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ON THE EXPEDIENCY OF USING THE ONLINE SYSTEM OF MODELLING ACTIVITIES "OPENLABYRINTH" IN TEACHING PRACTICE-ORIENTED DISCIPLINES IN HIGHER EDUCATION INSTITUTIONS WITH SPECIFIC LEARNING CONDITIONS

ЩОДО ДОЦІЛЬНОВСТІ ВИКОРИСТАННЯ ОНЛАЙН-СИСТЕМИ МОДЕЛЮВАННЯ ДІЯЛЬНОСТІ "OPENLABYRINTH" ПІД ЧАС ВИКЛАДАННЯ ПРАКТИЧНО-ОРІЄНТОВНИХ ДИСЦИПЛІН В ЗАКЛАДАХ ВИЩОЇ ОСВІТИ ЗІ СПЕЦИФІЧНИМИ УМОВАМИ НАВЧАННЯ

***Summary.** The article investigates the feasibility of using the online activity modelling system "OpenLabyrinth" in teaching practice-oriented disciplines in higher education institutions with a specific learning environment.*

In accordance with its tasks, the police has a wide range of powers, the analysis of which allows us to conclude that the activities of the National Police are diverse and multifaceted, and therefore often unpredictable in their dynamics. In Ukraine, the success of the National Police in fulfilling its powers is additionally affected by armed aggression and large-scale military operations, constant shelling of civilian infrastructure, the growth of illegal arms trafficking, etc. In such circumstances, police officers are increasingly required to act in special circumstances, including emergency (extreme) conditions, to be prepared to perform additional special tasks, to work under great moral and physical stress and in more difficult conditions, which in turn increases the requirements for the training of future law enforcement officers.

To solve this problem, higher education institutions with specific learning environments are increasingly using interactive multimedia teaching technologies and e-learning technologies in the educational process. Therefore, there is currently a need to study e-learning technologies used in the learning process by other higher education institutions both in Ukraine and in the world. One of these e-learning technologies is the OpenLabyrinth online activity modelling system. This online system allows users to create interactive "game" learning models, such as virtual patients, simulations, multi-level knowledge control systems, mazes, models of branched processes in various subject areas and algorithms, and is currently used in the educational process of medical higher education institutions in Ukraine and around the world. The online system of modelling activities "OpenLabyrinth" also meets the modern requirements of problem-based learning.

The article notes that the issue of using the online system of modelling the activities of the "OpenLabyrinth" system in the educational process of higher educational institutions with specific conditions has not been studied. A more detailed study of the online system allowed the author to conclude that the system can be used in the educational process of higher education institutions with specific learning conditions to teach a number of practical disciplines and, in general, to carry out problem-based learning for future police officers by modelling operational and combat situations as close as possible to real conditions. The author also concludes that it is advisable to use the online system to monitor the success of mastering the educational material submitted for independent study.

***Key words:** police training, educational process, problem-based learning, situation modelling, OpenLabyrinth, universities with special learning conditions.*

Анотація. У статті досліджуються доцільність використання онлайн-системи моделювання діяльності "OpenLabyrinth" під час викладання практично-орієнтовних дисциплін в закладах вищої освіти зі специфічними умовами навчанняможливості.

На поліцію у відповідності із її завданнями покладено широке коло повноважень аналіз яких дозволяє зробити висновок, що діяльність Національної поліції носить різнобічний, багатогранний характер і тому часто не прогнозована у своїй динаміці. В Україні на успішність виконання повноважень Національної поліції додатково впливають збройна агресія та повномасштабні воєнні дії, постійні обстріли цивільної інфраструктури, зростання незаконного обігу зброї, тощо. За таких обставин поліцейські дедалі частіше зобов'язані діяти особливих, в тому числі, і в надзвичайних (екстремальних) умовах, бути готовими до виконання додаткових спеціальних завдань, до роботи з великими моральними і фізичними навантаженнями і в більш складних умовах, що у свою чергу підвищує вимоги до підготовки майбутніх правоохоронців.

Для вирішення цього завдання заклади вищої освіти зі специфічними умовами навчання дедалі частіше застосовують інтерактивні мультимедійні технологій навчання та технології електронного навчання в освітньому процесі. Тому наразі існує необхідність вивчення технологій електронного навчання, які використовуються в процесі навчання іншими закладами вищої освіти як України, так і світу загалом. Однією з таких технологій електронного навчання є онлайн-система моделювання діяльності "OpenLabyrinth". Зазначена онлайн-система дозволяє користувачам створювати інтерактивні "ігрові" навчальні моделі, такі як віртуальні пацієнти, симуляції, багаторівневі системи контролю знань, лабіринти, моделі розгалужених процесів у різних предметних областях та алгоритми та наразі використовується в освітньому процесі медичних закладів вищої освіти України та світу. Також онлайн-система моделювання діяльності "OpenLabyrinth" відповідає сучасним вимогам проблемно-орієнтовного навчання.

В статті зазначається, що питання використання онлайн-системи моделювання діяльності "OpenLabyrinth"системи в освітньому процесі закладів вищої освіти зі специфічними умовами не досліджувалися. Більш детальне ознайомлення з онлайн-системою дозволило авторові зробити висновки, що систему можливо використати в освітньому процесі закладів вищої освіти зі специфічними умовами навчання для викладання низки практичних дисциплін і взагалі проводити проблемно-орієнтоване навчання майбутніх поліцейських шляхом моделювання максимально наближених до реальних умов ситуацій оперативно-службової та службово-бойової. Також автор робить висновки, що онлай систему доцільно використовувати для контролю успішності засвоєння навчального матералу, який винесено на самостійне опрацювання.

Ключові слова: підготовка поліцейського, освітній процес, проблемно-орієнтоване навчання, моделювання ситуацій, OpenLabyrinth, заклади вищої освіти зі специфічними умовами навчання.

Problem statement. Article 3 of the Basic Law of our country states that a person, his life and health, honour and dignity, inviolability and security are recognised in Ukraine as the highest social value. Human rights and freedoms and their guarantees determine the content and direction of state activity, and the state is accountable to the individual for its activities. The affirmation and guarantee of human rights and freedoms shall be the primary duty of the State [1]. In order to implement these constitutional provisions, Ukraine creates and operates state bodies whose main purpose is to protect the rights and interests of individuals. The National Police of Ukraine is one of these state bodies.

According to Art. 1 of the Law of Ukraine "On the National Police", the National Police of Ukraine (Police) is a central executive body serving the public by ensuring the protection of human rights and freedoms, combating crime, and maintaining public safety and order. According to Article 2 of the Law of Ukraine "On the National Police", the main tasks of the Police are to provide police services in the following areas: to ensure public safety and order; to protect human rights and freedoms, as well as the interests of society and the State; to combat crime; to provide, within the limits established by law, services to assist persons who need such assistance for personal, economic, social or emergency reasons [2]. In addition, the police have a wide range of powers according to their tasks, the analysis of which allows us to conclude that the activities of the National Police are diverse and multifaceted, and therefore often unpredictable in their dynamics. The conditions for the effective performance of policing tasks are becoming more and more complicated not only in Ukraine, but also in all regions of the world. In Ukraine, the successful exercise of the powers of the national police is additionally hampered by armed aggression and large-scale military operations, constant shelling of civilian infrastructure, increased illegal arms trafficking, the commission of bold, pre-planned criminal offences, the commission of latent criminal offences, a high level of political radicalisation of certain segments of the population, and so on. In such circumstances, police officers are increasingly required to act in special circumstances, including emergency (extreme) conditions, to be prepared to perform additional special tasks, to work under great moral and physical stress and in more difficult conditions.

In this respect, the requirements for the level of professional training of law enforcement officers are increasing. During the training the police officers should develop skills of personal safety, covering a partner, tactically correct actions in atypical and extreme situations, under conditions of high physical and mental stress, etc. This is facilitated by the use of multimedia learning technologies and

e-learning in the educational process. These tasks are facilitated by the use of interactive multimedia learning technologies and e-learning technologies in the educational process, and therefore there is a need to find and study e-learning resources that can be used for proper and up-to-date police training. One of these resources is the OpenLabyrinth online activity modelling system.

The state of the problem. Some issues of e-learning have been studied by N. Balyk, K. Buhaichuk, O. Buinitska, S. Volkova, O. Vovk, V. Levchuk, V. Lukin, L. Oleksienko, S. Semerikov, O. Trubitsyna, O. Chornous, T. Sharova and others. M. Avramenko, L. Zhuravleva, Y. Kolesnyk, N. Lopina, S. Morguntsova, S. Sazhyn, I. Yurchenko and others have studied the use of the on-line system of activity modelling "OpenLabyrinth" in the educational process. However, their works concerned the implementation of the on-line system of activity modelling "OpenLabyrinth" in the educational process of medical universities. None of them dealt with the issue of implementation of the on-line system of modelling activities "OpenLabyrinth" in the educational process of higher educational establishments with specific learning conditions, which train police officers.

Purpose of the study. In view of the above, the purpose of our work is to study the possibilities of using the online system of modelling activities "OpenLabyrinth" in the process of training police officers at higher education institutions with specific learning conditions, to identify the disciplines where the use of this system will be most appropriate.

Summary of the main material. OpenLabyrinth is an open-source online activity modelling system that allows users to create interactive "game" learning models such as virtual patients, simulations, multi-level knowledge control systems, mazes, models of branched processes in various domains, and algorithms. It is designed to be adaptive and easy to use, while retaining many game-like features. OpenLabyrinth is distributed under the terms of the Academic Free Licence (AFL) version 3.0 [3].

The original OpenLabyrinth online activity modelling system was developed by the Learning Technologies Department of the College of Medicine and Veterinary Medicine at the University of Edinburgh [3].

"A "labyrinth" is the main organisational unit of the OpenLabyrinth online activity modelling system. Each labyrinth has a number of global properties, such as type (scenario, maze, algorithm, etc.), author information, timer, visual appearance (skins), security, score, etc. Each maze has a number of related pages or nodes within it.

Labyrinth nodes are units of information presentation to the user, usually web pages, around which all other components of the labyrinth are organised. A labyrinth is usually made up of many interconnected nodes.

Each node can be filled with different educational information presented in different formats: text, audio-visual, video-visual, graphic, interactive, etc.

Each node in the maze has its own unique identifier (node ID) and a number of other properties such as name, text content, type and a number of rules and functions. Rules and functions determine what is shown to the user in each particular node, depending on the current properties of the node and what the user has previously done.

The nodes of the maze are connected by a series of links, expressed by pairs of node identifiers with some additional properties such as order, icons and alternative text. The links are unidirectional; a second link with independent properties is required for feedback. The transition from one node to the next is made by activating a link. In linear maze models there is only one transition, whereas in branched models there are an infinite number of transitions.

By activating the link, you can simulate a student's decision making based on data previously entered into the system. Options for possible decisions and links to go to are placed on each page of the labyrinth node.

The online activity modelling system "OpenLabyrinth" is a multitasking system and therefore has the ability to run a lesson both by one student and by a group. To do this, a student or a group of students is registered in the system and given access to a specific course. When logging in to the system, the student enters the text key given to him or her, which serves as the basis for taking a particular course. In addition, the multitasking capabilities of the OpenLabyrinth online activity modelling system allow virtual patients to be created by a group of labyrinth designers. The created labyrinths are stored in the repository on the OpenLabyrinth online activity modelling system server and can be further edited, modified or copied (both the whole labyrinth and its parts).

Currently, the OpenLabyrinth online system is being used by Zaporizhzhia State Medical University, Bukovinian State Medical University, Kharkiv National Medical University and others. In particular, Zaporizhzhia State Medical University created 17 virtual patients based on cases for the first and second years of the programme using the OpenLabyrinth online modelling system. Teaching was carried out in relatively small academic groups of 8 3rd year medical students [4].

C. Sazhyn points out that modelling clinical situations (cases) with virtual patients simulates different options for further actions — right and wrong, and the outcome of a clinical case is the patient's recovery or death. By creating a database of branched processes, the author is able to simulate both correct and incorrect actions of a doctor during the examination, diagnosis and treatment tactics of a patient.

After an incorrect choice, the system switches to a model of the patient's physical condition and shows the gradual progression of events leading to the failure of individual organs, systems or the death of the patient. Mistakes made by students during the case are carefully analysed and discussed with the tutor. This helps to prevent similar errors in real medical practice in the future. In addition, error-based learning makes it impossible for students to work with real patients [5].

Virtual patient technology offers students a unique opportunity to study the dynamics of the diagnostic process, to influence the tactics of the treatment process and to evaluate its effectiveness after certain interventions. The undoubted advantages of such technologies include stimulation of interest in self-study, visibility, ability to treat and see the results of treatment, ensuring patients' rights, safety for students and teachers, etc. The widespread use of virtual technologies, simulations and distance learning is an integral part of medical education in the world's leading universities [6].

Thus, we can conclude that the use of the online system of activity modelling "OpenLabyrinth" is an effective means of training future doctors, meets the modern requirements of problem-based learning and creates sufficient opportunities for mobility of teachers and students.

Regarding the use of the system in police training, after getting acquainted with the external interface of the OpenLabyrinth online simulation system, virtual patients and freely available scenarios, we can conclude that it can be used in the educational process of higher education institutions with specific learning conditions. Thus, the OpenLabyrinth online activity modelling system can be used to teach a number of practical disciplines, such as tactical and specialised training, firearms and tactical training, tactical training, tactical medicine, personal security of the police, actions of the National Police in emergency situations, organisation and conduct of special operations of the National Police, and others. To do this, it is necessary to create scenarios that meet the objectives of the discipline, including solving complex specialised tasks and practical problems in the field of law enforcement.

For example, the use of the OpenLabyrinth online system for modelling activities in the form of a linear "labyrinth" in tactical and specialised training courses will allow students to learn typical algorithms for responding to various situations of operational and combat activities. Building a "labyrinth" on the basis of a non-linear, branched model allows to include several options for decisions or behaviour of a police officer in a given situation, some of which will be quite correct, some of which will be acceptable in a given situation, and the rest of which will be wrong or unacceptable under any circumstances. For example, after making a correct/incorrect decision or selecting an option for acceptable/unacceptable behaviour, the system moves to a maze node that reflects the escalation of the situation depending on the choice made. Further selection of an action option will either resolve the situation or lead the police officer to a 'dead end'. Given that the construction of a "labyrinth" based on a non-linear, branched model involves two or more options for action or decision, we can model any situation as close as possible to real situations of operational and combat activities of a police officer. It is also worth noting that for proper training of police officers it would be advisable to construct "mazes" based on real situations that police officers face "on the street".

Also, when using the online activity modelling system "OpenLabyrinth", instead of the term "virtual patients", it would be more appropriate to use the terms "virtual applicant", "virtual victim", "virtual witness or eyewitness", "virtual perpetrator", etc. (depending on the situation that the teacher-designer is going to simulate).

In conclusion, we can say that the online activity modelling system "OpenLabyrinth" can be used to monitor and evaluate the independent work of a university student. It is known that in the study of a certain discipline a significant number of pedagogical topics or questions on pedagogical topics are submitted for independent study by a student of higher education, the control over the success of which is usually carried out by means of test tasks. The use of the online system of modelling activities "OpenLabyrinth" as a means of assessing independent work allows us to perform a dual function — to promote the study of the material submitted for independent study (teaching function) and to assess the process of studying the material submitted for independent study (control function).

Also, online systems of modelling activities "OpenLabyrinth" can be used to conduct the theoretical part of the final or intermediate control of knowledge of a higher education student.

Conclusions. The on-line system of modelling activities "OpenLabyrinth" can be used in the educational process of higher educational institutions with specific learning conditions, in teaching practice-oriented disciplines, such as: tactical and special training, tactical training, tactical medicine, actions of the National Police in emergency situations, organisation and conduct of special operations of the National Police, etc. It allows to create linear, non-linear and branched "labyrinths", which in turn allow to simulate any situation as close as possible to the real situations of operational and combat activities of a police officer. The use of the OpenLabyrinth online activity modelling system in the educational process of higher education institutions with specific

learning conditions enables problem-based learning for future police officers. It can also be used to monitor and evaluate the independent work of university students.

The OpenLabyrinth online simulation system allows you to study on any electronic device, at any time, from any location, and generally provides almost the same theoretical training as classroom training. At the same time, the system is not a substitute for practical training, so its use should be combined with practical training on specialised training grounds or in classrooms.

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