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Professional Training of Future Specialists in Physical Training and Sports

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Abstract The study aims to identify the specifics of training specialists in physical culture and sports. The specialities 014.11 “Secondary Education (Physical Education)” and 017 “Physical Education and Sports” train teachers, coaches, methodological instructors and lecturers. The training of such specialists is influenced by many different factors: distance learning caused by the global COVID-19 pandemic and military operations in the country, the growth of students with special educational needs (SEN) (inclusive environment), the development of innovative and digital technologies, changes in the labour market, educational innovations, etc. The study covered key points such as the analysis of the educational programmes of the above specialities (on the example of the Faculty of Physical Education of Ternopil Volodymyr Hnatiuk National Pedagogical University), the study of the key competencies of physical education and sports specialists. The study showed that the process of training future teachers and trainers addresses the development of basic professional competencies but does not sufficiently include psychological training and the introduction of innovative, interactive technologies. There are no disciplines that provide digital health training and targeted soft skills training. The study also outlined several factors that have a direct impact on the quality of education and training of physical education and sports professionals. Among them are the transition to distance learning, the peculiarities of the material and technical base, the insufficient number of students studying in the dual form, and the decline in student motivation due to stress factors. High-quality training (including updated curricula in line with new professional standards), cooperation with educational institutions and sports facilities (clubs, children's and youth sports schools, sections), an optimal combination of practical training and theoretical education, and participation in competitions at various levels can ensure the high efficiency of training physical education teachers, coaches and instructors.

Keywords Higher Education, Key Competencies, Innovative Technologies, Professional Skills, Lifelong Learning, Learning Models

1. Introduction

The issue of professionalism of future graduates of pedagogical specialities is a priority for society because it is the education sector that provides the labour market with specialists following the needs of employers. The standards of the New Ukrainian School (NUS) provide for the development of lifelong learning skills, as this competence contributes to the successful adaptation of an individual in society. The labour market is changing, and researchers predict that some professions will either

disappear completely or undergo significant transformation in the coming decades. Therefore, specialists who will be graduating in 2024 already need to account for these changes.

In addition, the COVID-19 pandemic and the invasion of Ukraine in 2022 had a significant impact on the educational process. This has led to the emergence of remote work in many professions, so practical skills have become more important than theoretical knowledge. The best way to combine theoretical and practical knowledge is through dual education. However, as of 2023, according to the Analytical report on the results of the fourth year of the pilot project in higher education institutions for the training of specialists in the dual form of education (2023), only 4 people were studying in this form (in the specialities 014.11 "Secondary Education (Physical Education)" and 017 "Physical Education and Sports"). Due to distance learning, the dual system of education is the most optimal form [1]. However, this model of education is just beginning to be implemented in Ukrainian education, although all participants confirmed its effectiveness.

Childhood obesity and low levels of physical activity have become urgent public health concerns, particularly among children aged 6 to 9. This period is critical for forming lifestyle habits that often persist into adolescence and adulthood. According to the WHO, the global prevalence of overweight in this age group is steadily increasing due to poor nutrition, reduced outdoor play, and excessive screen time. Many children do not meet the recommended 60 minutes of daily physical activity, which is linked to negative outcomes such as excess weight, impaired motor development, and early risk factors for chronic diseases. Addressing these challenges requires targeted interventions through school-based physical education, early prevention programmes, and greater parental involvement.

The consequences of distance learning for physical education teachers during the pandemic were studied by W. O'Brien et al. [2], analysing the experience of five European higher education institutions (HEIs) from different countries (England, Greece, Ireland, Portugal and Finland). The researchers determined that to improve the quality of education and effective training of physical education teachers, it is necessary to adapt educational programmes and increase the time for the practical application of theoretical skills.

The quality and effectiveness of professional education of future graduates of physical education faculties are investigated in V. Naumchuk et al. [3]. It is emphasised that educational programmes for training physical education specialists should be changed following current trends in the field of sports and sports services, in particular, trends in the fitness industry.

L. V. Kotendzhi et al. [4] addressed the modernisation of the educational process of training teachers in physical culture and sports. In particular, the emphasis is placed on professional competence and ways of its development and improvement, the introduction of innovative forms and methods in the educational process. The professional standards of university graduates in the field of sports are analysed.

S. Lazorenko [5] analysed aspects of the use of digital competence skills of graduates of physical education faculties and coaches. The importance of forming digital culture and information competence skills was substantiated, their main components were outlined, and methodological approaches to the formation of digital literacy were updated.

Higher education in Ukraine is gradually integrating into the European education system, which leads to changes in learning models. For instance, O. Topuzov et al. [6] analysed the level of university education in Ukraine in comparison with the experience of Latvia. It is noted that distance education has significantly influenced the educational process and led to changes in the educational programmes of both countries. Self-esteem factors were investigated by J. Su et al. [7]. This study emphasised the role of self-determination in the process of professional activity of physical education graduates, the impact on teaching and body image. The influence of motivation on learning and the professional activity of students was studied by R. White et al. [8]. As such, the motivation to learn directly depends on the correct self-assessment of activities and own results. The aspects of the introduction of technological and innovative changes, academic freedom and student centricity in the training of the above-mentioned specialists remain insufficiently researched.

The purpose of this study is to identify and analyse the key features of professional training for future physical education teachers, instructors, and coaches in the context of modern educational and societal demands.

Objectives of the Study:

1. To analyse the structure and content of educational programmes in specialities 014.11 (Secondary Education – Physical Education) and 017 (Physical Culture and Sports) at Ukrainian higher education institutions.
2. To assess the effectiveness of professional competency development among students enrolled in these programmes, particularly in relation to labour market needs.
3. To examine the integration of innovative teaching methods and interactive technologies in the training process and evaluate their impact on the professional readiness and performance of graduates.

2. Materials and Methods

The Educational and professional programme "Physical Culture and Sports" at Ternopil Volodymyr Hnatiuk

National Pedagogical University [9] and the Educational and professional programme "Secondary Education" (Physical Education) of Ternopil Volodymyr Hnatiuk National Pedagogical University [10] were analysed. The study emphasised the formation of key competencies that will allow future graduates to have a high professional level and adapt to social changes (in particular, labour market needs). The data from the Analytical report on the results of the fourth year of the pilot project in higher education institutions for the training of specialists in the dual form of education [11] were analysed. An analysis of the compliance of the educational programmes of the above-mentioned specialities with the percentage of theoretical and practical training of students (educational practice, trainings, summer schools, competitions, etc.), and the introduction (full or partial) of a dual form of education at the Faculty of Physical Education were conducted. The leading competencies provided by educational programmes following the NUS standards and professional skills of future teachers, including the possibility of their practical application (cooperation with sports clubs, sections, etc.) are considered. The formation of an innovative educational space was emphasized, considering the digitalisation of education, the conditions of blended and distance learning, virtual spaces and the principle of student centricity.

The study employed a comprehensive set of data collection and analysis methods to assess the quality of professional training for future specialists in physical education and sports. Documentary analysis was conducted using statistical data from the Ministry of Education and Science of Ukraine [12] on inclusive education and the report of the National Health Service of Ukraine [13] in order to determine whether changes in students' physical and mental development are reflected in the design of educational programmes and models. This was especially relevant given the mandatory nature of practical experience in the professional activities of physical education teachers. A content analysis of curricula for specialities 014.11 and 017 was carried out to evaluate the presence of disciplines aimed at preparing graduates to work with students with special educational needs (SEN), as well as educational components related to the psychological dimensions of professional training – such as motivation, resilience-building, and addressing stress and psychological disorders in children.

Strategic policy documents were also analysed, including the Order of the Cabinet of Ministers of Ukraine No. 286-r "On Approval of the Strategy for the Development of Higher Education in Ukraine for 2022-2032" [14] and the Draft "Concept of Education Development for 2015-2025" [15]. This analysis aimed to assess whether educational programmes have undergone qualitative changes in terms of integrating inclusive practices, applying innovative educational models, enhancing digital literacy, and strengthening students' academic freedom and professional competencies. To examine the relevance of these programmes to labour market demands, materials from the State Employment Service of Ukraine [16] and the National Institute for Strategic Studies [17] were analysed. These sources provided insights into youth unemployment, including the proportion of recent graduates without employment, and the extent to which the training of physical education specialists aligns with the needs of employers.

The Report on Physical Culture and Sports from the Ministry of Youth and Sports of Ukraine (n.d.) was reviewed to identify the availability and utilisation of sports infrastructure (e.g., gyms, sports complexes, stadiums) in the educational process. Based on these data, an empirical assessment was made regarding the use of material and technical resources in the training of future physical education teachers and coaches.

The selection of data for this study was guided by relevance to the objectives of analysing the professional training of future specialists in physical education and sports within the context of current educational reforms in Ukraine. Emphasis was placed on sources that provided insights into inclusive education, dual education models, digital transformation, youth employment, psychological resilience, and the development of soft skills. Analytical methods included qualitative content analysis of curricula and policy texts to identify thematic patterns. Comparative analysis was used to examine educational programmes across different institutions in order to detect regional variation and assess their alignment with national strategic goals. Descriptive statistical analysis was applied to interpret quantitative trends related to student enrolment, youth unemployment, and mental health indicators. The triangulation of documentary, empirical, and institutional data ensured a comprehensive understanding of the structural and pedagogical dimensions of physical education training programmes.

One of the principal limitations of this study lies in the scope of the sample, which is primarily centred on the analysis of educational programmes at Ternopil Volodymyr Hnatiuk National Pedagogical University. While this institution serves as a representative case due to its active implementation of relevant specialities (014.11 and 017) and engagement with contemporary educational reforms, the exclusive focus on a single university inevitably constrains the generalisability of the findings. The institutional, regional, and infrastructural variability among other higher education institutions in Ukraine is not fully accounted for, which may limit the applicability of the conclusions to the national context. Future research should involve a comparative multi-institutional analysis to validate and expand upon the findings presented here.

3. Results

According to the Strategy for the Development of

Higher Education in Ukraine for 2022-2032, the leading problem of higher education in Ukraine is its lack of efficiency [14]. In particular, the study noted that a significant gap between the labour market and the training of specialists in higher education institutions causes a significant imbalance in supply and demand. The specificity of training physical education specialists is that the activities of future teachers are directly related to the life and health of students [18, 19]. Therefore, the practical component of training should be at least as important as the theoretical one. Dual education provides 60-70% of practical on-the-job training, but according to the Analytical report on the results of the fourth year of the pilot project in higher education institutions for the training of specialists in the dual form of education [11], only 24 higher education institutions provide this opportunity in the specialities 014.11 and 017. Among them are the National University "Zaporizhzhia Polytechnic" and the Hlukhiv National Pedagogical University of Oleksandr Dovzhenko. As of 2023, only 4 people were studying in the dual system of education in the above-mentioned institutions. The dual form of education provides an optimal combination of theory and practice, allowing students to acquire skills directly at work, and employers can save on recruitment resources and get a specialist who is already familiar with the specifics and working conditions. The analysis of the curricula of the 014.11 and 017 specialities has shown that they do not provide for the same division of theoretical and practical training as in the dual form, and if they are provided, they are provided at the request of the student, in some cases - at the request of employers. According to the report, a survey of students and employers on the effectiveness of dual education revealed that one of the reasons for the inefficiency of this system is the mismatch between the educational programmes and the needs and conditions of production. That is, the knowledge that students receive is detached from reality and does not correspond to the working conditions of their future employment. Thus, it is possible to state that most employers are interested in ensuring that educational programmes are as adapted as possible to the working conditions of the employees at the production site, considering all the technologies and methods implemented and used by the enterprise. As for the specialities 014.11 and 017, which train teachers, coaches and instructors, it is the dual form of education that would be most effective, but the educational programmes do not provide for the prevalence of practical knowledge over theoretical knowledge.

The study determined that the number of children with special educational needs (SEN) has almost doubled over the past four years, but educational programmes provide for a minimum number of credits for the study of the educational components "Adaptive Sports" and "Inclusive Education and Physical Education in Special Medical Groups" [12, 13].

The analysis of educational programmes has led to the conclusion that the introduction of innovative technologies into the educational process is insufficient. Innovative technologies include augmented reality (AR) and virtual reality (VR), soft skills development and digital health. Such a mismatch between curricula and modern working conditions reduces the efficiency and level of training of specialists.

Notably, the training of physical education and sports specialists has its specifics, as in addition to classroom training, sports facilities and complexes are also actively used. According to the Report on Physical Culture and Sports of Ukraine for 2023, as of 1 January 2024, the country has the following types of sports facilities (including state and municipal property) complex facilities, which include stadiums, arenas, tennis courts, football fields, gyms, swimming pools, shooting ranges and stands, cycling tracks, artificial ice facilities, archery and biathlon ranges, ski resorts, equestrian facilities, rowing canals, etc.

Ternopil Volodymyr Hnatiuk National Pedagogical University was taken as an example. The implementation of the educational programme of this educational institution in the specialities 014.11 and 017 involves training in specialised sports halls, which include game, gymnasium and sports halls, halls for music rhythm and wrestling classes, an athletics arena and athletics tracks, as well as a stadium, which includes a football field, running tracks, throwing and jumping sectors, physical therapy rooms and a massage room. In addition, students of the institution regularly participate in competitions at regional, national and European levels, as well as in athletics cross-country, sports days, relay races and tournaments in various sports, thereby improving their level of skills. The curriculum also includes summer and winter camps and teaching practices. This allows students to improve their knowledge and skills by applying them in practice. In addition, the educational institution cooperates with children's and youth sports schools and sections, which allows students to practice.

The results of the study showed that the educational programme of Ternopil Volodymyr Hnatiuk National Pedagogical University in the speciality 014.11 provides for the study of the educational component "Inclusive Education and Physical Education in Special Medical Groups" – 6 credits. The educational programme in the speciality 017 includes the study of the educational component "Theory and Methods of Adaptive Sports" – 3 credits, the same speciality (017) at Sumy State Pedagogical University named after A.S. Makarenko – "Adaptive Sports" – 4 credits. However, the number of students in inclusive classes in general secondary education has almost doubled in a few years [12]: from 18,643 students in the 2019-2020 academic year to 40,354 in 2023-2024. Thus, there is a certain mismatch between

the educational programmes of higher education institutions and the needs of specialists for secondary education institutions. Children with SEN require increased attention, including in terms of their physical condition [20-22]. The New Ukrainian School (NUS) programme defines the full inclusion of children with SEN in the educational process (i.e., not individual education, not education in inclusive resource centres or separate educational institutions, but full inclusion and adaptation in general education and preschool education institutions). This highlights the urgent need for trained physical education specialists capable of working with students with special educational needs. Most teachers have to teach in inclusive classes. Therefore, physical education teachers also need to individualise curricula and build a special educational trajectory that will contribute to better socialisation of such children.

The Strategy for the Development of Higher Education in Ukraine for 2022-2032 emphasises the same problem, stressing that the student-centred approach is imperfect and inconsistent in practice [13]. This concerns the lack of opportunities for students to choose and build their educational trajectory: to choose certain disciplines or educational components. The educational programmes in the specialities 014.11 and 017 of Ternopil Volodymyr Hnatiuk National Pedagogical University contain elective components in the amount of 1:4 relative to the total volume of the educational programme, which complies with the norms specified in the Law of Ukraine No. 1556-VII "On Higher Education" [23].

The education sector is one of the first to respond to social and technological changes in society. Global digitalisation covers all sectors of society. However, in education, they are gaining maximum significance, as they are designed to introduce innovative technologies for the effective adaptation of future graduates of different levels of institutions.

The results of this study have shown that the modernisation of the content of education in Ukrainian higher education institutions is very slow. In particular, the use of digital tools in the professional activity of future graduates of physical education faculties was introduced only at Sumy State Pedagogical University named after A. S. Makarenko and Ivan Franko National University of Lviv in the form of the author's model [24]. Given the requirements of society, important skills for coaches and physical education teachers are the ability to use hardware and software to determine or assess a person's physical condition to further provide recommendations or build a personal trajectory of sports activities. Such devices include fitness bracelets, various trackers, controllers, heart rate monitors and various applications (Runceeper, Freeletiks, FitOn, Glo, etc.). The widespread development and distribution of fitness programmes (as well as mobile applications on this topic), pilates, and yoga have not yet been reflected in the educational programmes of higher education institutions that train physical education teachers and coaches. Health-saving technologies are being introduced in the NUS, but the focus should be on the higher education system: it is there that future specialists should acquire this knowledge and skills, which will later be implemented in preschool, secondary or vocational education institutions.

Digital health or "digital health" began to develop rapidly in the last century, but as of 2024, this concept is not included in the regulations of Ukrainian legislation [25]. Digital and interactive technologies are used by HEIs, in particular, "Digital Technologies and Metrological Control in Professional Activity" is among the mandatory components in all first-level higher education programmes, and "Digital Technologies in Education and Science: Training Course" and "Workshop on Digital Technologies" are included in the second (Master's) level educational programmes of Ternopil Volodymyr Hnatiuk National Pedagogical University.

The education sector, and especially higher education institutions, should be at the forefront of societal change, but the introduction of qualitatively new technologies is not as widespread as in other countries. The use of augmented reality (AR) and virtual reality (VR) can also significantly improve the training of physical education and sports teachers. Digital technologies are significantly changing the format of education and expanding the opportunities for innovation [26]. For example, the use of AR in lectures and practical classes can be used to build a fundamentally new system of interaction between students and information. This allows students to immerse themselves in a gaming environment or be part of a simulation.

Unlike AR, VR can be used to immerse in the digital world, in an environment created by computer devices, while interacting with different gyms or other venues in a safe and easily controlled environment. Among the most famous effective and convenient platforms for creating AR applications are the following: Vuforia, ARToolKit, Kudan, Catchoom, Augment, HP Reveal, WikiTude, LayAR, Blippar, EON Reality, InfinityAR, and others. They have a wide range of tools to create AR objects (in 2-D and 3-D format), allow combining audio and video files, and text elements, and successfully save the result in the cloud. In addition, it is possible to use software libraries, use a mobile camera, create animations of objects and 3-D models, track the location and movement of objects, etc. Therefore, the learning process is no longer tied to the classroom and can take place both directly on the sports field and in any convenient place. However, this study has shown that in Ukrainian higher education institutions (specifically concerning specialities 014.11 and 017) such methods are used only in fragments. The reason for this is several objective reasons: outdated material and technical base, lack of necessary gadgets

(both for students and teachers), problems with access to content, lack of adaptation of curricula to innovations, etc. However, the benefits of using these realities are quite significant: expanding the field of scientific research, creating and testing experimental models and programmes, combining elements of learning, teaching and play, interactivity, accessibility (can be used with just a smartphone with an installed application), and improving technological skills.

This study has shown that the problem with the use of virtual and AR in the training of physical education and sports specialists is the lack of single-system technology, as the above innovations are developing so rapidly that the pedagogical community does not have time to comprehend and integrate them into the educational system.

An analysis of the curricula of the specialities 014.11 and 017 showed that 6 credits are provided for the study of the basics of psychology ("Psychology" and "Psychology of Sport", respectively). However, scientists note that it is necessary to adapt curricula, educational programmes and teaching methods to the conditions of martial law. This concerns stress resistance, overcoming the symptoms of post-traumatic stress disorder (PTSD) that all participants in the educational process may have, anxiety, mental disorders, etc. The number of patients diagnosed with PTSD almost quadrupled in 2021-2023, and as of 06.03.2024 (the latest figure in the chart), the number of patients was almost as high as in the whole of 2021 (Figure 1).

Due to the COVID-19 pandemic and martial law, most educational institutions have switched to distance learning, and some to blended learning [27]. As a result, the educational process has become more digital, and psychological stress has increased: this is due to frequent air raids, power and internet outages, forced relocation of students to other cities or countries, etc. Therefore, these factors should be addressed in the educational programme. The discipline "Psychology of Sport" involves studying the conditions for the safe physical development of pupils (students) during training and competitions, since during the professional activity of coaches and physical education teachers, mental stress caused by noise, the presence of several age groups at the same time at a training session (lesson), responsibility for the safety, life and health of students, etc. To these factors there are added those caused by the consequences of military operations and their aftermath on the territory of Ukraine. Therefore, teachers and trainers must have the tools to overcome the above stress factors to work effectively. For the successful development of skills and abilities of psychological support and mental health of future physical education specialists, appropriate psychological and pedagogical conditions should be if form both theoretical and practical knowledge and skills, active participation in the implementation of various sports and recreational activities, taking into account the personal psychological characteristics of students, etc.

To enhance the empirical foundation of the study and improve the clarity of key findings, the following Table 1 presents selected statistical indicators related to inclusive education, the prevalence of post-traumatic stress disorder (PTSD), and youth employment dynamics in Ukraine between 2021 and 2024. These data reflect broader socio-economic and psychological factors that influence the design and effectiveness of professional training programmes for physical education and sports specialists.

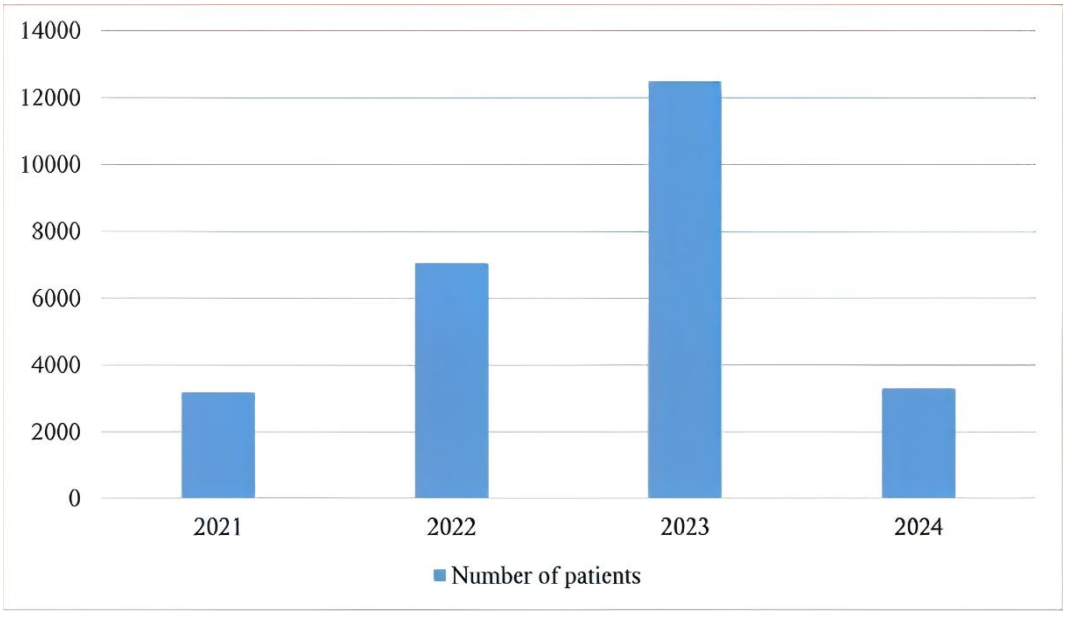

Figure 1. Growth dynamics of patients with PTSD in 2021-2023. Source: National Health Service of Ukraine [13]

Table 1. Key statistical indicators related to Youth Employment and Mental Health (2021-2024)

Indicator	2021	2022	2023	2024 (as of 06.03)
Number of students with special educational needs (SEN) in secondary schools [12]	18,643	-	-	40,354
Number of PTSD patients registered in Ukraine [13]	Baseline value	↑ (growth)	↑↑ (tripled)	Nearly quadrupled
Number of unemployed youth (aged 15–24), thousand persons [17]	139.1	122.0	112.3	-
Share of unemployed youth (under 35) among all unemployed (%) [17]	-	-	22%	-
Number of unemployed university graduates (youth, under 35) [17]	-	-	1.8 thousand	-

Source: created by the authors.

To accurately interpret the physical development and health status of children aged 6 to 9 years, it is essential to compare individual measurements against internationally recognised reference values. The WHO provides growth standards that serve as benchmarks for evaluating height and weight within specific age groups. These standards help identify deviations from normal growth trajectories and are widely used in both clinical practice and research. The Table 2 below presents average reference ranges for height and weight in children aged 6, 7, 8, and 9 years, which can be used to assess physical development, calculate body mass index and detect potential cases of underweight, overweight, or obesity.

Table 2. Reference values for height and weight in children aged 6-9 years

Age	Height, cm (mean ±1 SD)	Weight, kg (mean ±1 SD)
6 years	115–122 cm	19–24 kg
7 years	119–127 cm	21–27 kg
8 years	124–132 cm	23–30 kg
9 years	129–138 cm	25–34 kg

Source: created by the authors.

This study has revealed that the training of future physical education and sports professionals currently lacks a systematic approach to the development of psychological resilience – understood as the ability to sustain mental and physical well-being in the aftermath of adverse events such as war, natural disasters, pandemics, or prolonged stress. Given that teachers, instructors, and coaches operate primarily in direct interpersonal contexts, the capacity to remain psychologically stable, responsive, and empathetic is essential. Psychological resilience encompasses several core attributes – optimism, adaptability, perseverance, emotional regulation, and a future-oriented mindset – which are critical not only for professionals' personal well-being but also for fostering a safe and supportive environment for learners.

Despite the heightened relevance of resilience in the Ukrainian context – particularly under martial law, displacement, and increased cases of PTSD among students – current curricula do not provide structured content aimed at developing this competency. It is therefore necessary to integrate resilience-building components into both the theoretical and practical segments of physical education programmes. This may include the introduction of dedicated disciplines such as "Psychological Resilience in Education and Sport," practical modules on stress management and trauma-informed pedagogy, and the inclusion of simulated scenarios to train adaptive responses. Interdisciplinary collaboration with departments of psychology, social work, and public health could enhance the comprehensiveness of such training. Embedding resilience education in the pedagogical framework would not only contribute to the professional longevity and effectiveness of future specialists but also ensure that they are equipped to meet the evolving emotional and psychological needs of their students, particularly in high-stress or post-crisis educational environments.

Since the specialities 014.11 and 017 involve the training of teachers, instructors and trainers, the study examined the presence of such professional competence as mentoring in educational programmes. According to the Draft "Concept of Education Development for 2015-2025" [15], the main approach implemented by modern education is competence-based. Updating the content of education and changing the system of values in society (in particular, Industry 4.0, or the fourth industrial revolution) necessitate the need for specialists with developed social and psychological competencies. These include the ability to navigate the information space, to learn throughout life, to self-improve, to master innovative technologies, and to possess such qualities as mobility, initiative, creativity, dynamism, etc. Among the methods used by a mentor are counselling, training and coaching. These aspects are required due to a fact that a physical education teacher should have not only general skills in conducting lessons, training or competitions but also the skills of creating individual and/or group lessons based on age, psychological and physical characteristics, the ability to use digital technologies in professional activities (at the professional level) to restore, maintain or adjust a person's physical condition. Thus, the analysis of the educational programmes for specialities 014.11 and 017 showed that the training of specialists in these specialities partially considers the use of information

technology, namely specialised software and digital mobile technologies (tracker applications, pedometers, virtual reality, etc.). Accordingly, this affects the educational outcomes of the training of such specialists, thus creating an imbalance between the demand of society for teachers and teacher trainers with a certain set of qualities and competencies and the ability of HEIs to provide such specialists. The results of this study suggest that educational and professional programmes do not fully meet the needs of employers.

According to the National Institute for Strategic Studies, the number of unemployed youths as of 2023 was the lowest compared to 2021 (Figure 2). However, out of 112.3 thousand people, the share of unemployed youth (under the age of 35) was very significant (22% of the total). Among them, 1.8 thousand people are university graduates who have not yet been employed. This suggests that the labour and education markets need to be synchronised.

According to the National Institute for Strategic Studies (Figure 2), the number of unemployed youths as of 2023 was the lowest compared to 2021. However, out of 112.3 thousand people, the share of unemployed youth (under the age of 35) was very significant (22% of the total). Among them, 1.8 thousand people are university graduates who have not yet been employed. This suggests that the labour and education markets need to be synchronised.

Modern trends in education and the sports industry are instrumental in shaping the human resources and the demands of society as a consumer of these personnel [28-30]. Technological advances (Industry 4.0) are increasingly expanding the range of physical capabilities and activities: online training (personal and group), fitness platforms and social media groups have grown significantly in recent years. This demonstrates the high interest of consumers in trainers, instructors, etc. However, the study results showed that educational programmes for training such specialists are based on traditional methods that do not allow students to choose specific aspects of training (percentage of the elective component of the educational programme). The Bachelor's degree provides only general theoretical and practical knowledge of the organisation of training or competitions, while the Master's degree contains more highly specialised knowledge [31]. For the educational programme 014 of the second (Master's) level of higher education, practical training accounts for 33.3% of the total amount of credits of the European Credit Transfer and Accumulation System. At the same time, pedagogical practice does not provide the kind of experience that would allow students to fully prepare for professional activities. Instead, internships or dual education could significantly improve this situation.

The activities of students in the digital environment are not only about acquiring professional skills but also about adapting to modern realities. As mentioned above, most educational institutions have changed the format of education to distance and/or blended learning. According to the Strategy for the Development of Higher Education in Ukraine for 2022-2032, students can freely choose the format of education, including individual, distance learning, etc. [13]. This means that graduates of physical education faculties should have the skills to work in a distance format: be familiar with educational platforms (Moodle, Padlet, NZ, etc.), interactive technologies that allow working in a distance format (Learning, Kahoot, Canva, Google Space for Education, etc.), and electronic textbooks. The curricula of the specialities 014.11 and 017 of the Ternopil Volodymyr Hnatiuk National Pedagogical University, which was taken as an example, provide for the study of the disciplines "Digital Technologies and Metrological Control in Professional Activity" and "Information and Technical Teaching Tools" with a total number of 10 credits. For the quality training of specialists, it would be advisable to use blended learning models ("Flex Model", "On-line Driver Model", "Face-to-Face Driver", and "Rotation Model"), where students will form and develop skills in working with digital technologies. This study has shown that physical education teacher training programmes include full-time forms of education: lectures, seminars, practical classes, laboratory classes, and practical training. Blended learning combines traditional forms of education and the use of distance learning technologies [32]. Such learning is more personality-oriented and has a wider scope for academic freedom for students. During 2021-2023, the educational process at Ternopil Volodymyr Hnatiuk National Pedagogical University took place in full-time, distance, and blended learning formats.

General trends in the development of education require specialists to be competitive, able to quickly adapt to changes in professional activities, master innovative technologies, etc. This can be achieved by using the principle of integration of academic disciplines and knowledge from different fields of science. The implementation of the NUS Concept includes interdisciplinary integration, the use of knowledge from related disciplines, and the formation of a broad system of interdisciplinary links to form a comprehensive system of ideas about the world and improve systemic thinking skills. As the analysis of the educational programmes of the specialities 014.11 and 017 has shown, there are two such disciplines: "Biochemistry" and "Biomechanics" (3 credits each).

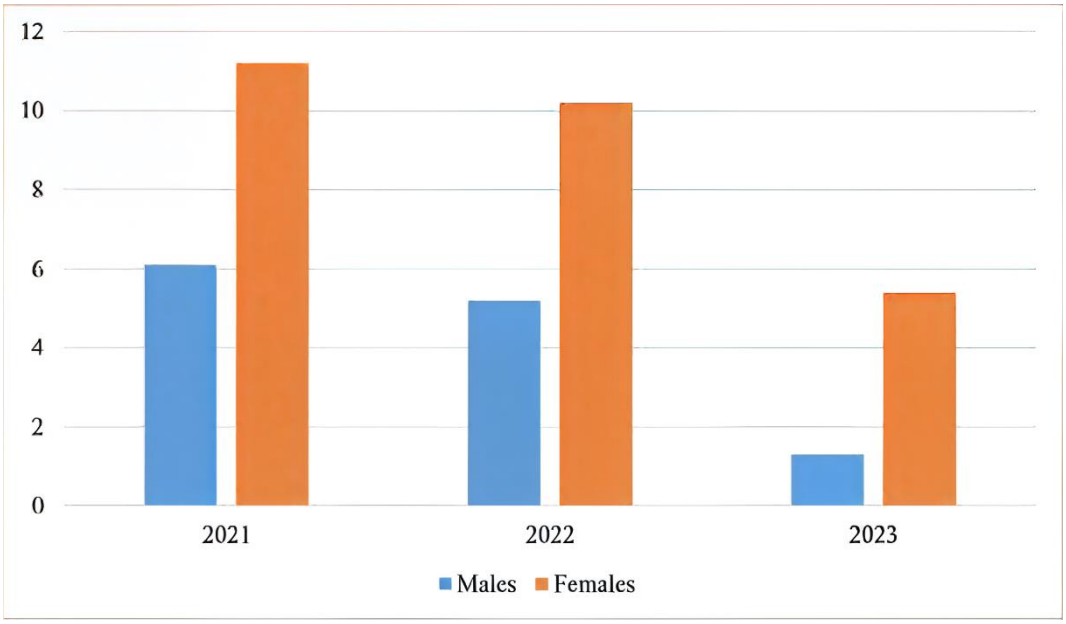

Figure 2. The number of unemployed people aged 15-24 in 2021-2023. Source: The National Institute for Strategic Studies [17]

The transformation of the labour market driven by rapid technological advancement has significantly elevated the importance of soft skills – such as interpersonal communication, emotional intelligence, teamwork, conflict resolution, adaptability, leadership, and critical thinking [33, 34]. These skills are now essential for successful integration into professional environments, especially in fields where direct human interaction, mentorship, and motivational guidance are central, such as physical education and sport instruction. The findings of this study indicate that while current physical education training programmes do provide a solid foundation in hard skills – technical competencies, instructional methodologies, and domain-specific knowledge – the development of soft skills remains under-emphasised and insufficiently systematised.

Although certain soft skills are nominally addressed through isolated components such as optional workshops or project-based activities, their integration into the formal curriculum lacks both depth and continuity. To address this gap, it is necessary to embed soft skills training as a structured, cross-cutting element throughout the educational trajectory. This can be achieved through the inclusion of dedicated courses such as "Communication and Leadership in Sport," "Conflict Management in Educational Settings," or "Teamwork and Coaching Psychology." Soft skills should be developed through experiential learning models, including service-learning, problem-based learning (PBL), collaborative sports projects, and peer mentoring. Interactive teaching formats – such as role-plays, debates, case studies, and reflective journals – should be systematically incorporated into core modules to reinforce these competencies in context.

Assessment strategies must evolve to capture not only knowledge acquisition but also the demonstration of soft skills in practice. Portfolios, peer assessment, and formative feedback loops could be used to track progress. Embedding soft skills in this manner would not only modernise the training of physical education professionals but also enhance their readiness to meet the multifaceted demands of contemporary educational and coaching environments, where collaboration, empathy, and adaptability are no less important than technical expertise.

To address current gaps in the psychological preparedness and soft skills development of future physical education and sports specialists, it is essential to introduce dedicated modules that respond to the realities of professional practice in post-crisis and high-stress educational environments. Proposed courses for integration into bachelor's and master's degree programmes include: "Psychological Resilience and Stress Management in Education," which would focus on coping strategies, emotional regulation, and burnout prevention; "Trauma-Informed Pedagogy and Inclusive Physical Education," aimed at preparing educators to work with students affected by trauma, displacement, or special educational needs; and "Mental Health Literacy for Educators," which would provide foundational knowledge in recognising and responding to psychological difficulties in student populations.

For the development of soft skills, programmes should implement modules such as "Leadership and Team Dynamics in Sport," "Conflict Resolution and Mediation in Educational Settings," and "Effective Communication and Emotional Intelligence in Coaching." These courses would apply interactive and practice-based methods, including role-playing, peer coaching, group problem-solving, and reflective journals. Embedding such modules within the core curriculum and offering them at both the undergraduate and graduate levels would ensure

consistent, structured development of essential non-cognitive competencies, aligned with the demands of contemporary educational and athletic settings.

The specificity of training physical education and sports specialists is the continuity of education: advanced training courses, self-education, and non-formal and informal education, which allows graduates to improve their professional competencies, and implement and develop innovative forms and methods of teaching in their activities.

4. Discussion

The study has shown that the education and training of physical education teachers, coaches and instructors has its specifics, which consists of the formation and development of competencies that should help stakeholders (service users) maintain social, physical and mental health. In addition, the scope of their activities includes the ability to develop group or individual wellness programmes (based on the needs and capabilities of each individual), use and implement modern digital technologies to restore, partially diagnose or maintain a person's physical condition, build individual educational trajectories, etc.

The results of the study are partially or fully correlated with the studies of other authors. The results of this study correlate with the findings of E. Backman and D. Barker [35], who emphasised the need to rethink the content of pedagogical knowledge for physical education teacher training. The experience of Australia has shown that such training of future specialists is more effective, based on the knowledge gained empirically. The point is that, given the changes in society, the very concept of education needs to be changed, because the range of physical activity has increased, and therefore the educational programmes for physical education teachers should be adapted to this. Different strategies and models of teaching should be applied, and their flexible combination will increase the effectiveness of the educational process. This is also emphasised by British scientists A. Casey and D. Kirk [36] who emphasise the obsolescence of traditional teaching practices and the need to replace them with more modern models. Among them are models of learning and curricula, each of which contains a separate set of social, cognitive, and psychomotor competencies designed to create a quality alternative to traditional learning models.

During the analysis of the educational programmes of this study, the educational programmes of specialities 014.11 and 017 were found to not contain such a concept as digital health. Notably, global digitalisation and technologization require qualitatively new results in the professional training of teachers and trainers. This is also emphasised by A. Chatterjee et al. [37] in their article about the digital impact on human life and health. The study highlights the potential of digital technologies to improve, maintain, and support a person's physical condition. This topic is also addressed by Y. Ronquillo et al. [25]. The researchers emphasise the importance of digital health, including the use of digital mobile devices to help track and adjust physical activity.

This study focused on the use of innovative technologies to improve the results of training. These include gamification of the educational process, hybrid educational games, etc. The conclusions about the importance of using such technologies coincide with the conclusions of other researchers. This aspect is also considered in the study by R. Barba-Martín et al. [38], which emphasises the use of educational games as a tool for developing technical skills, decision-making in different situations, and increasing physical activity. In addition to these skills, educational games develop and improve soft skills: teamwork, initiative, critical thinking, etc. Hybrid educational games were also studied by A. Gil-Arias et al. [39]. Notably, the use of hybrid games significantly improves the development of competencies of teachers, trainers and instructors, and increases the average achievement of students, which affects their motivation.

The analysis of educational programmes in this study showed that there is no methodology of cooperative learning as an analogue of hybrid games. However, its effectiveness is quite high. This is also emphasized by D. Bores-García et al. [40]. The results of the study showed that cooperative learning can be used during the educational process at different stages, as it is aimed at developing the ability to work in a team, determine the direction and intensity of physical activity, and affect motivation and a positive assessment of one's performance.

Given the growth of children with SEN, the curricula of preschool and secondary education institutions have changed. This has also affected the educational programmes of higher education institutions. For instance, one of the academic disciplines provides for the study of the specifics of working in an inclusive environment, as curricula and calendar planning should be created considering the characteristics of each child. This was also discussed by I. Demchenko et al. [41] and L. Lieberman et al. [42]. The researchers emphasise that the strategy of working in an inclusive environment differs from traditional teaching models, as it necessarily includes an individual development programme based on the conclusion of an inclusive resource centre.

Modernisation of society always requires changes in education [43]. The requirements of distance education caused by the COVID-19 pandemic and military operations in many regions of Ukraine have significantly accelerated the introduction and development of information and interactive technologies in the educational process. This includes the use of VR and AR in the educational process. A wide range of applications (including mobile ones) for virtual reality technology

increases the effectiveness of learning and makes it more interactive, practical, visualised and modern. This topic was addressed by Y. Liu et al. [44], J. Putranto et al. [45], and L. Tarangul and S. Romaniuk [46]. They emphasise the effectiveness of using VR and AR in the training of physical education teachers and coaches. These technologies are designed to expand the methodological tools of teachers for a better and more effective educational process. The conditions in which training takes place (mostly distance learning) are conducive to the use of computer-simulated situations to enhance professional development. Virtual sports grounds, training sessions, etc. are as close as possible to real ones and allow students to safely develop skills. VR and AR in Ukrainian education were also covered by N. Khmil et al. [47], which emphasised the prospects and possibilities of using such technologies in the educational process and analysed the main stages of implementation and the advantages and disadvantages of VR and AR in education. The results of this study correlate with the results of the above-mentioned scientists.

Ò. Chiva-Bartoll et al. [48], L. Garcá-Rico et al. [49] and R. Pérez-Ordás et al. [50] revealed the features of service learning: it is a set of professional and personal skills that are formed in the future physical education teachers following the needs of society. Similarly to the results of this study, the works reveal the essence of the strategy, which consists of combining theoretical and practical knowledge (with a significant advantage of practice) and developing social, professional and soft skills. They prove the positive result of implementing service learning for physical education teachers, instructors and coaches.

The psychological aspect is highly relevant in the training of future graduates of physical education faculties [51]. Due to several factors and reasons, the mental and psychological health of students is as important as their physical health. The consequences of stress, PTSD, special educational needs, etc. necessitate the training of physical education teachers in this area. This is also emphasised by S. Karasievych et al. [52], Y. Demus [53], and O. Sogokon and O. Kirilenko [54]. The socio-psychological competence of physical education teachers and coaches is no less important than the pedagogical one, as for the full development of the individual, a balance between the physical, social, mental and psychological aspects must be maintained. The results of this study suggest that the psychological component of the educational programme should be more extensive, considering vulnerable categories of students.

Specialists in physical culture and sports are representatives of the teaching community, and therefore their education is continuous. This includes advanced training courses and coaching. Educational trends are changing every year, and the range of innovative and interactive technologies is expanding, so teachers (of any discipline, and especially physical education, as it is related to the health of students) must constantly improve their knowledge and skills, master new technologies, etc. The results of this study suggest that the educational programmes of specialities 014.11 and 017 are designed for advanced training (Bachelor's and Master's degrees). This is also emphasised by M. Griffiths et al. [55] and J. Stone et al. [56], who emphasise the importance of in-service training and coaching for the professional development of physical education teachers. P. Ward and H. van der Mars [57] also investigated this topic, discussing the duration of professional development throughout life and emphasising the importance of constant change in the professional activities of physical education teachers. The study also emphasises the need for professional growth and self-improvement of future teachers, focusing on the introduction of as many innovative technologies as possible in the educational process.

O. Marchenko and O. Moskalenko's study [58] explores the motivational and needs-based aspects of future physical education specialists, emphasizing the importance of personal motivation in shaping effective professionals. Their findings suggest that understanding these motivational factors is crucial for designing educational programmes that align with modern demands, including continuous professional development and the adoption of innovative teaching methods. This is relevant to our study, as it highlights the need for physical education teachers to adapt to diverse student needs and societal changes, particularly in the context of inclusive education.

T. Hulko's research [59] focuses on developing students' ability to apply modern healthcare technologies in physical education and sports. This aligns with our discussion on the integration of digital tools and health monitoring technologies into physical education training. Author emphasizes how these technologies can enhance teaching effectiveness and provide individualized approaches to physical development, which is essential in modern education. Both studies underline the importance of updating curricula to equip future specialists with the skills needed to integrate new technologies and meet evolving educational demands.

The analysis highlights the need to adapt physical education training programmes to meet contemporary societal demands. The integration of digital health technologies, inclusive education strategies, and innovative teaching methods is crucial for preparing future specialists to effectively address the diverse needs of students. The use of modern tools such as VR, AR, and hybrid educational games can significantly enhance the learning process, fostering both professional and soft skills. The increasing relevance of psychological support, particularly in dealing with stress and mental health issues, emphasizes the importance of a holistic approach to education.

5. Conclusions

The professional activity of physical education teachers, coaches and instructors requires thorough training in various areas: from digital literacy to the development of resilience skills. The effectiveness of the use of existing educational programmes affects the formation of the competencies of future specialists, so they should include key points that determine the quality of the final result – the professional level of the graduate and professional skills. The analysed educational programmes of the Faculty of Physical Education of Ternopil Volodymyr Hnatiuk National Pedagogical University showed the importance of introducing dual forms of education, innovative technologies and educational practices and methods into the educational process, updating the content of educational programmes and methodological support. Priority areas for the development of higher education should include increasing the competitiveness of future graduates in the labour market, improving the qualification competencies of specialists, increasing the level of academic freedom and integrity, etc.

The study concludes that the current system of professional training for physical education and sports specialists in Ukraine only partially responds to the dynamic needs of society. The increasing popularity of physical activity, the expansion of the fitness and wellness industry, and the rise of digital and mobile technologies for health monitoring have significantly changed the demands placed on future specialists. However, existing educational programmes often remain traditional in structure, with limited integration of digital tools, inclusive practices, psychological preparedness, or interdisciplinary content. There is also a notable disconnect between academic training and labour market needs, as well as insufficient mechanisms to support vulnerable student groups and ensure the employment of graduates.

To address these challenges, educational programmes must be substantially modernised and aligned with current realities. Priority should be given to updating curricula to include digital health technologies, psychological resilience, and inclusive education. The development of a barrier-free educational environment and the integration of dual education models are essential for ensuring practical relevance and employability. It is also critical to support academic mobility, foster international cooperation, and provide targeted assistance to displaced students and those from temporarily occupied territories. Strengthening the link between education and employment through strategic partnerships with sports organisations and local authorities, as well as embedding applied research and social initiatives into the educational process, will enhance the responsiveness and quality of training. Finally, sustainable reform requires updated regulatory and financial frameworks to support innovation, quality assurance, and the long-term professional development of physical education and sports specialists.

The study was partially limited by the lack of some data caused by the hostilities and the forced migration of students and teachers. Prospects for further research could be the development of educational and methodological support for physical education faculties, and the introduction of innovative technologies in the educational process.

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