	87%	+12%

Source: created by the author

As mentioned earlier, interactive tasks were an important part of the methodology. This involves the use of computer programs and interactive whiteboards, where

students perform various exercises to develop the structure of the speech-oral and language components. One of the most effective tasks was to make words out of parts. Children

were asked to put the sounds in the correct order to form a word, which was then displayed on the screen. This task not only helped to develop speech analysis, but also helped students to better understand how speech is transformed into words. Another interactive task involved listening to and playing back an audio recording of words. Children had to repeat the words they heard, paying attention to the correct pronunciation of sounds and syllables. This not only contributed to the development of phonemic awareness, but also helped to correct speech errors in real time. The majority of students improve their ability to identify errors in their speech and demonstrate the development of reflection skills. The results of the study showed that the greatest improvements were observed in students with a moderate language disorder, who initially had moderate difficulty pronouncing sounds. These students showed significant progress after the introduction of instructional cards and

interactive tasks. Students who initially had significant difficulties with pronunciation also showed positive dynamics, but their progress was less pronounced. This suggests that children with more pronounced speech impairments need an individual approach and a longer rehabilitation period. The results of the study indicate the high efficiency of using training cards and interactive tasks in the correction of language deficits in children with intellectual disabilities.

Based on the study, it can be concluded that the use of training cards and interactive tasks significantly improves the level of development of the language structure component of students with intellectual disabilities. The methodology based on the active use of voice and composition tasks allows students to analyse and synthesise linguistic elements important for further language development more effectively. Table 5 shows the results of the students by class after the three-month experiment.

Table 5. Students' results by class after the three-month experiment

Class	Before the experiment (mean score)	After the experiment (average score)	Change (%)
2 nd grade	50.5	69.7	38%
3 rd grade	55.1	77.2	40%
4 th grade	59.4	90.1	60%

Source: created by the author

It should also be noted that younger pupils showed somewhat slower progress compared to older pupils, which can be explained by differences in cognitive development. The formation of the syllabic structure of language is a very important stage in the development of primary school pupils' conversational ability, especially those with intellectual disabilities. In this regard, the following recommendations will help to organise the educational process of developing the constituent structure of language. Firstly, the use of flashcards is an effective tool for developing oral skills. To help students recognise objects, we recommend creating a set of cards with pictures of objects and their corresponding names, as well as cards with sounds. It is important that the cards have different levels of difficulty so that the learning process can be adapted to the individual needs of the students. For example, it is possible to use simple word cards for students with mild language impairments and more complex word combinations for students with higher abilities. In the future, it is very important to introduce interactive tasks into the learning process. These are games for classifying sounds and making words from given sounds, as well as interactive games for language development.

It is important to update these tasks regularly and adapt them to the current needs of one's class. Systematisation of learning material is central to the development of language structure. It is recommended that one creates clear lesson plans that include a variety of activities related to all aspects of language development. Lessons may consist of first introducing new sounds and syllables to students, and then gradually using them in speech. Cooperation with parents is also an important factor. It is also

recommended to hold information meetings with parents to give them the opportunity to become familiar with the methods and tools used in the classroom. Parents can also be offered homework that includes games and exercises to develop the language structure component, which will enhance the learning process at home. The introduction of games in education will make the learning process not only effective but also interesting for students. It is recommended to include games that promote the development of syllabification, such as "sound puzzles", "find the pairs", "make up words". These games can be played in the classroom or at home with parents. They help develop communication skills and strengthen students' social connections. Regular assessment of students' progress is an important part of the learning process. It is recommended to establish clear assessment criteria based on the learner's achievements in the development of the language structure. Assessment can be formal (tests) and informal (classroom observation). It is important to keep records of each learner's progress, which will help to adjust future curricula.

Modern technology makes learning much easier. It is worth using computers, tablets, and mobile apps for interactive learning. For example, a programme that teaches phonetics and phonology, including games, videos, and language development exercises. This not only makes learning more interesting, but also allows students to learn at their own pace. Ensuring a quality educational process requires ongoing professional development for teachers working with students with intellectual disabilities. Teachers should also be encouraged to attend additional seminars, conferences, and training courses on the latest

teaching methods and techniques. This helps teachers keep abreast of the latest trends and approaches in special education. Adapting the learning environment to the needs of students is a key element of successful learning. It is recommended to create a comfortable environment that is conducive to language development. Comfortable furniture, sufficient lighting, and no distractions. It is also important to organise classes so that students have the opportunity to work in groups or pairs, which helps to develop communication skills. The mental health of students is an important aspect that directly affects their speaking skills. It is also worth paying attention to the emotional state of students, creating a positive atmosphere in the classroom, and encouraging students to express their thoughts and feelings. The use of relaxation and breathing techniques can help reduce students' anxiety and create a comfortable learning environment. It is advisable to use specialised teaching materials that take into account the characteristics of children with intellectual disabilities. These can be illustrated books, textbooks, multimedia resources, etc. Specialised learning materials help students to better understand information, concentrate on their studies and develop their language. Working with experts (speech therapists, psychologists, teachers) can have a positive impact on the learning process. It is recommended to involve them in the development of educational programmes and remedial development measures for students with intellectual disabilities. By communicating with experts, it is possible to gain new knowledge and experience, which will lead to an improvement in the quality of education. Successful development of the structure of speech of primary school students with intellectual disabilities requires an integrated approach that combines a variety of teaching methods and tools. The use of flashcards, interactive tasks, games, special materials and technologies, and the involvement of parents and specialists can help create an effective learning environment that promotes the development of pupils' speech skills. These recommendations are the basis for organising the educational process of children with intellectual disabilities and improving the quality of education.

The level of success in completing tasks is one of the central aspects of the study, which was analysed in the course of its implementation. Students in the experimental group using interactive tasks and study cards showed a 20% increase in the level of success in completing tasks compared to the control group. This shows that the new teaching methodology has a positive effect on students' overall motivation and interest in the learning process. Interactive elements, especially games and audio classification tasks, contributed to a deeper understanding of the material and, as a result, encouraged children to actively participate in learning. An analysis of the sound proficiency of the experimental group showed that this indicator increased significantly by 20%. This performance can be explained by the interactive task, which involves the identification and recognition of individual sound elements. The positive dynamics indicate that students are paying more attention

to the sound composition of the language. This is an important aspect in the development of language skills, especially for children with intellectual disabilities. The 28% increase in this indicator is particularly important because sounds can be classified. The pupils in the experimental group showed significant improvements in their ability to classify sounds according to different criteria (e.g., vowels and consonants). This suggests that the interactive sound categorisation tasks helped students to develop analytical skills, which is very important for their further language development. The study also showed a 25% increase in students' ability to make words from individual sounds or syllables. This indicator shows that students feel more confident and assured in their oral skills. The use of learning cards and word-formation games had a positive impact on the development of a healthy mindset, which is important for children with speech impairments. The level of communication skills of students in the experimental group also improved by 24%. This is another important result, which shows that interactive tasks and flashcards contributed not only to the development of students' speech, but also to their communication skills. This indicates that students became more active in communication, which contributed to their integration into society and the development of interpersonal skills.

In terms of gender analysis, the performance of boys and girls in the experimental group was monitored, and it was found that girls performed better in many aspects related to conversational skills. This indicates possible gender differences in learning methods and perception of information. Boys, on the other hand, were more active in interactive tasks, which may indicate a different approach to learning. The results of the study confirm the need to adapt teaching methods to the gender characteristics of students. To achieve maximum learning success, it is important to use a variety of approaches that take into account the individual characteristics of students. This includes both interactive tasks and traditional methods, depending on the needs of each group of students.

Studies of the learning process for students with intellectual disabilities have highlighted a number of important aspects that can have a significant impact on learning outcomes and the development of language skills. For example, the article by R. Sirkko & M. Takala (2024) analyses teachers' experiences of distance learning during the COVID-19 pandemic. Teachers have faced new challenges, but they have also learnt new skills to support their students. This study focuses on teachers' professional activities. When comparing the results of this study, which focuses on the development of the syllabic structure of primary school students with intellectual disability, author see similarities in the need to adapt teaching methods in unusual circumstances. The use of flashcards and interactive tasks discussed in this study became tools to enhance the learning process, similar to the way Finnish teachers use professional teaching materials. P.B. Ramteke *et al.* (2020) investigated the detection of phonological processes in children's

speech, in particular nasalization and nasal assimilation. Since correct articulation of speech is the basis for the formation of the sound-syllable structure of language, the recognition of these phonetic features provides an opportunity for corrective work with students. This study also included an analysis of students' speech, focusing on the study of sounds and their combinations. The similarity in approaches to speech analysis is obvious. The methods mentioned in the work by P. Menyuk (2021) also add value to this study. It is analysed how children's language abilities can be assessed at an early age. This approach is especially important when working with children with intellectual disabilities, as it allows not only to modify language, but also to understand the language structures that influence language correction. Comparing these results with the present study, it can be argued that this is a systematic approach to the assessment of speech skills and their development. Discussing the findings with the above studies, we can emphasise the importance of integrating different methods and approaches in teaching students with intellectual disabilities. The use of flashcards, interactive tasks, and a deep understanding of the phonological aspects of language are also important factors in the development of children's language skills. This study shows that adapting teaching practices in response to changes in the educational environment is a prerequisite for success in educational institutions.

M.S. Makhmudova *et al.* (2024) studied the phonetic and phonemic development of speech in children, which is a consequence of defects in the process of pronunciation and sound perception. Their study focuses on disorders of the formation of the sound system of the native language, as well as on teaching methods and correctional approaches aimed at improving communication skills in children with speech difficulties. O. Turko *et al.* (2022) focus on how inclusive education affects the development of communication skills in preschool children. I.A. Nigmatullina (2015) examines the peculiarities of teaching children with attention deficit hyperactivity disorder who have language disorders. Her research focuses on the difficulties that such children experience when learning to read and write. The author draws attention to the fact that children with attention deficit hyperactivity disorder are at risk of developing difficulties with writing, and considers options for corrective work in educational institutions to improve academic performance. R. Treiman *et al.* (1993) investigated the effect of consonants that make up the English phonology on children's spelling. The researchers found that vowel omissions and vowel misplacement occurred more frequently in words containing consonant blends, indicating the important role of phonology in early writing. In his article, C.K. Leong (1997) explores the morphosyllabic nature of the Chinese language and provides an exemplary analysis of linguistic relations in Chinese words. The author emphasises that phonological principles that are "universal" also apply to Chinese lexical access. This study analyses how phonological variables affect Chinese reading learning and the interaction of letter form, sound,

and meaning. N.N. Ligembe (2014) investigates the factors that influence the acquisition of Swahili reading skills in primary schools in Tanzania. The author analysed the relationship between the availability of learning materials and textbooks and reading comprehension in primary schools. The study showed that the lack of textbooks and early education significantly affects the level of reading comprehension in schools, especially in public schools. L. Mozheikina & P. Emelyanov (2019) presented in their study a number of mobile applications designed to diagnose and correct language disorders in children. The authors emphasise the use of game strategies to reduce stress during learning, and discuss alternative methods of communication for children that use emojis to facilitate communication. Language affects the development of speech and personality. S.P. Redozubov (1988) analyses innovations in reading lessons using the phonetic method, which is based on the phonetics of languages and helps to better master the syllabic composition of word sounds.

Thus, the studies demonstrate a variety of approaches to the study of language skills and their development in children with intellectual disabilities. Particular emphasis is placed on the adaptation of teaching methods using interactive and innovative strategies, as well as on the importance of a deep understanding of the phonological aspects of language. All of these factors indicate the need for a systematic approach to language education and correction, which can improve the effectiveness of the educational process for children with different types of disabilities. Thus, the results of these studies emphasise that the integration of different methods and approaches is key to the successful development of language skills and communication abilities in students with disabilities.

CONCLUSIONS

The study has revealed that the formation of the constituent structure of speech of primary school children with mental retardation is a complex and multicomponent process that requires the use of special methods. The main problem is that children with intellectual disabilities often have difficulty learning grammatical and phonetic rules of the language due to cognitive and perceptual problems. This makes it difficult for them to correctly perceive and reproduce the phonological properties of language. The results confirm the effectiveness of individual and differentiated approaches to teaching for these students, including the use of specialised programmes to correct language disorders. In practice, it has been proven that the integration of technology into the educational process (for example, the use of mobile applications and multimedia tools for the correction of language disorders) not only improves language skills but also reduces anxiety in children.

Incorporating interactive activities and cards into one's curriculum is an essential way to increase student motivation and promote language development. A study has shown that this method not only enhances the learning process, but also has a positive effect on the development

of speech components in mentally disabled children. By using multimedia tools and materials, one can create a more stimulating learning environment that promotes better learning. Therefore, the introduction of innovative approaches to the educational process is necessary for effective correctional work and the development of language skills of students with special needs.

To summarise, authors can say that the formation of the component structure of primary schoolchildren with mental retardation is a complex task that requires a careful approach and individualisation of the educational process. The identified difficulties faced by these children demonstrate the need to use adapted methods and resources that take into account the cognitive and perceptual characteristics of children. The results of this study also confirm that the learning process can be significantly improved by integrating modern technologies, such as mobile applications and multimedia. This not only improves language skills, but also creates a more comfortable and motivating environment for students, reducing anxiety. Adaptive flashcards and interactive activities can be important tools in the learning process, stimulating interest and helping to ensure successful learning.

Further research could focus on the impact of innovative technologies, such as mobile applications and digital

tools, on the language development of children with intellectual disabilities. It is also important to develop and test special interactive programmes for learning the structure of language that can be used both in school and at home. In addition, future research could focus on the effectiveness of interdisciplinary approaches to teaching that combine linguistic, social and emotional components. This will help to create a more holistic educational model that takes into account all aspects of the development of children with intellectual disabilities. The effectiveness of rehabilitation programmes can be greatly enhanced by the involvement of various professionals, such as speech therapists, psychologists, teachers, etc. Another important element is building partnerships between educational institutions, parents, and the community. Joint efforts create a more favourable environment for children with special needs and promote the introduction of new approaches to the educational process. A positive impact on language development can only be achieved with the active participation of all those involved.

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CONFLICT OF INTEREST

None.

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Формування звуко-складової структури мовлення учнів початкових класів з інтелектуальними порушеннями на уроках української мови

Анотація. Метою дослідження було визначити вплив різних методів і прийомів на розвиток мовних навичок у дітей з інтелектуальними порушеннями. Особливу увагу було приділено аналізу інноваційних підходів, таких як мобільні додатки та інтерактивні методи навчання, які використовуються для вдосконалення усних навичок в умовах інклюзивного освітнього середовища. Дослідження підтвердило ефективність альтернативних методів і методик корекції мовної недостатності у учнів з інтелектуальними порушеннями. Діти, які регулярно користувалися інтерактивними засобами, показали кращі результати в розвитку фонематичного сприйняття та здатності розрізняти звуки. Інтерактивні вправи допомогли полегшити проблеми з артикуляцією слів і розвитком складової структури. Дослідження підтвердили, що діти з інтелектуальними порушеннями мають труднощі зі сприйняттям і аналізом звуків, і це пов'язано з нижчим рівнем розвитку фонематичного сприйняття. Процес формування фонематичного свідомості настільки важливий на ранніх етапах розвитку мовлення, що його порушення позначається на подальшому засвоєнні структури складу. У статті описані підходи до діагностики та корекції цих порушень, зокрема спеціальні вправи для розвитку фонематичного свідомості, артикуляційні вправи та методика навчання для корекції порушень будови звуків мови та їх складових компонентів. Отримані результати можуть бути використані для вдосконалення освітніх програм у спеціалізованих школах для дітей з інтелектуальною недостатністю. Це сприяє не лише розвитку мовних навичок, а й загальному вдосконаленню комунікативних навичок учнів. Впровадження інноваційних методів у навчальний процес забезпечує кращі результати корекційної діяльності та створює більш сприятливе середовище для дітей з особливими потребами.

Ключові слова: мовленнєва терапія; когнітивний розвиток; мультимедійні засоби; інтеграція технологій; комунікативні стратегії; складова структура; інтелектуальні порушення