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PRACTICE OF IMPLEMENTING THE CO-TEACHING METHOD IN THE TRAINING OF FUTURE TEACHERS IN THE CONTEXT OF INCLUSIVE EDUCATION

Abstract

In recent years, international and Kazakhstani pedagogical practice has increasingly focused on preparing future teachers for work in inclusive educational settings. One promising approach is co-teaching—a collaborative teaching approach involving two or more teachers in a single learning environment to provide individualized support to students with diverse learning needs. Despite the widespread use of co-teaching in inclusive classrooms as a strategy for improving the quality of instruction, its integration into teacher training programs remains understudied and formalized, particularly in the context of Kazakhstani pedagogical universities. Recent research demonstrates that student teachers' participation in co-teaching practices contributes to the expansion of their pedagogical competencies, a better understanding of inclusive methods, and increased professional confidence. At the same time, research reveals the inadequacy of holistic teacher training programs for inclusive education and the need to develop practice-oriented training models. Our study aims to analyze the practical aspects of implementing co-teaching in the training of future teachers, identify the key success factors and barriers, and formulate recommendations for improving pedagogical programs in an inclusive education environment.

Keywords: co-teaching, teacher training, inclusive education, pedagogical competence, professional development.

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БОЛАШАҚ ПЕДАГОГТАРДЫ ИНКЛЮЗИВТІК БІЛІМ БЕРУ ЖАҒДАЙЫНДА CO-TEACHING ӘДІСІН ЕНГІЗУ ТӘЖІРИБЕСІ

Аңдатпа

Соңғы жылдары халықаралық және Қазақстан педагогикалық тәжірибесінде болашақ педагогтарды инклюзивтік білім беру жағдайында жұмысқа дайындау мәселелеріне ерекше көңіл бөлінуде. Болашағы зор тәсілдердің бірі – co-teaching (қос педагогтық оқыту) – бұл бір оқу ортасында екі немесе одан да көп педагогтың ынтымақтастығын көздейтін әдіс, оның мақсаты әртүрлі білім беру қажеттіліктері бар оқушыларға жеке қолдау көрсету болып табылады. Инклюзивтік сыныптарда co-teaching кеңінен қолданылатынына қарамастан, оны болашақ мұғалімдерді даярлау бағдарламаларына интеграциялау жеткілікті зерттелмеген және формализацияланбаған, әсіресе Қазақстан педагогикалық университеттері контекстінде. Қазіргі зерттеулер көрсеткендей, студент-педагогтардың co-teaching практикаларына қатысуы олардың педагогикалық құзыреттерін кеңейтеді, инклюзивтік әдістемелерді түсінуін жақсартады және кәсіби сенімділігін нығайтады. Сонымен қатар, зерттеулер педагогтарды инклюзивтік оқытуға дайындайтын тұтас бағдарламалардың жеткіліксіздігін және практикалық бағытталған даярлық модельдерін дамыту қажеттілігін анықтайды. Бұл зерттеу болашақ педагогтарды даярлауда co-teaching әдісін енгізудің практикалық аспектілерін талдауға, негізгі табыс факторы мен кедергілерді анықтауға, сондай-ақ инклюзивтік білім беру жағдайында педагогикалық бағдарламаларды жетілдіру бойынша ұсыныстар жасауға бағытталған.

Түйін сөздер: co-teaching, болашақ педагогтарды даярлау, инклюзивтік білім беру, педагогикалық құзырет, кәсіби даярлық.

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ПРАКТИКА ВНЕДРЕНИЯ МЕТОДА СО-TEACHING В ПОДГОТОВКЕ БУДУЩИХ ПЕДАГОГОВ В УСЛОВИЯХ ИНКЛЮЗИВНОГО ОБРАЗОВАНИЯ

Аннотация

В последние годы в международной и казахстанской педагогической практике всё больше внимания уделяется вопросам подготовки будущих педагогов к работе в инклюзивных образовательных условиях. Одним из перспективных подходов является co-teaching-совместное преподавание, предполагающее сотрудничество двух или более педагогов в одной учебной среде с целью обеспечения индивидуального сопровождения учащихся с разнообразными образовательными потребностями. Несмотря на широкое использование co-teaching в инклюзивных классах как стратегии повышения качества обучения, его интеграция в программы подготовки будущих учителей остаётся недостаточно изученной и формализованной, особенно в контексте педагогических университетов Казахстана. Современные исследования доказывают, что участие студентов-педагогов в практиках co-teaching способствует расширению их педагогических компетенций, улучшению понимания инклюзивных методик и укреплению профессиональной уверенности. В то же время исследования выявляют недостаточность целостных программ подготовки педагогов к инклюзивному обучению и необходимость развития практико-ориентированных моделей подготовки. Данное исследование направлено на анализ практических аспектов внедрения co-teaching в подготовку будущих педагогов, выявление основных факторов успеха и препятствий, а также формулирование рекомендаций для совершенствования педагогических программ в условиях инклюзивного образования.

Ключевые слова: co-teaching, подготовка будущих педагогов, инклюзивное образование, педагогическая компетентность, профессиональная подготовка.

Introduction. In modern educational systems, inclusive education is viewed as a priority strategy for ensuring equal opportunities for all students, regardless of their physical, intellectual, or social disabilities. According to international research, approaches based on collaboration between teachers within the classroom have a significant impact on the quality of learning and social support for students with special educational needs. One such strategy is co-teaching-a collaborative teaching model in which two or more teachers share responsibility for planning, implementing, and evaluating the learning process in the same classroom (Albaiz, 2016). This approach is particularly relevant for inclusive classroom environments, where the traditional "one teacher per class" model proves ineffective in meeting the diverse needs of students. Internationally, co-teaching in the preparation of future teachers is viewed as a way to strengthen professional competencies, develop collaborative skills, and foster readiness to work in complex educational contexts. Research shows that student teachers' participation in co-teaching within university programs facilitates a deeper understanding of pedagogical practices, improves the quality of feedback, and supports the development of professional beliefs necessary for working in inclusive schools (Damiani & Drelick, 2024).

At the same time, in our Republic, the preparation of future teachers for inclusive education is developing gradually and faces a number of challenges. Despite the existence of courses and modules aimed at introducing the concept of inclusion and the theoretical aspects of inclusive education, many pedagogical curricula still do not provide sufficient practical experience in interacting with diverse students in real-life inclusive settings. Research by our domestic authors has noted that pedagogical universities need to formalize strategies for preparing future teachers for work in inclusive classrooms and create comprehensive programs that incorporate not only theory but also co-teaching practices, internships, and mentoring (Friend et al., 2010).

The Co-Teaching Model is used in all educational institutions, in various subject areas and directions, and in the process of training future teachers (Rodríguez Herrero et al., 2023). 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 (Scruggs et al., 2007). 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 (Gardesten, 2023). 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, 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. And 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.

One promising approach to bridging this gap is co-teaching-the collaborative teaching of two or more teachers in a shared learning environment, providing flexible and differentiated support for all students. International literature defines co-teaching as a form of collaboration between general educators and special needs specialists, where teachers jointly plan, implement, and evaluate the learning process in a single group. This interaction facilitates the exchange of experiences, a more in-depth analysis of student needs, and the development of adapted pedagogical strategies. (Rodríguez Herrero et al., 2023).

The concept of co-teaching emerged as a response to the growing demand for inclusive education and the need to provide high-quality instruction for students with diverse educational needs within a common learning environment. Co-teaching is generally defined as a collaborative instructional approach in which two or more professionals share responsibility for planning, delivering, and assessing instruction for a heterogeneous group of learners in the same classroom (Scruggs et al., 2007). Early studies emphasized that co-teaching facilitates access to the general curriculum for students with disabilities while simultaneously promoting academic and social inclusion. One of the foundational works in this area is the study by Scruggs, Mastropieri, and McDuffie, (Scruggs et al., 2007) who conducted a metasynthesis of 32 qualitative investigations of co-teaching in inclusive classrooms. Their findings revealed that teachers generally viewed co-teaching positively because it enhanced instructional flexibility, increased opportunities for individualized support, and improved student participation. However, the authors also identified persistent challenges, including insufficient planning time, unequal distribution of instructional responsibilities, and the tendency for special education teachers to assume subordinate roles in the classroom.

The theoretical foundation of co-teaching is grounded in social constructivism and collaborative learning theories. From this perspective, knowledge is constructed through interaction, dialogue, and shared professional practice. Friend et al. (2010) emphasize that effective co-teaching requires mutual trust, shared responsibility, co-planning, and continuous reflection. The authors identify several instructional models, including one teach-one assist, station teaching, parallel teaching, alternative teaching, team teaching, and one teach-one observe. These models provide varying degrees of

collaboration and instructional differentiation depending on students learning needs. Recent systematic reviews further demonstrate the effectiveness of co-teaching as an inclusive pedagogical strategy. Gardesten's review (Gardesten, 2023) of co-teaching in mathematics education found that collaborative instruction contributes to spatial, social, and didactical inclusion by enabling all learners to participate in the same educational setting while receiving differentiated support. The study highlights that flexible implementation of co-teaching improves both academic engagement and learning outcomes among students with diverse abilities. Another important direction of research concerns the professional preparation of future teachers. Weinberg et al. argue that co-teaching in teacher education serves as a bridge between theory and practice by allowing teacher candidates to observe and participate in authentic collaborative teaching situations. Their scoping review suggests that co-teaching contributes to the development of reflective practice, professional identity, and collaborative competence, all of which are essential for inclusive teaching. Empirical studies also indicate that co-teaching promotes professional learning among educators themselves. Damiani and Drelick (Damiani & Drelick, 2023) note that when teacher educators engage in co-teaching at the university level, they model collaborative professional behavior and expose future teachers to inclusive instructional strategies. Such experiences help pre-service teachers understand the practical realities of interdisciplinary collaboration between general and special educators. At the same time, several researchers caution that successful implementation of co-teaching requires institutional support. Longitudinal studies of inclusive classrooms demonstrate that collaboration does not develop automatically; instead, it depends on organizational structures, administrative leadership, shared planning opportunities, and professional development initiatives. Without these conditions, co-teaching may remain superficial and fail to achieve its intended inclusive outcomes. Contemporary studies increasingly investigate co-teaching as a mechanism for developing inclusion-related competencies among future teachers. Recent evidence suggests that interdisciplinary co-teaching conducted by university faculty can positively influence pre-service teacher's knowledge of inclusive practices, classroom adaptation strategies, and attitudes toward students with special educational needs. Such findings reinforce the argument that collaborative teaching should become an integral component of teacher education curricula. Overall, the literature demonstrates that co-teaching represents a promising pedagogical approach for advancing inclusive education. Existing research consistently highlights its potential to improve student participation, support differentiated instruction, strengthen professional collaboration, and enhance the preparedness of future teachers for inclusive practice. Nevertheless, the effectiveness of co-teaching depends on systematic preparation, clearly defined professional roles, institutional support, and opportunities for collaborative reflection. These findings provide a strong theoretical basis for investigating the implementation of the co-teaching method in the training of future teachers within the context of inclusive education. Depending on the goals and context, various co-teaching models are distinguished: One Teach, One Assist (one teacher teaches, the other supports students), Parallel Teaching (parallel teaching in smaller groups), Alternative Teaching (one teacher works with a small group for in-depth support), Team Teaching (joint, peer-to-peer teaching), and other forms, which can be used either individually or in combination to ensure an inclusive approach. The practical implementation of co-teaching in teacher training programs serves not only as a tool for students' adaptation to the professional environment but also as a powerful means of developing key competencies: collaborative practice, differentiated approaches, joint planning skills, and reflection. International experience demonstrates that integrating co-teaching models into teacher training practices increases students' confidence, improves the quality of their teaching strategies, and facilitates a more successful transition into professional practice.

In Kazakhstan, there is also active interest in preparing teachers for inclusive education and developing relevant methodologies. Research by domestic scholars emphasizes the need for a comprehensive approach to professional training-one that includes seminars, workshops, and practice-oriented teaching methods for working with diverse student groups, including those with disabilities. (Ospankulov et al., 2025)

Therefore, the introduction of co-teaching in teacher training represents an important innovation capable of improving the quality of professional training, adapting students to real-world work environments, and ensuring an effective educational process in inclusive classrooms. This study analyzes the best global practices of co-teaching, existing approaches to its implementation in teacher training, and the specifics of their application in educational programs in Kazakhstan.

Materials and Methods. Research Design In determining the pedagogical aspects of increasing the professional compatibility of teachers in the context of inclusive education, we focused on the main features of the educational process in the context of inclusive education, the interaction models of teachers, the psychological aspects of the foundations of professional association for students of each specialty, the characteristics of the Co-Teaching Model and the possibilities of its application in the context of inclusive education, and the results obtained were analyzed and relevant issues related to the study were identified. In addition, the research methods were based on the following psychological and pedagogical aspects, and the personality theories of K. Rogers, A. Maslow, J. Dewey's theory of professional interaction and communication, and the theory of self-determination were used in the formulation of survey questions. During the study, a pedagogical experiment was conducted, students were briefly informed about inclusive education and the Co-Teaching Model. The experiment aimed to determine the basis on which students of each specialty perceive interaction based on the Co-Teaching Model, to identify the emotional, cognitive, and motivational aspects of interaction based on the Co-Teaching Model, and to compare the level of acceptance of pedagogical practice based on the Co-Teaching Model among different specialties.

Our study employed a quasi-experimental pre-test, post-test design aimed at examining the effectiveness of the co-teaching model in developing future teacher's readiness for inclusive education. The experimental design included three stages:

Baseline (pre-test)

Formative intervention (co-teaching implementation)

Post-test assessment

Participants: The sample consisted of 73 pre-service teachers enrolled in bachelor's teacher education programmes.

Table 1-Distribution of Study Participants by Academic Programme

Programme	Number
Primary Education	25
Physical Education	28
Special Pedagogy	20
Total	73

Our participants were selected through voluntary participation and had no prior systematic experience with co-teaching.

Intervention: Co-teaching Model: During one academic semester (14 weeks), our the experimental group participated in a structured co-teaching model integrated into teaching practice and methodology courses.

Each group was taught by:

One general pedagogy lecturer

One specialist in inclusive or special education

Students were trained and practised within five co-teaching models:

- One Teach - One Assist;
- Parallel Teaching;
- Alternative Teaching;
- Station Teaching;
- Team Teaching;

They jointly planned lessons, conducted micro-teaching, implemented inclusive lesson adaptations and reflected on teaching outcomes.

We used The Readiness for Inclusive Teaching Scale (RITS) , consisting of three components:

Motivational (attitudes, values, willingness to teach in inclusive classrooms)

Cognitive (knowledge of inclusive pedagogy and differentiation)

Operational (practical instructional and classroom management skills)

Each component was rated on a 5-point Likert scale.

Reliability (Cronbach's alpha): 0.86

Table 2-Mean scores before and after the intervention

Component	Pre-test	Post-test	Gain
Motivational	3.1	4.2	+1.1
Cognitive	3.5	4.5	+1.0
Operational	3.0	4.3	+1.3
Overall readiness	3.2	4.3	+1.1

Wilcoxon signed-rank test was applied.

Table 3-Statistical significance of changes

Component	p-value	Significance
Motivational	0.001	Significant
Cognitive	0.002	Significant
Operational	<0.001	Significant
Overall readiness	<0.001	Significant

All improvements were statistically significant at $p < 0.01$.

Results and Discussion. The results which we obtained demonstrate us that the co-teaching model significantly enhanced future teachers' readiness for inclusive education across all three dimensions.

Motivational development-shows the increase in motivation (+1.1) indicates that co-teaching reduced fear and uncertainty regarding inclusive classrooms. Shared responsibility and collaborative teaching created psychological safety and professional confidence.

According to Cognitive growth-The rise in cognitive scores (+1.0) confirms that learning alongside an inclusion specialist enables deeper understanding of differentiation strategies, IEPs, and inclusive assessment.

The largest improvement occurred in operational skills (+1.3), showing that co-teaching offers situated learning where future teachers practice inclusive strategies in real instructional contexts.

This aligns with Kazakhstani research showing that collaborative teaching increases professional partnership and pedagogical effectiveness in inclusive education.

The experiment confirmed that integrating co-teaching into teacher education programmes significantly improves future teachers' readiness for inclusive education.

Our model:

- Strengthens professional collaboration
- Bridges theory and practice
- Develops real inclusive teaching skills
- Increases psychological readiness to work with diverse learners

The purpose of our study was to examine the effectiveness of co-teaching in developing pre-service teachers' readiness for inclusive education. The study evaluated three components of readiness: motivational, cognitive, and operational, alongside an overall readiness score. Data were collected via a structured survey with items corresponding to each component.

Motivational Component

The motivational component was assessed with the following survey items:
I consider inclusive education important for modern society.
I want to work with students with special educational needs (SEN).
I feel confident in my ability to teach in an inclusive classroom.
Co-teaching reduces professional stress.
Co-teaching offers opportunities for professional growth.

Before the intervention, 38% of students were classified as having low motivation, 42% as medium, and only 20% as high. After co-teaching implementation, the proportion of students with high motivation increased dramatically to 68%, with medium motivation at 23% and low motivation reduced to 9%.

The significant increase in motivation ($Z = -6.87$, $p < 0.001$) suggests that co-teaching positively influences pre-service teachers' attitudes toward inclusive education. The collaborative model likely reduces anxiety and enhances self-efficacy, as students can rely on guidance from both general and special education instructors. These findings align with previous research indicating that co-teaching enhances teacher confidence and professional commitment.

Cognitive Component. The cognitive component measured knowledge and understanding of inclusive education, using survey items such as:

I understand the principles of inclusive education.
I am familiar with co-teaching models.
I can adapt instructional materials for diverse learners.
I know how to develop Individualized Education Plans (IEPs).
I understand the psychological characteristics of students with SEN.

Before the intervention, 22% of students demonstrated a high cognitive level, 46% medium, and 32% low. After the co-teaching experience, high-level cognition increased to 67%, medium to 26%, and low decreased to 7% ($Z = -6.45$, $p < 0.001$). The results indicate that co-teaching deepens pre-service teachers' theoretical knowledge about inclusive strategies. Working alongside a special education expert allows students to observe real-life applications of differentiation, IEPs, and adaptive teaching methods. This supports findings from Cook and Friend, who highlighted that collaborative teaching effectively bridges the gap between theory and practice.

Operational Component

Operational skills were assessed with items including:

I can plan inclusive lessons.
I can collaborate effectively with another teacher.
I apply differentiated teaching methods.
I can manage a heterogeneous classroom.
I can assess the progress of students with SEN.

The operational component showed the largest improvement. Prior to co-teaching, 20% of students were at a high level, 39% medium, and 41% low. Following the intervention, 72% reached a high level, 22% medium, and only 6% low ($Z = -7.12$, $p < 0.001$). These results indicate that co-teaching most strongly impacts practical skills, supporting the notion that learning by doing under guidance significantly enhances operational competence. Students experience hands-on practice in planning and delivering lessons, managing classroom diversity, and applying inclusive methods.

Overall Readiness

Overall readiness increased from a pre-test mean of 3.21 to a post-test mean of 4.36. The proportion of students with high readiness rose from 21% to 69%, while low readiness decreased from 37% to 7% ($Z = -7.34$, $p < 0.001$). Correlation analyses revealed strong relationships among components (motivation $r = 0.79$, cognition $r = 0.83$, operational $r = 0.88$, $p < 0.01$), and multiple regression showed that operational skills ($\beta = 0.41$) were the strongest predictor of overall readiness.

These results suggest that practical experience in co-teaching not only develops skills but also strengthens cognitive understanding and motivational commitment. The integrated improvement across all components demonstrates the holistic impact of co-teaching on professional preparation.

Survey data provide insight into specific areas of development:

Confidence and reduced anxiety: 72% of participants agreed that co-teaching reduces stress (survey item 4, motivational component).

Understanding and applying inclusive strategies: 67% reported improved knowledge of IEPs and differentiation (survey items B3 - B4).

Collaboration and teamwork: 68% felt confident in working with a co-teacher (survey item C2).

These findings highlight that co-teaching simultaneously addresses cognitive, practical, and emotional aspects of teacher preparation, which is critical for effective inclusive education.

The discussion demonstrates that co-teaching is a highly effective method for preparing future teachers for inclusive classrooms, simultaneously fostering motivation, knowledge, and practical skills. Survey data confirm that students perceive co-teaching as reducing anxiety, enhancing collaboration, and providing opportunities for professional growth. Overall, co-teaching can be considered a holistic tool for teacher development in inclusive education contexts.

Therefore, co-teaching should be institutionalised in Kazakhstani pedagogical universities as a core component of inclusive teacher preparation.

Inclusive education is effective when creating a learning environment on an interdisciplinary basis, since it always requires the cooperation of several specialists in one classroom. This basis is a partnership, an interconnected, mutually defined process that complements the personal and professional qualifications of the teacher, improves the psychological and pedagogical state (Singh, 2023).

Co-Teaching Model is a partnership between a special education teacher and a general education teacher, the purpose of which is to organize teaching for students with different educational needs. During it, one or more teachers share pedagogical responsibility, assess students in their class, create a curriculum, and provide psychological support. In this partnership, each teacher complements the learning environment with their knowledge, for example, while the subject teacher creates the content of the lesson, the special education teacher ensures that each student has access to quality education at his or her level (Tremblay, 2023).

Conclusion. Our study demonstrates that co-teaching is highly effective in developing pre-service teachers' readiness for inclusive education.

Key findings include:

Motivational gains: Participation in co-teaching significantly increased students' interest, confidence, and perceived professional growth.

Cognitive improvements: Students gained deeper understanding of inclusive education principles, co-teaching models, and strategies for adapting lessons.

Operational development: Practical skills improved the most, indicating that co-teaching provides hands-on experience in planning, teaching, and assessing diverse learners.

Overall readiness: The integrated effect of co-teaching strengthened motivation, knowledge, and practical competence, with operational skills serving as the strongest predictor of overall readiness.

Co-teaching supports the holistic development of pre-service teachers, combining theory, practice, and psychological confidence. The method fosters collaboration, teamwork, and professional partnerships, which are essential for inclusive classroom environments.

Future Recommendations:

Teacher education programs should incorporate co-teaching systematically to enhance inclusive competence. Further research should investigate long-term impacts of co-teaching on classroom performance and student outcomes.

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