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Preparing future physical education teachers for inclusive education in secondary education institutions

Abstract. The relevance of the topic is due to the growth of public demand for inclusive education, the presence of an appropriate legislative basis and dynamic changes in the education system. The purpose of the study was to develop, scientifically substantiate and experimentally confirm the effectiveness of the author's model of training future physical education specialists to work in conditions of inclusion. To achieve the goal of the study, a set of theoretical methods was used: analysis and synthesis of professional literature, in particular, correctional and special pedagogy, physical education methodology, higher education pedagogy, etc.; logical and systemic analysis; comparison; classification; and modelling. The empirical methods included: pedagogical observation, questionnaires, and pedagogical experiment. The experiment confirmed the effectiveness of the author's model of training future physical education teachers for inclusive education in the synergistic unity of three blocks: conceptual-target, operational-content and control-result and pedagogical conditions: the formation of positive motivation for professional activity and psychological and pedagogical support for students; development and implementation of specially oriented training content, which requires the integration into the educational process of professionally oriented disciplines, in particular "Special Pedagogy in Physical Education" and "Inclusive Physical Education of Schoolchildren"; development of practical skills through production pedagogical practice. The implementation of the model yielded the following quantitative results: in the experimental group, a significant increase in students with high (+12.5%) and sufficient (+25.7%) levels of readiness was observed, while the number of applicants with average (-6.6%) and low (-32%) levels significantly decreased. This significantly exceeds the indicators of the control group, where the increase in high and sufficient levels was only 4.3% and 16.6%, respectively, and the decrease in average and low levels was 2.2% and 23.1%. The developed educational and methodological materials and scientific principles can be used by scientific and pedagogical workers of higher education institutions to prepare future physical education teachers for work in inclusion conditions

Keywords: professional training; physical education specialists; inclusive education; educational institutions; students with special educational needs; training model

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INTRODUCTION

The modern education system is actively changing, and one of the key areas is the implementation of inclusive education, which provides equal opportunities for all students. The effectiveness of this process largely depends on the readiness of teachers, especially physical education teachers, who influence the physical development, social competencies and integration of children with various educational needs. Working with students with special needs requires the teacher to have special knowledge, skills and flexibility in organising learning, as well as effective interaction with parents and colleagues. Therefore, research into the preparation of future physical education teachers for inclusive education is relevant and necessary for improving the quality of education and the formation of humanistic values.

Over the past decade, the issues of developing inclusive education, methods of its implementation and ensuring quality conditions for people with special educational needs (SEN) have been actively studied by both Ukrainian and foreign scientists. Analysis of international experience in implementing an inclusive approach in education has made it possible to identify significant scientific works that have made a significant contribution to the formation of its theoretical and methodological foundations. J.O. Aloka & A. Mamogobo (2025) studied the challenges faced by teachers in implementing inclusive education in a general education school in South Africa. The authors, relying on the social model of disability, found that the main obstacles are the negative attitude of teachers, insufficient knowledge of inclusive policies, low self-esteem of teachers and insufficient professional training. The study emphasises the need for priority attention to initial and continuous training of teachers in identifying the needs of students with disabilities and effectively managing them. M.J. Jardinez & L.R. Natividad (2024) devoted their research to analysing the advantages and problems of inclusive education, as well as ways to achieve equality in the classroom. The authors identify numerous barriers to successful implementation, including insufficient teacher training, limited resources and infrastructure, difficulties in building relationships with peers, and insufficient parental involvement. The study highlights the importance of adequate teacher training, as limited understanding and skills can make it difficult to create an inclusive environment.

S. Tsirantonaki & A. Vlachou (2025) provide a systematic review of school principals' attitudes towards inclusive education. The study analyses existing literature to summarise school principals' views and assessments of the implementation of inclusive practices, challenges and factors influencing their management decisions in an inclusive environment. The results of this analysis are important for understanding the role of administrative staff in shaping an inclusive culture in schools. A study by A.B. Llanes & M.C.L. Llanes (2023) was devoted to the analysis of the effectiveness of a capacity-building program for teachers working with students with special educational needs. The

results showed that after completing the program, teachers' knowledge and experience in this area significantly increased. This indicates that targeted professional development programs are an effective way to provide teachers with the necessary tools and knowledge for successful work in inclusive classrooms. The article by N.V. Bezzlyudna & N.V. Dudnyk (2023) examined the theoretical foundations of preparing future primary school teachers for work in inclusive education. The author analyses the key components of teacher readiness, namely: motivational, cognitive, activity and reflective. The work emphasises the importance of forming a holistic understanding of inclusion in students and providing them with practical skills to create an adaptive and supportive learning environment.

H. Stambekova *et al.* (2021) analysed modern approaches to professional training of teachers in inclusive education. The author emphasises the need to implement innovative methods, such as co-teaching, universal design for learning (UDL), and interactive training, which allow teachers to effectively develop practical skills. The study emphasises that high-quality training should be based not only on theoretical knowledge, but also on the development of emotional resilience, empathy, and the ability to cooperate with other specialists. Despite the significant attention of scientists to various aspects of inclusive education and the preparation of future physical education teachers for work in inclusive settings, certain issues remain insufficiently covered. There is a lack of research on specific methods and approaches to adapting physical exercises, games, and motor activities for students with different types of disabilities (for example, with musculoskeletal disorders, sensory disorders, or intellectual disabilities).

The purpose of the study was to create, theoretically substantiate and experimentally verify the effectiveness of the author's model of training future physical education teachers for the organisation of inclusive education in secondary education institutions. The main tasks were as follows: to substantiate methodological approaches and pedagogical conditions for the formation of the readiness of future physical education teachers for inclusive education, to determine the criteria and levels of formation of this competence, and also to experimentally verify the effectiveness of the developed author's model of training.

MATERIALS AND METHODS

To solve the tasks and achieve the goal of the study, a set of theoretical and empirical methods was used. The theoretical methods included a review, analysis and synthesis of modern literature on special and correctional pedagogy, physical education methods, and vocational education, which allowed to outline key concepts and comprehend the content of the phenomenon. Logical and systematic analysis, classification, analogy, induction, deduction and generalisation were used to determine the basic pedagogical conditions necessary for preparing students for effective individual work in an inclusive environment. The

modelling method was used to develop a model for preparing future physical education teachers for work in inclusive education in secondary education institutions. Comparative analysis of data from the experimental and control groups before and after the experiment was used to identify causes, consequences and interdependencies between variables. The empirical methods included pedagogical observation, questionnaires and testing, which allowed to investigate and evaluate the effectiveness of pedagogical conditions and training models. The pedagogical experiment (confirmatory, formative and control stages) was aimed at assessing the level of readiness of future physical education teachers to work in an inclusive educational environment and checking the effectiveness of the proposed author's training model. In order to assess the level of readiness of students for professional activity, an open anonymous questionnaire was conducted, which contained three blocks: cognitive, motivational value and professional-practical. The cognitive block included the question:

1. What definition of inclusive education is, in your opinion, the most complete?
2. What are the main regulatory and legal documents of Ukraine that regulate inclusive education in the field of physical education?
3. Define the concepts of "individual development program" and "universal learning design".
4. What basic principles of adapting physical exercises for students with musculoskeletal disorders do you know?
5. Name three effective strategies for involving a child with autism spectrum disorders in team games.
6. What factors should be considered when choosing sports equipment for an inclusive class?

The responses were evaluated on a five-point scale, where 5 points corresponded to the most complete and correct answer, and 1 point to an incorrect one. The motivational and value block was aimed at identifying attitudes, beliefs and readiness for interaction. The Likert scale ("strongly agree", "agree", "hard to say", "disagree", "strongly disagree") was used for the assessment, which was converted into a five-point system (5 – "strongly agree", 1 – "strongly disagree"). The questions of this block were:

1. I believe that inclusive physical education lessons benefit all students, not just children with special needs.
2. I will be comfortable working with children who have visible physical disabilities.
3. Physical education teachers should take an active part in developing individual development programs.
4. I feel ready for the challenges of working in an inclusive classroom.
5. Having a child with a disability in the classroom will not complicate my work.
6. I am ready to independently study additional information and take courses to improve my qualifications.

The professional-practical block contained questions on practical skills and willingness to cooperate:

1. Describe in five sentences your own experience of communicating or interacting with people with disabilities.

2. Suggest options for adapting an outdoor game for a classroom with students with disabilities.

3. Which of the specialists (teacher assistant, correctional teacher, psychologist, parents) would you work with most closely and why?

4. Assess your level of skills in adapting motor tasks to the needs of students with special educational needs.

5. Assess your level of skills in interacting with parents of children with special educational needs.

The responses were assessed on a five-point scale. For each respondent, an average score was calculated for the block, after which the level of readiness was determined. Four levels were established:

➤ High (4.1-5.0 points): students have deep knowledge, high motivation and confidence in their practical skills, are aware of the importance of inclusion and are ready for innovative approaches.

➤ Sufficient (3.1-4.0 points): students have sufficient knowledge and a positive attitude, but need additional support and practical training.

➤ Average (2.1-3.0 points): characterised by fragmentary knowledge, an uncertain attitude towards inclusion, and the need to deepen theory and practice.

➤ Low (1.0-2.0 points): students demonstrate a low level of knowledge and motivation, and are unprepared to work in an inclusive environment.

To obtain a percentage distribution, it was determined what proportion of respondents belonged to each level. The pedagogical experiment was carried out in three stages. The ascertaining stage determined the criteria, indicators and levels of readiness of future teachers, and selected diagnostic methods (questionnaires, test papers, practical tasks, lesson plan-summaries, physical fitness tests). The formative stage involved the development, justification and implementation of a model for training future physical education teachers for professional activity in an inclusive environment. The control stage included repeated diagnostics and verification of the effectiveness of formative influences. The study was attended by second-year students: control group ($n = 184$) and experimental group ($n = 200$). 10% of respondents with the highest and lowest readiness indicators were excluded from the total sample to avoid extreme values. The experiment was conducted in the 3rd-4th semester of the 2024-2025 academic year. Based on Poltava National Pedagogical University, Kharkiv State Academy of Physical Culture, Hryhoriy Skovoroda University in Pereyaslav, Ivan Franko Zhytomyr State University and Poltava Institute of Business of the Yuriy Bugay International Scientific and Technical University. Diagnostics of students' readiness was carried out according to five criteria: motivational and value (attitude to inclusive education), cognitive (knowledge and understanding of methods), operational and activity (ability to organise lessons), reflective and evaluative (ability to analyse one's own activities) and socio-communicative (effectiveness of interaction with students, colleagues and parents). Additionally, the emotional and volitional criterion was taken

into account, reflecting the teacher's readiness to maintain a positive psycho-emotional climate.

Four levels of readiness were determined based on a set of criteria: high – students with deep knowledge, high motivation and developed practical skills; sufficient – with moderate motivation, sufficient level of knowledge and partial skills; medium – students with fragmentary knowledge and uncertainty in practice; low – with limited knowledge, insufficient motivation and lack of skills to work in an inclusive environment. The preparation of future physical education teachers for work in inclusive classes was carried out based on the principles of humanism, accessibility, equality, individualisation, integration,

scientificity, practical orientation, complexity, continuity, partnership, activity and variability, which ensured the integrity and systematicity of the study. The study was conducted in accordance with the American Psychological Association (2010).

RESULTS AND DISCUSSION

To identify the preliminary state of formation of competence of future physical education teachers for professional activity in the inclusive environment of general secondary education institutions (GSSE), a pedagogical experiment was conducted, the results of which are presented in Tables 1 and 2.

Table 1. Initial state of readiness of future physical education teachers for professional activity in an inclusive environment of secondary education institutions

Level of formation	Experimental group (EG)		Control group (CG)	
	persons	%	persons	%
High	17	8,5	16	8,7
Sufficient	33	16,5	28	15,2
Average	61	30,5	59	31,8
Low	89	44,5	81	44,3
Total	200	100	184	100

Source: developed by the authors

Table 2. Results of preliminary diagnostics of EG and CG by levels and criteria

Criterion	High %		Sufficient, %		Average %		Low %	
	EG	CG	EG	CG	EG	CG	EG	CG
Motivational-value	10	11	20	18	30	32	40	39
Cognitive	9	8	19	20	31	34	41	38
Operational-activity	7	6	14	10	30	31	49	53
Reflective-evaluative	6	5	12	9	34	29	48	57
Social-communicative	9	11	15	17	27	32	49	40
Emotional-volitional	10	11	19	17	31	33	40	39
Average value	8,5	8,7	16,5	15,2	30,5	31,8	44,5	44,3

Source: developed by the authors

A generalised analysis of the results of the ascertaining experiment showed that according to the motivational and value criterion, most applicants have weak motivation for future professional activity with students with special needs, have a superficial understanding of the concept of inclusive education and insufficient awareness of the value of each child regardless of their abilities; have no interest in professional development in the field of inclusive education. The results of the study of the cognitive criterion showed insufficient knowledge among students of regulatory and legal documents regulating the activities of inclusive education, have limited knowledge about the features of the physical and cognitive development of children with special needs, weak orientation in methods of adapting physical activity, and have insufficient understanding of the need for social and psychological support for children with special educational needs.

According to the operational and activity criterion, partial ability to adapt curricula to the needs of students with inclusion is noted; lack of skills in applying special

methods for working in inclusive classes, difficulty in organising inclusive sports events or outdoor games; students have fragmentary skills in collaborating with assistants and other teachers. According to the indicators of the reflective-evaluation criterion, it was found that most respondents have low reflection on their own professional activities, sometimes evaluate the successes and difficulties of students with SEN, do not conduct self-analysis and are unable to improve their own pedagogical activities. The indicators of the social-communicative criterion in future physical education teachers are mainly at an average and low level. This is manifested in a low level of communication with students, in unformed skills to involve students in activities, and weak mastery of skills of cooperation with colleagues, parents, etc. According to the emotional-volitional criterion, applicants have low emotional stability and the ability to empathise; students are unable to support other students emotionally in practice. The identified predominantly low level of professional competence of future physical education

teachers for activities in an inclusive educational environment prompted the development, theoretical

substantiation, and experimental verification of the author's pedagogical model (Fig. 1).

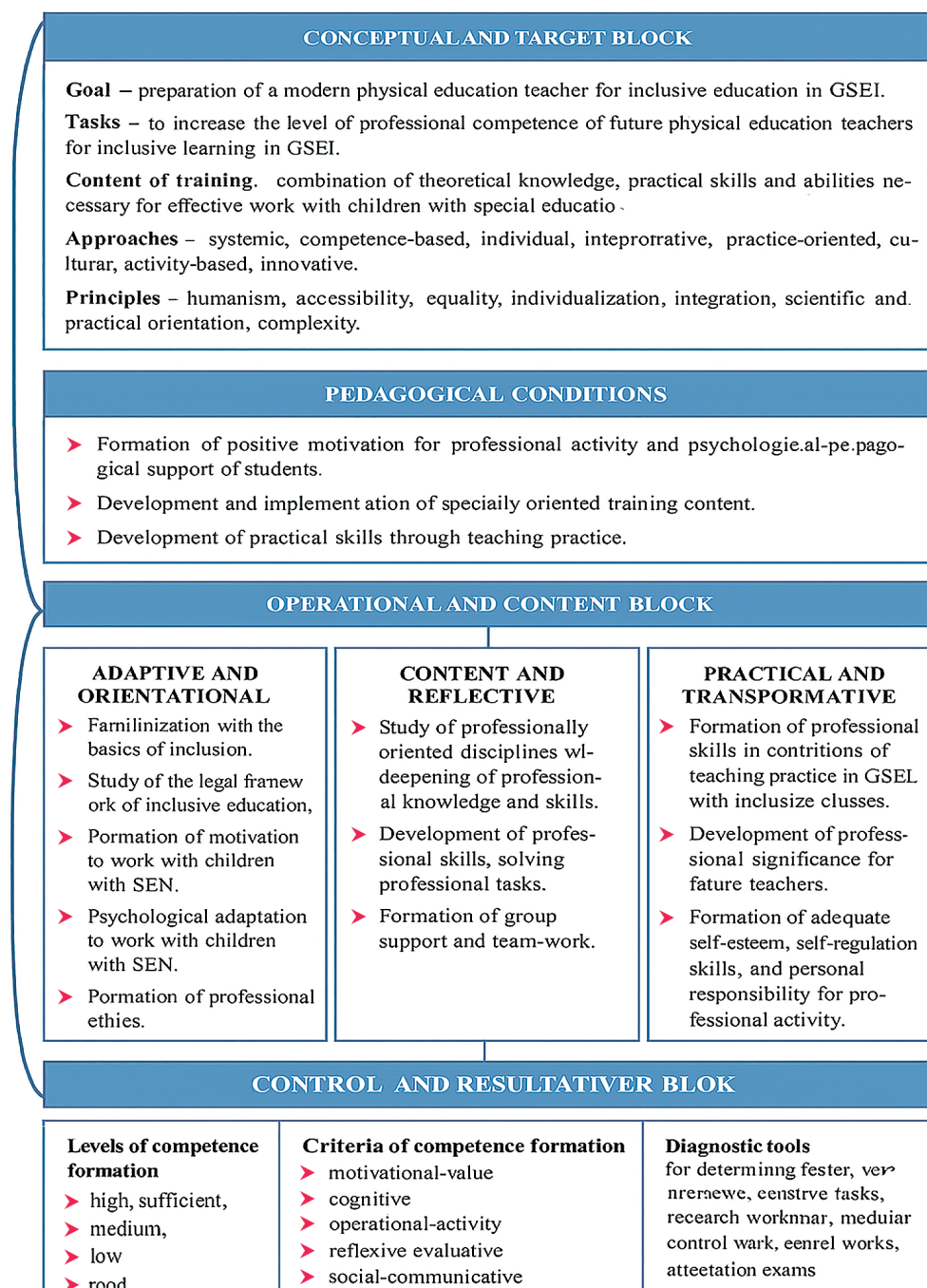


Figure 1. Model of training future physical education teachers for inclusive education in secondary education institutions

Source: developed by the authors

The basis of this model is a system of interconnected stages that lead to the formation and development of professional qualities of teachers. According to the conceptual basis of the model, professionally significant qualities of the personality of the future teacher not only become visible but also actively develop in conditions that contribute to their growth, starting with adaptation and ending with

the integration of the personality into the professional environment. The main component of the model is the conceptual-target block, which includes the goal, as an ideal image of the expected result of the functioning of the model, tasks, content of training, as well as the methodological basis (approaches and principles) for the implementation of tasks that act as intermediate goals, and the definition

of smaller actions to achieve these results. Professional training of specialists is a holistic, integral process based on a number of methodological approaches, the most significant of which are: systemic, competency-based, individual, integrative, activity-based, and practice-oriented (Sushchenko, 2003).

The systems approach is a research methodology that involves considering objects as holistic systems. It focuses on identifying the integrity of the object, analysing various relationships between its elements, and forming a single theoretical model. The use of a systems approach contributes to the effective design and implementation of the educational process through structuring the content of educational material and optimising the management of the process of its assimilation. The competency-based approach assumes that to successfully fulfil their professional duties, future physical education teachers must master the necessary knowledge, skills, abilities, and develop important personal qualities. They must be ready to carry out correctional and pedagogical, diagnostic and advisory, research, and cultural and educational work in educational and healthcare institutions (Chernichenko, 2017).

The basis of the concept of an individual approach is the principle of the interrelation of two levels of influence: external (procedural) and internal (psychological). The external, or procedural, level involves adapting the educational process to the needs of the student (for example, changing teaching methods, forms of work, pace of learning), while the internal, or psychological, level focuses on the student's personal perception (his motivation, emotional state, readiness for learning), which is crucial for the successful assimilation of the material. Important characteristics of this approach are reflection, dialogue and subjectivity. According to L.P. Sushchenko (2003), personally oriented professional training of future teachers is a scientifically substantiated system of interaction between students and teachers of a higher education institution, where the principle of a personalised approach is the basis. This system is rich in content, individualised in form, intensive in time, and aimed at forming a semantic paradigm of the future teacher's personality. An individual approach confirms the understanding of a person as an individuality, directs the organisation of the pedagogical process towards the individual, who is the goal, result and criterion of effectiveness, and requires recognition of the uniqueness of the individual, his or her right to freedom and respect.

The integrative approach reveals the intellectual potential of preparing a future physical education teacher for inclusive education in secondary education institutions, contributes to the formation of general and professional competencies, and also creates psychological and pedagogical conditions for the development of self-education, self-development, and socialisation (Babenko, 2008). This approach makes it possible to ensure the complexity and integrity of the knowledge of future physical education teachers, contributing to the development of systemic thinking and a rational worldview, and its use in the educational

process of higher education institutions is aimed at training specialists with a high level of mastery of general cultural, general professional and professional competencies.

The activity approach is a complex of theoretical, methodological and empirical research that studies the psyche and consciousness, as well as their development and formation through various forms of subject activity. This approach is focused on acquiring deep systemic knowledge, improving general methods of action and their creative application in various situations. The main characteristics that distinguish educational activity from other types of activity are its focus on mastering educational material and solving educational tasks. The result of such activity is structured and updated knowledge, which becomes the basis for solving tasks that require its application in various fields of science and practice (Babych, 2010). The practice-oriented approach to training a future physical education teacher for inclusive education in secondary education institutions involves the active integration of theoretical knowledge and practical skills. This allows the future teacher to work effectively with students with different needs and abilities. The approach focuses on developing students' skills to adapt physical exercises, create an inclusive environment, and apply appropriate methods for organising physical education lessons (Chernichenko, 2017).

Pedagogical conditions play an important role in the model of formation of specialists. The first condition is the formation of positive motivation for professional activity and psychological and pedagogical support of students, which is fundamental in the process of preparing future physical education teachers for professional activity in an inclusive environment of secondary education institutions. It includes: the use of practice-oriented tasks to create a positive attitude towards working with children with SEN; the use of examples of successful inclusive practice, in particular, through the participation of students in open lectures or events dedicated to inclusive education; motivation for continuous professional growth in the field of working with children with SEN; the organisation of trainings, seminars and workshops aimed at developing empathy, tolerance, and communication skills; the involvement of psychologists and specialists in working with children with SEN to advise students; the creation of conditions for students to reflect on their own pedagogical activity and attitude to inclusive education.

The second condition is the development and implementation of specially oriented teaching content, which includes the development and implementation of two professionally oriented disciplines in the educational process: "Special Pedagogy in Physical Education" and "Inclusive Physical Education of Schoolchildren". In the process of teaching these OKs, it is important to: use modern forms and methods of organising the educational process, interactive teaching methods; use of the case method, situation modeling, role-playing games for teaching work in inclusive conditions; conduct discussions and master classes with the analysis of complex pedagogical situations; use

of modern technologies, in particular multimedia, to create individual and group educational tasks; use of tools for self-analysis and self-assessment of students regarding their readiness for inclusive learning; inclusion of tasks for the formation of reflection in the educational process; regular assessment of the level of formation of students' competencies using questionnaires, tests, portfolios, etc.; involving physical education teachers who have successful experience working in an inclusive environment in the educational process; conducting joint classes and seminars with specialists who work with children with special needs; taking into account the personal characteristics and abilities of each student during preparation for work in an inclusive environment; providing the opportunity to choose the topics of projects and practical tasks that meet their interests and future career goals. An important element in accordance with this pedagogical condition is the provision of a material and technical base, namely: equipping classrooms with special equipment for demonstrating and modelling physical education lessons in an inclusive environment; providing access to educational materials aimed at adaptive physical education; and creating a database of educational videos and other resources for training students.

The third condition is the development of practical skills through production pedagogical practice. According to this pedagogical condition, the organisation of production pedagogical practice should be carried out exclusively in inclusive classes or specialised schools to gain direct experience; mandatory cooperation with teacher assistants, correctional teachers and psychologists to understand the features of teamwork; ensuring that students are trained in the organisation and conduct of physical education lessons adapted to the needs of children with SEN (Demus, 2023). The operational-content block of the model is structured into three stages of preparation: adaptation-orientation, content-reflection and practical-transformation. At the adaptation-orientation stage, familiarisation with the

basics of inclusion occurs, the study of the regulatory and legal framework of inclusive education, the formation of motivation to work with children with SEN, psychological adaptation to work with children with SEN, and the formation of professional ethics. At the content-reflective stage, the study of disciplines of practical orientation to deepen professional knowledge and skills, in particular, the practical development of professional skills, solving problem tasks, the formation of group support and team interaction. At the practical-transformational stage, special attention is paid to the integration of theoretical concepts with their practical application. Students are involved in solving real pedagogical tasks, including the management of educational activities, the development of programs and conducting classes, contributing to the awareness of the functional aspects of pedagogical methods and strategies, as well as their adaptation to the individual needs of students. This practical experience deepens the understanding of the educational process, the specifics of students' needs and contributes to the development of key skills. For future physical education teachers, this stage is of particular importance in the context of preparation for work in an inclusive environment. Students acquire the skills to adapt physical activities according to the various psychophysiological characteristics of students, which includes not only lesson planning, but also the formation of a safe and supportive environment for all participants in the educational process. Testing the acquired competencies in real conditions contributes to the awareness of the complexity of inclusive education, the development of empathy and flexibility in the pedagogical approach, which is critically important for ensuring equal access to quality education (Lyubarets *et al.*, 2017). Technological aspects of professional training of physical education teachers in inclusive education include adaptation to the future profession, the development of individual skills and competencies through gradual integration into the professional educational environment (Table 3).

Table 3. Organisational and methodological principles of professional activity of physical education teachers in conditions of inclusive education in secondary education institutions

Contents	Methods	Forms	Features
Planning and organising physical education lessons	Individualised Learning Method	Frontal forms of organisation	Adaptation of curricula
Adaptation of physical exercises and games	Group Work Method	Individual classes	Use of differentiated teaching methods
Creating an inclusive environment	Differentiated Instruction Method	Group classes	Psychological support and motivation
Monitoring and evaluation	Visualisation and Demonstration Method	Game classes	Collaboration with other specialists
Psychological and pedagogical support	Game Method	Complex classes	Correctional and developmental nature of physical exercises
Training and advanced training	Physical Therapy and Remedial Exercise Method	Classes using the blended learning method	Monitoring and evaluation
Overcoming stress factors	Feedback Method	Correctional, developmental, and extracurricular classes	Working with a group of students

Source: developed by the authors

Each technological stage is characterised by clearly defined tasks and methods of their implementation, which ensures deep assimilation of the material and the development of professional skills. The content of the professional activity of physical education teachers in inclusive education is a set of tasks, methods, approaches and competencies that ensure effective physical education of all students, including children with special educational needs. In such conditions, the teacher's activity is aimed at integrating children with different abilities into the educational process, taking into account their physical, intellectual and emotional characteristics. Individualisation of curricula in physical education is an important component of inclusive education. It allows you to take into account the individual needs of each student, adapting the educational process and ensuring equal participation of all children in physical activities.

Methods of professional activity of physical education teachers in inclusive education are a set of special pedagogical approaches that allow you to effectively teach physical education, taking into account the diverse educational and physical needs of students. These methods help to ensure equal access to physical education for all students, including children with SEN. The use of individualised, differentiated, and game methods contributes to the socialisation of students, the development of their physical and social skills, and increasing motivation for physical education classes. Forms of professional activity of physical education teachers in inclusive education in secondary education institutions include various organisational approaches and work models that are used to ensure effective learning of all students, including children with SEN. These forms involve an individual approach, adaptation of exercises and activities, as well as the integration of students into joint educational activities. They aim to ensure

the active participation of all students, regardless of their physical or sensory capabilities. The use of various forms of classes – from individual to group and game – helps to adapt the educational process, taking into account the needs of each child, and promotes their physical, emotional and social development.

The specifics of the professional activities of physical education teachers in inclusive education in secondary education institutions are due to the need to ensure equal access to physical activity for all students, including children with disabilities. These features include individualisation of the approach, adaptation of programs and exercises, psychological support, as well as cooperation with specialists to ensure maximum involvement of children in the educational process. The main goal of the teacher's activity is to create conditions that promote the physical, social and emotional development of all students, regardless of their abilities (Demus, 2023). Therefore, the content, methods, forms and features of the professional activities of physical education teachers in inclusive education are of critical importance for ensuring equal access to education for all students, regardless of their physical abilities. Inclusive education is an important part of modern pedagogical activity, and for physical education teachers, this means responsibility for the physical development of each child, regardless of their abilities. The final stage of the training model is the control and results block, which involves determining the effectiveness of the proposed model of training future physical education teachers for professional activity in an inclusive environment of secondary education institutions. The introduction of the author's model into the process of professional training allowed to obtain control results of the study by levels and criteria, which are presented in Tables 4 and 5.

Table 4. Results of EG and CG diagnostics by levels and criteria at the control stage

Criterion	High %		Sufficient %		Average %		Low %	
	EG	CG	EG	CG	EG	CG	EG	CG
Motivational-value	22	15	44	33	25	35	9	17
Cognitive	20	12	42	30	25	34	13	24
Operational-activity	19	11	40	31	23	33	18	25
Reflective-evaluative	20	10	40	30	25	33	15	27
Social-communicative	23	16	44	34	24	35	9	15
Emotional-volitional	22	14	43	33	24	34	11	19
Average value	21	13	42,2	31,8	24,3	34	12,5	21,2

Source: developed by the authors

Table 5. Dynamics of the formation of competence of future physical education teachers for professional activity in the inclusive environment of secondary education institutions before and after the experiment

Level of formation	EG		Dynamics, %	CG		Dynamics, %
	At the ascertaining stage of the experiment, %	At the control stage of the experiment, %		At the ascertaining stage of the experiment, %	At the control stage of the experiment, %	
High	8,5	21	+12,5	8,7	13	+4,3
Sufficient	16,5	42,2	+25,7	15,2	31,8	+16,6
Average	30,5	24,3	-6,6	31,8	34	-2,2
Low	44,5	12,5	-32	44,3	21,2	-23,1

Source: developed by the authors

The result-criterion analysis of the final cut showed positive dynamics in the EG compared to the CG. The distribution of results demonstrated a significant shift in results towards high and sufficient levels of readiness. In particular, in the EG, there is a significant increase in the number of students at a high level according to all criteria. The most pronounced increase (by 7-8 percentage points) was recorded for the social-communicative (23% versus 16% in the CG), motivational-value (22% versus 15%) and emotional-volitional (22% versus 14%) criteria. This indicates the effectiveness of the program in forming a positive attitude, empathy and interaction skills. As for the sufficient level, the highest indicators are also observed in the EG. In particular, for the motivational-value and social-communicative criteria, the results in the EG are ahead of the CG by 11 percentage points (44% versus 33% and 34%, respectively). These criteria are considered the

most informative regarding the effectiveness of the model, since their improvement contributed most to the overall increase in readiness. The distribution at the medium and low levels indicates a reverse trend: in the EG, the number of students at these levels is significantly lower than in the CG. According to the operational-activity criterion, only 18% were found at a low level in the EG, while in the CG, 25%. A generalised analysis of the results shows that the majority of EG students (42.2%) reached a sufficient level, and 21% – a high level, while in the CG, the majority (34%) remained at an average level, and 21.2% of students are at a low level. This confirms that the proposed training model is effective in forming the readiness of future physical education teachers for the conditions of inclusive activity. According to the results of the formative experiment, the developed training model showed high efficiency (Fig. 2).

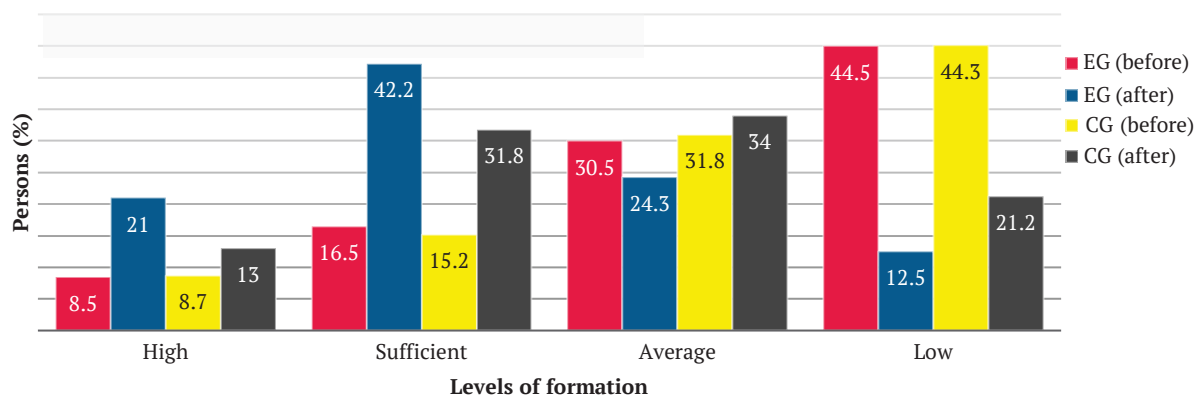


Figure 2. Comparative quantitative analysis of the readiness of future physical education teachers for professional activity in an inclusive environment in general secondary education institutions in EG and CG at the control stage of the experiment (developed by the authors)

Source: developed by the authors

Analysis of changes in the EG and CG showed that the implementation of the model caused a significant positive shift in the levels of readiness of future physical education teachers. In particular, a significant increase in students who reached high and sufficient levels was recorded in the experimental group. The number of students at a high level in the EG increased by 12.5%, which is almost three times higher than the increase in the CG (4.3%). Similarly, the increase in a sufficient level in the EG (25.7%) was almost twice as high as in the CG (16.6%). The effect of the model is also manifested in a significant reduction in the number of students at medium and low levels. The decrease in the percentage of students at a low level in the EG (-32%) is much greater than in the CG (-23.1%), which indicates the successful formation of professional qualities and competencies of applicants. The total increase in the percentage of students at high and sufficient levels in the EG (38.2%) is significantly higher than the similar indicator in the CG (20.9%). These results confirm that the developed model is effective in forming the readiness of future teachers to work in an inclusive

environment. Thus, positive dynamics were found both in the EG, where purposeful work was carried out, and in the CG, where the training process took place according to the traditional system, but in the experimental group, the results are significantly higher.

The conducted study confirms its relevance and timeliness, which is consistent with the works of leading foreign authors, in particular with L.P. Ewe *et al.* (2023). Scientists emphasise the exceptional value and importance of using an individual approach in the system of inclusive education, which should adapt to the unique needs of students with different types of nosologies and aims not only to teach the material, but also to form positive self-esteem, social integration and development of all students. The importance of an individual approach also lies in the fact that it is the basis for the development of unique abilities, socio-emotional potential and competencies of each student. This opinion is supported by Ukrainian researchers. N.Z. Sofii (2007) analysed in detail the conceptual aspects of inclusive education, emphasising the need for the systematic implementation of individualised learning

strategies and pedagogical technologies that allow taking into account the psychophysical characteristics of each student. The author emphasises that inclusion is not only the adaptation of the material, but also a complex process of social integration, which involves the interaction of students, teachers and families, aimed at the formation of positive self-esteem and communicative competencies. Yu.M. Naida (2014) added to this the aspect of social activity and social responsibility, emphasising that an inclusive school should create conditions for involving all students in collective activities, which contributes to the development of cooperation skills, social empathy and the formation of a civic position. These studies together indicate that effective inclusion requires not only methodological knowledge, but also a high level of socio-psychological training of teachers who can organise the educational process, taking into account the diversity of the student contingent.

The opinion of scientists C. Steinert & S. Jurkowski (2023), who note that modern realities of the educational space require teachers to form basic competencies in individual support of students in inclusive classes, deserves attention. This sets the task of training future specialists capable of integrating knowledge in inclusive education, special pedagogy, general didactics, subject methods and industry sciences before the system of Ukrainian higher pedagogical education. In view of this, special courses “Special pedagogy in physical education” and “Inclusive physical education of schoolchildren” were developed, which directly form professional competencies in the implementation of physical education in general secondary education institutions of Ukraine. Developments and ideas of scientists S. Hopkins *et al.* (2023), who investigated the usefulness of tools for assessing the quality of training of future teachers for teaching students with intellectual disabilities, will be taken into account in further scientific research. These studies will be devoted to studying the behavioural characteristics of children with intellectual disabilities and preparing future teachers to work with them. This approach will allow for the development of effective technologies for professional training of physical education teachers aimed at overcoming the difficulties of interacting with people with intellectual disabilities and forming a positive attitude towards inclusion.

M.L. Boscardin (2005) presents a professional development model aimed at supporting secondary school teachers in inclusive settings. The model is based on Bandura’s cognitive theory and includes key elements such as: collaborative problem-solving in the classroom; increasing self-esteem and a positive attitude towards inclusion; effective collaboration between general and special education teachers; and improving classroom management skills. The author emphasises that continuous, collaborative professional development is critical for successful inclusion. M.L. Boscardin’s (2005) work formed the basis for the development of a questionnaire and criteria for assessing the readiness of future physical education teachers to work in an inclusive setting. Elements of this

model, such as collaborative problem-solving, increasing self-esteem, collaboration, and improving classroom management skills, became key guidelines in the development of research tools. Ukrainian scholars, in particular A.A. Kolupaieva *et al.* (2012), are unanimous in their position that inclusive education is defined as a set of educational services. This set guarantees the basic right of every child to receive education in general secondary education institutions at the place of residence. Their scientific research has made it possible to understand that the key aspect is the formation of an educational environment capable of meeting the unique educational needs of each child, taking into account their individual psychophysical characteristics. This implies the openness of the educational system for all children and its adaptation to the diversity of the student contingent. An inclusive educational environment is a multi-component and dynamic system that ensures equal access to education for all students, going beyond physical adaptation alone.

According to the concept of I. Demchenko *et al.* (2021), the professional competence of physical education specialists should ensure not only the effective organisation of physical education of various social groups, but also successful professional activity in the field of sports that meets the current requirements of the labour market. The result of training is professional competence, which is a broader and deeper concept compared to the traditional categories of “readiness” or “preparedness”. This approach emphasises the need to form in graduates not only knowledge and skills, but also a holistic ability to effectively solve professional tasks in the dynamic conditions of modernity. The author’s model of professional training of future physical education teachers is based on a systemic approach to the formation of professional competence, integrating theoretical training, practical skills and personal qualities necessary for successful activity in an inclusive educational environment.

Within the scientific discourse of professional training of physical education teachers for activities in an inclusive environment, a key aspect is the teacher’s ability to empathise and understand the psychological characteristics of students. Given the diverse challenges faced by students with special needs, the physical education teacher must be sensitive to their needs, provide emotional support, and ensure a safe environment for physical activity. This involves not only observation but also active listening to students to deeply understand their emotional state and adequately respond to their needs. Tolerance and flexibility are imperative components of effective work in an inclusive environment. The physical education teacher must be ready to adapt pedagogical approaches to the needs of different students, in particular those with physical limitations or cognitive difficulties. This may require adjusting training models, selecting specialised equipment, and developing adapted physical exercises that take into account the capabilities of each student. Flexibility of approaches and the ability to adapt to changing conditions are key to

ensuring equal opportunities for all students to participate in physical education classes, contributing to their overall physical and psychological development.

According to leading scientific concepts, in the process of preparing future physical education teachers to work in an inclusive environment, it is necessary to focus on the development of students' creative potential. It is important to provide them with opportunities for innovative application of acquired knowledge and skills, which will facilitate the transition from reproductive to productive levels of professional activity. This approach forms teachers who are able not only to reproduce the studied material but also to generate new ideas and effective solutions in dynamic and unpredictable conditions of inclusion, which is confirmed by the results of the criterion analysis.

CONCLUSIONS

Based on the conducted research, it can be stated that the developed model of training future physical education teachers for professional activity in an inclusive environment is timely, theoretically sound and practically significant. Its relevance is due to its compliance with state policy and European standards of inclusive education, which are actively implemented in Ukraine at all levels of education. The model meets modern requirements, ensuring the training of teachers who are able to effectively meet the educational needs of children with special educational needs. The developed model integrates leading pedagogical approaches, in particular, competency-based, systemic, activity-based and practice-oriented, which creates a holistic system of training future teachers.

It ensures the formation of cognitive, motivational-value, operational-activity, reflective-evaluative, social-communicative and emotional-volitional competencies in students that meet modern educational standards and labour market requirements. The pedagogical conditions provided by the model include the formation of positive motivation for professional activity, psychological and pedagogical support for students, specially oriented content of training and organisation of practical training in inclusive classes. This ensures active assimilation of knowledge, development of professional skills and the ability to effectively interact with students and colleagues. The operational-content block of the model is implemented

in three stages: adaptive-orientational, content-reflective and practical-transformative, which contribute to the integration of theoretical knowledge with practical skills. Experimental verification of the model confirmed its high effectiveness. In the experimental group, a significant increase in the number of students at high and sufficient levels of readiness was observed (12.5% and 25.7%, respectively), which significantly exceeds the indicators of the control group. At the same time, the number of students at medium and low levels decreased, which indicates the successful formation of professional competencies and a positive attitude towards inclusive education. The results obtained allow using the model as a basis for developing methodological recommendations, teaching aids and training programs aimed at improving the professional competence of future physical education teachers and ensuring high-quality physical education for students with special educational needs. A promising direction for further research is the development of specialised physical training programs for children with special needs and the preparation of future teachers to work with students with intellectual spectrum disorders, which will contribute to their effective social development and integration into the educational process.

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CONFLICT OF INTEREST

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Підготовка майбутніх учителів фізичної культури до інклюзивного навчання в закладах загальної середньої освіти

Анотація. Актуальність теми зумовлена зростанням суспільного запиту на інклюзивну освіту, наявністю відповідного законодавчого підґрунтя та динамічними змінами в освітній системі. Мета дослідження полягала в розробці, науковому обґрунтуванні та експериментальному підтвердженні ефективності авторської моделі підготовки майбутніх фахівців фізичної культури до роботи в умовах інклюзії. Для досягнення мети дослідження було застосовано комплекс теоретичних методів: аналіз та синтез фахової літератури, зокрема з: корекційної та спеціальної педагогіки, методики фізичного виховання, педагогіки вищої школи тощо; логічний та системний аналіз; порівняння; класифікація; моделювання. До емпіричних методів належали: педагогічне спостереження, анкетування, педагогічний експеримент. Проведенням експерименту підтверджено ефективність авторської моделі підготовки майбутніх учителів фізичної культури до інклюзивного навчання у синергетичній єдності трьох блоків: концептуально-цільового, операційно-змістового та контрольного-результативного і педагогічних умов: формування позитивної мотивації до професійної діяльності та психолого-педагогічна підтримка студентів; розробка та впровадження спеціально орієнтованого змісту навчання, що вимагає інтеграцію в освітній процес професійно-орієнтованих дисциплін, зокрема «Спеціальна педагогіка у фізичному вихованні» та «Інклюзивне фізичне виховання школярів»; розвиток практичних навичок через виробничу педагогічну практику. Упровадження моделі дало такі кількісні результати: в експериментальній групі спостерігався значний приріст студентів із високим (+12,5 %) та достатнім (+25,7 %) рівнями готовності, тоді як кількість здобувачів із середнім (-6,6 %) і низьким (-32 %) рівнями суттєво зменшилася. Це значно перевищує показники контрольної групи, де зростання високого та достатнього рівнів становило лише 4,3 % та 16,6 % відповідно, а зниження середнього та низького – 2,2 % та 23,1 %. Розроблені навчально-методичні матеріали та наукові засади можуть бути використані науково-педагогічними працівниками закладів вищої освіти для підготовки майбутніх учителів фізичної культури до роботи в умовах інклюзії

Ключові слова: професійна підготовка; фахівці фізичної культури; інклюзивна освіта; освітні заклади; учні з особливими освітніми потребами; модель підготовки