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RELEVANT APPROACHES TO MODERNIZATION OF ACADEMIC AND MATERIAL AND TECHNICAL PROCESS SUPPORT OF ACADEMIC PROCESS IN THE FIELD OF KNOWLEDGE “HEALTH CARE” IN TERMS OF ADAPTING TO INTERNATIONAL ASSESSMENT CRITERIA

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Ключевые слова: КРОК, международный экзамен по основам медицины, USMLE, модернизация, медицинское образование

Abstract. Relevant approaches to modernization of academic and material and technical process support of academic process in the field of knowledge “Health care” in terms of adapting to international assessment criteria. Pertseva T.O., Shponka I.S., Tverdokhlib I.V., Pototskaya O.Yu. One of the important tasks in modernization of Ukrainian medical education is to bring it in line with international assessment criteria, which has become especially relevant after the introduction of the International Basic Medicine Examination in 2018. The aim of this work was to identify the most significant differences between international medical exams (for example, The United States Medical Licensing Examination, USMLE) and the national system of licensed exams KROK, and based on this, determine the direction of modernization of Ukrainian medical education for its adequate adaptation to new systems of assessment. The most significant differences between the two exams are: format (on computers / on paper); presence / absence of digital files with images and audio data in tasks; thematic focus of tests within one / several subjects; different list of items by which tasks are distributed; in the case of USMLE, there is a much higher motivation to pass the exam with the highest possible result. To adapt the medical education system to such features, it is necessary: to provide students with high-quality illustrated textbooks and meaningful digital data bases for each specialized subject; to actively use images (audio, video files) from these sources during the analysis of the material and all types of control (including test ones); to establish cooperation between the fundamental and clinical departments in the process of creating test tasks, as well as the exchange of digital materials for practical classes. Of particular importance is the synchronization of methodological approaches to conducting practical classes and assessment criteria not only in theoretical but also in clinical departments, which will make the learning process more transparent and understandable. Such a set of measures will help not only to adapt students to exams at the international level, but also will increase their interest and improve the effectiveness of the educational process. The employment of digital images, audio, video files will also contribute to the adequate preparation of students for new directions in medicine, such as telemedicine and telepathology.

Реферат. Актуальные направления модернизации учебно-методического и материально-технического обеспечения учебного процесса в области знаний «Здравоохранение» в аспекте адаптации к международным критериям оценивания. Перцева Т.А., Шпонька И.С., Твердохлеб И.В., Потоцкая О.Ю. Одной из важных задач модернизации медицинского образования в Украине является приведение его в соответствие с международными критериями оценивания, что стало особенно актуальным после внедрения в 2018 году Международного экзамена по основам медицины. Целью данной работы было выявить наиболее существенные отличия между международными медицинскими экзаменами (на примере The United States Medical Licensing Examination, USMLE) и отечественной системой лицензионных экзаменов КРОК, и на основе этого определить направления модернизации медицинского образования в Украине для его адекватной адаптации к новым системам оценивания. Наиболее существенными отличиями между двумя системами

оценивания являются: формат проведения (на компьютерах / на бумаге); наличие / отсутствие в заданиях цифровых файлов с изображениями и аудиоданными обследований; тематическая направленность тестов в рамках одного / нескольких предметов; разный перечень предметов, по которым распределены задания; в случае с USMLE намного более высокая мотивация сдать экзамен на максимально возможный результат. Для адаптации системы медицинского образования к подобным особенностям необходимо: обеспечивать студентов качественно иллюстрированными учебниками и содержательными базами цифровых данных по каждому профильному предмету; активно использовать изображения (аудио-, видеофайлы) из названных источников во время разбора материала и всех видов контроля (в том числе тестового); налаживать сотрудничество между фундаментальными и клиническими кафедрами в процессе разработки тестовых заданий, а также обмена цифровыми материалами для проведения практических занятий. Особое значение имеет синхронизация методических подходов к проведению практических занятий и критериев оценивания не только на теоретических, но и на клинических кафедрах, что позволит сделать процесс обучения более прозрачным и понятным. Подобный комплекс мер поможет не только адаптировать студентов к экзаменам международного уровня, но также повысит их заинтересованность и повысит эффективность учебного процесса. Использование цифровых изображений, аудио-, видеофайлов также будет способствовать адекватной подготовке студентов к новым направлениям в медицине, таким как телемедицина и телепатология.

In order to identify the main trends in the modernization of medical education, it is important, first of all, to take into account the main trends in the modern healthcare system. One of the most promising areas of medicine around the world is telemedicine, which enables the involvement of highly qualified specialists in the consultation of patients in the most remote locations in the country [6]. In Ukraine, the development of telemedicine has been recognized as one of the priority areas, as evidenced by the Order of Ministry of Health of Ukraine No. 261 of 26.03.2010 "On the introduction of telemedicine in healthcare institutions" [3]. It requires medical education to increase the role of digital data obtained by various diagnostic methods in the training of future specialists [9].

Also in the process of modernization it is important to take into account the tendency towards the internalization of education, in particular medical, which consists in the development of academic mobility and adaptability of the system for training not only domestic but also foreign students [5, 11]. According to the Ministry of Education and Science data, 75605 foreign students from 154 countries of the world study in Ukraine; among the first 10 higher education institutions by the number of foreign nationals, medical institutions rank 8 [2]. Most of all, foreign medical students are taught in a non-native language, which requires the education system to reduce the need for verbalization and maximize the role of other media, including visual, in audio and video format with the use of modern digital technologies.

But the most important and effective impetus for the renewal of Ukrainian medical education is the fact that the state-level International Medical Exam is introduced at the state level, which aims to provide the most objective assessment of the activity of medical establishments in the country [4]. In

order to avoid any corruptive component, a contract to conduct this exam is signed with the National Board of Medical Examiners (NBME), a company that develops the world-famous USMLE (for the United States) and IFOM (for other countries) tests. Such circumstances require the fastest possible adaptation of the educational process in medical establishments to international standards, since the conditions of study of students must be adequate to the system of their assessment [10]. In order to develop adaptation programs, it is important to understand the differences between the licensed integrated exam system in Ukraine and the NBME system.

The purpose of this work was to identify the most significant differences between the Ukrainian licensing exam system Step (KROK) and the international format of medical examinations (on the example of USMLE) and on this basis to determine the actual directions of modernization of the methodological and logistical support of educational process of specialists in the field of "Health care" for the adaptation to international evaluation criteria.

Main part

An analysis of the typical USMLE and Step examples of tasks identified the following differences.

1. Passing computer-based exam (USMLE) and not in paper form (STEP). From a purely technical point of view, this difference is not so much a problem for students who have experience of studying in the computer classes of some departments, but for the exam organizers. From the experience of passing KROK licensing exam, it is known that the exam must be held at the same time throughout the country, otherwise it is impossible to avoid premature disclosure of the content of the tasks. In most medical establishments, computer

classes are created in separate departments and are equipped with 15-30 workplaces, which requires the simultaneous involvement of a large number of exam rooms simultaneously. It also requires more supervisors and technical staff. For example, in Dnepropetrovsk Medical Academy in 2019 569 students were passing exam at the same time, with the average number of 15 computers in one department, so there was a need to organize about 40 class-rooms.

2. USMLE tests contain not only text content but also (in a large number) digital files with images of patho-histological sections, x-ray images, tomograms, external manifestations of genetic and skin diseases, audio recordings of auscultation data, etc. This makes it possible to test the skills of recognizing diagnostic features directly, not by their describing in the text (as in Step exams), which is much closer to practical medicine. Given the priority development in Ukraine - telemedicine - the importance of digital imaging skills for future doctors is difficult to overestimate. In addition, memorizing an image is much easier than imagining it in a detailed description in the text, so if students are adequately trained, this type of knowledge checking is even easier. It is of particular note the advantages of such assessment for foreign students, since providing the image, rather than describing it in the assignment, minimizes the likelihood of error due to insufficient command of the language used in the exam.

3. The USMLE format tests often test the knowledge of several disciplines at the same time, and it is difficult to distribute the test database for preparation between different departments. For example, Step 1 disciplines (such as anatomy, histology, embryology, biochemistry, genetics, microbiology, immunology, pathology, health protection) are divided into the following headings: cardiology, endocrine, gastroenterology, hematology, oncology, musculoskeletal, neurology, renal and reproductive. Conditions of tasks are also prepared in such a way that both disciplines equally affect the correct answer. For example, a neurological symptomatology may be described in the condition of the task, and the task will be to indicate the area of the brain lesion in the brain image. That is, at the same time it is necessary to demonstrate understanding of function of individual structures, as well as the ability to recognize them in the image.

In the practice of the same licensing exam, the tasks are prepared by the representatives of different departments according to their curricula, and the preparation of students for the examination is carried out at the departments separately in each discipline.

This allows to evaluate not only the work of the educational institution as a whole, but also to compare the performance of its individual units with each other. On the one hand, there are some advantages (the departments are motivated to prepare students as best they can), but it also has significant disadvantages (departments training third-year, sixth-year students do not pay attention to the education material of the previous years of study, because they are not interested in the result as a whole, but in their own rankings).

4. USMLE tests are distributed by subject according to Western training programs, which are significantly different from the Ukrainian ones. For example, Step 1 includes: Pathology, Physiology, Pharmacology, Biochemistry & Nutrition, Microbiology & Immunology, Gross Anatomy & Embryology, Histology & Cell Biology, Behavioral Sciences, Genetics. The main differences are that pathological anatomy and pathological physiology are combined into one subject, medical biology is absent, but genetics and "behavioral sciences" are present.

5. Students are much more motivated to pass the USMLE with maximum possible result (since this significantly affects their future employment and, consequently, their salary) compared to passing Step exam (since students only have to get "pass" mark not to be expelled).

The differences identified indicate the need to revise and modernize the main methodological approaches to the teaching of specialized disciplines in medical educational establishments which must first address these tasks.

I. Providing students with adequate material to prepare for practical classes and various forms of exams.

To solve this problem, it is necessary:

1. Provide students and teachers with textbooks with a high level of illustrative material. Modern editions (especially of the western sample) contain a large number of diagrams, drawings and photographs, which facilitate the perception of the material regardless of discipline. Often, students do not pay attention to the drawings and merely submit textual information. With the ability to control the skills of image recognition, video and audio information, there is an opportunity for a more adequate, comprehensive assessment of students' knowledge on the topic.

Approving purchase requests for textbooks, commissions on disciplines must pay attention to quality and number of illustrations in the edition. In case of foreign students, it may be advisable to purchase original international publications in English, French language if the translations of the national textbooks are significantly inferior to the number of images. Taking into account conducting Step exam partly in English, it is advisable to involve native students in working with English-language textbooks.

2. To develop digital image databases for students' self-study out-of-class which should be on open access 24/7. Although the textbooks may contain a sufficient number of images, most of the drawings are presented in a single copy, which does not allow the student to fully focus on the key details and features of the phenomena and objects being studied. The task of digital databases is to provide as many variants of the same images, audio and video files as possible. This will make it impossible to primitively learn the minor features (for example, the color of the patient's clothes instead of manifestations of disease) and allow students to identify key common features by analyzing a series of images.

Formulating a list of sources recommended for self-study, it is important to follow the principle of sufficient numbers. When referencing more than one textbook or digital database, it is important to indicate which ones are essential, first-priority and mandatory, and which are - optional.

II. Increasing the role of digital images, audio and video files in the process of explaining material and evaluating students' knowledge.

To solve this problem, it is necessary:

1. Introduce usage of digital images in accordance with the department's profile during practical classes and all types of knowledge control, including tests. It is important to determine the required number of such images so that, on the one hand, not to load practical session, and on the other – to convey the maximum body of material to the student.

For selection of images and other digital material for in-classroom learning, it is advisable to involve faculty members teaching in foreign language and working with foreign textbooks. It is the material of such textbooks that can form the basis of illustrative practical session, since, as noted, it is the international publications that contain the largest number of images. In addition to the textbooks, the digital database materials of various diagnostic methods (histology, X-ray, tomogram, audio recording of auscultation of the heart or lungs, endoscopic

data, etc.) should also be included. It may be advisable to present some of the visual material during the lecture (if accompanied by a demonstration of digital images) and to check out its mastery during practical classes; this may further motivate students to be more attentive during lectures (but also require synchronization of lecturers' work).

2. Synchronize the work of all faculty members in order to create equal learning environment for all contingents of students. At the meeting of the department, a basic set of digital files for each practical class should be agreed upon, which would meet the necessary criteria in terms of quality, informative content and representativeness. In addition, it is desirable to coordinate the work of different departments within subject commissions, so that students do not have conflicts when learning according to different algorithms.

III. Establishing cooperation between the departments in the process of preparation of materials for the educational process, as well as in the preparation of students for licensing exams.

In establishing cooperation between departments in the process of preparing students for international exams it is important:

- 1) synchronize as much as possible the calendar-thematic plans of related disciplines;
- 2) exchange digital materials for practical classes between fundamental and clinical departments;
- 3) create interdepartmental working groups to develop test tasks, taking into account the knowledge of several subjects (theoretical and clinical).

IV. Develop a system of encouraging students to pass Step at a high level.

Following the example of international exams, it is important to consider the results of the KROK licensing exams in job placing. It would also be advisable to create an open market of vacancies for healthcare professionals and a transparent recruitment system, where the major criteria will be the results of licensing exams at the graduate level. However, this is only possible at the state level.

Experience of the Department of Histology of the SE "DMA" in the modernization of methodological and material and technical support of learning process

Since February 2019, new algorithms of educational and methodological approaches have been developed at the Department of Histology, taking

into account the need to increase the role of visual support of practical classes. To implement new approaches in all academic audiences, with an average area of 20-25 square meters, designed for 12-15 students, 55-inch Smart TVs were installed; The department was also previously equipped with Carl Zeiss Primo Star microscopes. Also, original English textbooks were purchased for English-speaking students, “Junqueira's Basic Histology: Text and Atlas” [8], and a new edition of a basic national textbook [1] was purchased for domestic students, which differs from the previous in color illustrations. Additionally, a web page with a histological atlas was created on the site of the department, with downloaded digital images of histological specimens, distributed according to the topics of practical classes [7].

The experience of the Department of Histology has shown that the standard of conducting practical class should include three compulsory components, which can vary in duration depending on the specifics of a topic, namely:

- 1) consideration of the topic and input control of knowledge;
- 2) practicum (work with albums, microscopes, atlases);
- 3) recitation of each student using Smart TV.

In order to make good use of class time during individual recitation, students of the group continue to complete hands-on workshop. An important prerequisite for the practical training is the use of Smart TV to provide all three of these components.

Consideration of the topic / input control of knowledge

In the process of consideration of the topic, images of histological specimens, samples of which were downloaded from the department's atlas web page, schemes and diagrams from basic textbooks, as well as short (up to 10 minutes) videos, which are available online are used. A total of 20-25 images (up to 2 min per slide) and 1-3 video files per session are used.

It is important to emphasize that the images used during the revision of the material were not signed and did not contain the markings of individual fragments, which allowed them to be used for input control of knowledge simultaneously. With quality training, students should be able to recognize the common features of the objects demonstrated on their own, while the teacher is required to explain the most complex details. Thus, demonstrating a new slide, the teacher asked a particular student to

give the general name of the tissue or organ depicted and to explain on what grounds it could be done. If the student could not explain or his answer was incomplete, other members of the group were involved in the discussion. After discussing the image and related theoretical information, the teacher answered the questions of the audience and summed it up, focusing on the most important criteria. Such a form of the first block of classes actively attracts students to work and also increases their interest as it is debatable and competitive.

Additory, one should also focus on the benefits of using captionless images. It is not only makes it possible to control the students' input knowledge, it also motivates them to listen carefully to the teacher and keep an eye on the topic, since at any time everyone present may be asked to repeat the material just explained. Also, the teachers are deprived of the ability to read the titles from the slides, so they must constantly keep hand in and be ready to answer any additional question asked by students. It is important that the language problem is solved, since, in the absence of captions, the same images can be used when working with different contingents of students (in SE “DMA” training is conducted in four languages). Absence of captions additionally prevents students from copying (photographing slides) and learning words of a limited number of marked details.

Video files were used to summarize basic information as well as to examine the mechanisms of action of cell and tissue structures. Most of the freely available videos are in English, so teachers who work with students from other language groups have to additionally comment and explain the videos.

Working with albums and a microscope

During this part of the class, students learned the skills of recognizing diagnostic criteria of histological specimens and sketched them in albums. At the beginning of this class, the teacher demonstrated digital images of the specimens on Smart TV, focused on the basic criteria and suggested that students try to identify them using a microscope (Fig.). The use of Smart TV enabled to show all students a high-quality image of the specimen (possibly at several magnifications, or under different coloring conditions), being an absolute advantage over atlases and tables. After analyzing the diagnostic features and viewing the specimens under the microscope, the students schematically sketched the main ones. Assessment of protocol figures enabled the teachers to more clearly understand the quality of the material learned and practical skills.



Practical session at the Department of Histology: working with albums and microscope. Associate Professor Romanenko L.A. explains basic diagnostic criteria of histological specimen, while students are able to view similar specimens under a microscope

Recitation of each student using Smart TV

During the last part of the class teachers conducted recitation of students (about 5 minutes for each student), during which several slides from the first part of the class were used, i.e. they controlled both theoretical knowledge of the material and the ability to recognize the diagnostic criteria of the specimens in practice. It was this part of the class that particularly motivated students to be attentive at the beginning, when reviewing the material, as participation in the discussion of the material in the end was taken into account upon receipt of a mark. Provided that the student was actively involved in reviewing the material at the beginning of the class and demonstrated good knowledge, the teacher could ask only a theoretical question.

Images discussed during practical class in the time following were used during module control assessment; it is also planned to involve them in the preparation of the materials of the first round of the Olympiad in histology, cytology and embryology and holding meetings of the students' scientific society.

At the end of the practical classes, each student gets mark that considers in the round: his/her participation in the discussion of the topic, correctness of the drawings in the protocols, as well as oral answer to theoretical questions and skills of diagnostics of histological specimen by means of Smart TV.

Preliminary results

Analyzing the first six months after the modernization of the educational process at the Department of Histology, it is possible to note both the increase of students' interest in the classroom activity and the increase in the effectiveness of mastering practical skills in recognizing the diagnostic features of histological specimens. Theoretical information supported with the visual images contributed to its better absorption, as in addition it involved visual memory. The new way of discussing learning material and students' recitation has made it easier to work with foreign students studying in a non-native language. From now on, the teacher does not have to describe the characteristics of certain

structures in the question – it is only necessary to indicate them in the appropriate image and ask the student to define their name. In this case, the importance of verbalization was reduced and language problems were minimized, this does not allow the student to complain about the incomprehensibility of the question while the problem is his unpreparedness. It is also much easier for students to point out and name different elements of an image than to construct complex sentences by describing abstract images.

Thus, due to the updating and modernization of the technical support and teaching-methodical algorithms, it was possible to increase the efficiency of the students' classroom and out-of-class activity.

CONCLUSIONS

The most urgent trends in the modernization of higher medical education are the standardization of the structure of practical classes, the introduction in the educational process of digital technologies for image analysis, audio and video files, as well as the development of collaboration between theoretical and clinical departments in the development of educational and methodological algorithms. The identified areas of modernization of medical education not only help to adapt it to NBME international assessment criteria, but also to optimize the work with international students and facilitate adequate training of specialists for the use of modern technologies in medicine.

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