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Cultural aspects of the formation of a system of teaching natural sciences in schools in sub-Saharan Africa

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Abstract

The experience of African countries shows that even with a significant limitation of resources in the conditions of a developed culture of implementation of the educational process, opportunities are created for schoolchildren in hard-to-reach rural areas to obtain learning outcomes similar to those in urbanized areas. The key factor in this is the presence of a well-established culture of organizing the pedagogical process and the presence of a sufficient number of motivated teachers belonging to the ethnic group of compact residents in a given region, constantly searching for new tools for acquiring knowledge, a practice-oriented approach, developing scientific and methodological tasks in accordance with the level of schoolchildren. For the formation of such a culture, the practice of teaching natural science disciplines is significant by means of maximizing the use of the capabilities of the environment – forests, agricultural areas and other natural objects to demonstrate individual positions of objects. The experience of African countries shows that the use of this approach and the presence of a sufficient number of motivated teachers can significantly reduce the difference between the level of training of urban and rural schoolchildren, especially in terms of teaching natural sciences, which is most important for training highly qualified specialists for rural areas. The presence of such practice can be taken into account when forming priorities for the development of school education in hard-to-reach areas.

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Keywords
Culture of education, pedagogical process, sub-Saharan African countries, natural sciences.

Introduction

Studying the experience of countries searching for ways to develop the educational system in terms of the culture of teaching natural sciences is a pressing topic of modern research. In developing and less developed countries, the problem of organizing education in secondary schools is associated with significant restrictions in relation to the natural science complex of disciplines. On the one hand, training requires significant costs for special equipment for teaching physics, chemistry and astronomy, and on the other hand, the competencies obtained as a result of their insufficient study refer to utilitarian skills such as reading, writing and mental arithmetic. Thus, in order to maintain interest in these disciplines, it is necessary to create a culture of their teaching system.

Not having significant resources, as well as having significant limitations in the development of infrastructure for scientific and innovation activities, African countries are the fastest growing in the world. At the same time, the results of industrialization in these countries are primarily associated with the development of the education system, especially in terms of teaching natural sciences.

Main content

In African countries, there are a number of economically developed regions, both urbanized and agricultural, and there are also a number of hard-to-reach regions, such as areas of compact settlement of indigenous people, primarily related to mountainous regions, which are relatively sparsely populated, have little electrification and have insufficient transport infrastructure. . Highly qualified work in this region can be obtained in the field of construction, tourism, public administration and in international organizations, which requires developed cultural competencies and value education.

High school education in remote areas of Africa became widespread in the late 20th century. Education in secondary school is usually paid, scholarships are provided only to a certain percentage of students with high academic results. There are significant infrastructural limitations and a low level of material support in the organization of the educational process. Thus, transport accessibility to schools is significantly limited during the rainy season, and classrooms often lack equipment to support the teaching process. Consequently, the impact of the cultural factor of interaction with specialized equipment in the learning process is not formed.

Secondary schools in Africa, located in inaccessible areas, usually have teachers from ethnic groups who are able to teach, and staff turnover is low.

Currently, biology and chemistry are studied in secondary schools in remote areas of Africa; in addition, students can study geography and agriculture. There is time for individual lessons, all tasks are individually developed by school teachers, the final report is a six-month test, the content of which is determined by national educational standards. Tasks can be assigned individually to each student.

All these conditions – insufficient material support, the presence of national educational standards and the availability of teaching staff – determine the cultural characteristics of teaching natural science disciplines.

Teachers of agriculture, biology and geography use educational technologies that make it possible, with insignificant resources, to implement the educational program within the framework of established standards. A feature of teaching natural sciences in hard-to-reach rural schools in Africa is the use of

environmental features – agricultural areas and forests for learning, and their use for the formation of cultural competencies in the field of natural sciences.

There are not enough material resources – equipped chemical and physical laboratories – to teach natural science disciplines. The lack of resources is compensated by a sufficient level of proficiency in pedagogical technologies of the teaching staff, the use of differentiated tasks in conditions where laboratory classes cannot be conducted without the availability of appropriate equipment. That is, in fact, a special cultural approach to teaching foreign languages has been formed.

It should be noted that when mastering disciplines, the most important thing is the individual approach used by teachers, the constant search for forms and methods of teaching, high motivation, and the use of a practice-oriented approach to education.

Students are able to acquire the level of knowledge necessary to pass state exams through the use of environmental features, including experience acquired through family upbringing, together with the presence of a detailed educational program that determines the required amount of knowledge and its detail, to form a culture of attitude towards these areas of knowledge.

Conclusion

The experience of African countries shows that even with a significant limitation of resources in the conditions of an established culture of implementation of the educational process, opportunities are created for schoolchildren in hard-to-reach rural areas to obtain learning results similar to those in urbanized areas.

Institutional and infrastructural support for the educational process in remote rural schools in Africa has significant limitations, primarily associated with the lack of equipped laboratories, enough educational literature, and transport accessibility of schools. However, these problems are not an obstacle to obtaining a full school education and successfully passing tests developed centrally by the Ministries of Education of countries for all schools. It is shown that the key factor is the presence of a well-established culture of organizing the pedagogical process and the presence of a sufficient number of motivated teachers belonging to the ethnic group of compact residents in a given region, constantly searching for new tools for acquiring knowledge, a practice-oriented approach, developing scientific and methodological tasks in accordance with the level of schoolchildren.

For the formation of such a culture, the practice of teaching natural science disciplines is significant; the practice of maximizing the use of the capabilities of the environment – forests, agricultural areas, and other natural objects to demonstrate individual positions of objects – is effective. The experience of African countries shows that the use of this approach and the presence of a sufficient number of motivated teachers can significantly reduce the difference between the level of training of urban and rural schoolchildren, especially in terms of teaching natural sciences, which is most important for training highly qualified specialists for rural areas. The presence of such practice can be taken into account when forming priorities for the development of school education in hard-to-reach areas.

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Культурологические аспекты формирования системы преподавания естественно-научных дисциплин в школах стран Африки южнее Сахары

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Аннотация

Опыт стран Африки показывает, что даже при существенном ограничении ресурсов в условиях сформированной культуры осуществления образовательного процесса создаются возможности получения школьниками труднодоступных сельских территорий результатов обучения, аналогичных урбанизированным территориям. Ключевым фактором этого является наличие сформированной культуры организации педагогического процесса и наличие достаточного количества мотивированных педагогов, относящихся к этносу компактного проживания в данном регионе, осуществляющих постоянный поиск новых инструментов усвоения знаний, практико-ориентированного подхода, разрабатывающих научно-методические задания в соответствии с уровнем школьников. Для формирования такой культуры значима практика преподавания естественно-научных дисциплин посредством наибольшего задействования возможностей окружения – лесов, аграрных территорий и других природных объектов для демонстрации отдельных положений

предметов. Опыт стран Африки показывает, что применение такого подхода и наличие достаточного количества мотивированных педагогов позволяют существенно сократить разницу между уровнем подготовки городских и сельских школьников, особенно в части преподавания естественно-научных дисциплин, что наиболее значимо для подготовки высококвалифицированных специалистов для сельской местности. Наличие такой практики возможно учитывать при формировании приоритетов развития школьного образования в труднодоступных территориях.

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Ключевые слова

Культура образования, педагогический процесс, страны Африки южнее Сахары, естественно-научные дисциплины.

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