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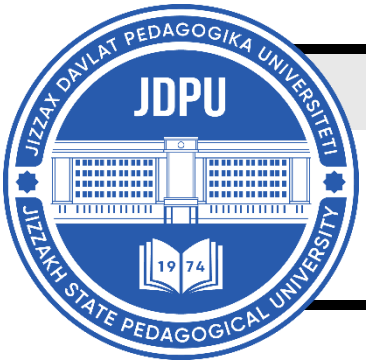

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THE IMPACT OF THE INNOVATIVE DEVICE 'MOTION CONTROL XR' ON THE EFFECTIVENESS OF LESSONS FOR DEAF AND HARD-OF-HEARING STUDENTS

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ABOUT ARTICLE

Key words: Motion Control XR" device, preparation, training, deaf and hard-of-hearing, motor density.

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Abstract: This article presents the impact of the innovative 'Motion Control XR' device on the effectiveness of lessons for deaf and hard-of-hearing students, as well as its analysis.

Introduction. At the global level, improving the physical preparedness of students with hearing impairments remains one of the most important and pressing issues of today. Among these students, the insufficient development of motor coordination and difficulties in maintaining balance often lead to a decrease in their level of physical activity.

Through the use of specialized exercises and methods, enhancing the physical preparedness of students with hearing impairments not only improves their overall physical health but also facilitates their adaptation to the social environment.

Due to the functional limitations of the auditory organs, these students are often unable to fully participate in many types of sports and physical activities. Therefore, conducting scientific research and developing methodologies aimed at improving the physical preparedness of this category of students through specialized exercises has become an urgent and highly relevant task in the modern era.

literature analysis and methodology. At the level of our republic, modern theoretically and practically scientifically based methods are being developed and widely applied in practice to improve adaptive physical education, the physical preparedness of persons with hearing impairments, sports training, and the acceleration of their socialization. All research conducted in this direction is aimed at improving students' physical preparedness, and scholars R.S. Salomov, N.K. Svetlichnaya, M.Kh. Mirjamolov, L.B. Sobirova, Sh.A. Abdiyev, M.A. Ibragimov, and Sh.Z. Rajapov, in their scientific and methodological works, have revealed the methodology of optimizing and planning athletes' training and have given various suggestions.

The purpose of the research: to increase the general and motor density during physical education classes for students with hearing impairments.

Research methods: analysis of scientific and methodological literature, pedagogical observation, chronometry, and mathematical statistical methods.

During the work, the following tasks were solved:

To determine the general and motor density during physical education classes for children with hearing impairments.

To study the impact of the "Motion Control XR" device on the general and motor density of physical education classes for deaf and hard-of-hearing children.

In order to determine the general and motor density of physical education classes for hearing-impaired students, chronometry was carried out. Chronometry in physical education lessons is conducted to determine the general and motor density of the lesson.

The general density of the lesson is defined as the ratio of the time used correctly from a pedagogical point of view to the entire duration of the lesson.

The motor density of the lesson refers to the time spent directly on students' motor activity and performing exercises.

The data obtained from chronometry deepens the pedagogical analysis of the lesson to a certain extent, as it makes it possible to rationally use the time spent on different types of activities.

Before the lesson begins, the examiner must record in the chronometry protocol the objectives of the lesson and the time allocated to different sections or parts of the lesson. For this purpose, the examiner must familiarize himself with the teacher's lesson plan.

In order to ensure the continuity of the training process and the efficient use of the allocated time, it became necessary to apply the "Motion Control XR" technological device developed by us during the research process.

To describe the “Motion Control XR” device more specifically: it is designed for students with hearing impairments to be used in the educational process. Its main function is to control the exercise process by transmitting vibration signals.

This device consists of the following main components:

Mobile application: This component functions to transmit commands from the teacher to the watch device during the training session.

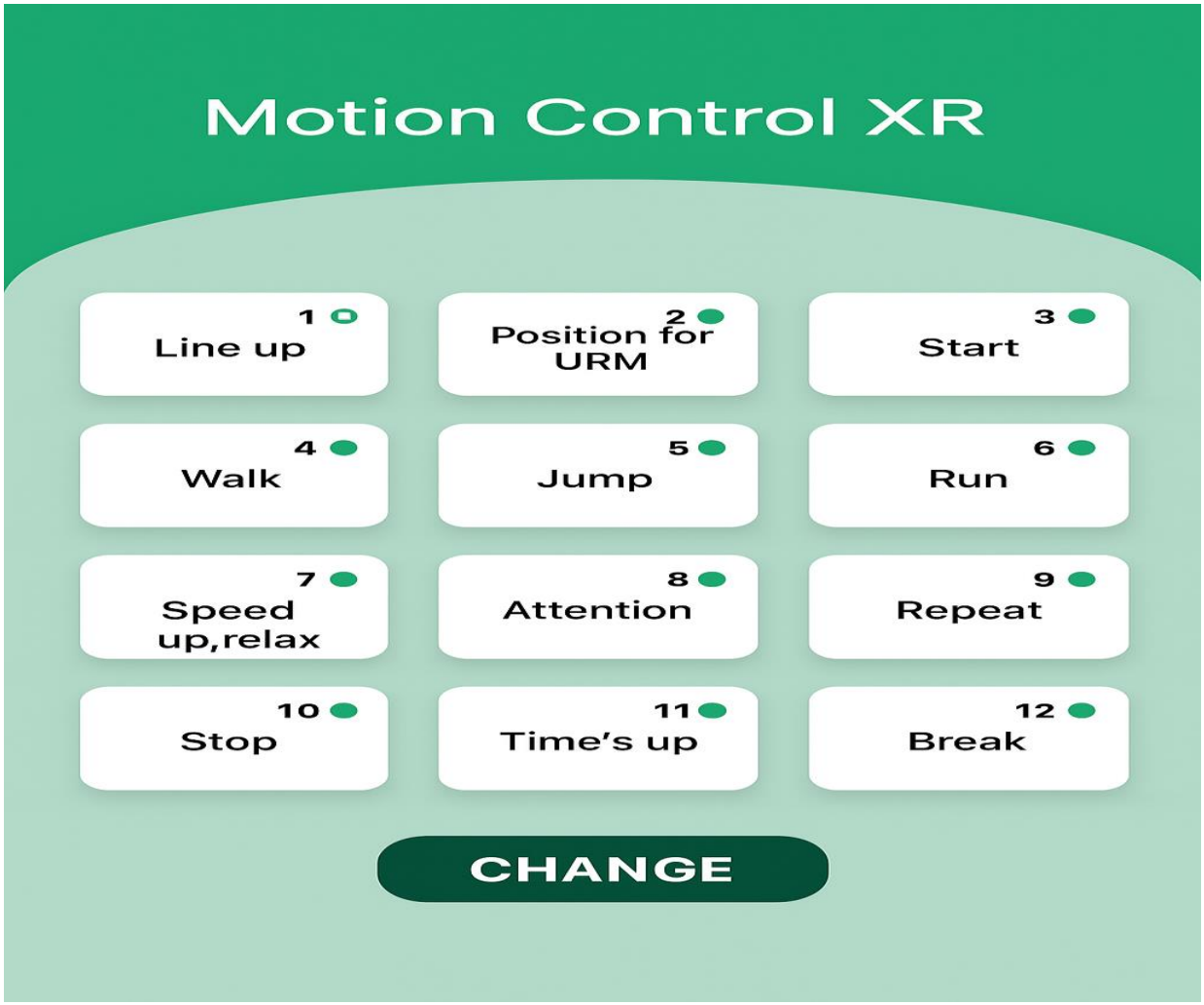

Figure 1. “Motion Control XR” mobile application.

This mobile application is actively used in twelve educational training sessions and simultaneously serves as a means of communication between the teacher and students during the lesson process. As shown in the presented image, each numerical command corresponds to a specific action. This makes it possible to transmit instructions quickly and ensure mutual understanding even in situations where hearing is not possible.

We will examine below how the vibrations are distinguished for each command:

1. For the “Line up” command – 1 short and 1 long (• —)

2. For the “Take position for general developmental exercises (URM)” command – 1 long and 3 short (▬ ● ● ●)

3. For the “Start” command – 1 short (●)

4. For the “Walk” command – 2 long and 1 short (▬ ▬ ●)

5. For the “Accelerate, don’t relax” command – 2 short and 1 long (● ● ▬)

6. For the “Run” command – 2 short (● ●)

7. For the “Jump” command – 2 long (▬ ▬)

8. For the “Attention” command – 3 long (▬ ▬ ▬)

9. For the “Repeat” command – 3 short (● ● ●)

10. For the “Stop” command – 1 long (▬)

11. For the “Time is over” command – 1 short and 2 long (● ▬ ▬)

12. For the “Break” command (during training, when moving from one exercise to another) – 1 long, 2 short, and 1 long (▬ ● ● ▬)

Vibration-emitting watch: It is worn on the students’ wrists and is used as a device for receiving vibrations. The display mainly shows the power indicator. The green color indicates that there is power, the red color indicates that the power level has decreased, and the yellow color indicates that the power is completely depleted and the device will soon turn off.

Figure 2. Vibration watch of the “Motion Control XR” device

Wireless connection system: It ensures the independent and convenient operation of the device. It connects via Bluetooth and has the ability to transmit signals to 12 watches simultaneously. In addition, it functions as the central unit (“brain”) of the system and, through

the red button, can send vibration signals to the watches even without using the mobile application.

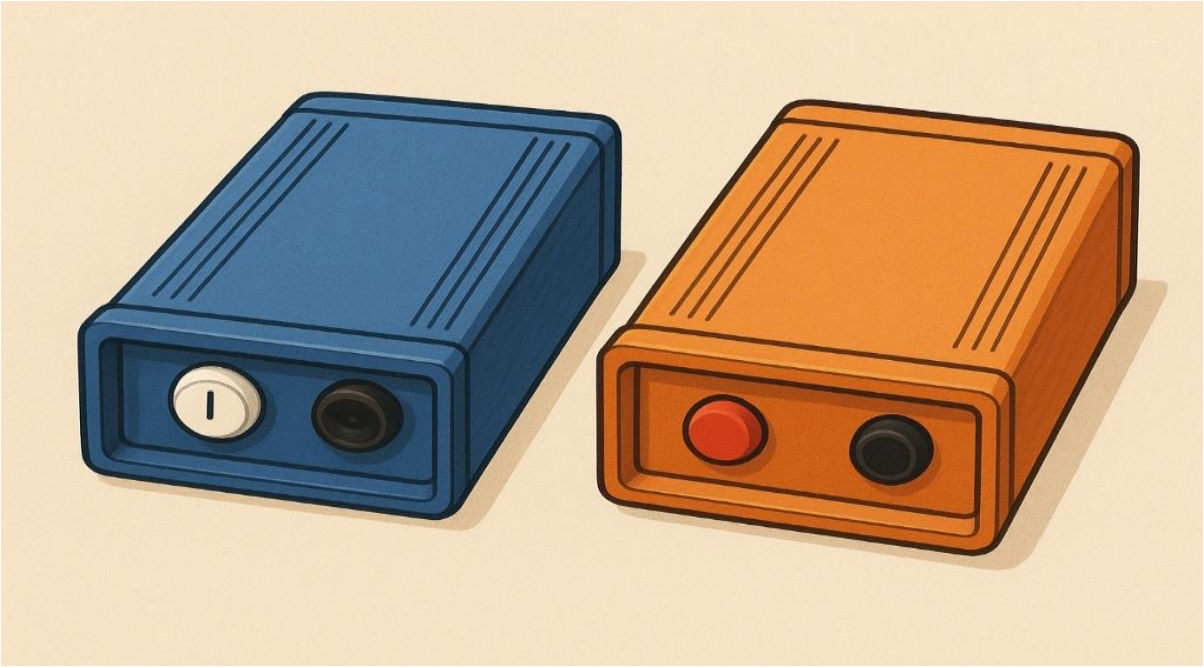

Figure 3. Central unit (“brain”) of the “Motion Control XR” device

The technical capabilities of the device make it possible for students to receive signals accurately and promptly, which significantly simplifies communication during physical education classes. Organizing training sessions using this device becomes more convenient and efficient.

Moreover, signal-based control enhances safety and creates a more comfortable environment for students. Managing exercises through vibration signals represents an innovative pedagogical approach. The device improves the overall quality of the lesson and increases student engagement. During training sessions, controlling movements through signals helps reduce the risk of injuries.

Results and discussion. Based on this, the general and motor density of 45-minute lessons was determined through chronometric analysis conducted before and after the development of this technological device. Chronometry was carried out for both the control and experimental groups. At the end of the study, the results of both groups were analyzed.

Table 1

Chronometric analysis of the control and experimental groups

Group	Beginning of the study		End of the study	
	EG	CG	EG	CG
General density	77,5%	80,7%	85,5%	79 %

Motor density	38 %	40 %	56,6 %	42,4 %

As can be seen from this table, the conducted experiment — the use of the “Motion Control XR” technological device — proved to be highly effective in ensuring the efficient use of the allocated time. For deaf and hard-of-hearing children, achieving a high percentage of motor density during physical education lessons is generally more challenging. Their inability to hear creates difficulties in receiving and executing instructions in a timely manner.

For this reason, we developed and implemented the “Motion Control XR” technological device in practice. This innovation enabled students to perceive instructions more quickly during the lesson, which in turn increased the efficiency of time use.

Conclusions. In conclusion, the use of the “Motion Control XR” technological device ensured the efficient distribution of lesson time, enhanced students’ focus on performing exercises, and simplified the management of the lesson process.

The significant improvement in the level of efficient time use in the experimental group compared to the control group is regarded as the result of the methodologies and modern approaches developed and implemented by us.

References:

1. Egamberdieva, B., Ishtayev, J., Korobeynikov, G., Khasanov, O., Gapparov, Z., Xursanova, R., ... & Juraev, I. (2025). Brilliant moves in chess and early grandmaster success: a study of the world's youngest grandmasters. Slobozhanskyi Herald of Science and Sport, 29(2), 151-166.

2. Xursanova, R. (2023). Adaptiv jismoniy tarbiya nazariyasi va uslubiyati. Sport ilm-fanining dolzarb muammolari, 1(3), 118-121.

3. Nuriddinova, M., Bobomurodov, A., Kenjayeva, H., & Xursanova, R. (2022). Maktabgacha yoshdagi bolalarni asosiy harakatlarga o ‘rgatish uslubiyati. Central Asian Research Journal for Interdisciplinary Studies (CARJIS), 2(2), 373-384.

4. Khursanova, R. (2024). THE ROLE AND IMPORTANCE OF THE PRINCIPLE OF CONTINUITY IN IMPROVING THE SPEED ABILITY OF 12-14-YEAR-OLD HEARING AND SPEECH IMPAIRED CHILDREN. Mental Enlightenment Scientific-Methodological Journal, 5(01), 229-235.

5. XURSANOVA, R. (2024). ESHITISHIDA MUOMMOSI BO‘LGAN O‘QUVCHILARNING JISMONIY TAYYORGARLIGINI ANIQLASH VA TAHLIL QILISH.«. ACTA NUUz, 1(1.6), 1.

6. Ma’murbekova, G., & Akramaliyeva, N. (2024). YOSH BASKETBOLCHICHILARDA KUCH SIFATINI RIVOJLANTIRISH USLUBYATI. Modern Science and Research, 3(12), 1391-1394.

7. Mamadaliyev, S. (2024). THE CURRENT STATE OF SPORTS AND WELLNESS MOUNTAIN TOURISM IN UZBEKISTAN AND MEASURES FOR ITS MASS DEVELOPMENT. Multidisciplinary Journal of Science and Technology, 4(12), 44-48.

8. Po‘latov, L. A. (2025). TALABALARNING O‘ZIGA XOS XUSUSIYATLARINI SHAKLLANTIRISHDA ZAMONAVIY TEXNOLOGIYALARNING AHAMIYATI. Modern Science and Research, 4(1), 1242-1250.

9. Bakiev, Z. A., Davidov, B. B., & Fayzullayev, T. S. (2022). THE SIGNIFICANCE OF MARKETING OF SOCIAL SERVICES IN THE STABLE ECONOMIC AND POLITICAL PATH OF UZBEKISTAN. In Актуальные проблемы физического воспитания студентов (pp. 356-358).

10. Ibragimov M.A. - Imkoniyati cheklangan shaxslarga Yunon-rum kurashini o‘rgatishning optimal nisbatlari \\ pedagogika fanlari bo‘yicha falsafa doktori.diss…, OAK O‘z.Res. Chirchiq. O‘zDJTSU. 2024-100 b.

11. Lieberman, Lauren Joy. The Effect of Trained Hearing Peer Tutors on the Physical Activity Levels of Deaf Students in Inclusive Elementary Physical Education Classes // for the degree of Doctor of Philosophy in Human Performance presented on August 14. 1995. 143. pp.

12. SARAH SOMERSET. - Investigating the experiences of deaf or hard of hearing children participating in Sport // Thesis submitted to the University of Nottingham for the degree of Doctor of Philosophy. 28th June 2018. – 311. pp