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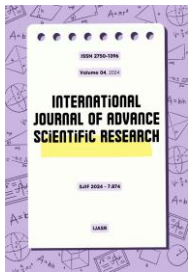

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Research Article

OPPORTUNITIES FOR USING MULTIMEDIA TOOLS IN TEACHING "NATURAL SCIENCES" IN GENERAL EDUCATION SCHOOLS

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ABSTRACT

The integration of multimedia tools in teaching "Natural Sciences" in general education schools offers significant opportunities for enhancing the learning process. These tools enable the visualization of complex concepts, facilitate interactive engagement, and promote active learning strategies. By incorporating animations, videos, presentations, and other digital resources, educators can create an engaging and immersive learning environment. Multimedia tools not only improve the understanding and retention of scientific concepts but also support differentiated instruction, catering to diverse learning needs. Furthermore, they provide teachers with innovative methods to assess students' knowledge and skills effectively. This article explores the potential benefits, challenges, and strategies for effectively utilizing multimedia tools in natural sciences education, emphasizing their role in fostering a more dynamic and impactful teaching process.

KEYWORDS

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Multimedia tools, natural sciences education, general education schools, interactive learning, educational technology, teaching methods, visualization, digital resources, differentiated instruction, student engagement.

INTRODUCTION

In the teaching of natural sciences, significant practical efforts have been undertaken to introduce electronic resources and achieve effective learning outcomes. For instance, educational games organized in collaboration, discussion-based lessons, shows, evening events, celebrations, and similar activities in natural science classes contribute to improving the quality indicators of the learning process. Many tasks associated with these activities—such as demonstrating visual materials effectively, encouraging motivation, self-assessment and monitoring, efficient use of internet resources, updating and modifying information, and so on—necessitate an increased reliance on computers to accomplish these objectives promptly and effectively.

In biology lessons, students develop knowledge and skills about the animal world, their distribution, lifestyles, similarities and differences, diversity, reproduction, and development. Teachers aim to use various didactic tools and materials during lessons to help students quickly and easily comprehend theoretical information related to the topic. As noted above, teaching tools for 7th-grade biology vary in their specific features. These teaching tools are not only useful in the classroom but also play a significant role in organizing extracurricular and out-of-class activities.

In biology (zoology), such groups of didactic tools include textbooks, methodological guides, illustrated charts, tables, microscopes, animal specimens, didactic tests, crossword puzzles, and similar items. During a one-hour lesson, teachers aim to develop students' skills and competencies regarding the topic using these tools, thereby facilitating the acquisition of knowledge on the subject.

The use of multimedia tools in biology lessons introduces a unique method into the educational process. Through this method, biology (zoology) topics are computerized systematically, animations are utilized to study the internal structure of animals, and systematic units of animals are explored. The inclusion of visual aids, presentation clips, and other multimedia materials naturally enhances the quality of visual elements in lessons and allows for quick monitoring of students' knowledge and skills. Furthermore, this approach enables teachers to organize their activities based on new methods and techniques.

For many subjects in general secondary schools, multimedia tools have been developed, leading to an increased focus on organizing the educational

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process in a computerized environment. Educational software tools now encompass many subjects. Based on this model, multimedia tools serve as an essential resource for teaching 7th-grade biology in general secondary schools. This model enables the use of electronic educational tools in biology systematically and sequentially.

Working with electronic textbooks provides significant convenience for students. These resources include instructions and tasks that guide and systematize students' activities, offering immediate feedback on the correctness or incorrectness of their actions. To ensure retention, teachers provide recommendations for mastering various information and continuously monitor and support the development of memory. Working with electronic textbooks or manuals also fosters students' self-monitoring skills.

Academician V.P. Bespalko categorizes pedagogical technologies into eight types, explicitly identifying "computer-based learning" as one of them. Similarly, pre-prepared "programmed learning" based on projects is also noted. In the classification of technological education presented by F.Ya. Savelyev, six types are distinguished, with specific emphasis on the use of technical tools, including audiovisual equipment, video technology, and computer technologies. The integration of pedagogical technology into the educational system, along with the use of computer technologies, has influenced their role and importance in the learning process.

Considering that the initial topics in natural sciences that students study are related to invertebrates, the effective use of the aforementioned multimedia tools plays a significant role in shaping and developing their knowledge and skills. This has led many pedagogical practitioners to recognize multimedia programs as a means of comprehending the world. The development and active use of multimedia tools have sparked discussions about the introduction of innovative teaching methods, ideas, and approaches in schools.

The interactive software tool developed by G. Ergashyeva focuses on developing the professional competencies required by future biology teachers. It emphasizes the use of modern educational technology elements such as web quests and software-based tests hosted on portals. Utilizing the materials available on these sites expands the interactive approach in biology lessons.

Additionally, within the framework of research conducted by M. Ibodova, the use of information resources in organizing students' independent work has been studied. This electronic resource incorporates software designed to encourage individual activities in academic lyceum students during lessons, independent learning, and laboratory exercises, helping them acquire biological knowledge and skills.

The integration of computer technology in natural science lessons largely depends on the teacher's initiative and organizational skills. Each

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teaching material used in the lesson should contribute to the student's understanding of the topic. The demand for using multimedia tools in educational processes is steadily increasing. Multimedia tools not only aid in quickly and easily comprehending topics studied with the help of computers but also provide teachers with numerous opportunities.

When using multimedia tools, students can study animal sounds, natural movements, distinctive features, and skeletal and muscular structures programmed with hyperlinks. (The proportional placement of images with numbered labels helps students easily grasp and remember complex terms.)

The significant features of multimedia in the educational process include:

- **Visual presentation of information** (using various colors, illustrations, sounds, videos, animations, and other elements);
- **Immediate feedback** (established test systems provide quick monitoring of material comprehension);
- **Interactive format** (teaches students self-monitoring while quickly mastering educational materials);
- **Continuous updating and enriching of educational manuals** (replacing outdated information in electronic manuals with new data or modifying it ensures future clarity for users).

The use of electronic resources in teaching natural sciences ensures effective solutions to educational and pedagogical tasks:

1. Conveying complex knowledge, such as studying processes occurring in an organism's external and internal environment through monitors when direct observation is impossible;

2. Organizing the study of organ placement and functions in animal organisms through specific methods;

3. Supplementing topics on animals' lifestyles, distribution in nature, reproduction, development, and diversity with scientific and popular films in CD and DVD formats, helping instill educational concepts about the importance of protecting and preserving nature;

4. Developing students' independent learning skills.

In M. Lutfullayev's research on the use of computer technology elements in teaching natural sciences, particular attention is given to organizing biological processes based on animated models. His experimental work demonstrates the possibility of organizing complex biological processes in biology (zoology) and plant physiology using computer tools to expand the scope of topics.

For example, in natural sciences, processes such as animals' movement (crawling, walking, swimming, flying, and landing), feeding and associated organs, and their living conditions (e.g., in mountains, water, land, hot and cold

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regions) are demonstrated to students in multimedia format, facilitating the quick and easy comprehension of new topics. This allows students to perceive processes as if they were directly involved. Multimedia tools stand out from traditional didactic materials by offering the ability to repeatedly view objects.

For studying topics in the natural sciences curriculum in general secondary schools, materials are recommended, including images of origin and embryonic development, main types of animals, skeletal structures of mammals, collections of stuffed specimens, slides of domestic animal breeds, and video clips on the lives of wild mammals.

The use of multimedia tools in natural science lessons introduces a new method characterized by the technological implementation of educational materials, a step-by-step increase in the database of educational content, and high-quality visual representation. Additionally, students' knowledge on new topics is monitored during the lesson.

When using presentation programs to enhance the effectiveness of natural sciences in general secondary schools, it is essential to note an additional key aspect. Natural sciences contain topics that are difficult to comprehend, and it would be incorrect to assume that every student in a classroom can understand them easily at the same time. Considering students' psychological characteristics, the comprehension of topics relies on the effective use of differentiated teaching methods.

As highlighted above, the teaching of natural sciences, the formation of students' knowledge and skills, and the enhancement of lesson effectiveness and teacher-student activity rely on the use of these tools.

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