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USE OF VISUALIZATION TOOLS IN THE EDUCATIONAL PROCESS

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Key words: visualization tools, educational process, competencies, knowledge acquisition.

An article integrates data on visualization tools used in the educational process of high school students, particularly in the field of medicine. The role of visualization in the formation of professional competencies of students is also shown in the paper.

Objective – analysis of scientific papers that describe the possible visualization tools in the educational process during the explanation of new material, generalization, systematization and testing of knowledge and prove their role as the acquisition of knowledge, skills and abilities of students.

Conclusions. There is a significant choice of teaching methods and tools in the arsenal of a high school teacher now, that considerably facilitates the perception of educational material by the students and contributes to its better acquisition. One of such effective methods is visualization by means of multimedia presentations, videos and interactive technologies. This approach will contribute to the better formation of the students’ professional competencies, ability to analyze and think critically.
Introduction

Modern education is impossible without the use of various teaching methods and tools that facilitate the perception of educational material and promote its better acquisition by the student audience. Among the teaching methods an important role is given to visualization with the use of multimedia technologies. Digital technologies are becoming the organic components of education and bring significant discoveries of new knowledge, principles and shifts in the perception of existing theory [5].

The purpose of using any visualization in the educational process is to promote the acquisition of certain knowledge (ideas, scientific facts, concepts, tracking of causation, etc.). In order to achieve its goal, visualization must establish a connection between the knowledge that student has and the knowledge that is taught to him. Therefore, in order to choose the effective tools of visualization, it is necessary to find out the initial level of student’s knowledge, which is especially important in the context of education [11], so it is important to choose the methods and tools that are suited for studying of specific topics the best.

Objective

Of the paper is to analyze research that describes the possible tools of visualization in the educational process during the explanation of new material, generalization, systematization and testing of knowledge, and prove their role for the acquisition of knowledge, skills and abilities of students. This article also characterizes the features of visualization tools use in the education of medical students to form the competencies of the future doctor.

Main part

In recent years, many studies have been conducted on the need to strengthen of critical thinking in students of various science fields, as it has long been proven the importance and role of critical thinking for their successful development in the chosen profession [3]. In the context of higher education, a critical approach is needed, which involves an application of effective teaching methods, in particular with the use of visualization [1]. The main merits of such methods are the development of critical thinking, as well as the promotion and improvement of student learning and their success in general, making them able to solve problems in their fields [11]. Visualization motivates students to learn, making them more communicative and developing skills of a critical approach to learning material [14]. This issue becomes especially relevant in the context of training students of medical specialties, where the foreground is not only the study of a particular topic, but also the development of practical skills [4, 16]. In addition, the visualization method helps students to develop the ability to think analytically, helping to form logical connections [2].

The specific character of teaching disciplines to medical students is to emphasize the practical significance of the knowledge, so training should be accompanied by a detailed description of the disease symptoms, its clinical manifestations and features, as well as morpho-physiological characteristics of human pathogens [10]. Therefore, a variety of visualization tools come in handy, among which the most popular today are interactive technologies [6].

The application of an interactive whiteboard while training medical students is a good tool for them to master important skills in medicine [7]. In particular, conducting practical classes in medical parasitology with an interactive whiteboard allows students to examine in detail the structural elements of the human pathogen that has a diagnostic value, to find a match between the structure and functions of the structural departments [17], to establish the cause of certain clinical signs, teaches to draw logical conclusions (Fig. 1).

Figure 1. Use of an interactive whiteboard by students while studying medical parasitology

The advantage of using an interactive whiteboard as a new modern learning tool is the ability to integrate various learning resources effectively, improve their application, has a significant impact on improving the efficiency of communication with students’ audience [20]. It should be noted the successful use of 3D technologies in the diagnosis of parasitic human diseases [15], which has become quite common in the development of practical skills in students. This approach proves its effectiveness in the training of future doctors, as it contributes to the formation of their professional competencies and the acquisition of the necessary knowledge, skills and abilities for further medical practice [8, 9].

Among the visualization tools, a prominent place belongs to multimedia presentations, various professional videos, animated videos, demonstrations of micro- and macroslides, as well as high-quality tabular resources, illustrations and diagrams [16, 18]. One of the main purposes of using these tools, in particular animations, is to help students to build accurate mental models that can assist them to explain macroscopic observations made during practical and laboratory classes. Such a model will contribute to the formation of ideas about the mechanisms of processes occurring at the molecular level [12]. In addition, students can be asked to interpret histological and clinical images, assessing the skills of clinical diagnosis, general health and pathology indicators [19].

All these tools are publicly available and applicable in
international educational practice. Their use is becoming increasingly important during distance learning through social distancing under pandemic conditions [13].

Conclusions

Now the arsenal of a high school teacher has a significant choice of teaching methods and tools, that highly facilitates the perception of educational material by students and contributes to its better acquisition. Nevertheless, it is important to choose the methods and tools that are the best suited for the study of a certain topic. One of such effective methods is visualization, using multimedia presentations, videos and interactive technologies. This approach will contribute to the better formation of the students’ professional competencies, ability to analyze and think critically.

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