Bondar, T., Holub, V., & Melnyk, D. (2025). Rationale for the invariant content of physical education in the context of inclusive education. *Actual Issues of Modern Science. European Scientific e-Journal*, 38, 92–104. Ostrava.

DOI: 10.47451/soc2025-08-01

The paper is published in Crossref, ICI Copernicus, BASE, Zenodo, OpenAIRE, LORY, Academic Resource Index ResearchBib, J-Gate, ISI International Scientific Indexing, ADL, JournalsPedia, Scilit, EBSCO, Mendeley, and WebArchive databases.



Taras Bondar, Candidate of Sciences in Physical Education and Sports (Ph.D.), Senior Lecturer, Department of Theory and Methodology of Physical Education, Kremenets Taras Shevchenko Regional Academy of Humanities and Pedagogy. Kremenets, Ukraine.

ORCID 0000-0002-1389-6614, Scopus 58341038000

Viktor Holub, Candidate of Sciences in Physical Education and Sports (Ph.D.), Associate Professor, Head of the Department, Department of Theory and Methodology of Physical Education, Kremenets Taras Shevchenko Regional Academy of Humanities and Pedagogy. Kremenets, Ukraine.

ORCID 0000-0003-3123-7169

Diana Melnyk, Director, Municipal Institution "Inclusive Resource Centre of Kremenets City Council". Kremenets, Ukraine.

ORCID 0009-0009-1926-558X

Rationale for the Invariant Content of Physical Education in the Context of Inclusive Education

Abstract: In recent years, there has been a dynamic increase in the number of students with special educational needs (SEN) in educational institutions. However, as evidenced by the analysis of scientific and methodological literature, anomalies in the physical development of such children remain largely unexplored. This significantly complicates the development of physical education curricula, hinders the effective adaptation and modification of existing educational programs, and prevents the creation of effective individualized development programs for students with SEN. Therefore, to address this issue, there is a need to study empirical data on the physical development of children with SEN and to justify the invariant content of educational programs for this population. During the 2024–2025 academic year, 103 children with special educational needs were examined. The study assessed the level of development of motor coordination, balance, fine and gross motor skills, as well as abnormalities in gait patterns, posture, and the structure of the lower limbs. In addition, medical records and comprehensive assessment reports from the Kremenets Inclusive Resource Center were analyzed. The collected data were summarized in tables, statistically processed using the IBM SPSS software, and visualized through diagrams. The vast majority of students with SEN exhibited deviations in the development of both fine and gross motor skills, as well as impairments in motor coordination and balance. Furthermore, there was a high prevalence of postural disorders, structural defects of the feet, and improperly formed gait patterns. An additional issue is the difficulty in perceiving educational content, particularly instructions and explanations for motor tasks. Based on the data obtained during the study regarding physical development anomalies in learners with special educational needs (including deviations in fine and gross motor skills development, impaired coordination and balance, postural disorders, anomalies in foot structure, and gait abnormalities), a conceptual framework has been proposed for the content of an invariant module within adapted and modified individual educational programs for learners with SEN. This framework encompasses instruction and application of exercises aimed not only at facilitating children's social integration within the community, but also at enhancing motor activity and addressing the identified physical development deviations across all categories of educational difficulties.

Keywords: inclusive education, physical culture, physical education, special educational needs.

Тарас Бондар, кандидат наук з фізичного виховання та спорту, старший викладач, кафедра теорії та методики фізичного виховання, Кременецька обласна гуманітарно-педагогічна академія ім. Тараса Шевченка. Кременець, Україна.

ORCID 0000-0002-1389-6614, Scopus 58341038000

Віктор Голуб, кандидат наук з фізичного виховання та спорту, доцент, завідувач кафедри, кафедра теорії та методики фізичного виховання, Кременецька обласна гуманітарно-педагогічна академія ім. Тараса Шевченка. Кременець, Україна.

ORCID 0000-0003-3123-7169

Діана Мельник, директор, Комунальна установа Інклюзивно-ресурсний центр Кременецької міської ради. Кременець, Україна.

ORCID 0009-0009-1926-558X

Обгрунтування інваріантного змісту фізичного виховання у контексті інклюзивної освіти

Анотація: Останні декілька років характеризуються динамічним зростанням у закладах освіти України кількості здобувачів, що мають особливі освітні потреби (ООП). Проте, як засвідчують результати аналізу науково-методичної літератури, аномалії фізичного розвитку серед таких дітей майже не вивчені. Це затрудняє розробку змісту освітніх програм з фізичної культури, стає на заваді ефективній адаптації та модифікації чинних освітніх програм, складанню дієвих індивідуальних програм розвитку здобувачів з ООП. Відтак, для вирішення вказаної проблематики існує необхідність вивчення фактичних даних щодо фізичного розвитку дітей з ООП та обгрунтування інваріантного змісту освітніх програм для таких здобувачів. Впродовж 2024-2025 навчального року було обстежено 103 дитини з особливими освітніми потребами, а саме: рівень розвитку координації рухів, рівноваги, дрібної, загальної моторики, аномалії акту ходи, постави та будови нижніх кінцівок. Крім того, вивчалися медичні документи, висновки Кременецького ІРЦ щодо комплексної оцінки осіб з ООП. Одержані дані узагальнювалися у вигляді таблиць, статистично оброблялися за допомогою комп'ютерної програми IBM SPSS та візуалізувалися у вигляді діаграм. Серед переважної більшості здобувачів з ООП спостерігаються відхилення у розвитку дрібної та загальної моторики, порушення координації рухів та рівноваги. Крім того, виявлено високу поширеність порушень постави, дефектів будови стоп та неправильно сформованого акту ходи. Окрему проблему становить ускладнене сприйняття навчального матеріалу, зокрема пояснень та інструкцій до виконання рухових завдань. На підставі отриманих під час дослідження даних щодо аномалій фізичного розвитку здобувачів з особливими освітніми потребами (відхилення у розвитку дрібної та загальної моторики, порушення координації рухів та рівноваги, порушення постави, аномалії будови стоп та акту ходи) запропоновано концепцію змісту інваріантного модулю до адаптованих та модифікованих індивідуальних освітніх програм для здобувачів з ООП, зміст якого включає навчання та використання вправ не лише для соціалізації дітей в суспільному середовищі, але й для підвищення рухової активності та подолання виявлених відхилень фізичного розвитку для всіх груп освітніх труднощів.

Ключові слова: інклюзивна освіта, фізична культура, фізичне виховання, особливі освітні потреби.

Abbreviations:

IRC is the inclusive-resource centre, *SEN* is special educational needs.

Introduction

The issue of teaching and educating children with SEN is not new to pedagogical science. For a long period, the educational process for this category of learners was carried out in isolation from the mainstream educational environment—mainly in specialised schools or boarding institutions. The prevailing model of such education was primarily aimed at the formation of basic life and elementary learning skills, often without considering the need for socialisation, integration, and the comprehensive development of the child (*Poroshenko, 2019*). At the same time, practice has demonstrated the low effectiveness of this model in the context of the constant increase in the number of children with SEN.

The global educational community responded to the necessity of creating conditions to ensure equal access to quality education for all participants in the educational process (Hryshchenko, 2024): in 1994 the Salamanca Statement was adopted (Yefimenko & Moha, 2022). In the context of Ukrainian educational policy, inclusive education began to be systematically implemented with the adoption of the revised Law of Ukraine "On Education" (2017) and the Law of Ukraine "On Complete General Secondary Education" (2020), which established the main legal framework for inclusive learning. At the same time, the Resolution of the Cabinet of Ministers of Ukraine "On Approval of the Regulation on the Inclusive Resource Centre" (2017) was passed, defining the mechanisms for specialists' work on comprehensive assessment and identification of individual educational needs of learners with SEN. This was followed by the Resolutions of the Cabinet of Ministers of Ukraine "On Approval of the Procedure for the Organisation of Inclusive Education in General Secondary Education Institutions" (2021) and "On Approval of the Procedure for the Organisation of Inclusive Education in Pre-School Education Institutions" (2019).

Such steps by the state represent a logical response to the dynamic growth in the number of learners with special educational needs (*Inclusion..., n.d.*; *Development..., 2024*). In particular, according to official statistics, in 2019 the number of such children in pre-school and general secondary education institutions amounted to 29,733, while by 2024 it had reached 51,639, indicating an increase of 73.7% (*Statistical data..., n.d.*). This means that as of 2024, for every thousand learners there are approximately 13 children with SEN (1.3%), and this trend is showing steady positive growth. At the same time, the issue of inclusive education from the perspective of psychology, speech therapy, and corrective pedagogy has been widely covered in academic publications. However, the substantiation and rethinking of the content of physical education curricula for learners with SEN, as well as the adaptation or modification of learning material, remain insufficiently explored.

At present, educational institutions, guided by the conclusions of inclusive resource centres, independently carry out the adaptation or modification of standard physical education curricula. Yet, in most cases, such changes are fragmentary, lack a scientifically grounded approach, and often amount to a formal fulfilment of requirements. Moreover, there are no unified invariant (compulsory) components in the content of physical education for learners with SEN, which makes it impossible to ensure systematic and high-quality learning (*Bondar & Melnyk*, 2025).

An analysis of current academic and methodological literature confirms the underdevelopment of this issue. For example, O. Forostian (2018a) notes the near absence in

Ukraine of academic research devoted to the organisation and delivery of physical education lessons in inclusive classes (*Forostian, 2018a*). In our previous studies, we also emphasised the difficulties of implementing physical education in inclusive environments within general secondary schools (*Bondar et al., 2024*).

Researchers such as L. Borysenko (2018), O. Shukatka, and O. Korzhan (2022) draw attention to the prevailing scepticism among specialists regarding the effectiveness of inclusive education specifically in physical education, which is due to the significant variability of motor impairments in children with SEN (Borysenko, 2018; Shukatka & Korzhan, 2022). A. Solovey, M. Yaroshyk, and M. Danylevych (2025) in their work also emphasise the ongoing debate on the content of inclusive physical education and propose a justification for the content of physical education in general secondary schools for children with autism spectrum disorders (Solovey et al., 2025).

In the works of M. Yefymenko and M. Moha (2022), the forms and methods of physical development of pre-school children with SEN are systematised, particularly those with musculoskeletal disorders (cerebral palsy, spinal paresis, delayed psychomotor development, etc.). However, the authors do not consider the content of curriculum material that could be integrated into standard educational programmes (Yefimenko & Moha, 2022; Yefimenko, M. M., 2013).

N. Horopakha (2014) studied certain aspects of organising physical education in inclusive settings, in particular the issues of continuity of learning material and individual forms of teaching. At the same time, as the researcher notes, there is significant inconsistency between educational programmes and their substantive content with regard to the physical education of learners with SEN (Yefimenko & Moha, 2022).

Thus, the existence of objective difficulties in the organisation of physical education in inclusive settings, the necessity of incorporating into its content exercises aimed at correcting deviations in the physical development of learners with SEN, together with the insufficient scientific development of the content of educational programmes, determine the relevance of conducting this study. We assume that by identifying and substantiating the most relevant content of the subject Physical Education for learners with SEN, the state of their physical development will be improved.

Therefore, the aim of this study is to substantiate the invariant (compulsory) content of physical education in the context of inclusive learning, based on factual data on the physical development of learners with SEN.

Materials and Methods

During the 2024–2025 academic year, we examined 103 children with special educational needs. The sample represents 22.4% of the total number of learners in the service area (460 individuals) who are registered with the Municipal Institution "Inclusive Resource Centre of Kremenets City Council" (Kremenets IRC). Accordingly, the results are presented with a 95% confidence level and a 7% margin of error (p=0.5).

The study involved assessment using standardised tests: motor coordination (finger-to-nose test and straight-line walking), balance (one-leg stance "Crane" test), fine motor skills (the "Fingers Greeting" test), gross motor skills (box test—the child steps into the box and then out

of it again. The tasks are gradually made more complex by increasing the distance to the box and replacing it with a deeper one), gait (pedagogical observation), posture disorders (using a postural chart and child inspection), and lower limb deformities (footprint analysis, Navicular Drop Test). In addition, the child's medical records were examined. The data were recorded in the protocol for assessing the child's physical development. The conclusions of the Kremenets IRC concerning the comprehensive assessment of children with SEN were also studied.

The obtained data were summarised in tables, processed using the IBM SPSS software package, and visualised in the form of charts.

All official representatives signed consent forms for the processing of children's personal data in the state-prescribed format.

Literature Review

The study of inclusive education and its application in physical education has evolved significantly over the past decade. The legislative framework in Ukraine, established by the Laws "On Education" (2017) and "On Complete General Secondary Education" (2020), together with the Resolutions of the Cabinet of Ministers "On Approval of the Regulation on the Inclusive Resource Centre" (2017) and "On Approval of the Procedure for Organising Inclusive Learning in General Secondary Education Institutions" (2021), laid the legal foundation for inclusive practices, ensuring equal access to education for learners with special educational needs (SEN) (On Education, 2017; On Complete General Secondary Education, 2020; On Approval..., 2017; On Approval..., 2021). These legislative documents were preceded by international initiatives, notably the Salamanca Statement and Framework for Action on Special Needs Education (n.d.), which emphasised inclusive learning as a global priority.

In Ukrainian scholarship, inclusive education is increasingly viewed as a social and pedagogical condition for the adaptation of children with special needs (*Hryshchenko*, 2024). Poroshenko (2019) conceptualised inclusivity as a process of transforming educational systems to meet the needs of all learners, while Horopaha (2014) stressed the importance of continuity in physical education for preschoolers and younger pupils within inclusive settings. The institutional expansion of inclusive education is confirmed by statistics showing a 73.7% growth in the number of children with SEN in Ukrainian schools between 2019 and 2024 (*Statistical data..., n.d.*; *Development..., 2024*; *Inclusion..., n.d.*).

However, despite these advances, researchers identify significant gaps in the methodological and practical organisation of inclusive physical education. Forostian (2018a) underlined the lack of systematic approaches to planning and conducting physical education lessons for mixed groups. In a later collaborative work, Forostian, Sheremet, Leshchii, and Maliy (2018b) presented a corrective-developmental programme "Therapeutic Physical Culture" for children with hearing impairments, highlighting the therapeutic potential of targeted motor exercises. Nevertheless, such practices are rarely integrated into the broader structure of school curricula.

Several authors have focused on the psychological and physiological diversity of learners with SEN, which complicates the standardisation of physical education programmes. Borysenko (2018) emphasised that physical culture itself can serve as an inclusive environment that promotes socialisation and compensates for developmental disparities. Similarly, Shukatka and Korzhan (2022) observed that the variability of motor and cognitive impairments requires

differentiated pedagogical strategies, while Solovey, Yaroshyk, and Danylevych (2025) proposed methodological guidelines for the physical education of learners with autism spectrum disorders. These studies collectively demonstrate the need for unified methodological foundations that would ensure adaptability without fragmenting the educational process.

Earlier pedagogical approaches by Yefimenko (2013) and later by Yefimenko and Moha (2022) developed correctional models of physical development for children with musculoskeletal and psychomotor disorders, using movement-based therapy and differentiated physical training. Their works became the scientific basis for integrating rehabilitative practices into inclusive education. Yet, as noted by Bondar, Melnyk, Holub, and Bondar (2024), the implementation of such models in schools remains inconsistent and often formal, as teachers lack the methodological resources and practical tools to modify physical education programmes appropriately.

Recent methodical recommendations by Bondar and Melnyk (2025) provide a conceptual framework for designing physical education in inclusive settings, stressing the importance of an invariant (compulsory) content that addresses both physical development and socialisation. This aligns with the global trend towards designing adaptive yet unified curricula that balance individualisation with systematisation (Solovey et al., 2025; Forostian, 2018a). Moreover, as Hryshchenko (2024) and Poroshenko (2019) underline, inclusive education must not be limited to integration; it should promote comprehensive development through pedagogical, psychological, and physiological support.

In summary, the literature reflects a transition from fragmented adaptive practices to the development of a systematic, evidence-based framework for inclusive physical education. The synthesis of normative, theoretical, and empirical studies substantiates the need for an invariant component within educational programmes for children with SEN, integrating corrective, developmental, and social functions of physical culture.

Results

As evidenced by the analysis of the specialised literature presented above, children with SEN face five types of educational difficulties, namely: intellectual, physical, physiological, learning and socio-adaptive (sociocultural) difficulties. These, in turn, are categorised across five levels of educational support (from 1 to 5). However, in this study the distribution of the obtained results by support levels is not provided. The data are synthesised only by groups of educational difficulties, as contained in the official conclusions of the comprehensive assessment of persons with SEN carried out by the Inclusive Resource Centre (*Figure 1*).

The analysis of the results presented in the diagram (*Figure 1*) shows that the largest group of children with SEN are learners experiencing learning difficulties. The 2nd group (around 1/4) of learners with SEN face socio-adaptive difficulties (*Figure 1*). The 3rd group comprises intellectual difficulties, accounting for about one 5th of those assessed. The 4th group (about 1/6) are children with functional difficulties. The smallest, 5th group are children with purely physical difficulties.

In line with the aim of the research, namely to identify invariant (mandatory) physical exercises for the design of adapted or modified educational programmes for learners with SEN, the next step of the study was to determine the most characteristic anomalies in the physical

condition of such children, with the purpose of defining the components of the educational programme aimed at correcting physical development and preventing certain impairments. The results of the assessment are provided in the appendix (*Table 1*).

Overall, of the 103 children assessed, half had coordination and balance impairments; over one third had deficiencies in fine motor skills; slightly less than half had deficiencies in gross motor skills; 63.1% had posture problems; more than half suffered from flat feet, valgus-varus deformity of the feet, and in some cases limb shortening, which, as a result, led to gait anomalies in one third of the children; nearly half experienced difficulties in perceiving instructions and motor tasks; and one sixth of those assessed had problems with immunity (*Table 1*). (Given the margin of error in the data, the results concerning immunity formation will not be considered further as insignificant).

Further analysis of the results by groups of educational difficulties revealed that children with intellectual and physical difficulties were the most vulnerable in terms of physical condition (*Table 1*).

Thus, two thirds of learners with physical difficulties had problems with coordination, balance, gross motor skills, spinal deformities, foot structure, and gait. Half of them had fine motor deficiencies, while only a quarter experienced problems with understanding commands and instructions (*Table 1*).

Among learners with intellectual difficulties, 76.2% and 71.4% had, respectively, spinal deformities and movement coordination problems. The majority of such children also faced balance difficulties, anomalies in the structure of the lower limbs, and problems with understanding instructions and commands. About half of the children had deficiencies in fine and gross motor skills. Gait disturbances were observed in two out of five learners (*Table 1*).

The overwhelming majority of learners belonging to the socio-adaptive difficulties group experienced challenges in perceiving tasks and instructions. More than half had gross motor deficiencies, posture disorders, low coordination, and foot abnormalities. Two out of five had balance problems and fine motor deficiencies. One third had gait disturbances (*Table 1*).

Children classified in the functional difficulties group also displayed high rates of posture disorders—about two thirds—as well as problems in perceiving and carrying out tasks and instructions, and in movement coordination. Half had foot structure problems, while two out of five had balance issues. Meanwhile, the proportion of learners with fine and gross motor deficiencies was somewhat lower than in the previous groups—one fifth and one third, respectively. Additionally, one third of those assessed had gait disturbances, a figure similar to that observed in the socio-adaptive group (*Table 1*).

The final group consisted of learners classified as having "learning difficulties". Among them, high rates of spinal deformities and foot abnormalities were recorded, at 61.8% and 55.9%, respectively. By contrast, only slightly more than one third had coordination and balance impairments, significantly fewer than in the previous groups. However, the proportion of learners with fine and gross motor difficulties was somewhat higher than among the children in the preceding group. Gait disturbances were observed in only one sixth, while difficulties in perceiving and following instructions and tasks were noted in just one tenth of learners (*Table 1*).

At the next stage of the study, we conducted a variance analysis of the obtained data across groups of difficulties relating to physical development disorders in children with SEN (Figure 2).

The analysis of the diagram presented in Figure 2 demonstrates that the smallest deviations from the mean values are observed in indicators concerning posture disorders and abnormalities in the structure of the lower limbs (within 10–11%). This suggests that such defects are highly likely to occur in learners with SEN in the proportions presented in this study. Slightly less common (deviation within 12%) are impairments in fine motor skills. Less frequent still (15–17% deviation) is reduced development of movement coordination, balance, and gross motor skills. However, the variance analysis overall confirms the significant impact of the listed anomalies on the physical development of children with SEN as a complex problem.

Based on the data in appendix (*Figure 2*), gait abnormalities occur much less frequently (deviation from the mean of 21.2%). Even fewer children with SEN experience problems with the perception of learning material, tasks, and instructions (deviation of 25.01%).

At the final stage of the scientific substantiation for selecting invariant exercises for adapted or modified physical education programmes for learners with SEN, we carried out a correlation analysis between the groups of data and compiled a correlation matrix (*Table 2*). The data presented in Table 2 indicate that there is a high correlation between all indicators of physical development disorders as well as indicators of difficulties in perceiving instructions and tasks, ranging from 0.92703 to 0.99969, meaning that all the identified dependencies tend towards 1.

Thus, based on the above, it can be stated with high probability that learners with SEN face a complex problem concerning the formation of their bodies, regardless of the group of educational difficulties. This demonstrates the necessity of developing a unified invariant content for the physical education of such children. In our view, this will contribute to a more effective learning process and the prevention of physical development anomalies.

Discussion

Considering the research findings, it can be stated that the division of children with SEN into groups according to educational difficulties is rather conditional. The obtained data indicate that a learner is assigned to one group of educational difficulties most significant for the individual in accordance with the Regulations on the Inclusive Resource Centre (Resolution of the Cabinet of Ministers of Ukraine of 12 July 2017, No. 545). However, a child may simultaneously exhibit other educational difficulties of varying degrees. For example, a child with intellectual difficulties may also present with physical and other impairments.

Among children with SEN, a significant number of learners have deviations in physical development (deficiencies in fine and gross motor skills, disturbances in coordination and balance). In addition, many children experience postural disorders, foot structure anomalies, and gait abnormalities. This confirms the data in the scientific literature described by M. Yefimenko, A. Solovey, O. Forostian, etc. (Yefimenko & Moha, 2022; Yefimenko, 2013; Solovey et al., 2025; Forostian et al., 2018b). Some children also have difficulties in perceiving learning material through explanations and instructions for motor tasks.

Therefore, when designing adapted and modified educational programmes for learners with SEN, it is necessary to introduce an invariant component. Its content should include training in

physical exercises that not only increase children's level of physical activity but are also aimed at correcting the above-mentioned anomalies of physical development. The only exception is instruction in proper gait, which should be selected individually for a child if such a developmental defect is present. The same applies to the choice of teaching methods for learners who have difficulties in perceiving and assimilating learning material. For instance, if a child has a hearing impairment—demonstration and sign language are used; weak spatial orientation—assistance of a teaching assistant and various markings on the playground and signs; visual impairment—a system of signals; difficulties in comprehension—a slow demonstration of the exercise with explanation, and so forth.

Conceptually, the invariant content is presented below:

1. Gross motor difficulties

Educational needs of the child—development of gross motor skills, acquisition of motor experience, mastery of basic human movements. Main physical exercises: walking (in a straight line, on heels, on toes, sideways, stepping over obstacles such as a rope or blocks, with a beanbag on the head); running on the spot; jumping (on two feet, on one foot, forwards, sideways, backwards, from standing); rhythmic exercises; symbolic and active games.

2. Fine motor difficulties

Educational needs of the child—development of fine motor skills, mastery of precise hand movements. Main physical exercises: trays with small balls, Montessori lacing boards, games with buttons and beads (timed and untimed), rolling wooden and rubber balls with the palm on a flat surface, finger gymnastics, finger games.

3. Coordination difficulties

Educational needs of the child—development of movement coordination, formation of movement accuracy. Main physical exercises: standing on one leg with arms outstretched, exercises with closed eyes (standing on tiptoes, bends, head turns), stepping over obstacles (ropes, cushions, small objects), throwing and catching a ball in different ways (with both hands, one hand, over the head), ball dribbling (on the spot, between obstacles), jumping with a ball, arm rotations (bent at elbows, straight), trunk rotations, circular head movements, catching falling objects, throwing objects at a target, drawing exercises.

4. Balance difficulties

Educational needs of the child—development of balance, formation of spatial orientation. Main physical exercises: head rotations with support against the wall, side bends while standing on one leg, "Swallow" pose, balancing on a curved board, exercises on fitballs, crawling through tunnels, passing a ball between players standing on one leg, ball passing from a squatting position, dance exercises.

5. Postural difficulties

Educational needs of the child—correction of posture, strengthening of spinal muscles. Main physical exercises: pelvic lifts in a supine position, "Cat" exercise, "Plank" exercise, wall bar exercises, forward bends from sitting and standing positions, breathing exercises.

6. Foot structure difficulties

Educational needs of the child—prevention of flat feet, strengthening of lower limb muscles. Main physical exercises: foot rotations, walking on the spot-on different parts of

the foot, rising on tiptoes, walking on the inner and outer edge of the foot, picking up pencils with toes, self-massage of the feet, walking on a massage mat.

The obtained results are not final. To study the issue of developing physical education programmes for learners with SEN more thoroughly, a broader, similar study should be carried out in different regions of Ukraine. Moreover, based on the findings of this work, there is a need to develop and pilot an invariant module of the educational programme for learners with SEN, followed by the collection and processing of experimental data.

The data obtained will also be of practical use to physiotherapists in determining the content of therapeutic physical education for such children.

Conclusion

Thus, the study of the results of the assessment of learners with special educational needs (SEN) has enabled us to draw the following conclusions:

- 1. The findings of the study confirmed the presence of a considerable number of children with SEN who have impairments in physical development. The most common are delays in fine and gross motor skills, disorders of movement coordination and balance, postural defects, abnormalities in the structure of the feet and gait disturbances. At the same time, these issues are not dependent on the group of learning difficulties. Accordingly, the problem of deviations in the physical development of such children are worth regarding as complex, and the ways of addressing it is worth approaching through a unified, systemic strategy. A separate challenge lies in the difficulty of perceiving learning material, particularly explanations and instructions for performing motor tasks, which requires additional pedagogical support. The results obtained provide a more profound understanding of the content of physical education for learners with SEN and allow for a conceptual improvement of physical education curricula.
- 2. It has been proposed to include compulsory invariant content in the individual (in particular, adapted or modified) educational programmes for learners with SEN. This content should provide for the teaching and use of physical exercises aimed not only at facilitating the socialisation of such children in a community environment, but also at increasing their level of motor activity and promoting the correction of physical developmental impairments identified in conclusion 1. At the same time, it is important not only to adapt or modify the content of educational programmes, but also to carefully select teaching methods, taking into account the individual characteristics of instruction perception and the ability to perform motor tasks. The specified methodological approaches must be integrated into the individual development programme of each child with SEN.

Conflict of Interest

The authors declare that there is no conflict of interest.

References:

Bondar, T., Melnyk, D., Holub, V., & Bondar, A. (2024). Current issues of physical education for school-age children in an inclusive environment. *Scientific Journal of Mykhailo Drahomanov Ukrainian*

- *State University*, (10(183)), 60–65. (In Ukr.) [Бондар Т., Мельник Д., Голуб В., Бондар А. Актуальні проблеми фізичного виховання дітей шкільного віку в умовах інклюзивного середовища // Науковий часопис Українського державного університету імені Михайла Драгоманова. 2024. Вип. 10(183). С. 60-65.] https://doi.org/10.31392/UDU-nc.series15.2024.10(183).10
- Bondar, T. S., & Melnyk, D. P. (2025). Foundations for designing physical education in inclusive learning environments in educational institutions [Methodical recommendations for physical education teachers]. Kremenets city council municipal institution "The Inclusive-Resource Centre". (In Ukr.). [Бондар, Т. С., Мельник, Д. П. Основи проєктування фізичного виховання в умовах інклюзивного навчання у закладах освіти [Метод. реком. для вчителів фізичної культури]. Комунальна установа Інклюзивно-ресурсний центр Кременецької міської ради, 2025.]
- Borysenko, L. L. (2018). Physical culture as an inclusive environment. In System of Education for Children with Special Educational Needs in Modern Institutions: Proceedings of the VI All-Ukrainian Scientific-Practical Conference (12 December 2018) (pp. 23–26). Lysychansk: О. Н. Chernov. (In Ukr.). [Борисенко, Λ. Λ. Фізична культура як інклюзивне середовище. Система надання освіти дітям з особливими освітніми потребами в умовах сучасного закладу: Зб. за матеріалами VI Всеукр. наук.-практ. конф. (12 груд. 2018 р.). Лисичанськ: ФОП Чернов О. Г. С. 23-26.]
- Development of an inclusive educational environment in general secondary education institutions. (2024). The Centre for Analytical, Methodological, and Material-Technical Support for the Development of Educational Institutions of the Region. (In Ukr.). [Розбудова інклюзивного освітнього середовища в закладах загальної середньої освіти // Центр аналітично-методичного та матеріально-технічного забезпечення розвитку освітніх закладів області. 2024]. https://rozvytokosvity.te.ua/розбудова-інклюзивного-освітнього-с/
- Forostian, O. (2018a). Problems of organizing physical education lessons in an inclusive class. *Pedagogical Sciences: Theory, History, Innovative Technologies*, 8(82). (In Ukr.). [Форостян О. (2018). Проблеми організації уроків фізичної культури в інклюзивному класі // Педагогічні науки: теорія, історія, інноваційні технології. — 2018. — № 8(82).]. https://pedscience.sspu.edu.ua/wp-content/uploads/2019/02/26.pdf
- Forostian, O. I., Sheremet, B. H., Leshchii, N. P., & Maliy, V. M. (2018b). Program of corrective-developmental work "Therapeutic Physical Culture" for grades 1–4 of special secondary education institutions for children with hearing impairments. Kyiv: Ministry of Education and Science of Ukraine, Institute of Special Pedagogy of NAES of Ukraine. (In Ukr.). [Форостян О.І., Шеремет Б.Г., Лещій Н.П., Малій В.М. Програма з корекційно-розвиткової роботи «Лікувальна фізична культура» для 1-4 класів спеціальних закладів загальної середньої освіти для дітей з порушеннями слуху (для дітей зі зниженим слухом). Київ: Міністерство освіти і науки України, Інститут спеціальної педагогіки НАПН України, 2018.]
- Horopaha, N. M. (2014). Physical education of preschoolers and younger schoolchildren in the context of inclusive education: continuity and prospects. Renewal of Content, Forms and Methods of Teaching and Educating in Educational Institutions, (10), 11–15. (In Ukr.). [Горопаха, Н. М. Фізичне виховання дошкільників та молодших школярів у контексті інклюзивної освіти: проблеми наступності та перспективності // Оновлення змісту, форм та методів навчання і виховання в закладах освіти. 2014. № 10. С. 11–15.]. http://nbuv.gov.ua/UJRN/Ozfm_2014_10_6
- Hryshchenko, O. M. (2024). Inclusive education as a condition for social adaptation of children with special needs. *Naurok*. (In Ukr.). [Грищенко, О. М. Інклюзивна освіта як одна з умов соціальної адаптації дітей з особливими потребами // На урок. 2024.]. https://naurok.com.ua/inklyuzivna-osvita-yak-odna-z-umov-socialno-adaptaci-ditey-z-osoblivimi-potrebami-399961.html
- Inclusion in Lviv region: number of children in schools. (n.d.). *Loda*. (In Ukr.). [Інклюзія на Львівщині: кількість дітей у школах // *Loda*]. https://old.loda.gov.ua/news?id=65512
- On Approval of the Procedure for Organising Inclusive Learning in General Secondary Education Institutions. (2021). Resolution of the Cabinet of Ministers of Ukraine No. 957 dated September

- 15, 2021. (In Ukr.). [Постанова Кабінету міністрів України «Про затвердження Порядку організації інклюзивного навчання у закладах загальної середньої освіти» від 15 вересня 2021 р. № 957.]. https://zakon.rada.gov.ua/laws/show/545-2017-%D0%BF#Text
- On Approval of the Procedure for Organising Inclusive Learning in Preschool Education Institutions. (2019). Resolution of the Cabinet of Ministers of Ukraine No. 530 dated April 10, 2019. (In Ukr.). [Постанова Кабінету міністрів України «Про затвердження Порядку організації інклюзивного навчання у закладах дошкільної освіти» від 10 квітня 2019 р. № 530.]. https://zakon.rada.gov.ua/laws/show/530-2019-%D0%BF#Text
- On Approval of the Regulations on the Inclusive Resource Centre. (2017). Resolution of the Cabinet of Ministers of Ukraine No. 545 dated July 12, 2017). (In Ukr.). [Постанова Кабінету міністрів України «Про затвердження Положення про інклюзивно-ресурсний центр» від 12 липня 2017 р. № 545.]. https://zakon.rada.gov.ua/laws/show/545-2017-%D0%BF#Text
- On Complete General Secondary Education. (2020). Law of Ukraine No. 463-IX dated January 16, 2020). [Закон України «Про повну загальну середню освіту» від 16.01.2020 № 463-IX.]. https://zakon.rada.gov.ua/laws/show/463-20#n984
- On Education. (2017). Law of Ukraine No. 2145-VIII dated September 5, 2017. (In Ukr.). [Закон України «Про освіту» від 05.09.2017 № 2145-VIII]. https://zakon.rada.gov.ua/laws/show/2145-19#Text
- Poroshenko, M. A. (2019). *Inclusive education: textbook*. Kyiv: Agency "Ukraine". (In Ukr.). [Порошенко, М. А. Інклюзивна освіта: навчальний посібник. Київ: ТОВ «Агентство «Україна», 2019]
- Salamanca Declaration and Framework for action on special needs education. (n.d.). *Rada.* (In Ukr.). [Саламанська декларація та рамки дій щодо освіти осіб з особливими потребами // Рада.]. https://zakon.rada.gov.ua/laws/show/995_001-94#Text
- Shukatka, O., & Korzhan, O. (2022). Physical education in an inclusive environment. (In Ukr.). [Шукатка, О., Коржан, О. (2022). Фізичне виховання в інклюзивному середовищі.]. http://dspace.tnpu.edu.ua/bitstream/123456789/28515/1/Shukatka.pdf
- Solovey, A., Yaroshyk, M., & Danylevych, M. (2025). Features of inclusive physical education of students with autism spectrum disorders. *Physical Culture and Sport: Scientific Perspective*, 1(1), 371–378. (In Ukr.). [Соловей, А., Яроппик, М., Данилевич, М. Особливості інклюзивного фізичного виховання учнів з розладами аутичного спектру // Physical culture and Sport: Scientific perspective. 2025. Т.1 (1). С. 371–378.]
- Statistical data of the Ministry of Education and Science of Ukraine. (n.d.). Government of Ukraine. (In Ukr.). [Статистичні дані Міністерства освіти та наука України // Уряд України.]. https://mon.gov.ua/osvita-2/inklyuzivne-navchannya/statistichni-dani
- Yefimenko, M. M., & Moha, M. D. (2022). Forms of inclusion in the physical development of children with special educational needs. *Actual Issues of Correctional Education (Pedagogical Sciences)*, 20. (In Ukr.). [Єфименко, М. М., Мога, М. Д. Форми інклюзії у фізичному розвитку дітей з особливими освітніми потребами // Актуальні питання корекційної освіти (педагогічні науки). 2022. № 20.]. https://aqce.com.ua/vipusk-n-20-2022/efimenko-m-m-moga-m-d-formi-inkljuzii-u-fizichnomu-rozvitku-ditej-z-osoblivimi-osvitnimi-potrebami.html
- Yefimenko, M. M. (2013). Modern approaches to correctional physical education of preschoolers with motor impairments. Vinnytsia: Nilan Ltd. (In Ukr.). [Єфименко, М. М. Сучасні підходи до корекційно спрямованого фізичного виховання дошкільників з порушеннями опорно-рухового апарату. Вінниця: Нілан ЛТД, 2013.]

Appendix

Table 1. Summary data of the assessment of children with special educational needs regarding physical development by educational difficulties (p = 0.05)

development by educational difficult	(b	0.00)							
Difficulties / Physical characteristics	Impairments of movement coordination, %	Balance deficiencies, %	Difficulties in understanding tasks and instructions, %	Fine motor skill impairments, %	Gross motor skill impairments, %	Postural defects, %	Abnormalities in lower limb structure, %	Gait abnormalities, %	Weak immunity, %
Total children examined (n=103)	52,4	51,5	44,7	35,9	46,6	63,1	56,3	31,1	15,5
Of these:									
Intellectual difficulties (n=21)	71,4	66,7	66,7	47,6	57,1	76,2	66,7	38,1	9,5
Physical difficulties (n=4)	75	75	25	50	75	75	75	75	50
Functional difficulties (n=18)	50	44,4	55,6	22,2	33,3	61,1	50	33,3	16,7
Learning difficulties (n=34)	38,2	38,2	11,8	29,4	35,3	61,8	55,9	17,6	20,5
Socio-adaptive difficulties (n=26)	53,8	42,3	65,4	42,3	57,7	53,8	50	34,9	7,7

Table 2. Correlation Matrix of Physical Development Anomalies in Students with Special Educational Needs

		1	2	3	4	5	6	7
1	Movement coordination disorders							
2	Balance impairments	0,99910						
3	Difficulties in performing tasks and following instructions	0,96693	0,96727					
4	Fine motor skill impairments	0,99504	0,99771	0,95627				
5	Gross motor skill impairments	0,99523	0,99844	0,96458	0,99880			
6	Postural disorders	0,99144	0,99006	0,92866	0,98803	0,98522		
7	Lower limb structural abnormalities	0,99106	0,99058	0,92703	0,98992	0,98703	0,99969	
8	Gait disorders	0,99472	0,99452	0,97846	0,98675	0,99153	0,97774	0,97737

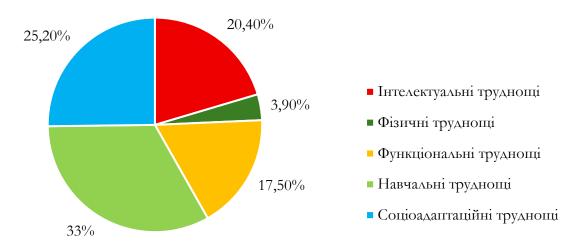


Figure 1. Number of children with special educational needs by groups of learning difficulties (In Ukr.)

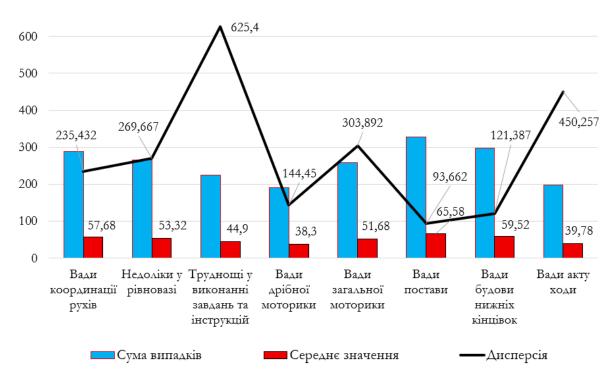


Figure 2. Data on the standard deviation from the mean values according to educational difficulties (In Ukr.)