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FORMATION OF PERSONALITY TRAITS OF FUTURE ECOLOGISTS IN THE PROCESS OF NATURAL-SCIENTIFIC TRAINING USING MOODLE

The article substantiates the effectiveness of learning technologies using Moodle in shaping personality traits of future ecologists during natural-scientific study: as the result of the analysis of research, it was found that Moodle has significant opportunities for the development of individual psychological characteristics that are important both for the future ecologists, and for a modern specialist in general; describes the structure of e-courses of natural sciences that were developed and are used in Khmelnitsky National University, and proved that the personality traits formation of the future ecologists is provided by all the courses resources – informational educational materials, practical and laboratory work, the recommendations for implementing the independent work, academic and control tests, interactive elements of the courses etc. The results of the experimental research on implementation of technology using Moodle in the process of natural-scientific study of future ecologists were analysed; the effectiveness of using Moodle in shaping the personality traits of the future ecologists was experimentally confirmed: such traits as the capacity for self-development and self-education, creativity, reflection, focus on individual success / failure avoidance and it was recommended to use educational technologies using Moodle to improve natural-scientific study of future ecologists in higher education institutions.

Key words: *informatization of education, informational educational environment, Moodle.*

Introduction. Nowadays, none of the areas of human activity cannot go without information technologies. Computerization becomes a priority direction of the development of modern post-industrial society, in which, according to D. Bell, the main productive power is scientific technologies, and its potential is measured by the amount of information used [1, p. 333]. The success of building an informational society, above all, depends on the effectiveness of informatization of the educational system.

Analysis of researches and publications in the studied area. Problems of informatization of education today are at the focus of pedagogy. This is confirmed by numerous studies that are devoted to the issues of informatization and computerization of educational process. (V.U. Bykov, R.S. Hurevych, M.I. Zhaldak, M.M. Kozyar, V.M. Kukharenko, A.V. Lytvyn, P.I. Obraztsov, A.N. Romanov, V.S. Toroptsov, A.I. Uman and others.) The scientists report that information processes affect the content of education, activity of teaching and ancillary personnel, resolving financial and economic issues and, in general, determine the direction of the educational system.

A special role is given to the use of informational-communicational technologies (ICT) in the educational process, which allows to take new approaches adapted to modern conditions and educational activities. According to V.U. Bykov "penetration of ICT in the educational process creates prerequisites for a radical renovation of the content-targeted and technological sides of training, which results in significant enrichment of teaching methods system, learning tools, and on this basis – in the formation of non-traditional educational technologies based on the use of computers" [2, p. 141]. A.V. Lytvyn said that the use of ICT for study changes the nature of the distribution and acquisition of knowledge; opens unprecedented opportunities for renovation of the content and methods of teaching; expands an access to education; qualitatively changes the role of the teacher in the educational process [3, p. 48].

One way of informatization of education is the creation and implementation in the learning process the informational educational environments (IEE), one of which is a modular object-oriented dynamic learning environment. The questions of the use of Moodle in training the specialists at the higher education institutions (HEIs) are studied in the researches of I.S. Voitovych, Y.M. Hladkyi, Y.O. Horokhova, K.R. Kolos, N.P. Kukharska, Y.V. Poznyak, O.G. Porshnyeva, V.P. Serhiyenko, L.V. Slavinska, Y.M. Smornova-Trybulska and others. However, it should be noted that the researches mostly highlight the prospects of using Moodle in shaping the knowledge and skills of students, and the question of formation the personality traits of future specialists is left unattended. Considering all said above, we think that exploring the capabilities of Moodle in shaping personality traits of future ecologists is an important task of educational theory and practice.

The aim of the paper is to analyze the possibilities of Moodle in shaping personality traits and to confirm the effectiveness of the use of the environment in natural-scientific training (NST) of the future ecologists in higher education institutions.

Methodology of the research. Experimental research work was carried out at the Department of Ecology of Khmelnytsky National University (KNU). The students of the speciality 6.040106 "Ecology, Environmental Protection and Sustainable Use of Natural Resources" took part in this investigation. For exploring the possibilities of Moodle in the formation of individual psychological characteristics, the theoretical methods were used, such as the study of literature, analysis, systematization and generalization of information, drawing conclusions. Also empirical methods were used in the investigation, in particular to confirm the effectiveness of NST technology using Moodle in the formation of personality traits of future ecologists, the educational experiment was conducted and a questionary for the students was carried out using the psychodiagnostic tests.

Description of the study and results analysis. In today's post-industrial society the personality traits of people are particularly important. A specialist of a new generation, besides having a certain amount of knowledge, has to be proactive and independent, ready for self-education and self-improvement; to possess creative thinking and have a creative approach to problem solving, including professional; to be able to solve problems which has integrative, complex character; to be able to work in a team; to be able to interpret and evaluate his own activities, to understand their impact and effectiveness, to be responsible for the results of his academic and professional activities.

Moodle environment has a significant opportunity for the formation of these qualities. This, above all, is demonstrated by the principles stated and put at the basis of the creating Moodle by Martin Dougiamas [4]. Let's study them:

1. In the educational environment all participants are potentially teachers and students. This principle provides a new kind of relationships between teachers and students when a teacher is an assistant, mentor, who does not only convey knowledge to students, but also directs them to search for information on their own.

2. Learning is realized along with the activity. Learning is particularly effective when we create something or try to explain something to others. Significant effects also can be achieved if the results of training activities are available to other members of the educational process. In this case, more attention is paid to self-examination.

3. Monitoring the activities of other participants of the learning process impacts the study. It encourages students to reflect, analyze, it forces to work in common mode, creates the ability to work in a group.

4. Understanding people creates an opportunity to teach them more individually, so it's necessary to provide opportunities for self-fulfillment and self-realization of the students to analyze information about their activity in the environment.

5. The learning environment has to be flexible, which can give the participants of the learning process the possibilities for realization of their educational needs. The principle suggests

that students should be given the opportunities to ask questions, share ideas, demonstrate their performances.

These principles testify that one of the tasks which had been solved during the creation of Moodle, was the providing the wide possibilities for self-improvement and formation of personality traits of future specialists in the learning process.

According to Ukrainian scientists, the informational educational environments are related to such active methods of learning as creative learning, method of projects, training in cooperation, method of constructionism [5, p. 136], which greatly ensure the formation of individual psychological qualities necessary for a specialist who will live and work in the conditions of post-industrial society. In particular, creative learning is based on the following principles: the appropriateness of the educational product to the internal needs of the student; individual educational trajectory of the student in the educational space; interactive learning, which is provided by the telecommunications; the appropriateness of the educational procedures to the forms of communication and technology [5, p. 136-137]. These principles, we believe, provide the direction of the educational technology with the use of IEE to the formation of personality traits.

As a result of research analysis, that was devoted to the issues of using Moodle, we found that the environment has a number of advantages and opportunities in the organization and implementation of educational process in higher education institutions [6, p. 15]. Therefore, for the improvement of natural-scientific preparation of students-ecologists, we developed a learning environment using Moodle. The expected result in the development of NST technologies is, as we considered, natural-scientific competence, the components of which are cognitive component, component of activity, motivation and personal component.

Let's study the possibilities of Moodle in the personal component – individual psychological characteristics that are important both for future ecologists, and for modern specialist in general.

One of the key concepts of Moodle is e-learning course, which is also the means of studying, method of studying, communication environment of teachers and students, and between students themselves. For realization of NST technologies for future ecologists we have developed e-learning courses of normative natural sciences, including: "Physics", "Chemistry with the Basics of Biogeochemistry", "Geology with the Basics of Geomorphology", "Pedology", "Hydrology", "Meteorology and Climatology", "Biology".

We'll consider the structure of the Moodle course, which is used in the KNU in the process of natural science study (Fig. 1).

Each course includes tools of work (navigation, administration, forum news, upcoming events etc.) that increase functionality, intuitive, and the plainness in using the environment, and the main content – educational materials of the discipline (resources of the course).

The main content of the course is divided into topics, each of which contains educational materials that reflect the content and ensure its development. In the courses of natural-science disciplines, that we have developed, the topics contain informational educational materials (lectures) and tests for thematic control.

If the topic suggests the practical (laboratory) work or self-study training material, it is composed of instructional materials to carry out these activities and tests for their protection.

To ensure contact between a teacher and students and between students, forums and messages have been developed in courses.

Acquiring the personal qualities of environmental experts, in our opinion, is provided by all the resources of the developed courses of natural sciences.

First of all, it should be noted that Moodle enables effective organization of independent work, which contributes to the ability to self-education and self-improvement. So, using the information educational materials in Moodle electronic courses, students can prepare for lectures in advance and in class they can perceive the theoretical material more consciously that will enable a teacher to organize a dialogue or discussion, during which the students will gain the ability to defend their own point of view.

Also, information educational materials provide students with more facilities in preparation for the practical and laboratory work, and various tests.

Fig. 1. The structure of the course "Geology and the Basics of Geomorphology" in Moodle

Practical and laboratory works in Moodle are built in such a way that the students can fulfill the tasks by themselves, and the role of the teacher is only to give the consultations for the students in questions that they cannot solve themselves. This provides the formation of independence, initiative, creative way of thinking, ability to be responsible for the results of their activities among the students-ecologists.

Independent work in Moodle is also provided by the tests that can be used in environments not only as a means of control, but also as a learning tool. In Moodle one can create educational tests, or use special settings of control tests that they will have training functions. For example, you can adjust the control test so that a student after passing the test could see the mistakes made. (Fig. 2) In this case, the student will be able to think why exactly this is the correct answer and why he was wrong. One can use another way of setting the control test: the test is adjusted so that the student has the opportunity to go through it several times and each time after testing he would see his responses and grades. In this case, the student has the opportunity to analyze the results of the test to detect and correct errors. Thus, the study tests form in the students-ecologists the capacity to comprehend and evaluate their activities, to understand their results and efficiency.

Питання 1 Неправильно Балів 0,00 з 1,00 ⚑ ⚙ Редагувати питання	Осади, які накопичуються під час діяльності тимчасових водних потоків називаються Виберіть одну відповідь: ○ a. пролювій ◉ b. алювій ✗
	Правильна відповідь: пролювій
	Зробити коментар або змінити оцінку
Питання 2 Правильно Балів 1,00 з 1,00 ⚑ ⚙ Редагувати питання	Який вид карсту відбувається у вапняках, доломітах? Виберіть одну відповідь: ○ a. сольовий ○ b. сульфатний ◉ c. карбонатний ✓
	Правильна відповідь: карбонатний
	Зробити коментар або змінити оцінку

Fig. 2. The fragment of educational test in Moodle

Moodle suggests that a student will pick convenient time for self-study, which also provides a personal approach to learning that focuses on the development of personal qualities of future specialists. Realization of a student-centered approach contributes to the changing nature of teacher-student communication. In Moodle it occurs indirectly through the information that virtually eliminates the dominance of a teacher over students. Relations in the learning process become more democratic. This, we believe, provides more activities, self-reliance and independence of students, creates conditions for free display of personality in learning process. Besides, the self-study using computer provides individualization of learning, increases motivation, promotes independence and creativity in decision making.

Significant opportunities in shaping the personal qualities of students-ecologists are provided by the interactive elements of Moodle electronic courses (tasks, forum, chat, glossary, practical work using training simulators, etc.). In the developed courses of natural sciences the forums are used, where there is interaction between students with a teacher and between students. Forums, in our opinion, provide more conveniences to students while preparing for different types of work and can be used for discussion. In addition, the forums are a social space for students to get to know each other better. Communication at the forums unites students to solve complex problems and promotes skills to communicate and work in teams, to assess their contribution to the results of their activities.

To confirm the possibilities of Moodle in shaping personality traits of future ecologists (establishing personal component of natural-scientific competence) an experimental study was conducted. When organizing pedagogical experiments in the experimental groups the technology of NST using Moodle was used, the traditional teaching was performed in the control group. To identify the changes that have occurred in the personal sphere of students-ecologists, there have been investigated such qualities as the ability to self-development and self-education, creativity, reflection, focus on individual success / failure avoidance. The psychodiagnostic tests were used for that.

To assess the capacity for self-development and self-education, the method of V.I. Andreev was used [7, p. 55-57]. The questionary proved that the experimental group showed a significant increase in the number of students-ecologists, who had higher levels of maturity of ability for self-development and self-education (Fig. 3). This, in our opinion, can be explained by the fact that the use of Moodle environment has significant opportunities for independent work organization, provides students with a wide access to educational resources, provides an opportunity to plan and implement individual educational trajectory depending on their needs and capabilities.
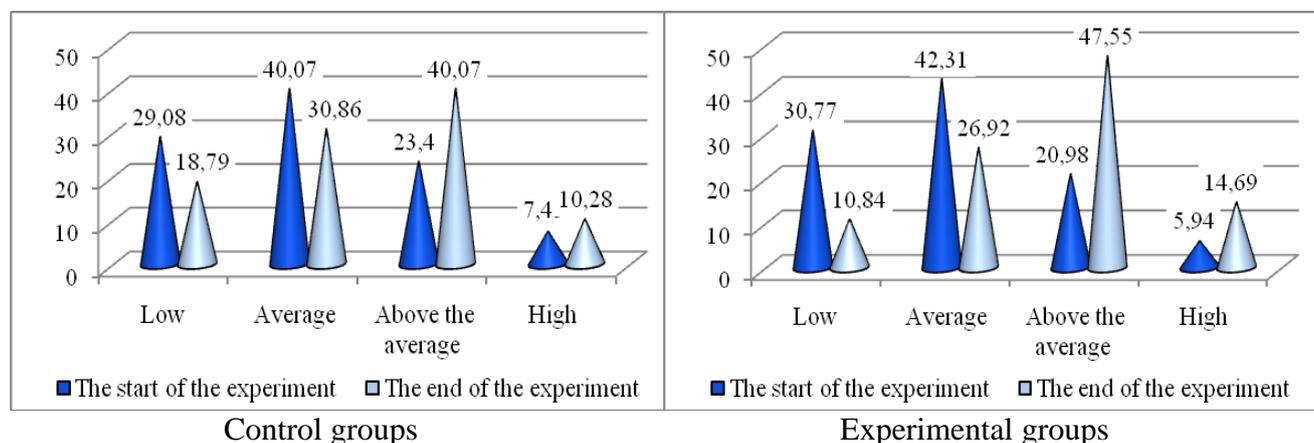

Control groups   Experimental groups

Fig. 3. Diagram of the distribution of students by formation of ability for self-development and self-education

To investigate the creativity of students-ecologists, a questionnaire of D. Johnson (adapted by O.E. Tunyk) was used [8]. The increase of the number of students with higher levels of creativity in the experimental groups (Fig. 4), confirmed the effectiveness of Moodle in the formation of this quality of personality. We believe that this is because the NST technology using Moodle promotes the forming a creative approach to problem solving (including professional) among the students-ecologists, because in this environment the role of a teacher is changed, he becomes a mentor who guides the student in learning. It promotes the development of such qualities as imagination, creativity, originality, flexibility, independence, originality, self-confidence, self-sufficiency, which describes the creativity of an expert.
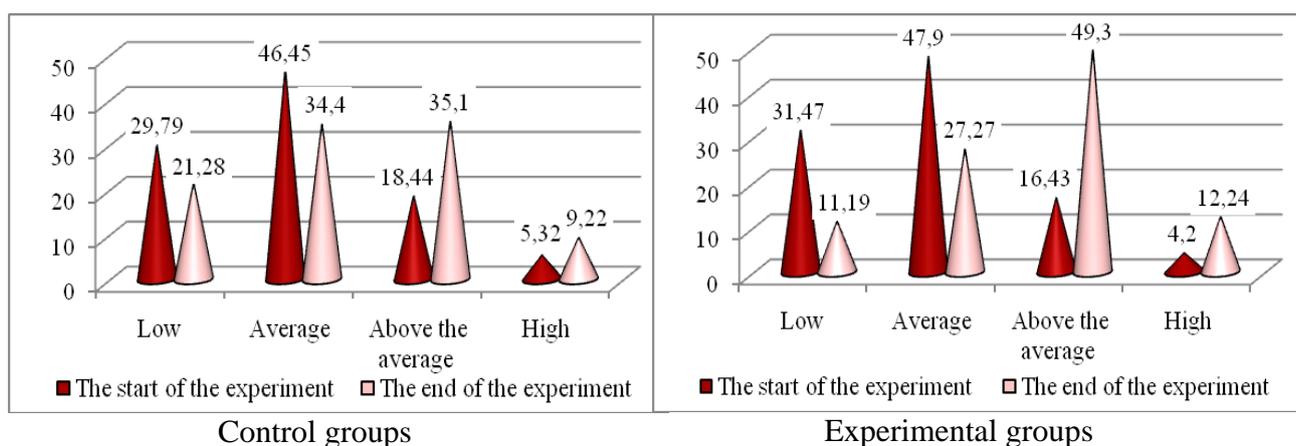

Control groups   Experimental groups

Fig. 4. Diagram of the distribution of students by level of creativity

To estimate the reflection a questionnaire by M. Grant [9] was used. The questionary showed that the number of students with higher levels of reflection has significantly increased in the experimental group (Fig. 5). The reason, we believe, is that the Moodle environment creates wide

opportunities to use active learning methods that ensure the formation of skills to put questions, discuss controversial issues, justify opinions and defend their own point of view; to unite in fulfilling the task, help other students learn; communicate in a team, to understand and evaluate the actions of others, regulate their actions according to the requirements of others and working conditions; evaluate their educational progress and performance of other students of this course. All this contributes to formation of such personality traits as the ability to interpret, predict and evaluate their activities and their results; ability to understand their contribution to the collective work.
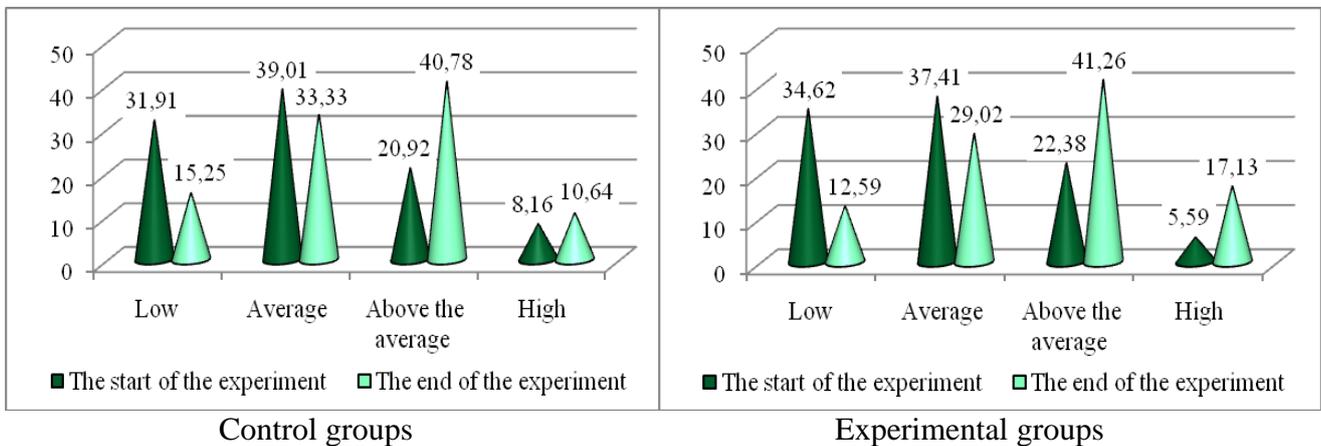

Control groups   Experimental groups

Fig. 5. Diagram of the distribution of students by level of reflection

To determine the orientation of the individual in achieving the success / failure avoidance the method by A. Rean was used [10, p. 146-147]. The result of the qustionary revealed that the students of the experimental group are more focused on success, whereas students in the control group focus mostly on avoiding failure (Fig. 6).
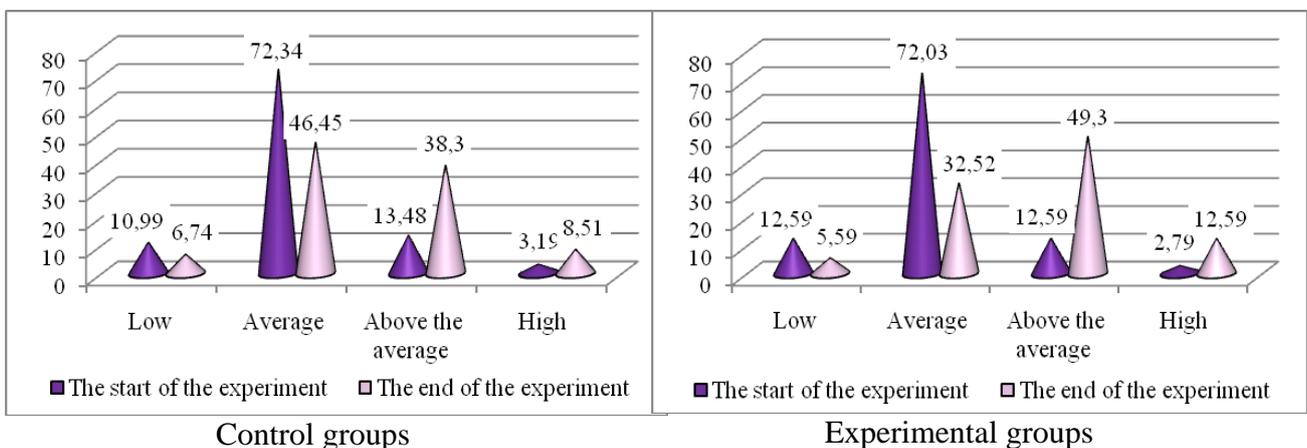

Control groups   Experimental groups

Fig. 6. Diagram of the distribution of students by level of formation of focus on achieving success / failure avoidance

In our opinion, this is due to the fact that when using the computer and Internet-technology, learning becomes exciting, the work of students gain research nature, which increases the motivation to learn. In addition, the formation of focus on achieving the success is facilitated by the opportunities of the Moodle environment, such as: students can choose a convenient time for independent work; the environment provides students with an access to a wide variety of educational resources; students are able to follow their grades that, together with the use of computer-based testing ensures the transparency and objectivity of the assessment of learning

outcomes; students can communicate with the teacher and other students, realizing interactivity between participants of the educational process and make it more active and interesting.

Conclusions. So, Moodle has significant opportunities in the formation of individual psychological qualities of future professional, the formation of which is provided by all the resources of electronic courses – informational educational materials, practical and laboratory work, recommendations for self-study, training and control tests, interactive elements, etc.

Implementation of learning technology using Moodle to the process of natural-scientific preparation of future ecologists promotes students' capacity for self-development and self-education, creativity, reflection, focus on success. A specialist possessing these qualities is initiative, ready for self-education and self-improvement, has an unusual approach to solving professional problems, is able to work in a team, is able to evaluate his activities and contribution to the results of collective activity. These qualities are very important as for a future ecologist, and for a modern specialist in general.

The perspective for further researches is to study the effectiveness of technology using Moodle in the formation of other components of the natural-scientific training of the future ecologists.

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ФОРМУВАННЯ ОСОБИСТІСНИХ ЯКОСТЕЙ МАЙБУТНІХ ЕКОЛОГІВ В ПРОЦЕСІ ПРИРОДНИЧО-НАУКОВОЇ ПІДГОТОВКИ З ВИКОРИСТАННЯМ MOODLE

У статті обґрунтовано ефективність технології навчання з використанням Moodle у формуванні особистісних якостей майбутніх екологів в процесі природничо-наукової підготовки, зокрема: в результаті аналізу наукових досліджень з'ясовано, що Moodle має значні можливості для розвитку індивідуально-психологічних якостей, важливих, як для майбутнього еколога, так і для сучасного фахівця, в цілому; охарактеризовано структуру електронних курсів природничо-наукових дисциплін, що розроблені і використовуються в Хмельницькому національному університеті, та обґрунтовано, що формування особистісних якостей майбутнього еколога забезпечують усі ресурси курсів – інформаційні навчально-методичні матеріали, практичні і лабораторні роботи, рекомендації до виконання самостійної роботи, навчальні і контрольні тести, інтерактивні елементи курсів тощо; проаналізовано результати експериментально-дослідної роботи з впровадження технології з використанням Moodle у процес природничо-наукової підготовки майбутніх екологів; експериментально підтверджено ефективність застосування Moodle у формуванні особистісних якостей майбутніх екологів, таких як здатність до саморозвитку і самоосвіти, креативність, рефлексія, спрямованість особистості на досягнення успіху / уникнення невдач та рекомендовано застосовувати технології навчання з використанням Moodle для удосконалення природничо-наукової підготовки майбутніх екологів у вищих навчальних закладах.

Ключові слова: інформатизація освіти, інформаційне освітнє середовище, Moodle.

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ФОРМИРОВАНИЕ ЛИЧНОСТНЫХ КАЧЕСТВ БУДУЩИХ ЭКОЛОГОВ В ПРОЦЕССЕ ЕСТЕСТВЕННОНАУЧНОЙ ПОДГОТОВКИ С ИСПОЛЬЗОВАНИЕМ MOODLE

В статье обоснована эффективность технологии обучения с использованием Moodle в формировании личностных качеств будущих экологов в процессе естественнонаучной подготовки, в частности: в результате анализа научных исследований выяснено, что Moodle имеет значительные возможности для развития индивидуально-психологических качеств, важных, как для будущего эколога, так и для современного специалиста, в целом; охарактеризована структура электронных курсов естественнонаучных дисциплин, которые разработаны и используются в Хмельницком национальном университете, обоснованно, что формирование личностных качеств будущего эклога обеспечивают все ресурсы курсов – информационные учебно-методические материалы, практические и лабораторные работы, рекомендаций к выполнению самостоятельной работы, учебные и контрольные тесты, интерактивные элементы курсов и др.; проанализированы результаты экспериментально-исследовательской работы по внедрению технологии с использованием Moodle в процесс естественнонаучной подготовки будущих экологов; экспериментально подтверждена эффективность применения Moodle в формировании личностных качеств будущих экологов, таких как способность к саморазвитию и самообразованию, креативность, рефлексия, направленность личности на достижение успеха / избегания неудач и рекомендуется внедрять технологии обучения с использованием Moodle для усовершенствования естественнонаучной подготовки будущих экологов в высших учебных заведениях.

Ключевые слова: информатизация образования, информационная образовательная среда, Moodle.