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USE OF INNOVATIVE TECHNOLOGIES IN TEACHING ECOLOGY MODULE NATURAL RESOURCES

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Abstract: the work discusses ways to effectively use various programs and applications used in modern devices when conducting classes in the Ecology module “Natural Resources” in universities. It is no secret that students actively use various types of devices in their lives, including tablets, phones, smartphones, laptops, etc. These devices have many potential opportunities for providing educational information in a visual format with audio accompaniment.
Keywords: innovative technologies, ecology, module, natural resources, tablets, phones, smartphones, gadgets, indicators, statistics.
Annotation: In this qualifying work, the ways of effective application of various programs and applications used in modern devices during the course " Natural resources" in universities are considered.
It is no secret that university students actively use various kinds of devices in their lives, including tablets, phones, smartphones, netbooks, etc. These devices have many potential opportunities for providing educational information in a visual format with sound.
Keywords: innovative technologies, ecology, module, natural resources, tablets, phones, smartphones, gadgets, indicators, statistics.

ИСПОЛЬЗОВАНИЕ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ В ПРЕПОДОВАНИИ ЭКОЛОГИИ МОДУЛЯ “ПРИРОДНЫЕ РЕСУРСЫ”

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Аннотация: в работе рассматриваются способы эффективного применения различных программ и приложений, используемых в современных девайсах при проведении занятий по Экологии модуля “Природные ресурсы” в ВУЗах. Не секрет, что студенты активно используют в своей жизни различного рода девайсы, среди которых планшеты, телефоны, смартфоны, ноутбуки и пр. Данные устройства обладают множеством потенциальных возможностей для предоставления образовательной информации в визуальном формате со звуковым сопровождением.
Ключевые слова: инновационные технологий, экология, модуль, природные ресурсы, планшеты, телефоны, смартфоны, гаджеты, показатели, статистика.
Annotatsiya: Ushbu malaka ishida universitetlarda " Tabiiy resurslar" kursini o'tkazishda zamonaviy qurilmalarda ishlatiladigan turli xil dasturlar va dasturlardan samarali foydalanish usullari ko'rib chiqiladi.

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Hech kimga sir emaski, universitet talabalari o'z hayotlarida turli xil qurilmalardan, shu jumladan planshetlar, telefonlar, smartfonlar, netbuklar va boshqalardan faol foydalanadilar. Ushbu qurilmalar ovozli qo'llab-quvvatlash bilan vizual formatda ta'lim ma'lumotlarini taqdim etish uchun ko'plab potentsial imkoniyatlarga ega.
Kalit so'zlar: innovatsion texnologiyalar, ekologiya, modul, tabiiy resurslar, planshetlar, telefonlar, smartfonlar, gadjetlar, ko'rsatkichlar, statistika.

Introduction

The research we conducted and described below shows the need to find new methods to improve the efficiency of the educational process. The topic “Natural Resources” is one of the “Ecology” modules. 8 classroom hours are allocated for studying the module. The teacher is faced with the difficult task of presenting educational material in a concise, accessible and visual form [1,2]. Of course, we use electronic presentations [3]. With the help of presentations, it is possible to present all the properties of the object being studied, to show options for the development of process events or the consequences of these processes. The characteristics of the developed electronic educational and methodological complexes on ecology and plant physiology are given. Information is provided on testing students before and after active use of EUMK materials. The experience of introducing some software products into the educational process is presented. It is noted that the use of computer technologies in teaching biology contributes to the generalization and deepening of students’ knowledge, but does not exclude traditional forms of teaching [1].

Information technologies have penetrated globally into human life, and of course into education. This allows us to implement at a higher level such teaching principles as scientific, visual, systematic, consistent, and accessible [1,2,5]. The use of information technologies in the field of higher professional education is constantly growing [7,8]. Information technologies gain great advantage in full-time, correspondence and distance learning [5,7]. In correspondence and distance education, much attention is paid to case technologies [4]. Electronic presentations have shown their high efficiency and productivity in learning new material. According to N. I. Kerro and D. P. Baranova, the teacher, having a large set of information tools in the presentation, gets the opportunity to present the whole variety of properties of the object or process being studied, as well as more clearly and accurately determine their place and significance in the system of scientific knowledge about the world around us [3]. This toolkit allows the student to develop deep theoretical and practical knowledge and develop the ability to introduce innovative technologies into environmental activities [6]. Modern innovative technologies reveal and consolidate various opportunities: the formation of students’ theoretical knowledge about environmental innovation; competent use of tools and methods for introducing innovative technologies in the field of ecology and environmental protection; formation of practical skills for the development of environmental innovative projects. An example of EUMK developed in the form of full-time, correspondence and distance learning for students of the Faculty of Biology, Pedagogical University is presented. Information technologies in teaching ecology and plant physiology: textbooks, electronic lecture course using Microsoft Power Point, online consultations, practical and laboratory work, video material, popular science films on the topic, tests, homework.

For example, in ecology, one of the theoretical parts of the EUMK is represented by the electronic textbook “Natural resources of Uzbekistan and their rational use.” The module

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outlines the basics of environmental management, mining, resource-saving technologies, and organization of the habitat. The main and most important goal of the electronic textbook is to provide assistance in effectively and efficiently mastering the materials of the ecology course for students of all forms of study, correctly organizing independent work on mastering ecology throughout the course, and assistance in completing individual tests during the entire course of study. The textbook contains information about the natural ecosystems of Central Asia, self-development and functioning features; natural resources, their rational use and protection of the atmosphere, the role of living organisms in transforming the abiotic environment and maintaining the stability of the biosphere; about negative changes in the biosphere as a result of human economic activity, which are the result of the modern environmental crisis. Protection of water resources and vegetation cover. Development of measures to prevent soil erosion and mitigate its negative consequences using innovative achievements of modern science and technology. Studying the scientific and practical significance of agricultural ecology and modernization of the agricultural industry, ensuring food security in the country. Formation of ideas about nature reserves, national parks, and wildlife sanctuaries. The main emphasis is placed on the legislative mechanism for environmental management, regulation of environmental quality, and international cooperation in the field of environmental protection. Each section of the textbook ends with questions for self-control of knowledge. Methodological part; practical and laboratory work; for the full-time department, it involves working on missed topics, systematizing and summarizing knowledge. Reference material, simulator-test systems of tasks for each topic, glossary and basic literature. Tests of current and final control. In order to check the effectiveness of perception of the material in the EUMK on ecology, a questionnaire survey was conducted among students of part-time and full-time forms of study at the Faculty of Biology. The results of the survey, in which 100 people participated, are shown in Fig. 1.

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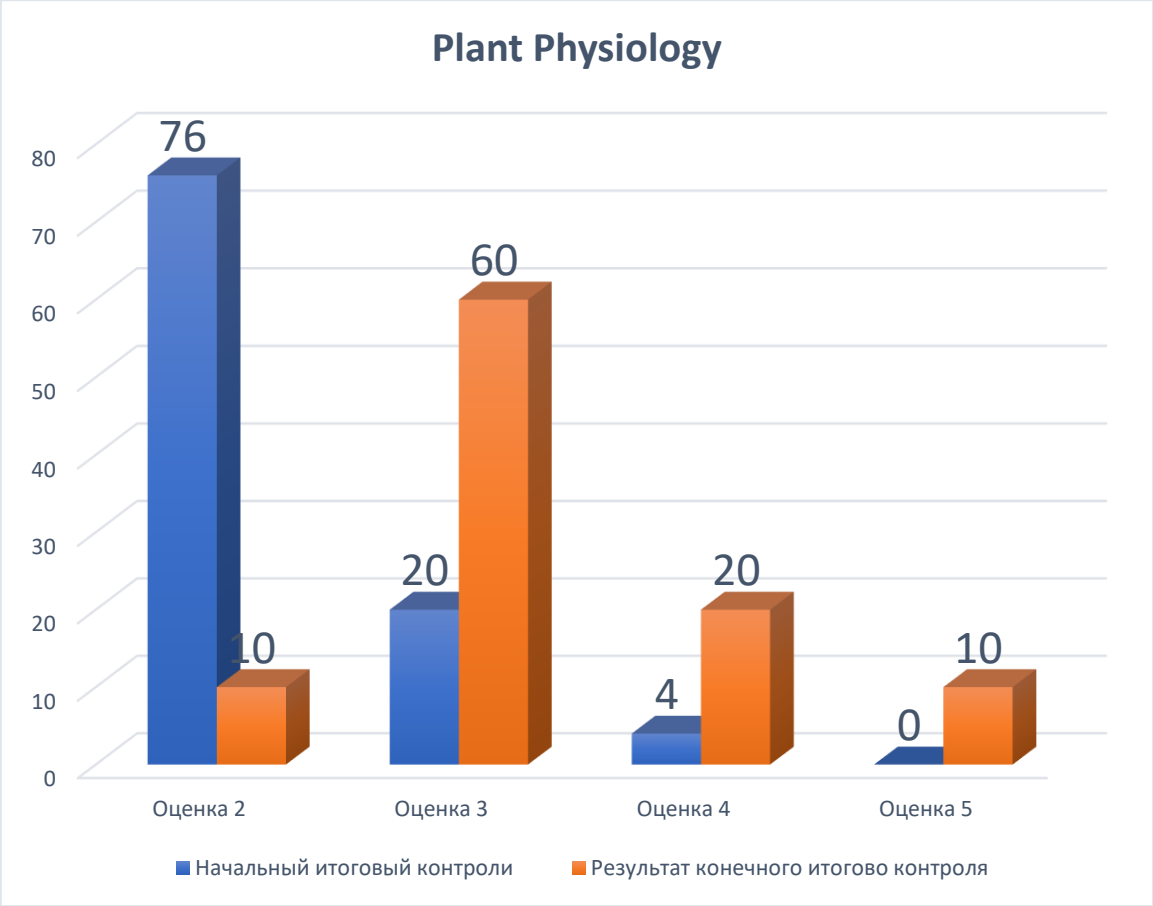

EUMK assessment

Figure. 1. Evaluation by EUMK students of Plant Physiology. The ratings correspond to the answers: 2- does not provide any assistance; 3- I find it difficult to answer; 4-5- EUMK provides significant assistance.

Students chose one of four answers: 5-EUMK provides great assistance in studying ecology; 4- provides assistance in studying the subject; 3- no difference; 2- I didn't notice the difference. As can be seen from Figure 1., 76% of the surveyed students, at the initial stage of studying the subject, believe that EUMK does not provide assistance; 24% noted that EUMK provide significant assistance in mastering ecology, reduces the time for mastering topics, solving homework, laboratory and practical work. At the Department of Biology of Chelyabinsk State Pedagogical University, an electronic course of lectures and presentations using Microsoft Power Point has been developed and introduced into the practice of teaching ecology. Electronic presentations are an effective method of learning that reveals the intellectual capabilities of students; strengthen the motivation of students' educational activities, increase cognitive activity, and allow them to develop personal competencies and professional growth. Using this form of teaching, the teacher focuses students' attention on the problems of our time: environmental pollution; and forms the main principles of rational environmental management and environmental protection. The presentation of educational material in the form of presentations is simple, accessible and visual, which increases students' interest in the subject. Enables the student to independently understand and evaluate human intervention in natural processes; predict and model existing environmental problems independently. At the end of

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the presentation there are control questions, tests or assignments, the implementation of which allows you to consolidate the main provisions, important concepts and patterns. Successful or unsuccessful completion of tasks makes it possible to timely identify gaps in knowledge on topics. Consulting students who are completing their thesis on the topic "Environmental safety", "Natural resources", "Species diversity", "Water resource of Uzbekistan" "Disposal of industrial waste", etc. - this is also one of the types of current computer technologies. Online feedback speeds up work and also improves its quality. Computer technologies significantly expand the possibilities of teaching natural sciences, ecology, biotechnology, plant physiology or botany. Sometimes laboratory work is difficult to carry out; certain biological phenomena or processes are very complex or extended over time. In this case, we use modeling of complex processes; they can be compressed in time. We have in our hands a modern, highly informative tool that can be used productively, both when familiarizing yourself with new lecture material, and when reinforcing new topics in practical or laboratory classes [8]. On more complex topics, computer laboratory work was developed and introduced into the educational process in the subjects "Plant Physiology", "Classification of Lower and Higher Plants": "Ecological Biotechnology", "Ecological Aspects of Biotechnology", "Characteristics of the Main Objects of Biotechnology", "Application biotechnological processes in various industries," and many others. To perform laboratory work, we used simple, visual, accessible programs: Chemland 6; Repetitorium of atom physics: Rutherford, Bohr, Shroedinger; Mendeleev 2.2; Outokumpu HSC Chemistry for Windows 4.0. To understand how effectively the process of mastering new material is going, 100 students were tested.

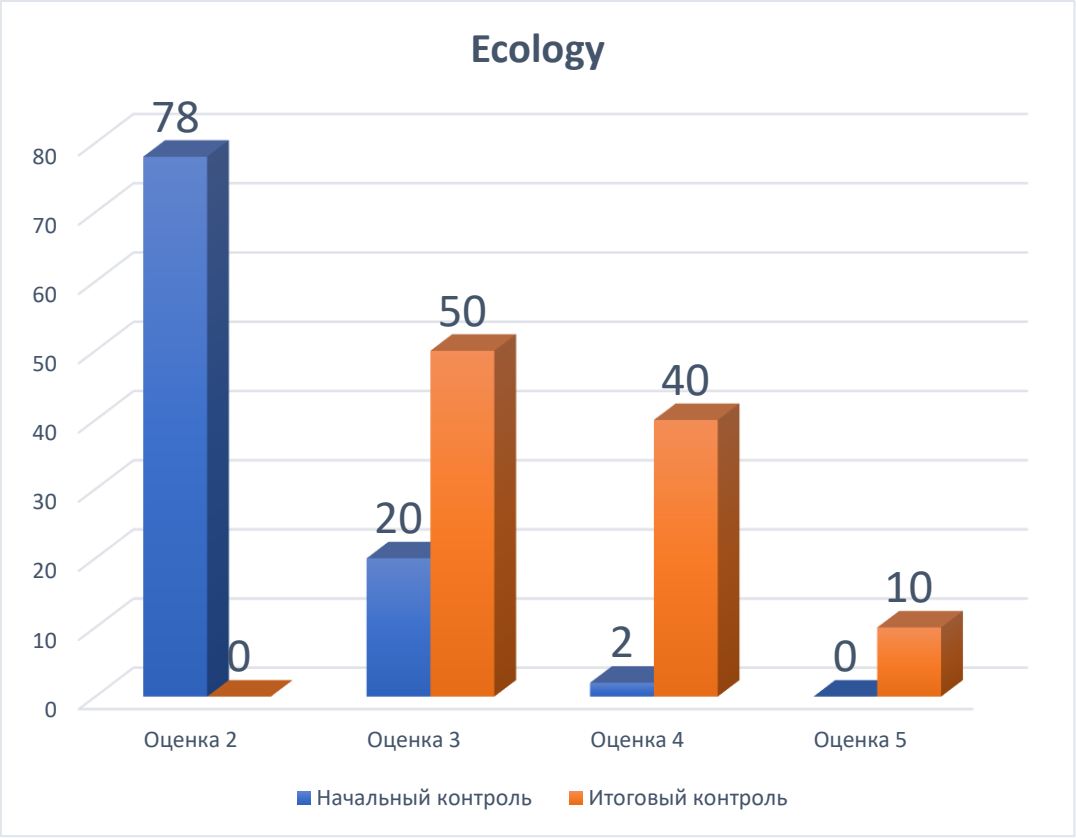

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Fig. 2. Results of the input and final control of students' knowledge in ecology.

The results of the initial control (Fig. 2) show a very low level of knowledge in biology: 78% of students have unsatisfactory grades on the intermediate control. Satisfactory (20%), good (2%). Such a low level can only be explained by poor preparation at school. After completing the laboratory workshop, testing was conducted on the same topics as at the beginning of training. In Fig. 3 shows that the number of satisfactory ratings has increased (50%); and some answers were rated "excellent" (10%) and good (40%). This shows good results and the need to study complex topics in virtual labs. It follows that in the educational process time should be allocated for electronic laboratory work and for laboratory work in the traditional form. Considering the specifics of "Plant Physiology", "Ecology", and other biological disciplines, their complexity for students to understand in full-time and part-time forms of study, EUMK in these disciplines is especially relevant in the mode of distance learning for students. It must be remembered that these forms of education are gaining more and more academic time, and they can be partially replaced by traditional forms of education and IT technologies. As mentioned above, time should be allocated in the educational process for laboratory work in the traditional form. Only a reasonable combination of various teaching methods can contribute to high-quality learning of the material. To construct the correct algorithm for the stages of analysis of the assimilation of the material, illustrations and block diagrams were used, since a simple demonstration of models cannot form the correct algorithm for understanding the material. It is necessary to explain and break down the information into its constituent components. There is an integration of traditional (explanation, illustration, generalization) and non-traditional teaching methods (infographics, digital technologies).

Thus, by combining traditional and innovative approaches to the presentation of lecture material, practical and laboratory work, it is possible to develop several types of competencies in students at once. Such as: competence to work with information, competence of self-development, understanding, recognition, and description of biological objects and events; including the formation of figurative and abstract thinking; the correct construction of an algorithm for the links of perception of new information takes place; interest in new innovative technologies is aroused.

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