

METHODS AND TOOLS FOR CONNECTING THEORY WITH PRACTICE IN THE COURSE HUMAN ANATOMY AND PHYSIOLOGY FOR STUDENTS IN DISTANCE LEARNING

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Online learning during the period of quarantine restrictions greatly influenced the learning ability and motivation of students, the direction of training and the course of which is strongly related to the practical testing of acquired knowledge. For this reason, to compensate for the negative impact, additional incentive measures and special tools are needed to ensure the connection of theory with practice at the level of visual, conceptual and tactile perception. This work is devoted to the consideration of distance learning methods and tools applicable to ensure the connection between theory and practice in the human anatomy and physiology course for students [1,2,5,6].

The purpose of the work is to demonstrate and justify distance learning methods and tools applicable to connect theory with practice in the human anatomy and physiology course at a higher education institution.

Materials and methods To obtain the result, methods of theoretical analysis of literature on the chosen topic, synthesis of one's own ideas and hypotheses were used.

Traditionally, such means of outputting audiovisual information as Zoom, Google meetings and Discord are considered as the main tools for distance learning. Meanwhile, despite the simplicity and prevalence of these tools, not all teachers use them to conduct online practical classes [3,4]. At the same time, these tools themselves include sections that actively promote this.

For example, they all support dividing a video or audio session into subgroups and separate rooms in which the teacher can evaluate individual and group assignments and the quality of their implementation. In the same way, you can divide laboratory or practical work into stages and students can move from stage to stage in special rooms, and those who did not have time to complete the previous stage can remain in the previous room and re-study the video material shown on the screen of the output device for as long as they will need it. In this way, it is possible to provide

students with differentiation of learning in terms of means of synchronous knowledge delivery.

In addition, these tools can be used when conducting classes in two small groups, divided into two rooms. Moreover, at the end of the video or audio session, you can compare the results of two small groups and arrange a triple debate between teachers and participants of the two small groups, in which you can consider ways to improve the result, common mistakes and innovations in practical work.

The most notable online learning methods used with these tools are project-based learning and creative activities.

To conduct a lesson using the project method, students are given a certain practical task, for example, to demonstrate the structure of a flower from the legume family, its typical features and characteristics. Students spend several days preparing a theoretical or practical model to demonstrate their knowledge.

So, for example, illustrative models, verbal models and even 3-D models can be chosen as a theoretical model, often demonstrating not only the internal structure, but also the physiological processes occurring in the human body.

Illustrative models are created using photo editors and other graphic tools, for example, Adobe Draw, Photoshop, SketchPad and many others.

In addition, interactive online boards, such as AMW board, MIRO, Whiteboard Fox, Webwhiteboard and many others, are an interesting way to collaborate and present theoretical models in verbal and visual format. They differ from each other in reliability, simplicity of the interface, technical requirements and technical capabilities. For example, some of them are capable of not only providing material themselves, but also supporting video material and even video communication. However, even in the absence of video communication tools as part of the online tool, this can be compensated by using communication in already voiced tools, for example, using the device screen sharing function.

Among the tools for creating theoretical models, one can also highlight tools that work on the principle of mind-maps, which help to systematize the information available to students, show its hierarchical connections, the principles of interconnection and helps to visualize the work of many technical systems related to the anatomy and physiology of a person and his individual elements, operating principle of an electron microscope, etc.

Today there are also many tools for creating 3-D models, among which it is worth noting such as Autodesk TinkerCAD, DesignSpark Mechanical, SketchUp, FreeCAD, Autodesk 3ds Max, Autodesk Maya and others. Despite the complexity of 3-D modeling, teams of students cope well with tasks of this type. At the same time, it is worth taking into account the technical capabilities of students, the large time costs for implementing the project, it is necessary to provide support to students in developing models that visualize physiological and especially biochemical processes in the human body and the difficulties in demonstrating the operation of the model on standard information output devices.

In order to successfully use 3-D modeling in a course teaching human anatomy and physiology, it is worth recommending that students design their work in several stages, for example, start with theoretical models, then move on to visual ones, and then begin developing the model itself. In addition, it is worth recommending to assign roles in the group in advance, in particular, the role of an idea critic, the role of a 3-D artist, the role of someone responsible for the verbal part, etc.

It is worth mentioning separately as a means of additional motivation for students in distance learning – practical online Olympiads in subject areas. So, for example, the tasks for such an Olympiad in human anatomy and physiology can include tasks on identifying body systems, identifying organs, functions of body systems, tasks on structure and functions, for example, the importance of digestion for the life of the body, general characteristics of food, the main functions of the digestive system. tract, additional functions of the digestive tract, functions of the oral cavity, stomach and intestines, secretory function of the digestive tract, gases of the digestive tract, absorption in various parts of the digestive tract, excretory function of the digestive tract, mechanisms of regulation of digestion, etc.

In addition, practical Olympiads in subject areas of biology can also include project elements, for example, team visualization of information from a task, etc.

Thus, today there are many online teaching methods and tools that can be successfully used in the course of teaching the subject of human anatomy and physiology to students.

These methods and tools can improve the quality of learning and motivation of students, compensate for the negative impact of distance learning and contribute to the formation of full-fledged specialists in the scientific and pedagogical fields.

Meanwhile, to confirm theoretical data, practical testing of the methods and tools highlighted in this work is needed.

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