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DEVELOPMENT OF SPEECH IN CHILDREN WITH HEARING IMPAIRMENTS ON THE BASIS OF INNOVATIVE TECHNOLOGIES

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Abstract:
This article examines the issues of using innovative technologies in the development of speech in children with hearing impairments. The work analyzes the effectiveness of audio-visual aids, computer programs, mobile applications and speech therapy technologies. The results of the study show that the use of innovative technologies in addition to traditional methods has a positive effect on the development of speech in children with hearing impairments

Keywords: hearing impairment, innovative technologies, cochlear implant, audio-visual aids, special education

Today, the increase in the number of children with hearing impairments has become an important social and pedagogical problem around the world. According to the World Health Organization, 34 million children in the world have severe hearing loss. This problem is also relevant in Uzbekistan: the number of children born with hearing loss or who acquire this defect in the first years of life is increasing every year.

Hearing loss directly affects speech development. Children with hearing loss cannot fully perceive speech sounds, so it is very difficult for them to master oral speech. This situation significantly complicates the child's adaptation to social life, education and personal development.

Although traditional speech therapy and deaf-mutist methods have proven their effectiveness, the rapid development of technology is creating new opportunities. Cochlear implants, speech and speech processing programs, applications based on artificial intelligence and virtual environments have the potential to provide more effective assistance to children with hearing loss.

Also, early diagnosis and development of individual educational programs are of great importance when working with children with hearing impairments. Especially if hearing problems identified in early childhood are eliminated through a prompt and systematic approach, the level of speech and cognitive development of the child will significantly improve. In this regard, cooperation between parents and specialists, as well as the integration of medical and pedagogical services, is an important factor.

In addition, the development of an inclusive education system also plays an important role in solving this problem. The involvement of children with hearing impairments in general education institutions and the provision of education programs adapted for them will be ensured. This will not only expand their educational opportunities, but also help accelerate the process of social development.

At the same time, the formation of skills in the effective use of modern technologies is becoming an urgent issue for educators and speech therapists. For example, mobile applications that allow recognizing and analyzing speech, interactive games and multimedia tools will help to organize the process of speech development in children in an interesting and effective way. Systems based on artificial intelligence are important in that they analyze the individual characteristics of the child and recommend appropriate activities for him.

We know that hearing is of decisive importance in the process of mastering speech. A child learns speech primarily by hearing: listening to what others say, imitating them, and gradually forming his own speech. Therefore, a child with reduced or completely lost hearing faces serious difficulties in speech development.

The science of deaf education divides hearing loss into four levels:

Level I - mild (26–40 dB);
Level II - moderate (41–55 dB);
Level III - severe (56–70 dB);
Level IV - very severe (71 dB and above).

The more severe the hearing loss, the more severe the problems with speech development. Children with severe hearing loss have almost no oral speech and often resort to sign language or written communication.

However, modern medicine and technology have made it possible to significantly alleviate this problem.

Types of Innovative Technologies:

Cochlear Implants

A cochlear implant is a medical device that sends electrical signals directly to the brain through the auditory nerve. This technology allows children with severe to profound hearing loss to perceive speech sounds. Studies have shown that a

cochlear implant implanted at an early age (2–3 years) significantly improves a child's speech. For example, in a study by Nicosia (2018), 80% of children with a cochlear implant were able to master spoken speech at a normal developmental rate.

Innovative technologies cannot completely replace traditional speech therapy, but they significantly enrich it. Specialists are using these technologies in the following areas:

At the diagnostic stage: Computer audiometric tests and speech analysis programs make it easier to identify specific problem areas in a child.

At the training stage: Interactive programs and applications increase the child's interest and make the training process interesting and effective. The child can perform any exercise in the form of a game on a computer or tablet, while the specialist monitors it.

At the control stage: With the help of technologies, it is possible to monitor the dynamics of a child's speech development and display the results obtained in a graphical form.

Speech is one of the most important mental functions that ensure human social activity, and its formation is based on complex psychophysiological processes. The auditory analyzer plays a leading role in speech development, since the child first of all learns speech through hearing: he listens to the speech of others, repeats them and gradually forms independent speech. Therefore, any violation of hearing directly affects speech development. As Lev Vygotsky noted, the formation of speech is closely related to the social environment and activity, and in children with hearing impairments this process occurs in a unique way. The slow development of speech in children with hearing impairments is explained by a number of factors. First of all, they cannot fully and clearly perceive speech sounds, which leads to insufficient formation of phonemic hearing. As a result, errors occur in the articulation process, the lexical reserve is limited, and grammatical structures are not fully formed. According to the scientific views of Alexander Luria, speech activity is the result of a complex integration of brain systems, therefore, hearing impairment also negatively affects the general cognitive development of the child. In the practice of deaf education, the degree of hearing impairment is an important criterion for determining the degree of impact on speech development. With a mild degree of hearing impairment, the child can partially perceive speech and has the opportunity to form oral speech through special training. At a moderate level, phonemic separation becomes difficult, and pronunciation disorders increase. At severe and very severe levels, natural speech acquisition is almost impossible, and in this case, alternative means of communication play an important role. The role of innovative technologies in the development of modern deaf education is invaluable. In particular, cochlear implantation has opened up new opportunities for children with severe hearing impairment. This technology transmits sound signals to the brain by directly stimulating the auditory nerve and serves to restore the child's ability to perceive sounds. This process is explained by the phenomenon of neuroplasticity, that is, the brain adapts to new conditions and learns to process auditory information. Implantation, especially at an early age, leads to accelerated speech development.

At the same time, multimedia and digital technologies significantly improve the process of speech development. With the help of audio-visual aids, the child not only hears the sound, but also perceives it visually. For example, showing the articulation process through animations, depicting sounds in graphic form, organizing classes through interactive games increases the child's interest and activates the learning process. This approach is based on the principle of multimodal education, using several analyzers at the same time. In recent years, technologies based on artificial intelligence have also been rapidly entering speech therapy and surdopedagogical practice. Such systems analyze the child's speech, identify errors, monitor the dynamics of development and offer an individual training program. This allows for an individual approach to each child. In particular, with the help of mobile applications, children have the opportunity to conduct independent training at home, which ensures the continuity of corrective work.

The introduction of innovative technologies into practice is carried out on the basis of a certain methodological system. Initially, at the diagnostic stage, the child's hearing and speech status is determined using modern technical means. At the next stage, speech development is carried out through interactive exercises. At the final stage, the results are monitored and the dynamics of the child's development are analyzed. Such a systematic approach increases the effectiveness of the pedagogical process. At the same time, there are certain problems in the use of innovative technologies. In particular, the lack of technical means, their high cost, and the insufficient formation of knowledge and skills of teachers in modern technologies complicate this process. However, by gradually eliminating these problems, it is possible to widely introduce innovative technologies.

In general, innovative technologies are taking the process of speech development of children with hearing impairments to a qualitatively new level. They are an important factor not only in the formation of speech, but also in the development of the child's socialization, independent thinking, and communicative competencies.

At the same time, there are, of course, a number of problems in the use of technologies. These include the high cost of devices, insufficient technological literacy of teachers and parents, and weak technical infrastructure in special educational institutions.

In conclusion, the role of innovative technologies in the development of speech in children with hearing impairments is increasingly increasing. Cochlear implants, speech synthesizer programs, mobile applications, artificial intelligence and virtual reality technologies enrich traditional surdopedagogical methods with new levels and opportunities.

For the effective use of these technologies, the following is necessary:

- Training teachers and specialists in modern technologies;
- Providing educational institutions with the necessary technical equipment;

- Training parents to use these technologies;
- Selecting technologies with an individual approach to each child.

Innovative technologies create new hearing and speech opportunities for children with hearing impairments, paving the way for their full integration into society. This has a positive effect not only on the child's speech, but also on their social and personal development.

LIST OF USED LITERATURE

1. Vlasova T.A., Pevzner M.S. Eshitishida kamchiligi bo‘lgan bolalar haqida. — Moskva: Prosveshenie, 1973.
2. Boskis R.M. Eshitishida nuqsoni bo‘lgan bolalarga o‘qitish. — Moskva: Prosveshenie, 1988.
3. Leonhard E.I. Eshitishida nuqsoni bo‘lgan bolalarda nutqni rivojlantirish metodikasi. — Moskva, 1991.
4. Nikol’skaya I.A. Surdopedagogika: darslik. — Moskva: Akademiya, 2010.
5. Morozov V.P. Nutq kommunikatsiyasining akustik asoslari. — Sankt-Peterburg: Nauka, 2006.
6. Zaytseva G.L. Zamonaviy surdopedagogika: muammolar va yechimlar. — Moskva: Defektologiya, 2009.
7. Pelymskaya T.V., Shakhovskaya N.D. Eshitish nuqsoni bo‘lgan kichik yoshdagi bolalarda nutqni shakllantirish. — Moskva, 2003.
8. Koroleva I.V. Kochlear implantatsiya va eshitishida qiyin bolalar. — Sankt-Peterburg: Karo, 2012.
9. Rulenkov M.O. Innovatsion texnologiyalar surdopedagogika amaliyotida // Maxsus ta’lim jurnali. — 2019. — №3. — B. 45–52.
10. Muminova L.R. O‘zbekistonda maxsus ta’limning rivojlanish tendensiyalari. — Toshkent: Fan, 2020.