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Features of Training Future Physical Education Teachers based on the Co-Teaching Method in Inclusive Education

Abstract

Introduction. This article addresses the issue of preparation of future physical education teachers in inclusive education settings requires innovative pedagogical approaches that ensure all students, regardless of their abilities, receive equitable learning opportunities. **Methodology and methods.** The research employed a mixed-methods design combining quantitative and qualitative approaches. The study involved undergraduate students majoring in physical education who participated in experimental training focused on co-teaching practices in inclusive settings. In this study, several research methods, including pedagogical observation, student surveys, analysis of reflective journals, and assessment of professional competencies before and after the implementation of the co-teaching approach were applied. To determine the effectiveness of the intervention, statistical analysis was conducted to compare changes in students' preparedness for inclusive teaching and collaborative professional work. **Results.** Analysis of the results showed that co-teaching had a positive influence on the professional development of future physical education teachers. Students became more confident in organizing inclusive lessons, interacting with peers, and adapting teaching strategies to different learners' needs. The study also identified several factors that played an important role in the success of co-teaching. Among them were joint lesson preparation, clearly defined responsibilities between teaching partners, collaborative decision-making, and regular reflection on classroom experiences. At the same time, participants reported a number of difficulties, particularly at the initial stage of implementation. **Scientific novelty.** The study's novelty lies in the substantiation of co-teaching as an effective pedagogical technology for preparing future physical education teachers specifically for inclusive educational environments. This research expands existing approaches to teacher preparation by integrating collaborative instructional models into physical education pedagogy and identifying organizational and methodological conditions necessary for successful implementation. **Practical significance.** The present study is associated with the possibility of applying the proposed co-teaching model in higher education institutions that train future teachers. The obtained results can be used in the development of educational programs, teaching practice modules, and professional development courses aimed at strengthening inclusive competence.

Keywords: co-teaching, inclusive education, physical education, teacher training, collaborative teaching, professional competencies.

Introduction. In the contemporary global educational space, one of the central priorities is the creation of an educational environment that enables every specialist to continuously enhance professional qualifications and acquire the competencies required for effective practice.

Inclusive education has become one of the leading priorities of contemporary educational policy worldwide, emphasizing equal access to quality education for all learners regardless of their individual characteristics and educational needs. The successful implementation of inclusive education requires not only the

adaptation of educational environments but also the preparation of teachers capable of working effectively in diverse classrooms. In this regard, the training of future physical education teachers acquires particular significance, as physical education lessons involve intensive social interaction, cooperation, and adaptation of learning activities to students with different abilities.

In Kazakhstan, the development of inclusive education is supported by a comprehensive legislative framework. The Law of the Republic of Kazakhstan “On Education” emphasizes the principles of accessibility, equality, and the creation of conditions for obtaining quality education by all citizens, including learners with special educational needs (Republic of Kazakhstan, 2007). Further strengthening of inclusive practices was reflected in legislative amendments aimed at expanding educational opportunities and social support mechanisms for persons with special educational needs (Republic of Kazakhstan, 2021). These reforms highlight the necessity of preparing future teachers who possess inclusive competencies and can effectively collaborate with other educational professionals.

One of the most promising approaches for teacher preparation in inclusive settings is the co-teaching method. Co-teaching refers to the collaborative work of two or more educators who share responsibility for planning, delivering, and assessing instruction within the same educational environment. According to Friend and Cook (2017), effective collaboration among educational professionals enhances instructional quality, supports differentiated learning, and promotes positive educational outcomes for all students. The co-teaching model enables future teachers to develop communication skills, professional flexibility, and the ability to address diverse learner needs through shared expertise and collective decision-making.

For future physical education teachers, co-teaching offers additional opportunities to master inclusive pedagogical strategies, adapt physical activities, and create supportive learning environments that encourage participation and engagement of students with varying

physical, cognitive, and social abilities. Through collaborative practice, teacher candidates gain practical experience in teamwork, reflective decision-making, and individualized instruction, all of which are essential components of inclusive physical education.

Despite the growing recognition of co-teaching in inclusive education, there remains a need to examine its specific role in the preparation of future physical education teachers. Therefore, this study aims to explore the features and pedagogical potential of training future physical education teachers based on the co-teaching method within the context of inclusive education.

In Kazakhstan, inclusive education has been developing steadily and is supported by several important legislative and conceptual reforms.

These include the introduction of the concept of inclusive education into the Law “On Education of the Republic of Kazakhstan” in 2011, the approval of comprehensive measures for inclusive education in 2014, the adoption of conceptual approaches to its development in 2015, the enactment of a specific law on inclusive education in 2021, the shift from a medical to a socio-pedagogical model, and the implementation of continuous support for inclusive and special education in 2023. On the whole, these changes have initiated a large-scale transformation of the national system of specialist training, moving it from a deficit-based medical model toward a socially oriented model that emphasizes participation, accessibility, and equal opportunities.

Research on inclusive education consistently emphasizes that successful inclusion depends on meaningful collaboration between teachers and the creation of supportive learning environments. Early studies demonstrated that cooperative teaching enhances instructional flexibility and promotes positive professional relationships among educators (Salend et al., 1997).

The co-teaching model has been recognized as one of the most effective approaches for supporting students with special educational needs in mainstream classrooms. Effective implementation of co-teaching contributes to

academic achievement, social participation, and differentiated instruction (Villa et al., 2013).

Empirical evidence suggests that students with learning disabilities demonstrate better educational outcomes when instruction is delivered through collaborative and inclusive teaching models rather than through segregated support systems (Tremblay, 2013).

Recent studies have highlighted the importance of preparing future teachers for equitable and inclusive educational practices. Teacher education programmes should provide opportunities for developing competencies related to diversity, participation, and educational equity (Pereira Ribeiro et al., 2024).

Current research also demonstrates that collaborative skills can be effectively developed through innovative training formats, including simulation-based learning environments, which help future teachers master interaction and teamwork skills required in inclusive classrooms (Qualls et al., 2025).

Recent studies conducted in Kazakhstan confirm the growing importance of co-teaching as an effective mechanism for implementing inclusive education. The co-teaching model contributes to the development of professional collaboration, emotional support, and pedagogical flexibility among future teachers, thereby improving their readiness to work in diverse educational environments (Ospankulov et al., 2025).

This transformation has created an urgent demand for highly qualified professionals who are capable of working in inclusive environments and who possess a broad range of professional, methodological, and interpersonal competencies. The development of inclusive policy, inclusive culture, and inclusive practice has therefore become a strategic priority for every educational organization. At the same time, the growing complexity of inclusive education increases the need for innovative methodological approaches in teacher education, which further strengthens the relevance of this research. In addition to subject-specific and practical teaching skills, future teachers must also develop digital literacy, innovative thinking, and creative decision-making abilities that are essential for working

in diverse and dynamic inclusive learning environments. To fully implement the principles of inclusive education, teachers require specialized methodological competencies and universal skills that allow them to respond flexibly to the needs of learners with different educational abilities and conditions.

The comprehensive preparation of future teachers involves a wide range of professional disciplines aimed at integrating psychological, theoretical, social, and practical components of training. Psychological preparation is directed toward fostering sustained motivation for working in inclusive settings and promoting effective interaction with learners with special educational needs and their families. Theoretical preparation equips future teachers with knowledge about learner diversity and the specific characteristics that must be considered in educational planning. Social and practical preparation, in turn, provides psychological, pedagogical, and methodological skills that support productive communication, collaboration, and professional interaction in inclusive contexts.

Research indicates that the effectiveness of inclusive education largely depends on the quality of collaboration between general and special education teachers. Co-teaching models create opportunities for shared responsibility, differentiated instruction, and improved educational outcomes for learners with diverse needs (McLeskey & Waldron, 2007).

Studies have demonstrated that successful implementation of inclusive practices requires systematic professional development and the formation of collaborative competencies among teachers. Positive relationships have been found between co-teaching experience, professional confidence, and teachers' willingness to implement inclusive strategies (Pancsofar & Petroff, 2016).

The development of collaborative teaching practices is associated with higher levels of instructional adaptation and student engagement in inclusive classrooms. Effective teacher partnerships contribute to the creation of supportive learning environments and increased participation of students with special educational needs (Jurkowski et al., 2020).

According to Albaiz (2016), co-teaching represents one of the most promising approaches for ensuring educational equity and addressing diverse learning needs within mainstream classrooms.

Recent studies continue to emphasize the importance of collaborative cultures in schools and the need for institutional support mechanisms that facilitate teacher cooperation and inclusive pedagogical practices (Damiani & Drelick, 2024).

International research also emphasizes the decisive role of future teachers in creating accessible, supportive, and equitable learning environments. Scholars highlight that teacher preparation must ensure the acquisition of relevant knowledge, the development of professional skills, and the formation of values and attitudes oriented toward recognizing and respecting the needs of learners with special educational needs (Rodríguez Herrero et al., 2023). However, despite growing recognition of inclusivity, some higher education programs still do not fully integrate inclusive competencies into teacher training, leaving graduates insufficiently prepared for professional practice in diverse educational settings. Consequently, teacher education must go beyond theoretical instruction and place greater emphasis on practical training, the development of flexible skills, and the effective use of innovative and digital technologies. Moreover, personal qualities such as patience, emotional stability, and professional commitment are also critical for future teachers working in inclusive environments, as demonstrated in recent studies.

The Co-Teaching Model is used in all educational institutions, in various subject areas and directions, and in the process of training future teachers. The Co-Teaching Model is often defined as a collaborative practice, during which lesson plans are created together, work is carried out with students, and the work is assessed. The vast majority of research on inclusive education focuses on the process of accessible education for students, and in inclusive education, co-teaching describes the relationship between special education teachers and general education teachers, although it can be

carried out between all teachers. To summarize the research, the Co-Teaching Model is widely used in all educational organizations; there are many types of interaction within this model. In our case, the Co-Teaching Model is an effective relationship between a future special education teacher and a future primary education teacher, a future physical education and sports teacher, that is, joint action based on the principles of the model.

Analyzing the research premises, we can conclude that inclusive education requires a high level of professional partnership and cooperation from future teachers and the ability to build effective joint action in the educational environment. Given the relevance of the integration of students with special needs, the relevance of studying the psychological and pedagogical aspects that affect the formation of professional activity of future teachers on a joint basis has been clearly demonstrated. Scientists have identified the conditions for co-teaching success. One of these is the combination of team teaching and individual lessons. The next condition is minimal theoretical preparation for the new role and the study of co-teaching models. The final determining factor for success is the ability to choose a colleague to teach in the team. Thus, co-teaching has great potential and has a beneficial impact on all participants in the educational process. However, for this method to be successful, the following conditions must be implemented in the educational system: professional development for teachers, sufficient time for joint planning, compatibility between teachers, and administrative support from the educational institution's leadership. It should also be noted that the full potential of team teaching is poorly understood. More qualitative and quantitative research is needed, including long-term observations of teaching teams at all stages of education, from primary school to continuing adult education. Only through such research will it be possible to determine the effectiveness of co-teaching.

Taking into account what we have indicated above, physical education (PE) teachers face unique challenges, as they work with students of varying abilities in dynamic, activity-based

settings. Effective preparation of future PE teachers requires the development of practical, methodological, and interpersonal skills that enable them to design inclusive learning experiences. One of the promising approaches is the co-teaching method, which involves collaboration between two or more educators in the same educational space. Co-teaching fosters shared responsibility, adaptive teaching strategies, and individualized support for students, making it a particularly effective model for inclusive physical education. Our article explores the features of training future physical education teachers using the co-teaching method in inclusive education. It examines the competencies required, the mechanisms of implementing co-teaching in teacher education, and the challenges and opportunities associated with preparing educators for inclusive practice. The main aim of our findings is to provide insights into effective strategies for developing highly qualified, socially responsive, and professionally competent PE teachers ready to work in an inclusive educational environment.

Materials and Methods. The study employed a mixed-methods approach, combining qualitative and quantitative methods to investigate the features of training future physical education (PE) teachers using the co-teaching method in inclusive education settings. The research design allowed us to gain a comprehensive understanding of both the perceptions of teacher trainees and the effectiveness of co-teaching strategies in practical pedagogical contexts.

Participants. The study involved 120 undergraduate students enrolled in the Physical Education program at a leading pedagogical university in Kazakhstan. Participants were in their third and fourth years of study and had completed foundational courses in pedagogy, inclusive education, and physical education methodologies. The sample was selected using a purposive sampling strategy, based on clearly defined inclusion criteria, namely: (1) enrollment in the PE teacher education program, (2) completion of prerequisite pedagogical and inclusive education courses, and (3) willingness to participate in the co-teaching intervention

and related data collection procedures. Students who did not meet the established criteria or were unable to complete all stages of the intervention were not included in the study. This approach allowed us to work with participants who possessed the necessary theoretical knowledge and a sufficient level of practical preparedness for participation in co-teaching activities in inclusive physical education classes. The final sample consisted of 120 students, including 65 female and 55 male participants aged from 20 to 24 years.

Data collection tools. Several complementary instruments were employed to collect data. First, a structured questionnaire was developed to assess participants' perceptions of their readiness to work in inclusive PE classrooms. The questionnaire consisted of 25 items organized into four domains: inclusive pedagogical knowledge, confidence in adapting physical education activities, classroom management in diverse groups, and collaboration with other professionals. Responses were measured using a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). The questionnaire was administered before and after the co-teaching intervention to identify changes in participants' self-assessments. Second, classroom observation protocols were used during teaching practicum sessions. These protocols enabled supervisors to document participants' instructional behaviors, communication patterns, adaptation strategies, and interactions with students with diverse educational needs. Particular attention was paid to how trainee teachers shared instructional responsibilities, managed classroom activities, and responded to challenges emerging in inclusive environments. Third, reflective journals were maintained by all participants throughout the practicum period. After each co-taught lesson, trainees recorded their observations, difficulties encountered, successful teaching strategies, and personal reflections on collaborative work. These journals provided valuable information about the developmental process that could not be captured through quantitative measures alone.

Data collection procedure. The study was conducted over one academic semester and

involved undergraduate students enrolled in a teacher education program specializing in physical education. Before the intervention, participants completed the baseline questionnaire measuring their preparedness for inclusive teaching. The co-teaching intervention was then integrated into the teaching practicum component of the program. Participants were organized into teaching pairs and assigned to inclusive school settings where they collaboratively planned, delivered, and evaluated physical education lessons. During the initial stage, trainees received orientation sessions introducing the principles of co-teaching, including collaborative planning, shared responsibility, role distribution, and reflective practice. Throughout the practicum, participants engaged in multiple co-taught lessons under the supervision of university instructors and school mentors. Supervisors conducted systematic observations using standardized observation protocols. Following each teaching session, trainees completed reflective journal entries documenting their experiences and professional learning. At the end of the practicum period, participants completed the post-intervention questionnaire. Subsequently, semi-structured interviews were conducted with selected participants representing different levels of teaching experience and engagement in the program. The combination of questionnaires, observations, journals, and interviews enabled methodological triangulation and enhanced the credibility of the findings.

The study was organized in three consecutive phases. During the preparatory phase, we examined theoretical and methodological literature, as well as national and international policy documents related to inclusive education and the co-teaching approach. Particular attention was paid to current practices of preparing future teachers for work in inclusive educational environments. The co-teaching program developed for future physical education teachers was mainly focused on practical experience and real classroom interaction. Its structure combined several closely related components: collaborative lesson preparation, the use of differentiated teaching methods, and adaptation

of assessment approaches for inclusive physical education classes. Throughout the program, students worked in pairs. In some cases, they collaborated with another trainee, while in others, they were paired with an experienced instructor. Such an organization made it possible to provide support at the early stages and then gradually increase the level of independence and responsibility. Practical training took place in inclusive physical education classes attended by learners with different educational and physical needs, including students with motor coordination difficulties, physical disabilities, and different levels of physical preparedness.

The lessons themselves were not conducted according to rigid scripts. Before each class, participants discussed lesson objectives together, distributed responsibilities, and decided how they would organize interaction with students during activities. During the lessons, teaching roles changed naturally depending on the situation: one participant could lead the activity while the other assisted individual learners, after which they switched responsibilities. This flexible cooperation helped trainees better understand how to adapt instruction in real classroom conditions and respond to students' needs more effectively.

An important part of the program was the discussion held after each lesson. Students reflected on situations that occurred during the class, analyzed the effectiveness of their teaching decisions, and discussed difficulties they encountered while working together. These conversations often influenced the planning of the next lesson, allowing participants to gradually improve their communication, teaching strategies, and ability to work collaboratively in inclusive settings. To assess the effectiveness of the program, pre- and post-intervention surveys were conducted. The questionnaires examined changes in students' perceived readiness for inclusive teaching, their confidence in working collaboratively with colleagues, and their ability to apply differentiated instructional strategies in diverse educational contexts. Observational checklists were used to assess the quality of co-teaching practices during PE classes, including communication, teamwork, and the ability to

provide individualized support. Semi-structured interviews with trainees and instructors explored perceptions of the challenges and benefits of co-teaching in inclusive PE settings. Surveys: A structured questionnaire assessed trainees' knowledge of inclusive pedagogy, confidence in co-teaching, and perceived readiness to teach in inclusive settings. The reliability of the instrument was verified with Cronbach's $\alpha = 0.87$.

The research used structured observation checklists developed on the basis of internationally recognized inclusive education and teacher competency frameworks. In particular, the indicators were aligned with the principles of the UNESCO (2009) Policy Guidelines on Inclusion in Education, which emphasize participation, accessibility, and responsive teaching practices in diverse classrooms. In addition, the checklist design was informed by the European Agency for Special Needs and Inclusive Education (2012) framework on teacher competences for inclusive education, which highlights collaboration, learner diversity, and reflective practice as core professional domains. To further operationalize classroom-level teaching behaviors, we also drew on the Danielson Framework for Teaching (Danielson, 2013), particularly the domains related to instructional planning, classroom environment, and professional responsibilities. Collaboration indicators were additionally informed by co-teaching models proposed by Cook (1992), while differentiation and adaptive instruction criteria were based on principles

outlined by Tomlinson (2014) in differentiated instruction. Accordingly, the final observation checklist evaluated four key dimensions during PE lessons: collaboration between co-teachers, student engagement, differentiation of instruction, and problem-solving in real-time instructional situations. All interviews were conducted with open-ended questions to capture qualitative insights regarding the implementation of co-teaching, challenges faced, and strategies developed by trainees.

Data analysis. Quantitative data from surveys and observations were analyzed using descriptive statistics, paired t-tests, and correlation analysis to determine changes in competencies before and after the co-teaching intervention. Qualitative data from interviews were analyzed using thematic content analysis, identifying recurring patterns, challenges, and effective strategies in co-teaching. Triangulation of qualitative and quantitative data ensured the reliability and validity of the results.

Limitations. The present study was limited to one university in Kazakhstan, and the sample size may not fully represent all PE teacher trainees nationwide. Additionally, the co-teaching intervention was conducted over a single semester, which may limit the observation of long-term effects on teaching competencies.

Results. *Self-Assessment of Inclusive Competencies.* Trainees completed pre- and post-intervention surveys measuring self-assessed competencies in inclusive teaching, collaboration, and adaptive instructional strategies. Table 1 shows the results:

Table 1

Changes in students' self-assessed competencies before and after the co-teaching intervention

Competency Area	Pre-test Mean $\pm$ SD	Post-test Mean $\pm$ SD	t-value	df	p-value
Knowledge of Inclusive Pedagogy	3.12 $\pm$ 0.68	4.21 $\pm$ 0.55	12.48	119	< 0.001
Confidence in Co-Teaching	2.87 $\pm$ 0.74	4.05 $\pm$ 0.61	13.02	119	< 0.001
Adaptive Instruction Skills	3.05 $\pm$ 0.70	4.17 $\pm$ 0.53	12.67	119	< 0.001
Collaboration & Teamwork	3.24 $\pm$ 0.65	4.32 $\pm$ 0.49	14.05	119	< 0.001

The results show a clear and statistically significant improvement in all assessed competency areas following participation in the

co-teaching program. The greatest improvement was noticed in students' ability to work together and coordinate their actions during lessons.

Regular participation in shared teaching activities helped them communicate more confidently, distribute responsibilities more effectively, and respond more flexibly to situations that emerged in inclusive physical education classes. Over time, many trainees became more comfortable discussing problems, making joint decisions, and supporting each other during the lesson process.

To evaluate how students applied co-teaching in practice, their work during physical education classes was systematically observed. Special observation checklists were used during lessons to record different aspects of teaching behavior, interaction with learners, classroom communication, and the use of adaptive teaching strategies. Since the observations were

conducted directly in real classroom situations, they made it possible to see how trainees reacted to students' needs and how effectively they cooperated with their teaching partners in practice. Particular attention was paid to how effectively students prepared and implemented lesson plans, the extent to which they engaged learners in physical activities, and their ability to adapt instruction to different levels of ability within the same class. In addition, evaluators focused on trainees' responsiveness in unexpected situations, especially their problem-solving skills when managing classroom dynamics or modifying tasks on the spot. Table 2 summarizes the average ratings obtained across these key indicators.

Table 2

Observational assessment of co-teaching performance (scale 1–5, n=120)

Indicator	Mean ± SD
Lesson Planning & Preparation	4.18 ± 0.51
Student Engagement	4.25 ± 0.48
Differentiation of Instruction	4.10 ± 0.53
Communication & Collaboration	4.34 ± 0.44
Problem-Solving in Inclusive Settings	4.12 ± 0.50

Observation results suggest that trainees were generally able to apply co-teaching strategies in a meaningful way, particularly when it came to supporting student engagement and adjusting activities to the diverse needs present in inclusive PE classes. Among the assessed indicators, communication and collaboration stood out most clearly, which, in our view, reflects the consistent emphasis placed on shared responsibility and teamwork throughout the co-teaching process. In addition, the thematic analysis of semi-structured interviews with both trainees and instructors allowed us to identify three interrelated themes.

First, many trainees described a noticeable increase in self-confidence when working in inclusive PE settings. They repeatedly noted that co-teaching created a kind of “safety net,” where they felt more comfortable trying out new instructional approaches, knowing that support and immediate feedback from a peer or mentor was available. Second, participants emphasized

the development of adaptive teaching skills. In our study, trainees often emphasized that observing a co-teaching partner in real time was one of the most useful aspects of the experience. It allowed them to see, in practice, how instructional decisions can be adjusted on the spot- for example, changing the pace of activities, modifying task complexity, or rephrasing explanations depending on students' responses and individual needs.

At the beginning of the program, many students faced certain difficulties while working in pairs. Some participants found it hard to divide responsibilities during the lesson or agree on who should lead particular activities. In several cases, communication between partners was not always smooth, which sometimes affected the overall organization of the class. Students also mentioned that managing lesson time in a co-teaching format was more complicated than they had expected. As the training continued, these issues became less noticeable. Regular joint

lesson preparation and discussions after classes helped participants better understand each other's working styles and improve coordination during teaching. Gradually, students became more confident in planning together, responding to unexpected situations, and maintaining communication throughout the lesson.

Overall, the results suggest that co-teaching is a promising approach for preparing future physical education teachers for inclusive classroom environments. The quantitative findings indicate improvements in knowledge, confidence, collaboration, and adaptive instructional skills, while the observational data support these results, showing that many of these competencies were increasingly applied in real teaching practice. At the same time, qualitative feedback highlights the importance of mentorship, peer learning, and joint problem-solving as key mechanisms of professional growth.

These results are in line with international studies that emphasize co-teaching as a powerful model for developing inclusive pedagogical competence (Cook, 1992; Murawski & Bernhardt, 2015). In the context of Kazakhstan, where inclusive education is still in a phase of active development, we believe that the systematic integration of co-teaching into teacher education programs may significantly contribute to preparing more competent and socially responsive physical education teachers. Finally, our study also highlights several practical conditions that appear essential for successful implementation. In particular, structured planning sessions, clearly defined role distribution, and regular reflective discussions were crucial in helping trainees overcome initial coordination difficulties and gradually build effective co-teaching partnerships. Moreover, combining theoretical knowledge with hands-on inclusive PE experiences strengthens digital literacy, innovative thinking, and creative problem-solving skills, all of which are crucial for modern educators.

Discussion. In the current global educational landscape, a key priority is the development of learning environments that support continuous professional growth and enable specialists to acquire the competencies required for

effective and adaptive practice. Within this context, Kazakhstan has made steady progress in advancing inclusive education, which has been reinforced through a series of legislative and conceptual reforms. Over the last decade, inclusive education in Kazakhstan has undergone several important changes at the legislative and policy levels. In 2011, the principles of inclusive education were officially incorporated into the Law "On Education of the Republic of Kazakhstan." A few years later, national measures aimed at supporting the implementation of inclusive practices began to be introduced. Further development continued with the preparation of conceptual documents in 2015 that outlined the main directions of inclusive education policy. In 2021, a separate law dedicated specifically to inclusive education was adopted, which strengthened the legal basis for supporting learners with diverse educational needs.

At the same time, the understanding of inclusion itself also started to change. Educational policy gradually moved away from a mainly medical interpretation of disability toward a socio-pedagogical approach that places greater attention on participation, accessibility, and educational support. More recently, continuous support systems for inclusive and special education were introduced, expanding assistance for both learners and teachers within educational institutions. Together, these reforms reflect a systemic shift in how specialist training is conceptualized, moving away from deficit-oriented perspectives toward a more holistic, socially grounded understanding of participation and equity. Against this background, there is a clear and growing demand for professionals who are not only well-trained but also capable of functioning effectively in inclusive educational settings. This requires a combination of professional expertise, methodological flexibility, and strong interpersonal competencies. As inclusive education becomes more deeply embedded in educational policy and institutional practice, the development of an inclusive culture has emerged as a strategic objective across all levels of the education system.

At the same time, the increasing complexity of inclusive classrooms places new demands on teacher education programs. It is no longer sufficient for future teachers to master only subject knowledge and routine pedagogical techniques. They are now expected to demonstrate digital literacy, creative and critical thinking, and the ability to make informed instructional decisions in rapidly changing and diverse learning contexts. In this sense, effective preparation for inclusive education depends on the formation of both specialized methodological competencies and broader transferable skills that enable teachers to respond sensitively and flexibly to the varied needs of learners.

The comprehensive preparation of future teachers involves a wide range of professional disciplines aimed at integrating psychological, theoretical, social, and practical components of training. Psychological preparation is directed toward fostering sustained motivation for working in inclusive settings and promoting effective interaction with learners with special educational needs and their families. Theoretical preparation equips future teachers with knowledge about learner diversity and the specific characteristics that must be considered in educational planning. Social and practical preparation, in turn, provides psychological, pedagogical, and methodological skills that support productive communication, collaboration, and professional interaction in inclusive contexts.

International research also emphasizes the decisive role of future teachers in creating accessible, supportive, and equitable learning environments. Scholars highlight that teacher preparation must ensure the acquisition of relevant knowledge, the development of professional skills, and the formation of values and attitudes oriented toward recognizing and respecting the needs of learners with special educational needs (Rodríguez Herrero et al., 2023). At the same time, the importance of taking into account learners' individual characteristics, preventing potential barriers to participation, and anticipating negative influences on learning has been stressed, which requires a comprehensive and proactive approach to educational support.

Adaptation and individualization of curricula, along with their continuous refinement in line with students' characteristics and evolving professional demands, are widely recognized as key conditions for ensuring the quality of inclusive education. In practice, this means that curricula cannot remain static; they require constant adjustment depending on classroom dynamics and learner diversity.

Future teachers are therefore expected to develop the ability to recognize and address emotional, social, and physical barriers that may restrict students' participation. These barriers are often subtle and context-dependent, which makes the teacher's sensitivity and responsiveness particularly important in inclusive settings. At the same time, it should be noted that not all higher education programs have fully embedded inclusive competencies into their teacher training frameworks. As a result, some graduates still enter the profession without sufficient practical readiness for work in diverse classrooms. This gap suggests that teacher education needs to move beyond predominantly theoretical preparation and place greater emphasis on practice-oriented training, the development of flexible pedagogical skills, and meaningful engagement with digital and innovative teaching tools.

Existing research also consistently shows that successful work in inclusive classrooms depends not only on methodological knowledge, but also on certain personal and professional qualities of the teacher. Traits such as patience, emotional balance, empathy, and a well-developed sense of responsibility play a decisive role in sustaining productive interactions with diverse learners. In real classroom conditions, these qualities often determine how effectively a teacher can respond to unexpected situations and maintain a supportive learning environment. Our study showed that the inclusion of the co-teaching model in the preparation of future physical education teachers led to positive results. In comparison with traditional forms of training, this approach placed students in situations where they constantly had to work together, discuss lesson organization, divide responsibilities, and make decisions directly

during classroom activities. Such experience helped them better understand the practical side of inclusive teaching.

As the program continued, students became more confident in collaborative work. They planned lessons together more easily, coordinated their actions during classes more effectively, and interacted with learners in a more organized and supportive way. Many participants noted that, with practice, they felt more comfortable adapting tasks and responding to different classroom situations. These changes developed gradually and became more visible after repeated participation in co-teaching lessons. The results of the study, including both statistical data and students' reflections, suggest that regular co-teaching practice helps future teachers feel more prepared for work in inclusive educational settings. Most importantly, it allowed students to connect theoretical knowledge with real teaching experience in the classroom.

Conclusion. The results of our study suggest that co-teaching may serve as an effective approach for overcoming many of the difficulties that arise in the preparation of future teachers. What became clear in practice is that structured collaboration between trainee teachers and experienced instructors gives students something difficult to achieve through lectures alone—real exposure to how inclusive classrooms actually function on a day-to-day basis. Rather than staying at the level of theoretical discussion, trainees are placed in situations where they have to act, respond, and adjust together with a partner. This gradual shift from “knowing about inclusion” to “working within inclusion” appears to be one of the most meaningful outcomes of the approach. An additional and equally important change concerns how trainees begin to interpret student diversity. As they observe inclusive strategies being implemented in real time, and as they participate in joint planning and reflection, many of them start to move away from deficit-oriented assumptions. Instead of focusing on what students “lack,” they increasingly focus on what can be adapted, supported, or redesigned in instruction. In this sense, co-teaching not only develops technical teaching skills. It

also reshapes how future teachers think about learners, decision-making, and responsibility in the classroom.

The results also show that future teachers' attitudes toward inclusive education vary according to factors such as gender, age, academic specialization, and professional experience. In this regard, the development of social and emotional competencies is particularly important, including self-reflection, professional empathy, and the ability to effectively implement the principles of inclusion in everyday pedagogical practice. The present study explored the distinctive features of preparing future physical education teachers through the co-teaching method within inclusive education. The findings indicate that integrating co-teaching into teacher preparation significantly enhances trainees' professional competencies, confidence, collaborative skills, and adaptive instructional practices. In our study, the quantitative results clearly indicate substantial improvements in trainees' understanding of inclusive pedagogy, their perceived co-teaching efficacy, and their ability to work effectively as part of a teaching team after participating in structured co-teaching experiences.

These outcomes suggest that when co-teaching is not treated as a short-term experiment but is systematically integrated into teacher training, it contributes not only to conceptual understanding but also to the gradual formation of real collaborative competence. In other words, students do not simply learn about cooperation—they begin to practice it in a structured and meaningful way. Overall, our research contributes to a more nuanced understanding of how co-teaching can be intentionally integrated into physical education teacher preparation. We argue that such integration not only strengthens professional readiness for inclusive classrooms but also has broader implications for curriculum development, teacher education practice, and educational policy aimed at promoting equity and inclusion for all learners.

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