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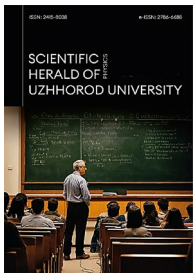

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Model of the "Green School" with the use of an educational-experimental site in the formation of biological skills of students in rural schools in the Republic of Kazakhstan

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Abstract

Relevance. The research activities of schoolchildren play a crucial role in their socialization and preparation for higher education, particularly in developing biological and environmental skills essential for understanding and preserving the natural world. This study focuses on identifying effective methods to foster these competencies among schoolchildren.

Purpose. This article aims to explore how extracurricular education, particularly through models like the "Green School" and educational and experimental sites, contributes to the formation of biological competencies in schoolchildren.

Methodology. The study examines the features of extracurricular learning, including the "Green School" model and educational and experimental sites. It explores the essence of biological and environmental skills, analyses the role of extracurricular activities in skill formation, and evaluates the teacher's influence on developing biological skills and the competencies required of modern biology educators.

Results. The research demonstrates the effectiveness of using educational and experimental sites and implementing the "Green School" model in enhancing schoolchildren's skills. It underscores the positive impact of these methods in fostering a love for nature, promoting environmental awareness, and cultivating the ability to explore and acquire knowledge about the natural world.

Conclusions. The findings support the integration of extracurricular activities like the "Green School" model and educational sites to enhance biological competencies among schoolchildren. This research is intended to assist biology

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and natural science teachers in rural secondary schools, improving their professional training and teaching methodologies. Additionally, the study encourages the development of students' appreciation for nature and their understanding of environmental preservation, thereby enriching their overall educational experience.

Keywords: project based learning; environmental education; training and experimental area; "Green School".

Introduction

In recent years, there has been a need to revise the former education systems. Increasingly, we are talking about the introduction of innovative teaching methods into the educational process, which can be especially actively used in extracurricular activities. These teaching methods not only help students improve their knowledge but also enhance their overall development. The use of innovative methods actively involves students in the learning process, often surpassing the teacher's activities, which can positively impact cognitive processes.

Ukrainian researchers V.O. Miroshnychenko and O.D. Stanina [1] revealed in their work the role of innovative methods in improving the professionalism of teachers and focused on the fact that these methods have a positive effect on the dynamics of learning and the assimilation of the necessary knowledge and skills. In extracurricular learning, innovative methods are often used, which can be effective in developing the necessary skills. For example, R.N. Zhanalieva et al. [2], analysing in their work the issue of the effectiveness of innovative pedagogical activity within educational institutions, came to the conclusion that extracurricular learning is aimed at the formation of certain instrumental and technological knowledge and skills.

Extracurricular learning can be actively used in the study of all school disciplines, but it is especially important to use it in the study of the natural sciences, which include biology. The study of such disciplines involves not only the theoretical study of the material but also the practical, as well as the active application of the acquired knowledge. Having no experience of interacting with the environment and not practising theoretical knowledge in practice, schoolchildren receive only a superficial understanding of the natural sciences. In addition, in the methodology of teaching biology, insufficient attention is paid to educational and experimental areas, which can be effective in the practical development of acquired skills, as well as in general in the formation of the necessary skills and competencies in students.

Speaking about the educational process in rural schools, it is required to understand that teachers in rural schools may have limited access to modern methodological materials and innovative methods of work. Kazakh scientists M.A. Tajik et al. [3], exploring the difficulties faced by rural teachers in their work, noted that teachers in rural schools also have reduced motivation to work due to insufficient conditions for a quality educational process. However, at the same time, teachers of rural schools can rely on the existing opportunities and advantages of the rural community. Kazakh scientist-researcher M.V. Slesar [4], studying the issue of teaching in a rural school at the present stage of education, concluded that a rural schoolteacher can use such an advantage as the proximity of nature in teaching methods. The proximity of nature can help in conducting experiments, will play a big role in observing nature, and can be good soil for creating and using a teaching and experimental site in the educational process. In his study, which is devoted to the analysis of the effectiveness of environmental education, A.Z. Brimzhanova and Z.E. Bayazitova [5] also concluded that the opportunity to observe nature, and the use of a teaching and experimental site in teaching, improve the methodology of teaching ecology and, as a result, increase the effectiveness of the educational process. In addition, the proximity of nature and active interaction with it can arouse schoolchildren's interest in agriculture, open up new facets of agricultural production for them, and influence the choice of profession, which will positively influence the development of the rural community in the future.

Analysing the role of modern learning models in the educational process, it can be assumed that they have a positive impact. So, S. Tolochko and N. Bordyug [6], who analysed the methodological features of the formation of environmental competencies, concluded that the use of various, including modern, methods for the formation of biological and environmental skills in schoolchildren can be quite effective and can affect not only the acquisition of skills but also in general for personal development. The "Green School" model is a unique method in the educational process. Innovative methods are not always available in the educational process of rural schools, however, the "Green School" model can be quite easily used in a rural community due to the proximity of nature and the availability of a huge amount of observational material.

The essence of the "Green School" model is to teach schoolchildren by observing the world around them, interacting with the environment, and conducting various experiments. The use of a learning-experimental plot when using the "Green School" model is not only an advantage but also a necessity. In the process of using the educational and experimental site, students develop the ability to independently organize their activities, and conduct their research (under the guidance of a teacher or even without outside interference), which enhances the understanding of the value of nature and the resources it provides.

S.S. Khamzina et al. [7] noted in their work on the formation of research competencies that research helps to develop relevant skills. It also forms the ability to work in a team or in pairs, which is essential for independent research activities. According to them, research also helps reveal the potential of schoolchildren, which is important for their successful development. However, the effectiveness of using the "Green School" model and educational experimental sites in the educational process requires additional analysis and confirmation.

The purpose of this study is to evaluate the effectiveness of teaching biology using the "Green School" model and educational experimental sites in the formation of biological and environmental competencies in rural schoolchildren. Research objectives: to reveal biological skills and their role in the life of schoolchildren, to reveal the features of the formation of functional literacy

in the study of natural sciences, and to analyse the main competencies of biology and natural science teachers.

Materials and Methods

In this article, the method of analysis, the method of comparison, the method of classification, the method of generalization, and the diary of observations were also used. A questionnaire was also utilized to assess the level of biological competencies and educational and experimental sites. This work was tested in rural schools in the Republic of Kazakhstan.

The method of analysis was used to reveal the features of education in rural schools, to describe the methods of innovative education, and to study biological and environmental skills. The comparison method was used in the analysis of the formation of biological skills before and after the experiment. The classification method was used to classify study areas and plants into categories, as well as to describe possible bio-ecological competencies. The generalization method helped to sum up the results of the study and determine the percentage of schoolchildren who managed to form biological skills in the course of work in educational and experimental areas. The participants of the study are schoolchildren of 5-7 grades in Kazakh rural schools. The age of schoolchildren is 10-13 years old. All schools that participated in the study function according to the standard educational program of the Republic of Kazakhstan. The number of schoolchildren who took part in the study was 400. The predominant number of children from rural schools had no experience working at the educational and experimental sites and keeping diaries of observations. To assess the impact of the "Green School" method and educational and experimental sites on the formation of biological skills in schoolchildren, the author's questionnaire was used to assess the level of biological competencies (Table 1).

Table 1. Questionnaire for assessing the level of biological competencies of schoolchildren

No.	Question	Answer "Yes"	Answer "No"
1	Are you interested in studying biology?		
2	Are you actively gaining knowledge in biology lessons?		
3	Are you able to apply the knowledge gained in biology lessons in practice?		
4	Do you often apply what you learned in biology lessons in practice?		
5	Do you have any idea about the impact of human activity on the environment?		
6	Do you think you can influence the environment?		
7	Are you familiar with the process of planting and growing plants?		
8	Do you know how to prepare seeds and soil for planting?		
9	Can you plant seeds?		
10	Do you know how to take care of a plant?		
11	Do you know how to tell when a plant and/or fruit is ripe?		
12	Will the knowledge and skills gained in biology lessons be useful to you in life?		

With the help of this questionnaire, the level of formation of the biological skills of schoolchildren was assessed before and after working with the educational experimental site. It also assessed the overall interest schoolchildren have in studying natural disciplines, how important these disciplines are in their lives, and whether they have a love for the environment. After the survey, the number of positive answers ("yes") is summed up. The number of positive answers of seven or more indicates the possible formation of biological skills or the potential of these students to master biological skills. If the number of positive answers ("yes") is six or less, we can talk about the low formation of biological skills and the low potential for their assimilation. During the study, the students were offered an observation diary. The diary of observations is filled in separately for each plant at each stage of work on the training and experimental plots. The observation diary was used when working with educational experimental plots in assessing the state of these plots, in studying the phonological phases of plant development, and is aimed at developing schoolchildren's observation skills, skills for analysing their actions and skills for correcting their actions if it is necessary to make changes to the research process (Table 2).

Table 2. Diary of observations

Stage of work	Date	Purpose of the stage	Description of the stage and description of the plant at this stage	Photo/drawing of the stage	Evaluation of results

The following departments were created to conduct practical classes and excursions at the educational and experimental site of the school:

1. Primary school department. This department was created for primary school students, where they had the opportunity to make observations and prepare for future research activities and future development of biological skills.
2. Flower and decorative department. In this department, perennial and annual plants were planted, which are intended for the aesthetic design of the school area.
3. Department of Medicinal Plants. In this department, medicinal plants were planted that can be used to treat any diseases. As part of the study, it was advisable to use medicinal plants for herbarium or various laboratory experiments.
4. Department of Plant Biology. This department was used to conduct various biological experiments, which helped to form in schoolchildren an idea of general biological laws.
5. Department of Field Crops. This department was used to monitor cereals and fodder crops, which are of great agricultural importance in this rural area.
6. Department of Vegetable Crops. It was used for the cultivation of vegetable cultures in the conditions of open and closed ground.
7. Fruit and berry department. This section was used to monitor young trees and shrubs that are actively developing and forming.
8. Ecological department. It was created for students to study the influence of environmental factors on living organisms. Also in this department, plants that are listed in the Red Book and require additional protection were studied.

The educational and experimental sites in this study were used to implement the "Green School" model, to form biological skills in schoolchildren and to assess the effectiveness of their use in the formation of these skills.

Results

At present, the issue of developing education in rural areas is acute. Students of rural schools can play a significant role in the development of their country's agricultural environment in the future. They are in constant interaction with nature and observe agricultural activities around them from an early age. This background can lead to positive results in their future education, particularly in teaching at agronomy faculties in higher educational institutions. In addition, environmental problems are noted at the present stage of development of the Republic of Kazakhstan. The need for accessibility of environmental education and related information for the population, the ability of residents to be active participants in the environmental situation in the country and be able to make important environmental decisions is noted [8].

There is also the problem of the weak connection of higher education institutions with the rural community and their weak role in the development of the environment [9]. Students of rural schools can in the future become a link between higher education institutions and the rural community, develop the countryside and work more efficiently in the agronomic sphere, as well as be active and conscious participants in solving environmental problems at the level of their country. However, to perform these tasks, developed biological and environmental skills are required, and the ideal environment for their formation is the school. The biological and environmental skills of schoolchildren include the ability to use basic biological laws in their lives. They should also be able to prepare plants for planting, monitor and correct the planting process, and oversee the process of fruit ripening. Additionally, they need to have the ability to care for plants and animals, providing necessary assistance when needed. The skills of preserving the environment can also be considered part of their biological and environmental competencies [10].

In rural schools, biological skills can be developed more actively than in urban schools due to the proximity of nature. However, at the same time, teachers of rural schools do not always have enough methodological materials, modern technologies and methods in the educational process. In the 21st century, teachers in rural schools retain their traditions and established teaching methods, but at the same time, non-formal education in rural communities is becoming increasingly relevant [11]. The educational environment of a rural school, in the teaching of natural sciences, can be more diverse than the educational environment of an urban school, so that the educational process can be improved, making it more efficient, and also including various extracurricular activities.

The role of extracurricular activities in teaching is that they improves the educational process, involves students in work and positively affects their intellectual activity, and is an effective tool in the formation of various competencies [12]. Speaking about the role of extracurricular learning in the study of the natural sciences, it can be assumed that this is an innovative teaching method that will help students apply the acquired knowledge in practice, and draw certain conclusions, based on which they can adjust their activities and improve biological and environmental competencies. In addition, extracurricular learning can influence the formation of functional literacy among schoolchildren. Functional literacy includes the ability to acquire knowledge and use it throughout life, constantly develop and actively solve emerging problems [13]. The use of extracurricular learning affects the ability of schoolchildren to acquire knowledge from various sources, as well as the ability to apply this knowledge, which as a result forms the very functional literacy of students.

The use of educational and experimental plots is, on the one hand, a traditional method of teaching, on the other hand, the very concept of "Green School" is new, especially in terms of its use in rural schools. The "Green School" model includes not only the use of educational and experimental plots but also landscaping of the school territory, social work of schoolchildren in the fresh air (which will positively affect their health) and landscaping of school classrooms (for example, by placing plants in pots or creating "living" corners) [14]. The "Green School" model can also positively influence the physical and mental health of schoolchildren, which is its advantage [15]. However, one of the main components of the "Green School" model is still the close connection of

schoolchildren with nature and the conduct of research by students. It is believed that in the study of natural sciences, observation, and interaction with nature is a necessary process that can be realized through the study of forests, parks, fields, and beaches. The areas where schoolchildren can conduct research and observe living organisms can also include greenhouses, and "living" corners in schools (rooms in which plants, small animals, and objects necessary for research are located), but in rural areas schools, this list can be expanded. As educational and experimental plots, schoolchildren can use their gardens and orchards, it may also be advisable to use fields as educational and experimental plots, which is practically impossible in urban conditions.

To confirm the effectiveness of teaching biology and ecology using the "Green School" model and, in particular, using educational experimental plots, a study was conducted among students in rural schools of the Republic of Kazakhstan. Before the start of the study, schoolchildren were asked to complete an author's questionnaire to assess their level of biological competencies. Its results showed that despite the proximity to nature and constant monitoring of agricultural activities, more than half of schoolchildren (336 students) have a low level of biological skills. 64 students have developed biological skills at a sufficient level (Figure 1).

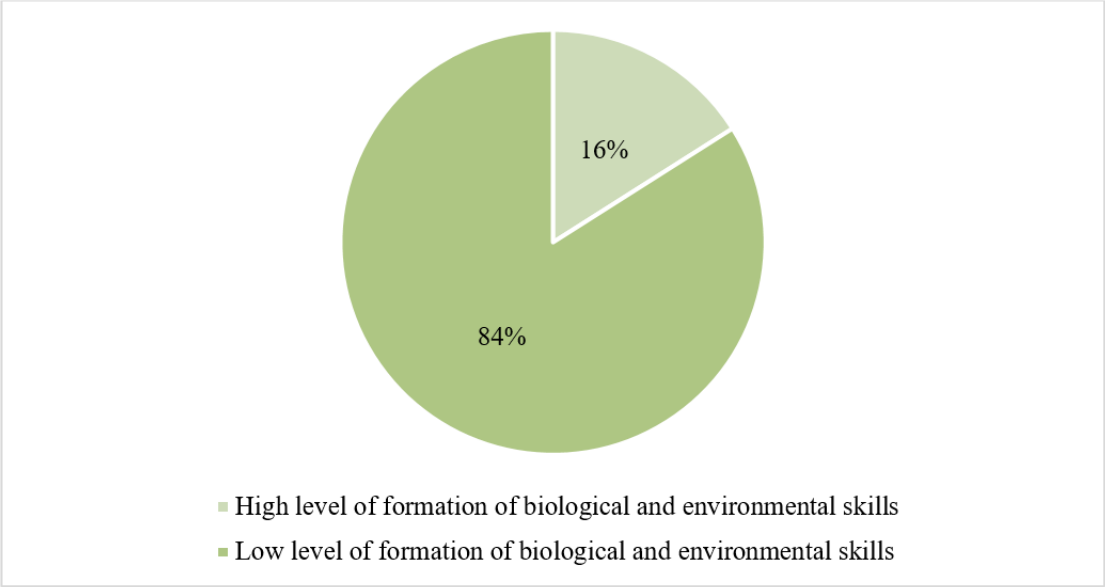

Figure 1. The results of the author's questionnaire to assess the level of biological competencies of schoolchildren before working in educational and experimental areas

The majority of the respondents noted that they were interested in studying biology (304 schoolchildren), however, more than half of the respondents admitted that they did not know how to apply the acquired knowledge in practice, and it was difficult for them in the process of preparing, planting and caring for plants. 107 respondents considered that the knowledge and skills acquired in biology lessons would not be necessary for them in life. It turned out to be positive that all students unanimously stated that they love nature, and 353 students noted that they take care of the environment and, in their opinion, have only a positive impact on it. In the lessons of biology and natural science, teachers were asked to explain the basic concepts to schoolchildren conduct conversations and dwell in detail on explaining each stage of growing plants and caring for them. Much attention was also paid to the individual characteristics of students and reliance on general didactic principles: scientific, systematic and consistent, accessibility, connection between theory and practice.

The connection between theory and practice is one of the most important principles in the study of natural sciences, for this reason, after obtaining the necessary theoretical knowledge, schoolchildren had the opportunity to choose a department of the educational and experimental site and conduct their research on it, using a diary of observations in the process.

Most schoolchildren chose the flower and decorative departments and fruit and berry departments. The field and vegetable departments aroused great interest. Most schoolchildren conducted their research in several departments of the educational and experimental area. In addition, schoolchildren took an active part in gardening the school grounds and classrooms, which was part of the implementation of the "Green School" model. The floral and decorative departments played the greatest role in this since they were aimed at decorating the school grounds. Most of the students helped "green" the classrooms by bringing plants in pots or planting them. A few months after planting their plants in the study areas, most of the students got positive results from their research. A second survey was conducted using the author's questionnaire to assess the level of biological competencies. The results showed positive dynamics in the formation of biological skills among students (Figure 2).

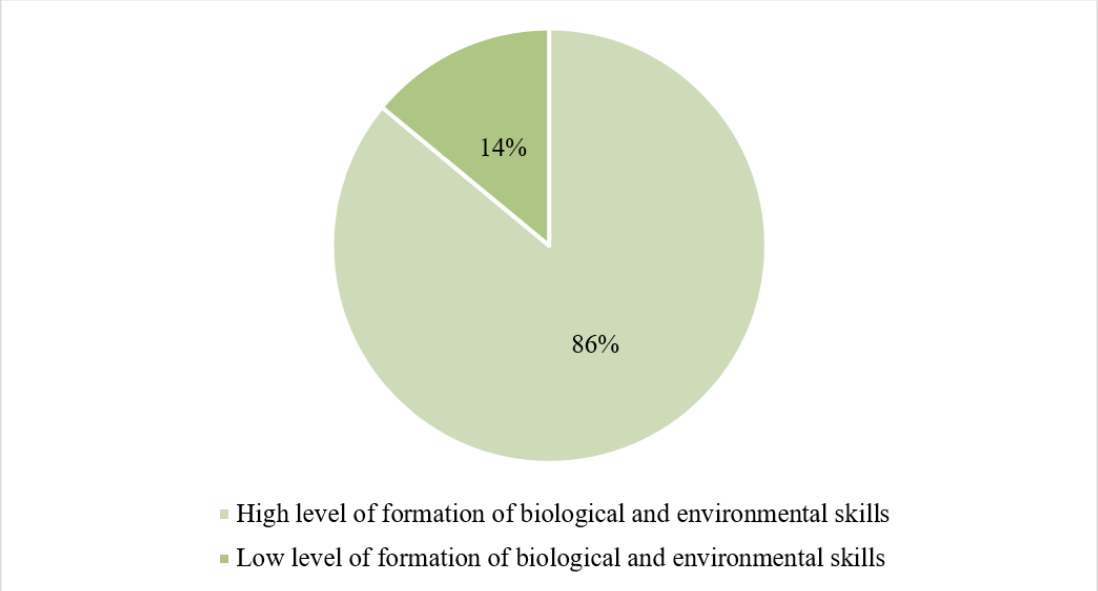

Figure 2. The results of the author's questionnaire for assessing the level of biological competencies in schoolchildren after working on educational and experimental sites

The number of schoolchildren who have a high level of biological skills became 344 students. Thus, only thirteen schoolchildren failed to develop biological skills. Based on the words of teachers, schoolchildren noted that now they have an idea of how to apply the acquired knowledge in practice. The most interesting process was harvesting and observing the development of the sprout. The observation diary helped some study participants to understand the mistakes they made during planting and correct them in time, and the entries in the observation diary can be a support in future studies to correct the processes of preparing, planting and caring for plants. After working on the educational and experimental plots, almost all schoolchildren noted that the process of planting and caring for plants turned out to be more laborious than they thought, but constant practice and support from the teacher will help improve this process.

Thus, it can be concluded that the "Green School" model and, in particular, work on educational and experimental sites, contribute to the formation of biological and environmental competencies in schoolchildren in rural schools, instil a love for nature and work, and improve cognitive processes. The diary of observations not only improves the intellectual activity of students but can also be a support for all subsequent research and help not to make the mistakes of past research. Landscaping the school grounds and the creation of "living" corners in the classrooms significantly influenced the desire of students to treat nature more carefully and take care of it, providing all possible assistance and contributing to the preservation of the environment. However, a large role in this process is assigned to the teacher and his interaction with schoolchildren, since without high-quality theoretical training and support for teachers in working at educational and experimental sites, the quality of schoolchildren's work could decrease.

The competencies of biology and science teachers include the ability to analyse their activities within the educational process and adjust it based on the needs of students, educating students in the natural sciences, explaining the importance of natural sciences, fostering love for nature, animals, and the environment, developing environmental literacy. One of the tasks of science teachers is also to create new methods of work that will attract the attention of schoolchildren and make the process of studying biology and ecology interesting. The solution to these problems is impossible if the teacher does not have a creative approach to their activities. When working in the learning-experimental areas, the creativity of the teacher can convince students to actively solve the problems that arise in the course of their research and show that they can approach any activity in a non-standard way and solve the problems that have arisen during the research in a non-standard way [16]. The method of joint learning is also interesting, which the teacher can easily implement through the "Green School" model. Collaborative learning is a modern educational strategy that involves learning in groups, helping each other in the learning process and the common activity of the teacher and all students [17].

The methods for implementing this educational strategy within the framework of the "Green School" model include several activities. These activities are joint work on landscaping the school grounds and organizing a "living" corner. Additionally, group projects aimed at forming biological and environmental competencies are essential. Examples of such projects are developing posters about the importance of preserving the environment, conducting general environmental projects on waste sorting or nature conservation, and creating presentations with theoretical information for classmates or elementary school students. Furthermore, joint work on educational and experimental sites is also a key component. Collaborative work on educational and experimental sites will help schoolchildren to learn from the experience of more experienced students, share emerging problems and find effective methods for solving them. Group research work will help in the formation of the necessary

competencies and can qualitatively improve the educational process and even the performance of individual students.

Thus, the conducted study showed that the implementation of the "Green School" model and the use of an educational and experimental site can be effective methods for forming biological skills in schoolchildren in rural schools. These methods positively affect the educational process and the academic performance of schoolchildren. Moreover, they influence the student's future career choices and contribute to the development of the rural community and agricultural activities.

Discussion

This study focuses on the fact that the educational process in rural schools differs from the educational process in urban schools. Spanish and Colombian scientists who, in their study, concluded that the improvement of the educational process in rural schools might be slower due to the low involvement of teachers and students share the same opinion [18]. Current research by Indonesian scientists confirms that teachers in rural schools have lack of methodological materials, schoolchildren have a low level of motivation to study natural disciplines, and research activities are most often absent or poorly developed [9]. At the same time, research results have shown that students in rural schools are more environmentally responsible and use natural resources more rationally [19]. Thus, it can be talked about the high potential for mastering environmental and biological skills among schoolchildren in rural schools, but at the same time about the weak motivation for learning and the insufficiency of modern methods. This determines the need to involve schoolchildren in the study of natural sciences with innovative teaching methods (which include the "Green School" model) in terms of the formation of biological and environmental skills and functional literacy.

The importance of functional literacy in the formation of the personality of schoolchildren is important both when studying at school and when entering higher educational institutions. Recent research on functional literacy supports the assumption that functional skills influence the process of knowledge accumulation and the ability to solve problems and make decisions based on this knowledge [20]. This study showed that the higher the child's functional literacy is, the higher the level of development and the ability to solve various problems, at a time when functional literacy decreases, the child's ability to cope with problems also decreases. Functional literacy in the aspect of studying the natural sciences determines the ability of students to understand their own role in the preservation of the environment and their constant interaction with it and be able to correct this interaction positively. The main biological and environmental competencies included an understanding of basic concepts, laws, and theories. They also encompassed an understanding of one's role in preserving the environment and knowledge of the basic classifications of plants and animals. Additionally, these competencies included the ability to draw up a plan for conducting a study or experiment, as well as the ability to conduct standard studies or experiments in biology and ecology and evaluate their results.

The conducted research proved the high efficiency of using the "Green School" model and educational and experimental sites in the formation of biological and environmental competencies of schoolchildren. The same opinion is shared by Brazilian scientists who, in their study of the use of educational experimental sites in schools, concluded that their use plays a large role in the environmental education of schoolchildren and in changing their views on the world around them [21]. In particular, during their study, schoolchildren formed an understanding that all living organisms, even those called "pests" are part of the environment and can coexist with it. This understanding excludes their destruction and serves as an indicator of the positive dynamics of the "Green School" model, which promotes a careful attitude towards nature and all its components. In this study, it is also noted that work in educational and experimental areas affects the performance of schoolchildren not only in the natural sciences but also in their general level of development and affects their success in studying other school disciplines. A study confirms that in addition to the study sites described in this study, zoos, aquariums, landscape parks, and even entire natural complexes can be used as study sites.

The "Green School" model and the projects that are part of this model are being implemented around the world. In particular, the project "H_2O Heroes" is of interest, which is aimed at developing biological and environmental competencies through an interactive excursion for students in rural schools and also contributes to the preservation of the environment [22]. The positive impact of various environmental projects is also confirmed by the study of a Vietnamese specialist who, in his work, revealed the role of extracurricular environmental activities among rural schoolchildren and concluded that parents and school administration, as well as the teaching staff, play an important role in conducting such activities [23]. The Swedish experience shows that schools, given the conditions and funding, can be accredited as fully "Green Schools", the impact of such schools on students and their skills will be investigated several years after the schools receive such status [24]. There are other views on the modern use of the "Green School" model, which argue that modern environmental education should include, firstly, the preservation of the environment and environmental projects should be aimed at collecting and sorting rubbish, collecting batteries, and maintaining clean water and air. This is especially true given the problems that exist in the environmental sphere of the Republic of Kazakhstan and the low involvement of society in this problem [8].

The role of the teacher in the biological and environmental education of schoolchildren and the implementation of the "Green School" model is quite high. However, the results of recent studies indicate that teachers have trouble in implementing this model of education. This is because the model is not approved at the legislative level, and there are no methodological recommendations for its use. Teachers are forced to rely only on their experience and their vision of implementing this model. These findings confirm the need for further detailed study on preparing teachers for implementing this model in the educational process [25].

Thus, experts agree that the educational process in rural schools differs from the educational process in urban

schools. Teachers in rural schools have limited access to modern technologies, and students have a lower level of motivation, but at the same time, students in rural schools have a greater potential for the formation of biological and environmental competencies, as they better understand the importance of nature and its resources. This confirmed the need to use modern methods in motivation for learning and the formation of biological and environmental competencies, in particular, the use of the "Green School" model and educational and experimental sites. The study showed the high efficiency of the "Green School" model, which is confirmed by the studies of Irish, Vietnamese, Spanish, and Swedish researchers, who revealed in their works the positive impact of various environmental projects on the formation of biological and environmental skills among schoolchildren, in particular, among students in rural schools. It was proved that the formation of the biological and environmental competencies of schoolchildren at this stage could be the basis for solving the educational and environmental problems of the country in the future.

The effectiveness of the use of educational and experimental sites in the formation of biological and environmental competencies was also confirmed by the research of scientists. Research by scientists also confirms the list of basic biological and environmental competencies described in this paper. Analysing the question of the role of the teacher in the formation of the listed competencies in scientific sources, it can be argued that most teachers are still not ready to implement the "Green School" model and require more training for the successful application of this method in teaching schoolchildren, which may be the prospect of further research.

Conclusions

This article analyses the role of extracurricular education (in particular, the "Green School" model) and the use of an educational and experimental site in the formation of biological and environmental competencies among schoolchildren in rural schools. The features of the educational process and the study of natural sciences in a rural school were described, highlighting both the advantages and disadvantages of studying biology and natural sciences in this setting. The role of innovative teaching models in the formation of biological skills was also examined, with a particular focus on the "Green School" model and educational experimental sites. Additionally, the basic biological skills fostered through these methods were detailed.

A study was conducted that showed that the use of the "Green School" model in the educational process and the use of educational and experimental sites can improve the formation of biological and environmental competencies in schoolchildren, which will positively affect their personality, their environmental views and their role in the preservation of the environment. This will have a positive impact on the choice of a future profession and, as a result, on strengthening the relationship between higher educational institutions and rural communities, and on solving important environmental issues in the future. It has been determined that the diary of observations is an effective tool for improving the biological and environmental skills of schoolchildren and helps in more correct conduct of further research.

This paper also reveals the essence of environmental projects, extracurricular biological and environmental events and their role in the environmental literacy of students, as well as the role of functional literacy in the study of natural disciplines and in the future activities of schoolchildren. The main competencies of the teacher were analysed, as well as the role of the teacher in the formation of biological and environmental skills, and it was determined that teachers in rural schools are most often not ready to implement modern teaching models in the educational process and require additional training. The prospect for further research is a detailed analysis of the role of the teacher in the formation of biological skills, the preparation of methodological recommendations for teachers in using the "Green School" model and educational experimental sites, and the analysis of methods for improving the study of natural sciences in rural schools.

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Conflict of Interest

None.

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Модель "Зеленої школи" з використанням навчально-дослідної ділянки у формуванні біологічних навичок учнів сільських шкіл Республіки Казахстан

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Анотація

Актуальність. Дослідницька діяльність школярів відіграє важливу роль у їхній соціалізації та підготовці до навчання у вищих навчальних закладах, зокрема у розвитку біологічних та екологічних навичок, необхідних для розуміння та збереження світу природи. Це дослідження спрямоване на визначення ефективних методів формування цих компетентностей у школярів.

Мета. Ця стаття має на меті дослідити, як позашкільна освіта, зокрема через такі моделі, як "Зелена школа" та навчально-дослідні ділянки, сприяє формуванню біологічних компетентностей у школярів.

Методологія. У дослідженні розглянуто особливості позашкільної освіти, зокрема моделі "Зелена школа" та навчально-дослідних ділянок. Досліджено сутність біологічних та екологічних навичок, проаналізовано роль позакласної роботи у формуванні навичок, оцінено вплив вчителя на розвиток біологічних навичок та компетентностей, необхідних сучасному вчителю біології.

Результати. Дослідження демонструє ефективність використання навчально-дослідних ділянок та впровадження моделі "Зелена школа" у формуванні навичок школярів. Підкреслено позитивний вплив цих методів на виховання любові до природи, формування екологічної свідомості та вміння досліджувати і здобувати знання про світ природи.

Висновки. Отримані результати підтверджують доцільність інтеграції позакласних заходів на кшталт моделі "Зелена школа" та освітніх сайтів для підвищення рівня біологічних компетентностей школярів. Це дослідження покликане допомогти вчителям біології та природничих дисциплін у сільських загальноосвітніх школах, покращити їхню професійну підготовку та методику викладання. Крім того, дослідження заохочує розвиток в учнів ціннісного ставлення до природи та розуміння ними важливості збереження довкілля, тим самим збагачуючи їхній загальний освітній досвід.

Ключові слова: проектне навчання; екологічна освіта; навчально-експериментальна ділянка; "Зелена школа".