

Using Digital Technologies for Formation of Oral Speech in Hearing-Impaired Pre-School Children by a Speech Therapist

Prihodko O.G.¹, Pjankova A.V.², Philatova I.A.^{2,*}

¹*Moscow City Pedagogical University, Moscow, Russian Federation*

²*Ural State Pedagogical University, Yekaterinburg, Russian Federation*

**Corresponding author. Email: filatova@uspu.me*

ABSTRACT

The article reveals theoretical foundations of formation of oral speech in hard-of-hearing preschool children, which include the study of the nature of the language and its role in human development, features of speech development in children with hearing disorders and normally hearing children, taking into account these features when teaching preschoolers with hearing impairment. The conditions, directions and stages of work on the formation of oral speech in hearing-impaired children of preschool age are disclosed. The article describes the use of digital technologies in the work on formation of oral speech in hard-of-hearing preschool children. Digital technologies can be used by speech therapists at every stage of work with hard-of-hearing preschoolers, applied in the correction and development of oral speech and its components, writing, and mental processes.

Keywords: *digital technology, hard of hearing, children of preschool age, formation of oral speech*

1. INTRODUCTION

In modern society, a person is surrounded by a huge amount of digital information. In the modern world every child is surrounded by digital devices, including televisions, computers, tablet computers, and smartphones. It is not surprising that many parents actively use various devices in their children's education or leisure activities (including cartoons, allowing them to use the Internet). Sometimes the child is not fully able to speak yet, but already actively uses a mobile device on their own, turns on the TV, microwave, etc. The child's brain adjusts to the perception of visual information, while speech development is repressed, as speech communication with the child's parents and their immediate environment is reduced. Potential communicants are actively involved in digital devices and communicate with each other less often.

Development of technologies and active use of various information devices make it necessary to use information technologies for targeted education of children, including those with hearing impairment. Information-computer technologies are actively used by the teacher-speech therapist in the work on the formation of oral speech and its components in preschool children with hearing disorders. The use of computer tools and programs, presentations, and video materials enable us to motivate preschoolers at the lesson, to maintain their interest, provide visualization of the material presented, its multiple and varied presentation, which ultimately ensures

acquisition and consolidation of formed oral speech skills, development of perception, attention, memory, and thinking.

The use of computer technologies give opportunities to make educational material available, adapt it to the structure of students' hearing impairment and taking the stage of correctional and developmental work into account, realize an individual approach to each child, and improve effectiveness of the carried out work.

2. METHODOLOGY OF THE RESEARCH

2.1. Theoretical bases of oral speech formation in hearing-impaired preschool children

The development of oral speech in children with hearing impairment is based on the use of communicative-activity system, which is aimed at the formation of speech as a means of communication. Notable contributions to this direction have been made by: S. A. Zykov, B. D. Korsunskaya, L. p. Novikova [2; 3]. Theoretical basis for the formation of oral speech of hard-of-hearing preschoolers includes the study of: the nature of language and its role in cognitive and social development of a person; originality of speech and mental development of children with hearing disorders; regularities of mastering

oral speech of preschool children with normacusis and their consideration when teaching children with hearing disorders.

In works of L. S. Vygotsky, A. N. Leontiev, and A. R. Luria, a psychological concept of child's language acquisition is revealed, according to which obtaining speech units is carried out in practice and is conditioned by the needs of communication [4]. L.P. Noskova notes while developing oral speech of hard-of-hearing preschoolers it is worth remembering the systematic structure of the language and close connection of its levels, which is reflected in their consistent assimilation. In their turn, T. V. Akhutina, I. A. Zimnyaya, A. A. Leontiev consider a language to be an activity that has a certain structure, and distinguished levels. And it is important for the formation of different types of speech activity.

The formation of oral speech of hard-of-hearing preschoolers should be based on a number of principles highlighted By L. P. Noskova [3]:

1) *genetic*, which supposes taking into account general patterns of speech development of normally hearing children at each age stage when determining the content and conditions, forms and methods of training, requirements for the state of speech of hard-of-hearing children. In working with hard-of-hearing children, it is important to take the state of prerequisites for mastering speech: sensory perception, attention to a speaker, desire to imitate speech and actions, attempts to articulate sounds and words;

2) activity principle indicates a close connection between formation of speech and practical activity, which is a necessary condition for the emergence of motives for speech communication and the need for assimilation and application of words. In preschool age, the leading activity is a game in which the child interacts with a variety of toys, examines, identifies and compares properties of objects, their relationships. This allows to fully acquire necessary speech material and use it in specific speech situations. Speech activity of hearing-impaired children is implemented in the following types: auditory-visual and auditory perception, speaking, global and analytical reading, writing, and finger-spelling; structural-semantic principle indicates that language has a system organization and its units are located according to levels and are connected to each other by certain relations (syntagmatic, paradigmatic and hierarchical). This property must be taken into account for consistent assimilation of these levels and relationships by children, which is provided by appropriate selection of speech material (words and statements) and the creation of conditions for their speech practice.

2.2. Conditions for formation of oral speech of hard-hearing children

The formation of oral speech of hearing-impaired preschoolers is a consistent and multi-faceted process. In

order to master speech by children with hearing loss it is important to constantly use it in communication. For this purpose it is necessary to implement auditory-speech environment in an educational organization and family. A child with hearing loss must constantly communicate, regardless of the degree of perception and speech production.

To create auditory-speech environment, you must form the following conditions:

- motivation of oral communication with children in the course of practical activities;
- formation of the need for oral communication of hearing-impaired children;
- encouragement and support of hearing-impaired children in the manifestation of speech activity;
- use of residual hearing by children;
- adults' monitoring of speech of hearing-impaired children;
- implementation of common requirements for adult's speech.

Speech development of a hearing-impaired child permeates all areas of his life. In routine moments and everyday situations, games and walks, the child communicates with adults and peers. Speech formation is performed according to stages. In everyday and gaming activities, conditions are created for establishing correlation of words with objects, while providing a visual basis. The properties and functions of objects are marked, and words are included in various types of utterances. In addition, children learn words and expressions related to the theme of the game, and the lexical topic of the lesson [5]. Classes are complex, and work is aimed at the formation of different forms of speech (oral, written), types of speech activity (auditory-visual and auditory perception of oral speech, speaking, reading, writing), coherent speech.

Various methods are used in the work on the formation of oral speech of hard-of-hearing preschool children: imitation of teacher's speech, didactic games, speech exercises using digital and computer technologies. Speech therapy sessions include working at development of auditory perception and correction and refinement of pronunciation skills audio-visual speech perception, the development of phonetic-phonemic, lexical and grammatical sides, the development of coherent speech, respiration, prosodic components of speech motor areas. Comprehensive correction of speech and non-speech functions of hard-of-hearing preschool children helps to increase clarity and intelligibility of their speech, which allows using it as a full-fledged means of communication.

2.3. Directions of work on formation of oral speech of hard-of-hearing children

The main goal of this work at development of oral speech of hard-of-hearing preschool children is formation of speech as a means of communication [6; 7; 8]. To achieve this goal it is necessary that children: accumulate a

vocabulary, learn the meaning of new words, understand and use various phrasal constructions, master different forms of speech and skills of coherent speech.

Formation of oral speech of hard-of-hearing preschool children is carried out *in the following areas*:

1. *The development of language ability*, which consists of readiness and ability to perceive speech, imitate the speech of others, obtain and apply new words and expressions in different communication situations. It requires a high-quality level of development of visual, auditory, tactile and vibration perception. The classes use sound-amplifying equipment, computer programs (for example, "Visible speech"), systematic work is carried out on development of phonemic processes and pronunciation in order to develop auditory and auditory-visual perception of speech, its sound and rhythmic-intonation sides. Development of visual perception is aimed at forming attention to a face, facial expressions and pantomimic of a speaker, correlating them with a speech content.

Within this direction, work is being carried out on the formation of imitation of subject and speech actions: articulation, pronunciation of babbling and full words, reflected and conjugated-reflected speaking. Children's speech activity is constantly stimulated and supported.

In the process of teaching preschool children, logopedists use various images, diagrams, pictograms, drawings, figures, as well as information technologies: presentations, programs, video and audio materials, animations.

2. *Formation of different forms of speech*. It is important to note that oral speech always acts as initial and basic at all stages of learning for hard-of-hearing children, since it is used as a dominant means of communication and is a base for formation of other forms of speech.

At the age of 2 – 3 years, oral speech is the basic and leading for hearing-impaired children. The child perceives words and phrases audibly and visually, independently reproduces words approximately, in the form of voice responses, sound combinations, and the outline of the word. The work of a speech therapist consists of formation of primary pronouncing skills, development of auditory and auditory-visual perception.

From the age of 3 to 4, the global perception of words presented in printed form on tablets or on the screen of a monitor, their correlation with objects and phenomena of the surrounding world, is applied. The written form of speech is used as an auxiliary, and helps to record accurately what is said and prepares for subsequent analysis of the word.

At 5 – 6 years old, oral speech is actively used in the perception and production of speech material, written speech is used as analytical reading and writing in block letters.

Due to the difficulties of auditory perception of the sounding speech stream, written speech is used in parallel [5]. It is an addition to the spoken language for accurate perception and reproduction of spoken speech. Written speech includes the formation of: global and analytical reading, independent writing in block letters. When

working with hard-of-hearing preschoolers, the oral-dactylic form of speech is not used.

3. *Development of vocabulary* includes work on the gaining new words, clarifying their meanings and their practical application in various speech situations. This work is carried out in accordance with the educational program in the framework of various lexical topics and is included in the following types of speech activity: speaking, auditory-visual perception, global and analytical reading, and writing. Studied words are included in phrases that are different in structure, according to the age of hearing-impaired children and the stage of learning. Including words in various contexts gives an opportunity to expand sphere of using a word, clarify its meaning and differentiate from others, enables children to learn all types of connections between words in practice.

4. *Special language observations* that are aimed at clarifying meanings of words, gaining sound-letter structure of words, their grammatical form in the structure of sentences. Preschool children are taught to hear and determine the sound composition of words, to notice grammatical forms of words and their similarities, to use them, to clarify the meaning of cognate words, words that are close and opposite in meaning.

The mentioned directions are realized simultaneously, speech material is differentiated in accordance with the age and stage of training of hearing-impaired children of preschool age.

3. RESULTS OF THE RESEARCH

3.1. Stages of work on the formation of oral speech in hard of hearing children

Working at formation of oral speech in hearing-impaired children of preschool age, various information technologies and computer programs are used to improve effectiveness of the educational process.

The work is carried out in stages, taking into account the age and level of speech development. At each stage, a speech therapist uses various information technologies and computer programs to improve effectiveness of educational process.

L. P. Noskova identifies the following general stages in formation of oral speech in hard of hearing preschoolers:

The first stage (from the beginning of training to 4 years) is aimed at a holistic perception of speech by hard-of-hearing preschoolers, supported by global reading. The main types of speech activity at this stage are: listening, auditory-visual perception of words and phrases, global reading of the presented material. When reading globally, children's attention is focused on integral composition of words, their length, rather than on individual letters and sounds, and their meaning is clarified. In independent speech, a speech therapist encourages preschoolers to approximate, complete reproduction of words and phrases. Learning to write in block letters begins, which is in the

nature of rewriting. At this stage, methods based on imitation are used: didactic games, during which hearing-impaired preschoolers conjugate or conjugate-reflect words and phrases, and learn to distinguish them.

The second stage (from 4 to 6 years) involves gradual transition from a holistic perception of speech material to its analysis. Attention is paid to individual sounds and letters, the sound composition of words is clarified, and as a result, the quality of pronunciation increases. The transition from global reading to analytical-synthetic reading is implemented, using syllable-by-syllable reading and working with split alphabet.

The third stage (from 6 to 7 years) is aimed at deep analysis of perceived and reproduced speech. The work is carried out to correct sound pronunciation, clarify the sound-syllabic structure, forms, and meanings of words when they are perceived and produced. There carried out work at formation of all components of oral speech, analytical and conscious reading skills.

3.2. Inclusion of digital technologies in the work on the formation of oral speech in hard of hearing preschool children

In working with hard-of-hearing preschoolers, a speech therapist actively uses various computer technologies and teaching tools to improve effectiveness of the educational process [1]. They are not the dominant methods, but only additional ones at a certain stage of the lesson.

Work at development of oral speech of hard-of-hearing preschoolers is extremely important, since without training auditory perception and in the absence of work at speech, the child's auditory and speech capabilities are reduced until they are completely lost. Therefore, technical means must be used to train residual hearing and develop speech skills.

Information technologies allow a specialist to vary volume of speech material playback, change audio signals frequency, which helps to increase availability of training and increase socialization of hard-of-hearing preschoolers [9]. It is also possible to present a visual image and audio accompaniment of the studied object simultaneously or phenomenon, supplemented by a text commentary.

When studying new material, it is necessary to form a full-fledged idea of the subject under study, its characteristics, properties (for example, the lexical topic "Wintering birds"). Using visual material not only in pictures by presenting a layout, feathers but also when using a presentation with images of different types of birds, video and audio files that depict birds in motion, their singing assist it this process.

The use of computer technology helps to compare different items to find similarities and differences, to draw an analogy.

When working at a phrase and developing coherent speech, sentence diagrams and reference images are used to compose and produce speech material. With the help of visual objects it becomes possible to teach hearing-

impaired preschoolers the algorithm for constructing a speech utterance, to stimulate their speech activity, taking into account the state of emotional and volitional sphere and interests of a child [10; 11].

Correction of sound reproduction can be accompanied by presenting sound profiles, animation of their correct articulation, pictures for fixing a sound in all positions, speech material for automating and differentiating sounds. Work at developing phonemic hearing and sound analysis skills can be accompanied by computer programs. A child relates a heard sound to an object, while it is possible to change the frequency and strength of the presented sound, to make schemes of words, to relate sounds to letters. The use of sound-amplifying equipment to increase the volume of spoken sounds, words, phrases by a speech therapist gives an opportunity to achieve a necessary level of a child's available volume of perception of the material. The speech therapist can use the program "Visible speech", which provides additional information about the main acoustic components of speech due to their visual representation. This resource can be used with children starting from senior preschool age. The program can be actively used when working at rhythmic-intonation side of speech, speech breathing, voice, tempo, rhythm of speech, verbal and logical stress, sound reproduction. The program allows you to clearly demonstrate the main characteristics of perceived and reproduced speech material, respectively, helps to clarify their main characteristics. In addition, the program encourages a child to bring his/her speech production closer to a sample, to control their own speech.

In the work at formation and correction of written speech, the program "Sea of language art" can be used. It presents tasks of different levels of complexity in accordance with various learning tasks: making letters from elements, copying, inserting missing letters, choosing the right letter in paronyms, writing letters, words, and sentences. At the same time, the program encourage to work at correcting phonemic processes, sound analysis skills, to clarify grammatical form of words, word matching, and to work at the structure of sentences and a text.

Computer technologies and programs can be used at different stages of training: surveys, skills formation, and skill-automation. Some programs calculate the number of correctly completed tasks independently, the number of errors and their nature, select the level of complexity, and form a schedule of preschool children's achievements on this basis. This allows a speech therapist to assess the dynamics of correctional work of each student objectively. Computer technologies give an option of creating an electronic card for each student, to track existing difficulties and select appropriate tasks for their elimination.

Digital technologies contribute to implementation of the person-centered approach, which is manifested in variation of volume of proposed material, its numerous repetitions, and variety of forms of presentation.

Computer resources enable speech therapists to create their own didactic material, taking requirements of the program, the level of development of auditory perception

and speech of preschoolers, their individual characteristics and capabilities into account. At the same time, the volume of didactic material and its complexity vary. For development of visual perception and attention, you can create noisy images, images that are absurd; memory- task "What has disappeared?", visual-effective and verbal-logical thinking (analogies, exceptions) and other mental processes.

4. CONCLUSION

The results show that the use of digital technologies significantly increases interest in classes, the level of cognitive capabilities of hearing-impaired children of preschool age. Implementation of innovative methods for explaining and gaining the studied material in a game form increases active and involuntary attention; increases stability of the developed skills. Presenting material in a visual, diverse form using presentations, video files, animation enables one to present the subject more accurately and variably. Bright performance allows you to attach necessary knowledge in the memory of a preschooler quickly.

Using computer programs and presentations can interest preschoolers, improve their quality of learning, and implement a differentiated approach to children with

Digital technologies open the way for speech therapists to select and create the necessary material in the classroom, affecting all components of speech and other mental processes of hard-of-hearing preschool children, which increases effectiveness of correctional and developmental work.

different levels of speech development. In the course of work, children are more motivated to study and use oral speech, and their attention, performance, and productivity are maintained throughout the class.

The use of Computer programs helps a speech therapist to systematize the material, work at all components of speech of a hearing-impaired preschool child, differentiate tasks by level of complexity and vary them directly in the classroom, depending on the successful or unsuccessful performance of their students.

The use of digital technologies allows a speech therapists to structure speech material, create necessary visibility for the lesson, present the necessary material in a visual form, and monitor the formation of necessary skills of hearing-impaired preschool children.

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