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INNOVATIONS IN THE METHODS OF TEACHING PHYSICAL EDUCATION IN UKRAINIAN UNIVERSITIES: CURRENT STATE AND CHALLENGES

INOVAÇÕES NOS MÉTODOS DE ENSINO DE EDUCAÇÃO FÍSICA EM UNIVERSIDADES UCRANIANAS: SITUAÇÃO ATUAL E DESAFIOS

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ABSTRACT

In the modern educational space, innovations play an important role in optimising education. Accordingly, the aim of the study is to classify the chief innovative solutions in physical education and to describe their opportunities and challenges. For this purpose, the concept of descriptive research was used. The main research tools are questionnaires and observations. The participants of the study are students and teachers of higher education institutions (30 people in total). A purposive sample was used to involve them, which involved the deliberate selection of participants according to specific criteria (ability to understand modern technologies, experience of their use). Observation was conducted during lectures and practical classes. The data obtained were categorised and analysed comparatively. The results indicate that yoga, Nordic walks, pump aerobics, fitness aerobics, step aerobics and martial arts are important elements in modern digital learning. The integration of such areas improves the physical fitness of students. An important role is also played by the use of modern technologies: digital, multimedia, interactive, virtual and augmented reality, which contribute to the interest of students in the learning process. The conclusions summarise that despite their potential, the implementation of these technologies faces a number of difficulties: insufficient material and technical base, lack of qualifications, and the fact that some technologies are superficially used.

Keywords: Pedagogical Technologies, Teaching Methods, Educational Innovations, Physical Education, Professional Training.

RESUMO

No espaço educacional moderno, as inovações desempenham um papel importante na otimização da educação. Dessa forma, o objetivo do estudo é classificar as principais soluções inovadoras em educação física e descrever suas oportunidades e desafios. Para isso, foi utilizado o conceito de pesquisa descritiva. As principais ferramentas de pesquisa são questionários e observações. Os participantes do estudo são alunos e professores de instituições de ensino superior (30 pessoas no total). Foi usada uma amostra intencional para envolvê-los, o que envolveu a seleção deliberada de participantes de acordo com critérios específicos (capacidade de entender tecnologias modernas, experiência de uso). A observação foi realizada durante as aulas teóricas e práticas. Os dados obtidos foram categorizados e analisados comparativamente. Os resultados indicam que ioga, caminhadas nórdicas, aeróbica com bomba, aeróbica de condicionamento físico, aeróbica com step e artes marciais são elementos importantes no aprendizado digital moderno. A integração dessas áreas melhora o condicionamento físico dos alunos. Um papel importante também é desempenhado pelo uso de tecnologias modernas: digital, multimídia, interativa, realidade virtual e aumentada, que contribuem para o interesse dos alunos no processo de aprendizagem. As conclusões resumem que, apesar de seu potencial, a implementação dessas tecnologias enfrenta uma série de dificuldades: material e base técnica insuficientes, falta de qualificações e o fato de que algumas tecnologias são usadas superficialmente.

Palavras-chave: Tecnologias pedagógicas, Métodos de ensino, Inovações educacionais, Educação Física, Treinamento profissional.

Introduction

The modern development of society requires improving the teacher education system through the conditions of a socially oriented economy and Ukraine's integration into the European educational community. For this reason, innovative professional education necessitates radically rethinking educational methods and tasks, updating education content, and forming a stable and effective project and life space. All of these innovations aim to develop a competitive, competent person who can creatively approach complex tasks and strives to use the skills they have acquired to the fullest. Physical culture and sports have always played an essential role in developing and contributing to forming a healthy lifestyle and developing physical, moral, and ethical qualities (PATHAK, 2022). As a result of the above changes in the socio-economic space and the rapid development of modern technologies, there is an urgent need to adapt physical education teaching methods to new realities.

In the context of globalisation and the intensification of the educational process, Ukrainian higher education institutions are faced with introducing innovative approaches to physical education. Therefore, innovations in physical education teaching methods are becoming essential tools for improving the quality of the educational process. The introduction of new technologies and pedagogical approaches raises several challenges. Modern scholars emphasise such aspects as the need to train qualified teachers and adapt curricula to meet the demands of the times.

For this reason, a significant research problem arises, which is to identify the key obstacles that hinder the implementation of innovations in the teaching of physical education, as well as to find ways to overcome them, taking into account the realities of the Ukrainian higher education system. Integrating digital technologies and gamification into physical education significantly improves student engagement and class satisfaction. However, many higher education institutions continue to use traditional methods that often need to meet innovative standards in teaching physical education. Despite the significant progress in

developing innovative methods of teaching physical education, several issues still need to be solved in current research. In particular, there needs to be more attention to the analysis of the introduction of innovative teaching methods, digital technologies, and integrative tools. Therefore, systematically introducing digital technologies and interactive methods into the education system requires a detailed scientific understanding.

The study aims to analyse the main possibilities of innovative approaches in physical education teaching methods and outline the key challenges for their use. Accordingly, the research questions are as follows:

1. What modern physical education methods are already being implemented in Ukrainian universities?
2. What innovative technologies help to support physical culture?
3. What are the challenges that limit the use of innovation?
4. What promising measures can influence the effective implementation of innovative approaches in physical education?

Literature Review

Implementation of New Forms of Training in the Context of Opportunities and Challenges

Given the considerable attention of scientists to the issue of changes in the teaching of physical culture and sports, several significant trends in the system of studying modern innovative technologies are noticeable. In particular, an important area is using digital learning technologies and forms of distance education (POTAPCHUK et al., 2023; DZHYM et al., 2023). Modern scientists have noted that this form of education in the physical education system contributes to a decrease in the level of physical activity and causes a deterioration in physical health and fitness (MYRONENKO et al., 2022; MYTIANENKO & ANASTASOVA, 2022). According to the results of modern scientists, in the conditions of the distance form of organisation of the educational process, one of the complex problems was the introduction of communication processes based on student-teacher (ISKAKOVA, 2024). Therefore,

physical culture is perhaps the only practical discipline, so the lack of live communication and the organisation of classes through digital distance systems has led to significant changes in the conduct of classes and the testing and monitoring of student performance. Some scholars point out that using modern remote resources requires the availability of appropriate competencies and skills (BIELIKOV, 2022; GONZÁLEZ-CALVO et al., 2019; IVASHCHENKO et al., 2020).

According to BAENA-MORALES et al. (2021), health and physical fitness must be monitored in the system of sustainable development of physical education. In addition, the results of CORBIN (2020) indicate the importance of forming an adequate level of motivation in students to engage in physical activity.

At the same time, several scientific works point to the importance of digital learning in the physical education system (NAUMCHUK et al., 2020). For this reason, the authors point to significant examples of fitness trainers who actively use online training (CAPELLA-PERIS et al., 2020; GOLOD et al., 2022). Nevertheless, scientific studies discuss the weaknesses of digital learning in detail, including the lack of live communication, lack of modern technical equipment, and limited space for indoor training.

Use of Modern Technologies in the Training System

Modern authors have also pointed to a number of modern innovative technologies that contribute to physical education. In particular, an important technology is the use of lecture visualisations, which contributes to transforming oral information into a visual form with the help of various technical means of teaching (ATAMANYUK et al., 2021). This form of lecture involves the introduction of a mechanism for transcoding textual information into graphic information. This type of lecture is a consequence of the new use of the principle of visibility (ATAMANYUK et al., 2021). At the same time, as presented by MOHAMED MOKMIN and RIDZUAN (2022), an important innovation is the use of immersive technologies and artificial intelligence in the physical education system. BOBRO (2024) also pointed out the possibilities of using artificial intelligence. These technologies contribute to implementing a person-centred approach and allow for faster and

better analysis of student results. However, modern authors ignored the integrated use of other technologies, including simulation and virtual reality. In addition, challenges in scientific research are not widely presented and are primarily mentioned in the context of distance learning. This study will address these gaps and characterise the possibilities of innovative approaches in the physical education teaching system.

Methodology

Research design

This study is based on an explanatory approach aimed at describing and systematising information about individual phenomena. The authors of the study did not intervene directly in the process under analysis. The study is based on quantitative data collection and analysis, which aims to form a clear picture of the main innovative technologies used in physical education.

This type of research was chosen for several reasons. Firstly, descriptive research is characterised by objectivity, as it is based on observation and accurate description of phenomena, which ensures the scientific reliability of the results. Secondly, this method is characterised by accessibility, which makes it effective for use in educational institutions, where it is important to take into account the real capabilities of the educational system. In addition, it provides the clarity and structure necessary to analyse innovative teaching approaches.

The peculiarity of this descriptive study is the emphasis on observing the participants of the educational process. This approach allows to obtain accurate data on the implementation and use of innovative technologies in physical education, as well as to analyse their impact on the educational process and learning outcomes.

Thus, the chosen methodological approach is optimal for achieving the research objectives, as it ensures the comprehensiveness of the analysis and the high accuracy of the conclusions obtained.

Sample and Participants

This study used purposive sampling, which involved deliberately selecting participants according to specific criteria. The main inclusion criteria were in the following areas: 1. Studying at a higher education institution in the field of physical education and sport. 2. Understanding and orientation in the main innovative technologies. 3. Use of innovative technologies in the educational process. 4. Experience with gadgets. Initially, 35 bachelor's and master's students and 10 teachers were included, but not all agreed to participate. Therefore, 20 students and 10 teachers took part in the study. Annex 1 provides detailed data on all respondents.

The research procedure

The study was conducted in stages using a questionnaire and observation. The questionnaire was designed to enable respondents to identify technology's main opportunities and disadvantages. It also aimed at identifying the main perspectives. The questionnaire consisted of open and closed questions, so respondents could freely write their own opinions without pre-formed answers (see Annex 2).

Observation was used to verify the data obtained from the questionnaire. The objects of observation were the participants mentioned above in the educational process of physical education in higher education institutions (20 students and 10 teachers). The research process included observation during 1. Lectures where interactive or digital technologies are used. 2. Practical classes in gyms. 3. Independent training programmes for students. This made it possible to identify the main technologies and innovations with their own eyes.

Data analysis

Data analysis involved processing the results using Excel software. This tool was chosen for its diverse functionality and efficiency in data processing. All the data from the survey were transferred to tables, which were divided into separate

sectors. The first sector included the following data: teachers, students, use of technology, frequency of use, and opportunities. The second sector comprises teachers, students, difficulties of use, and perspectives. This made it possible to conduct coding in these areas. The paper also uses a comparative analysis, particularly comparing the survey data with the authors' observations.

Results

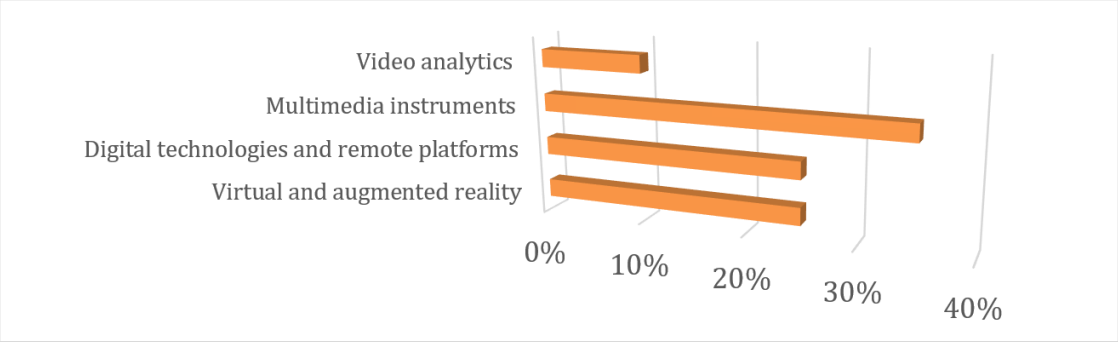
In modern conditions, the existence of requests for the physical development of higher education students has become a difficult task, as many higher education institutions are forced to switch to a distance learning format due to Russian aggression. This situation has created problems for all practical disciplines, including physical education. A large part of the classes is devoted to mastering practical skills, which is extremely difficult to implement remotely. Some attempts to use distance learning in physical education were made during the COVID-19 pandemic. However, the situation is now fundamentally different: the military threat has led to the need to provide quality physical activity for students, which should not only have a positive effect on health but also be carried out with the minimisation of relevant risks and taking into account safety standards. For this reason, it is extremely important to pay attention to the use of innovative technologies in the course of mastering the discipline, as well as to take into account both the best Ukrainian experience and international practices of physical education teaching methods.

A separate block consists of additional general developmental disciplines that have gained additional popularity as a result of the introduction of distance learning. The significance of these disciplines is to interest students and enable them to engage in sports on their own (SOKOLENKO, 2023). For example, before the Russian aggression, some new ways of physical development, which belong to non-traditional sports, were widely used in various sports clubs. After analysing online offers, the researchers agreed that there is a certain interest among students in certain areas. In particular, among the most popular sports interests, we can identify

certain practices that will have a positive effect if integrated into the educational process - according to the experts surveyed, the best of them are: 1. Yoga is one of the ways to control the body and emotions, which helps to improve concentration (TOLCHIEVA, 2012). This is evidenced by 10% of respondents. 2. Nordic walking - helps to activate muscle groups and is accessible even for beginners without special physical training (10%). 3. Pump aerobics - a type of dance aerobics that also uses different sports equipment according to the general level of training of students (10%). 4. Fitball aerobics - special training with the use of balls aimed at developing the vestibular apparatus, improving coordination of movements, and strengthening certain muscle groups. The advantage of football aerobics is that it allows you to practice at home, so it is ideally integrated with distance learning (27%). 5. Step aerobics - exercises with the use of special step platforms that improve mood, help improve coordination of movements and allow for a diverse workload (30%). 6. Capoeira is a martial art that is practised to music for additional development of flexibility, plasticity, strength and endurance (however, any other martial arts can be used) (3%). Integrating such areas into the educational process will definitely improve the support for students' physical development, even under military restrictions. However, it is also necessary to take into account elements of self-motivation (since many exercises will have to be performed independently) and proper training (some modern sports require the active involvement of a specialist coach) (SAYED, 2023; ORLOVA, 2024). The use of innovative technologies focuses students on achieving specific goals and results. Interactive simulators and simulations are essential for training various sports techniques. They are also used to analyse movements and correct mistakes. This requires the use of virtual and augmented reality capabilities, as indicated by 25% of respondents. Mobile applications also play an important role, allowing for the correct training and health monitoring organisation. Teachers use various multimedia tools during lectures (35% of respondents). Video analytics using specific applications, such as the Hudl Technique platform, allows them to record exercise and analyse movement techniques (10% of respondents). In today's digital world, digital resources and

remote platforms for online classes also play an essential role, as indicated by (25%) (see Figure 1).

Figure 1 – Dynamics of the use of modern technologies



Source: compiled by the authors.

The main features of the use of innovative educational technologies in physical education are the introduction of updated ideas and methods for recommending educational material, scientific substantiation of the theoretical component of learning, the logical structure of the educational process, integration of personal teaching experience into pedagogical practice, and optimisation of resource consumption (physical, psychological, etc.) for all participants in the educational process. Innovative pedagogical technologies have made it possible to significantly improve the quality of theoretical training of students in physical education (Table 1).

Table 1 – Application of innovative technologies

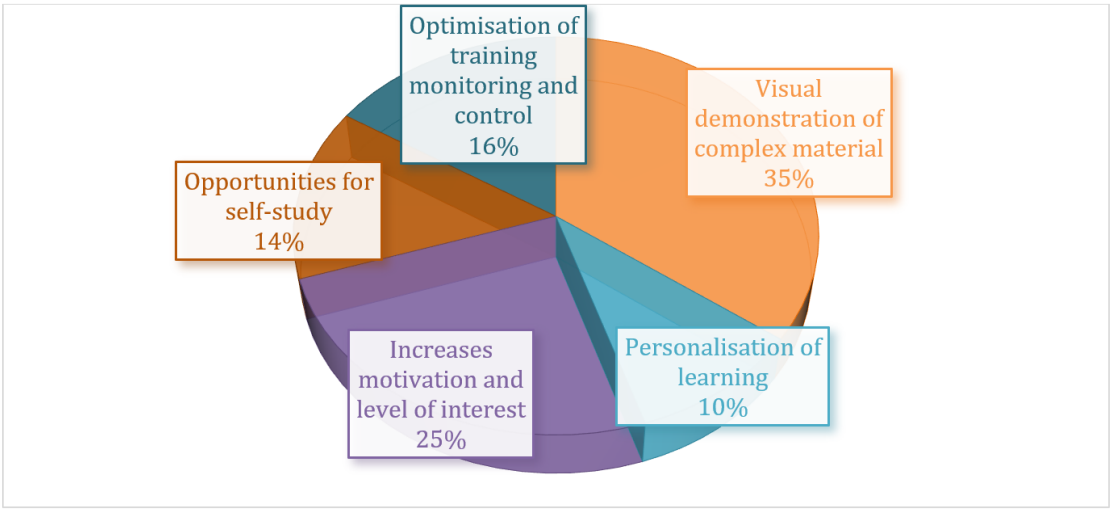
Question	%
1. How often do you use innovative technologies?	
A) In each class	30%
B) Several times a week	50%
C) Less than 1 time per week	27%
D) Not applicable	3%
2. What is your goal in using innovative technologies?	
A) Observations on the motivation of students	10%
B) Observation of students' physical activity	60%
C) Professional self-development, mastering new techniques	10%
D) Providing the necessary skills for independent sport	20%

Source: compiled by the authors

The use of modern technology has become deeply integrated into the process of teaching and learning physical education. Innovations related to digital technologies and the latest methodologies are used weekly. Almost a third of the respondents stated that this process occurs at every lesson, while half agreed it is applied at least several times a week. The respondents noted that the main goal remains to monitor the physical activity of higher education students. However, it was also noted that providing students with independent skills for sports is essential, which will create a desire to maintain their health and physical condition at the proper level.

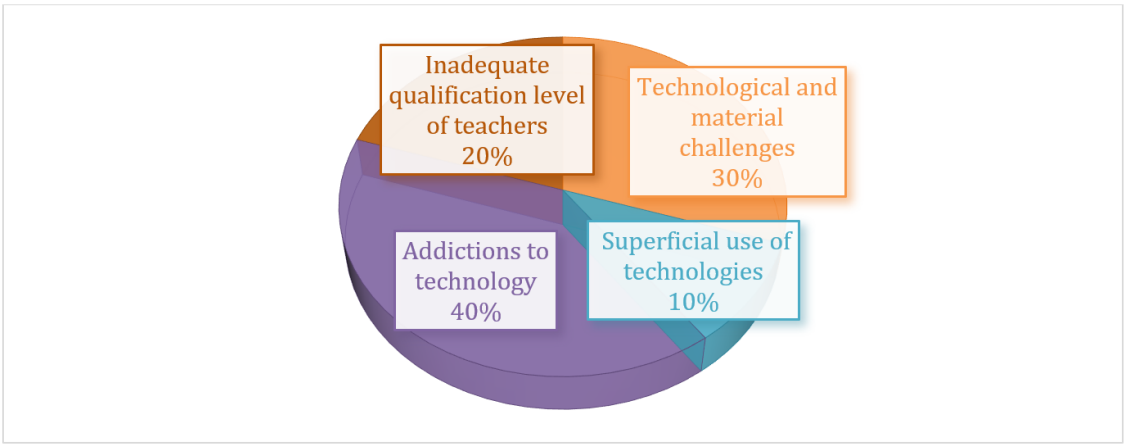
The use of modern technologies has both advantages and disadvantages. In particular, they help to increase students' motivation and interest in learning (25% of respondents). With the help of interactive tools and multimedia technologies, teachers can demonstrate important information (35% of respondents). In addition, using artificial intelligence technologies and automated systems allows for personalised learning (10% of respondents). Teachers can also create individual training plans. There is also a noticeable increase in student engagement. The use of virtual reality and multimedia makes learning more enjoyable for students. Another advantage is the possibility of self-study (14% of respondents). Modern digital resources allow students to practice at their convenience. It also allows them to keep fit regardless of the circumstances (see Figure 2).

Figure 2 – Possibilities of using modern technologies in physical education
Source: compiled by the authors



However, there are several challenges to introducing and using these technologies. In particular, some teachers and students pointed to technical limitations. Not all educational institutions have highly developed modern technological capabilities. In addition, such technologies can be costly for a university. At the same time, not all students can use expensive gadgets with sufficient capacity to download individual applications. This aspect was highlighted by 30% of respondents. Another challenge is the risk of inefficient use. In particular, the superficial use of technology can decrease the quality of learning (10% of respondents). However, most respondents pointed to the problem of dependence on technology (40%). For example, the use of technology can lead to dependence on electronic devices, which limits the ability to engage in traditional forms of physical activity. Another 20% of respondents indicated that they faced the problem of staff training. Some physical education teachers may have limited knowledge and experience using new technologies. This leads to their ineffective use (see Figure 3).

Figure 3 – Difficulties in using innovations in physical education
Source: compiled by the authors



Using innovative methods of teaching physical education in higher education institutions also has certain prospects. First, we discuss adapting the educational process to modern realities, including distance learning. In order to optimise theoretical learning, the introduction of video lessons (with practical exercises) or lectures (with theoretical guidance) may be important aspects. The use of VR/AR technologies to improve the visualisation of exercise techniques is also a promising option, although

such technologies are quite expensive. The latest technologies are also focused on developing individual learning paths, which will allow for future training personalisation. Digitalisation usually increases motivation, both in terms of gamification and motivation to maintain a healthy lifestyle. The further digitalisation of education will also contribute to the professional development of teachers, who will undergo certain professional development through training, webinars and online courses (to deepen their digital competencies).

Discussion

The main research problem was to analyse the impact of innovation on the methods of teaching physical education in Ukrainian higher education institutions to determine the current state and challenges. The results show that physical education is an important aspect of maintaining an active life, especially against the backdrop of Russian military aggression, which has led to the need to provide quality physical activity for students and to minimise the risks involved and consider safety standards. This confirms the views of other researchers who have noted the need to consider today's military realities (ROLIAK, 2020; PIÑEIRO-COSSIO et al., 2021). The views of those scholars who propose that the experience gained in Ukrainian realities is important not only as a model of action in the realities of martial law but also as the next stage of integrating modern technologies into the educational process are relevant (CHIVA-BARTOLL & FERNÁNDEZ-RIO, 2021). Moreover, it is not only physical education but also other disciplines of practical and theoretical importance.

The survey has shown that practitioners use general developmental disciplines that have become increasingly popular due to the introduction of distance learning. The significance of these disciplines is that they interest students and enable them to engage in sports on their own. First, we are talking about such opportunities as yoga, Nordic walking, pump aerobics, fitball aerobics, step aerobics, and capoeira (or other martial arts). Integrating such areas into the educational process will improve the support of the physical development of students, even

under military restrictions. Such results emphasise the relevance of other research hypotheses, according to which it is important to integrate physical education teaching with fashionable practices that operate in the environment of sports clubs, individual sections, etc., in modern conditions (LEE & LEE, 2022; TOLCHEVA, 2011; SOKOLENKO, 2023; LAVROV *et al.*, 2022).

At the same time, there is an important challenge in answering the question: to what extent are teachers in wartime ready to use new experiences? Some researchers point out that the crisis period is not conducive to using new technologies and teaching methods (CHUMAK, 2017; DEMCHENKO et al., 2022; GUMANTAN et al., 2021). However, not everyone agrees with these views: some scholars argue that times of crisis are a better period for using innovations than normal when there is little or no motivation to change and use new things (VAN DOODEWAARD & KNOPPERS, 2018). Such practices depend on personal experience, so it is difficult to make empirical measurements in such conditions. The survey found that modern technologies are deeply integrated into teaching and learning physical education: almost a third of respondents stated that this process takes place in every class.

In contrast, half of the respondents agreed it is used at least several times weekly. These results confirm the conclusions of FEDOROVA and RYBNIKOVA (2020) that an important task of today's teachers is to develop skills for students' further independent work. Forming an appropriate culture of applying innovative methods will only contribute to such consequences.

The survey has shown that modern teachers also use various innovative technologies that contribute to improving teaching effectiveness: interactive simulators and stimulators, special mobile applications, multimedia tools, video analytics, digital resources and distance learning platforms. In general, the same list is proposed by other researchers, which makes the results quite relevant for scientific use (BOBRO, 2024; CASEY & MACPHAIL, 2018; HUBAL, 2012). At the same time, it should be acknowledged that the use of digital technologies depends on the age of teachers (usually, younger teachers are more active in integrating digital

technologies into teaching) and the capabilities of the material base (which also depends on students - how much they can afford to use the relevant gadgets).

The use of modern technologies, as shown in the study, has advantages and disadvantages. First of all, it is about increasing motivation and interest in learning (25% of respondents), visual demonstration of important information (35% of respondents), personalisation of learning (10% of respondents), and the possibility of self-study (14% of respondents). These results are also confirmed by studies that identify approximately similar benefits of using innovative technologies in physical education (VAN DOODEWAARD & KNOPPERS, 2018; LUGUETTI & OLIVER, 2019). The emphasis on digitalisation, by the way, corresponds to modern trends in educational development, which indicates the important place and role of physical education in the environment of university disciplines.

The results also analysed some of the challenges that exist in the introduction of innovative technologies. In particular, they pointed to technical limitations, the lack of highly developed modern technological capabilities in educational institutions, their high cost, inefficient use, the problem of dependence on technology, and the problem of staff training. Researchers emphasise the latter challenge, as some physical education teachers may have limited knowledge and experience using modern digital technologies and innovative methods (PRANOTO & SUPRAYOGI, 2020; YINGKUN et al., 2022). It is noted that the use of innovative methods of teaching physical education in higher education institutions also has certain prospects: adaptation of the educational process to modern realities, introduction of video lessons (with practical exercises) or lectures (with theoretical guidance), use of VR/AR technologies, formation of individual learning paths, increasing the level of motivation, use of gamification, promotion of a healthy lifestyle, professional development of teachers. Undoubtedly, this list is not complete, as there are more detailed descriptions of the prospects for using the latest technologies (including through the prism of increasing access to learning, as digitalisation generally contributes to this) in the scientific literature (SHYSHKINA et al., 2023; OKANDA, 2024; YUSIFOV, 2024). However, in general, this list aligns with the latest trends identified by researchers and will continue to evolve.

At the same time, the proposed study has methodological limitations that should be considered in further work and interpretation of its results. The study uses a small number of respondents who have their own experience, knowledge, skills of working with higher education students, etc. This aspect is caused by the impossibility of interviewing a significant number of teachers due to the military call - in fact, the survey involved those respondents who expressed a desire to take it. Accordingly, the representativeness of the study has somewhat decreased, although the indicators generally indicate the prominent trends that are beyond doubt.

Conclusions

Thus, the study revealed the importance of using modern innovative technologies that help to optimise the educational process and improve students' interest and motivation. Integrating such areas as yoga, Scandinavian walks, pump aerobics, fitness aerobics, step aerobics, and martial arts improves students' physical fitness and motivation. Therefore, the key principles of the health-improving orientation of innovative physical culture are specified in physical culture and health technologies.

Among the most popular innovative technologies used in lectures and practical classes are multimedia, digital resources, online platforms, virtual and augmented reality, interactive simulators, fitness trackers, etc. The study found that using these technologies has many opportunities but also some challenges (technical and material difficulties, staff training, superficial and inappropriate use of technologies). For this reason, the original contribution of this study is to prove that innovations should not be seen as a simple replacement of traditional methods but as a complement that can greatly facilitate and influence the optimisation of the educational process.

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Appendix 1

Data about the Participants

Category	N	Average age	Experience with innovation	Use of technology
Students	20	21	1-3	Use of mobile applications, digital resources, learning platforms, participation in online conferences. Use of various gadgets
Teachers	10	40	3-8	Use of interactive technologies, multimedia, fitness gadgets, AR and VR technologies, simulation tools

Annex 2

Key Questions from the Survey

Use of technology	Do you use innovation in your teaching or learning? How often do you use them? What innovative developmental disciplines do you use in your teaching or learning? What innovative technologies do you use? What is the main purpose of using them?
Impact assessment	What are the benefits of using the innovation? What are the challenges to using them?
Identification of prospects	Do you plan to use technology in the future? What is needed for effective innovation? A) Additional funding B) Appropriate level of material and technical condition D) Training of teachers and students E) Modernisation of premises