

TRAINING OF PRESCHOOL TEACHERS

ПІДГОТОВКА ВИХОВАТЕЛІВ ДОШКІЛЬНИХ ЗАКЛАДІВ ОСВІТИ

UDC 378.6.016: [373.2.016:37.041-047.2-053.4]

[https://doi.org/10.31652/3041-1203-2026\(1\)-34-41](https://doi.org/10.31652/3041-1203-2026(1)-34-41)

Children's experimentation in the system of professional training of future preschool teachers

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Abstract

The article examines the theoretical and practical aspects of professional training of future preschool teachers for organizing children's experimentation in preschool education institutions. The relevance of the issue is substantiated in the context of implementing the competency-based approach, the requirements of the Basic Component of Preschool Education, and current trends in the development of preschool education. The essence of the concept of "children's experimentation" is analyzed, and its role in ensuring the cognitive, speech, intellectual, creative, and socio-emotional development of preschool children is identified. Particular attention is paid to experimental and research activities as an effective means of developing natural science competence, research skills, critical thinking, independence, initiative, and positive motivation to explore the surrounding world.

The specific features of professional training of higher education students majoring in 012 Preschool Education for organizing children's experimentation are revealed. The content of the academic discipline "Children's Experimentation in Educational Institutions," aimed at developing future preschool teachers' professional readiness to plan, organize, and provide methodological support for children's experimental and research activities, is characterized. Practice-oriented forms of training are presented, including designing a developmental subject-spatial environment, creating children's experimentation centers, developing original didactic materials and thematic research kits, modeling pedagogical situations, organizing workshops, promoting children's experimentation among parents, and conducting experiments integrated with various educational areas of the Basic Component of Preschool Education.

It is substantiated that a system of competency-oriented practical tasks ensures the integration of theoretical knowledge and practical skills, contributes to the development of professional competencies, creative potential, methodological expertise, and professional readiness of future preschool teachers to implement children's experimentation in the educational process of preschool education institutions. It is emphasized that high-quality teacher training is an important prerequisite for creating a developmental subject-spatial environment and ensuring the effective organization of research activities for preschool children.

Keywords: professional training, future preschool teachers, preschool education institution, children's experimentation, experimental and research activities, professional readiness, competency-based approach, natural science competence, developmental subject-spatial environment, practice-oriented learning

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[https://doi.org/10.31652/3041-1203-2026\(1\)-34-41](https://doi.org/10.31652/3041-1203-2026(1)-34-41)

Дитяче експериментування в системі професійної підготовки майбутніх вихователів закладів дошкільної освіти

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Анотація

У статті висвітлено теоретичні та практичні аспекти професійної підготовки майбутніх вихователів до організації дитячого експериментування в закладах дошкільної освіти. Обґрунтовано актуальність проблеми в контексті реалізації компетентнісного підходу, вимог Базового компонента дошкільної освіти та сучасних тенденцій розвитку дошкільної освіти. Проаналізовано сутність поняття «дитяче експериментування», визначено його роль у забезпеченні пізнавального, мовленнєвого, інтелектуального, творчого та соціально-емоційного розвитку дітей дошкільного віку. Акцентовано увагу на значенні експериментально-дослідницької діяльності як ефективного засобу формування природничої компетентності, розвитку дослідницьких умінь, критичного мислення, самостійності, ініціативності та позитивної мотивації до пізнання навколишнього світу.

Розкрито особливості професійної підготовки здобувачів вищої освіти спеціальності 012 Дошкільна освіта до організації дитячого експериментування. Охарактеризовано зміст навчальної дисципліни «Дитяче експериментування в закладах освіти», спрямованої на формування професійної готовності майбутніх вихователів до планування, організації та методичного супроводу експериментально-дослідницької діяльності дітей. Представлено практико орієнтовані форми підготовки, що передбачають проектування розвивального предметно-просторового середовища, створення осередків дитячого експериментування, розроблення авторських дидактичних матеріалів і тематичних дослідницьких наборів, моделювання педагогічних ситуацій, організацію майстер-класів, популяризацію дитячого експериментування серед батьків, а також проведення дослідів, інтегрованих із різними освітніми напрямками Базового компонента дошкільної освіти.

Обґрунтовано, що система компетентнісно орієнтованих практичних завдань забезпечує інтеграцію теоретичних знань і практичних умінь, сприяє розвитку професійних компетентностей, творчого потенціалу, методичної майстерності та професійної готовності майбутніх вихователів до впровадження дитячого експериментування в освітній процес закладів дошкільної освіти. Наголошено, що якісна підготовка педагогів є важливою умовою створення розвивального предметно-просторового середовища та забезпечення ефективної організації дослідницької діяльності дітей дошкільного віку.

Ключові слова: професійна підготовка, майбутні вихователі, заклад дошкільної освіти, дитяче експериментування, експериментально-дослідницька діяльність, професійна готовність, компетентнісний підхід, природнича компетентність, розвивальне предметно-просторове середовище, практико орієнтоване навчання

Problem Statement. At the present stage of educational development, an important issue is improving the quality of education, namely, the formation of an active, independent, and creative personality who demonstrates an interest in learning about the surrounding reality and is capable of thinking and finding solutions to any situation. Therefore, during preschool childhood, the problem of introducing experimentation as one of the leading types of children's activity is significant, since such personal qualities

as independence, interest in learning, purposefulness, activity, and creativity emerge precisely during this period.

Analysis of Recent Research and Publications. The problem of organizing children's experimentation in preschool education institutions is the subject of research by many Ukrainian and foreign scholars. The theoretical foundations of the development of children's cognitive activity, the importance of personal experience in the learning process, the role of the subject-spatial environment, and the child's active engagement have been

reflected in the works of classical educators, including J. Comenius, J. Pestalozzi, F. Fröbel, M. Montessori, K. Ushynsky, V. Sukhomlynsky, and others. Their ideas concerning learning through direct exploration of the world, observation, practical activity, and independent discovery of knowledge became the basis for the development of modern approaches to organizing children's experimentation.

The essence, content, and methodological aspects of experimental activities of preschool children have been examined in the scientific works of H. Bielenka, N. Baiurko, N. Havrysh, O. Hryhorovych, I. Karuk, K. Krutii, N. Lysenko, O. Pometun, Z. Plokhii, L. Prysiashniuk, I. Stakhova, H. Tarasenko, and other researchers. Scholars substantiate the importance of experimentation as an effective means of developing cognitive activity, research skills, critical thinking, independence, creativity, and natural science competence in preschool children. At the same time, their works pay considerable attention to creating a developmental educational environment, using ecological content in experimental activities, and introducing modern pedagogical technologies into the practice of preschool education institutions.

Purpose of the Article. The purpose of the article is to theoretically substantiate and reveal the specific features of the professional training of future preschool teachers for organizing children's experimentation, and to identify effective forms and means of developing their readiness for experimental and research activities of preschool children.

Presentation of the Main Material. An experiment is one of the most effective methods of scientific cognition, which ensures children's active involvement in the process of discovering new knowledge. Its distinctive feature is that a child does not receive ready-made explanations from the teacher but independently explores objects and phenomena of the surrounding world, observes their changes, analyzes the results, and draws their own conclusions. This approach promotes conscious acquisition of knowledge, the development of research skills, and the formation of cognitive independence.

During experiments, children have the opportunity to:

- analyze complex natural phenomena by examining their individual stages, properties, and components;
- establish cause-and-effect relationships between objects and processes occurring in the natural environment;
- test their own assumptions through practical activity and confirm or refute them;
- use various equipment, instruments, and materials to study the properties of objects in detail;

- change individual conditions of an experiment while observing how this affects the course of the process and its outcome;

- formulate conclusions based on the results obtained, substantiate their own opinions, and apply acquired knowledge in new situations (Romanchuk, 2008).

Such organization of research activity transforms a child from a passive observer into an active researcher, develops curiosity, critical thinking, the ability to analyze information, and the ability to find answers to their own questions. This creates a solid foundation for developing natural science competence and a positive attitude toward learning about the surrounding world.

In modern preschool education, children's experimentation is regarded not only as a method of familiarizing children with objects and phenomena of the surrounding world, but also as an important means of developing cognitive independence, research culture, communication skills, and positive motivation for learning. Therefore, particular importance is attached to creating an educational environment that stimulates children to engage in active search, discovery, and practical exploration.

Within preschool education institutions, scholars K. Krutii and I. Karuk understand children's experimentation as a specially organized form of children's cognitive and research activity carried out under pedagogical guidance or on the initiative of preschoolers themselves and involving active exploration of objects and phenomena of the surrounding world through practical testing, observation, modeling, comparison, formulation and testing of hypotheses. Such activity ensures the development of research competence, curiosity, independence, the ability to analyze the results of one's own activity, establish cause-and-effect relationships, and apply acquired knowledge in new life situations, which corresponds to the modern requirements of continuous and lifelong learning (Karuk, 2023).

Scholar N. Yarysheva considers children's experimentation an important means of forming children's scientifically objective understanding of nature as an integrated system. The scholar emphasizes that its main tasks are to develop research and experimental skills, form the ability to independently formulate hypotheses and draw conclusions based on the results of elementary research activities, as well as stimulate curiosity, perseverance, and the need for independent exploration of the surrounding world (Yarysheva, 2016).

One of the main tasks of preschool education teachers is to create conditions for the development of a creative, life-competent personality capable of realizing their

potential in modern society. An essential component of fulfilling this task is the formation of positive thinking in children, which not only contributes to their comprehensive development but also helps them acquire the skills necessary to navigate a changing environment, interact with it productively and harmoniously, and easily adapt to new living conditions.

Effective organization of children's experimentation involves clearly defining its educational purpose, which consists in stimulating the cognitive activity of children of early and preschool age, developing logical thinking, curiosity, independence, and the ability to plan their own research activities based on personal experience and positive emotions.

Achieving this goal requires the implementation of a set of pedagogical tasks that take into account children's age-related and individual characteristics. First of all, it is important to develop a sustained interest in research activities, teach children to formulate assumptions, test them practically, and draw well-founded conclusions. Equally important is the development of the ability to independently determine the purpose of research, select the necessary materials and equipment, as well as the formation of such personal qualities as initiative, perseverance, responsibility, communication skills, and the ability to cooperate with peers. In the process of experimentation, children also deepen their knowledge of objects and phenomena of the surrounding world, acquiring practical experience in exploring them.

Research activity most often begins with natural curiosity, which manifests itself through surprise, interest in a particular object or phenomenon, or a desire to find an answer to a question. Therefore, the teacher should create conditions that support and develop children's desire for learning and discovery.

In the practice of preschool education institutions, it is advisable to use various forms of experimental activity. Depending on the organization of the educational process, experiments may be:

- spontaneous, arising in the course of everyday observation and not requiring special preparation;
- planned, conducted in accordance with a specific topic or educational task;
- situational, organized in response to a child's question or cognitive interest.

Combining different types of experimentation ensures a gradual increase in preschoolers' independence, promotes the development of their research competence and interaction skills, and develops their ability to work as a team.

An important condition for the successful organization of research activity is the creation of a specially equipped experimentation center or mini-laboratory in a preschool education institution. Such an environment should be safe, accessible, and enriched with a variety of materials that stimulate children's cognitive activity (Karuk, et. al., 2024).

The experimentation center should be equipped with the following materials (Lazarenko, et. al., 2022):

- laboratory equipment: magnifying glasses, magnets, microscopes, scales, test tubes, pipettes, measuring cups, rulers, measuring tapes, wooden sticks, etc.;
- natural materials: pine cones, acorns, chestnuts, branches, leaves, plant seeds, sand, soil, water, dried fruits, and other natural objects;
- materials for creative activities: plasticine, salt dough, paints, colored pencils, paper, cardboard, fabrics of various textures, glue, scissors, brushes;
- household substances suitable for conducting safe experiments: salt, sugar, flour, starch, cereals, and food coloring;
- educational and methodological materials: children's encyclopedias, anthologies, and didactic manuals;
- means for orderly storage of equipment: containers, boxes, and organizers.

The organization of a developmental subject-spatial environment for children's experimentation is one of the key conditions for implementing the competency-based approach in preschool education. Such an environment provides opportunities for children's active cognitive interaction with objects and phenomena of the surrounding world, promotes the development of research activity, independence, critical and creative thinking, the formation of natural science competence, as well as experience in elementary exploratory and research activities. At the same time, the effectiveness of implementing children's experimentation largely depends on the level of the teacher's professional readiness, their ability to design a developmental educational environment, select appropriate methods, forms, and means for organizing children's research activities, and provide pedagogical support for these activities.

Therefore, an important component of the professional training of future preschool teachers is the formation of their readiness to introduce and organize children's experimentation in preschool education institutions. In the process of studying the academic discipline "Children's Experimentation in Educational Institutions," students of higher education majoring in 012 Preschool Education, enrolled in the educational and

professional programs Preschool Education. Primary Education and Preschool Education. Speech Therapy, master the theoretical, methodological, and practical foundations of experimental and research activities of preschool children, acquire modern approaches to creating a developmental subject-spatial environment, and develop professional competencies in designing children's experimentation centers, developing didactic support, modeling research situations, and organizing the educational process on the principles of activity-based and competency-based approaches.

The practical training of future preschool teachers involves developing author-designed models of children's experimentation centers, selecting equipment, materials, and tools for conducting experiments, modeling pedagogical situations aimed at developing children's research skills, as well as mastering methods of pedagogical support for experimental activities. This approach ensures the formation of future teachers' professional readiness to effectively organize children's experimentation, create an innovative educational environment, and implement the objectives of modern preschool education aimed at developing cognitive activity, research competence, and the creative potential of preschool children.

Particular attention is paid to practical classes during which students independently design and present author-developed models of children's experimentation centers and mini-laboratories for children of early and preschool age. In the process of completing such tasks, they develop a concept of the educational space, select safe equipment and didactic materials, determine areas of research activity according to children's age characteristics and the requirements of the Basic Component of Preschool Education.

The centers created by students are characterized by functionality, mobility, and variability of use. Their content includes laboratory equipment, natural materials, measuring instruments, means for conducting experiments, collections of natural objects, didactic games, thematic cards, algorithms for conducting experiments, as well as materials for recording observation results. Considerable attention is paid to ensuring the safety, accessibility, and aesthetic quality of the educational environment.

The presentation of their own projects contributes to the development of future preschool teachers' professional competence, creativity, research thinking, ability to substantiate pedagogical decisions, and ability to apply innovative approaches to organizing children's experimentation. This format of work enables students to model real conditions of activity in a preschool education

institution and understand the role of the subject-spatial environment in developing children's cognitive activity.

Therefore, one of the key tasks of a preschool education teacher is to create an educational environment in which children's experimentation becomes a natural, engaging, and emotionally rich process of learning. The organization of research activity should encourage children not only to observe phenomena of the surrounding world but also to ask questions, formulate assumptions, test them practically, analyze the results obtained, and draw their own conclusions. It is precisely emotional involvement, an atmosphere of discovery, and the opportunity to independently search for answers that support preschoolers' natural curiosity and motivate them toward active learning.

Creative professionally oriented tasks occupy an important place in developing the professional readiness of future preschool teachers, as their completion ensures the development of design, methodological, communication, and research competencies. In particular, students develop advertising and presentation materials devoted to various forms of organizing children's experimentation in preschool education institutions; design thematic collections of experiments according to children's age characteristics (for example, "Little Chefs – Great Researchers") with subsequent demonstration of the experiments during practical classes; and model information and educational interaction with parents by preparing video recommendations on organizing safe children's experimentation at home.

Practical training also involves the creation of author-designed didactic tools and materials for organizing children's research activities, including thematic research kits, plant-growing kits, as well as collections of experiments integrated with various educational areas of the Basic Component of Preschool Education. An important component of the training is the development and implementation of experiments for older preschool children, which contributes to the formation of future teachers' skills in planning, organizing, and methodically supporting cognitive and research activities.

Particular attention is paid to developing professional interaction skills and promoting modern approaches to organizing children's experimentation. For this purpose, students, working in small groups, develop and conduct author-designed master classes for teachers and future preschool teachers, including "Culinary Chemistry" and "Fashion Laboratory." These master classes involve creating a scenario, selecting the necessary materials, practically demonstrating experiments, and providing a methodological rationale for their use in the educational

process. Such a system of practical tasks ensures the integration of theoretical knowledge and practical skills, contributes to the formation of future preschool teachers' professional readiness to organize children's experimentation and create a developmental subject-spatial environment that meets the requirements of modern preschool education.

At the same time, experimentation contributes to the development of critical and creative thinking, research initiative, independence, and confidence in one's own abilities. The practical experience acquired through research activities helps children better understand cause-and-effect relationships, apply knowledge in new situations, and develop a positive attitude toward learning. Therefore, children's experimentation should be regarded as one of the most effective means of the comprehensive development of a preschool child's personality, combining cognitive, speech, social, emotional, and creative areas of development.

Conclusions. Thus, children's experimentation is an important means of implementing the competency-based approach in preschool education, as it ensures active exploration of the surrounding world and contributes to the development of critical and creative thinking, research initiative, independence, cognitive activity, and positive motivation for learning. In the process of experimental and research activities, children acquire practical experience in establishing cause-and-effect relationships, formulating and testing assumptions, analyzing the results obtained, and applying acquired knowledge in various life situations,

which ensures their holistic intellectual, speech, emotional-value, and creative development.

The effectiveness of organizing children's experimentation largely depends on the teacher's professional readiness to create a developmental subject-spatial environment, select modern methods, forms, and means of organizing research activities, as well as provide pedagogical support for children's cognitive activity. Therefore, the professional training of future preschool teachers should be aimed at developing integrated readiness to introduce experimental and research activities into the educational process of preschool education institutions. This involves combining theoretical knowledge with practical experience in designing, organizing, and methodically supporting children's experimentation.

The introduction of practice-oriented tasks into the educational process of higher education institutions aimed at modeling the professional activities of a preschool teacher contributes to the formation of future teachers' professional competencies, the development of their creative initiative and methodological skills, and their readiness to use children's experimentation as an effective means of developing the personality of a preschool child in accordance with modern requirements of preschool education.

The prospects for further research lie in studying the effectiveness of modern digital, STEAM, and integrated technologies in preparing future teachers to organize experimental and research activities of preschool children.

References

- Karuk, I. V. (2023). Eksperimentuvannia yak vyd diialnosti ditei u doshkilnii pedahohitsi Ukrainy (seredyna XX – pochatok XXI stolittia). Dys. na zdobuttia naukovooho stupenia doktora filosofii (PhD) za spetsialnistiu 011 Osvitni, pedahohichni nauky. Vinnytsia: Vinnytskyi derzhavnyi pedahohichniy universytet im. M. Kotsiubynskoho. 286 p. URI: <https://dspace.vspu.edu.ua/items/bd370408-3c7a-42ea-a6cf-ff5eee4cf8d4>
- Romanchuk, R. O. (Ed.). (2008). Formuvannia pervynnykh ekolohichnykh uiavlen u doshkilnykiv. Metodychnyi zbirnyk perspektyvnoho pedahohichnoho dosvidu z problemy ekolohichnoi osvity ditei doshkilnoho viku. Zaporizhzhia. 56 p.
- Yarysheva, N. (2016). Ekolohichne vykhovannia doshkilnykiv. Posibnyk dlia vykhovateliv. Kyiv: Vykhovannia doshkilnykiv. 226 p.
- Karuk, I., Kolesnik, K., Kryvosheya, T., Pakhalchuk, N., & Pokhyla, S. (2024). Trends of implementation of research-experimental activities in preschool educational institutions of Ukraine in today's conditions. *Society. Integration. Education: Proceedings of the International Scientific Conference*, 2, 16–26.
- Lazarenko, N., Kolomiets, A., & Kolesnik, K. (2022). Peculiarities of organization of group interaction of preschool children in the process of game-experimentation. *Preschool Education: Global Trends*, 2, 123–138. <https://doi.org/10.31470/2786-703X-2022-2-123-138>
- Shykyrynska, O., Kanarova, O., & Medun, L. (2022). Features of soft skills development children of senior preschool age in play activity: Theoretical and methodological aspect. *Science and Education for Sustainable Development*. Katowice: Publishing House of University of Technology. P. 708–719. <https://cutt.ly/k1LSFrz>

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