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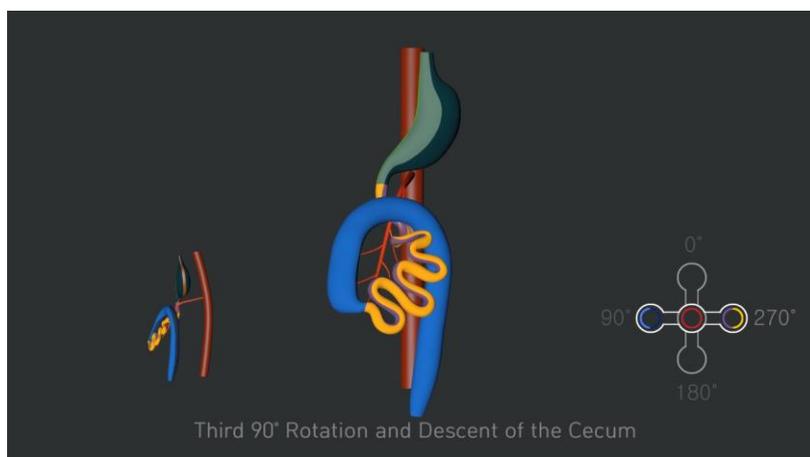
EVALUATION OF THE ROLE OF MULTIMEDIA IN TEACHING EMBRYOLOGY

Annotation: The purpose of this paper is to develop and evaluate new teaching materials and teaching methodologies based on multimedia approaches to improve understanding of human development. In addition, it is emphasized that guidelines for such design and evaluation should be formulated with broader educational and content objectives.

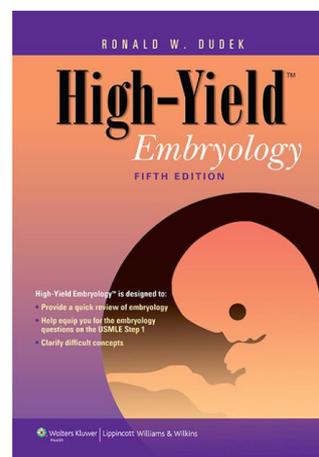
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Introduction. Embryology is a science of the origin and development of living organisms. The study of human embryology has theoretical (as a preclinical course during medical study), but also important clinical significance. Embryology is a fascinating field of science which can guide students of medicine or natural sciences in a miraculous way through the laws of human development from fertilization to birth.[4] However, it is known that the problems in obtaining the fundamental sciences of medicine are no secret among primary medical students, mainly 1st year students. In the 21st century, modern technological tools: animations, videos, pictures and presentations (Fig. 1 a) are great importance in solving difficulties in the teaching process and students' understanding problems.

Methods and materials. This research was conducted in 2 courses which completed Embryology lessons in 2021 and 2022 years at the Fergana Medical Institute of Public Health without awareness of survey. The obtained results were compared using Excel software and simple statistical methods. All participants were mentally and physically fit during the semester of Embryology training. At the end of the Embryology lessons, the opinions of the compared students were collected in the form of a simple questionnaire. In order to determine the effectiveness of the multimedia teaching process, students of 2 courses (n=426) were taught in the same working curriculum in consecutive years, and students of the 2022 academic year course (274) were taken for testing using projectors, videos, animations and education was provided with pictures, students who received education in 2021 (152) were educated in a traditional way and used course books (Fig. 1 b). They were compared with the final exam results (Fig. 2.). During the exam, candidates were taken 3 questions and 1 case study which related to 13 units and results measured 100%. The passing score for the exam is 60%.



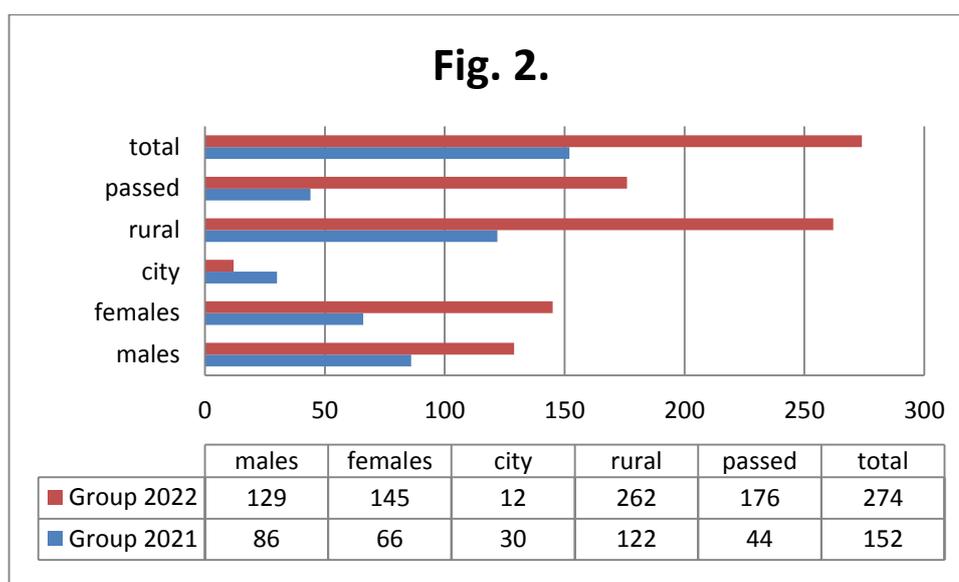
a)



b)

Fig. 1. a) Development of the GI tract b) High-Yield Embryology (High-Yield Series) Fifth Edition by Dr. Ronald W. Dudek PhD (Author)

Results. According to the results of the comparison of two groups, the results of the examination conducted in a strict order: the results of students in the main group(2022) and the results of students in the control group(2021) were 64.2%(176) and 28.9%(44), respectively. When the main group was surveyed after the end of the embryology lessons, 78,1%(214) of the participants were positive about the understanding of the students and they claimed the lessons were time saved during the semester.



Conclusion. The most frequent suggestions in the attitudinal instrument (which were confirmed by the interview) were to (1) make images of the clinical cases with explanatory texts, (2) make the teaching material and software available on CDs or on a website (3) reduce the number of sequential class hours while maintaining the same workload, and (4) apply this teaching methodology to other disciplines.[3]

In the first step, students declared that movies could increase their interest in Embryology and significantly help to the comprehension and memorization of embryologic processes. In the second step, we found that students answered better to the video-related questions of the test even if globally in the first year, results were weaker compared to previous years.[2]

We can confidently state that the development of this methodology aided students and instructors, via using multimedia software.

As a results of our single research we concluded that multimedia and additional teaching tools can enhance almost 2 times of medical educational quality. Furthermore, With advances in technologies and social media, distance learning is a new and rapidly growing approach for undergraduate, postgraduate, and health care providers. It may represent an optimal solution to maintain learning processes in exceptional and emergency situations such as COVID-19 pandemic. Technical and infrastructural resources reported as a major challenge for implementing distance learning, so understanding technological, financial, institutional, educators, and student barriers are essential for the successful implementation of distance learning in medical education.[1]

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