

ENSURING QUALITY IN THE TEACHING OF HISTOLOGY, CYTOLOGY AND EMBRYOLOGY IN A BLENDED LEARNING ENVIRONMENT

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Relevance of the problem. During the war, distance learning at higher education institutions in frontline cities has become the safest and, in many cases, the only accessible educational format for students and academic staff. With the gradual resumption of face-to-face classes, the educational process has evolved into a blended online-offline model combining digital technologies with in-person practical training.

Under wartime conditions, educational quality should be regarded as a multidimensional concept encompassing the continuity, accessibility, safety, flexibility, effectiveness, and integrity of the educational process [1]. It also reflects the extent to which students achieve the intended learning outcomes and acquire the theoretical knowledge, practical skills, critical thinking abilities, and professional competencies required for future medical practice. Accordingly, blended learning should maintain educational standards and ensure outcomes comparable to those achieved through traditional education [2].

The aim of this study was to analyze the combined use of online and offline methods in ensuring the quality of teaching Histology, Cytology and Embryology.

Main body. 'Histology, Cytology and Embryology' is a fundamental medical discipline that provides a basis for understanding the structural and functional organization of cells, tissues, and organs, as well as their embryonic development and age-related and pathological changes. The quality of its teaching directly influences students' subsequent mastery of physiology, pathological anatomy, pathophysiology, and clinical disciplines [3].

Ensuring the quality of histology education in a hybrid format requires more than transferring conventional materials to an online platform. It necessitates a purposeful redesign of the educational process in which each online and offline component performs a specific pedagogical function. Online activities can be used for theoretical preparation, visualization of microscopic structures, independent learning, formative assessment, and teacher feedback. Offline classes should focus primarily on practical microscopy, clarification of complex concepts, demonstration of acquired competencies, and direct interaction with the teacher.

Innovative methods should therefore be evaluated not only in terms of novelty or technological attractiveness but primarily according to their contribution to the quality of student training [2, 3]. Their educational value depends on whether they improve access to learning materials, facilitate the understanding of complex morphological structures, support practical skill acquisition, encourage active learning, provide timely feedback, and enable the objective assessment of competencies.

Virtual microscopy is one of the principal tools for maintaining the quality of histology education in a blended environment. It involves the high-resolution digitization of histological slides, enabling students to examine specimens using computers, tablets, or mobile devices. Virtual platforms allow learners to magnify images, navigate between different areas of a specimen, identify and annotate structures, and review the material repeatedly [4, 5]. Using identical, carefully selected digital slides in teaching and assessment increases the standardization, reliability, and transparency of evaluation.

Artificial intelligence provides additional opportunities for improving and personalizing education [3]. AI-assisted systems can generate practice questions, explain complex concepts, analyse students' responses, and provide rapid feedback. Image-recognition technologies may support the identification of tissues, cells, and structural components, while adaptive systems can modify the complexity and sequence of tasks according to individual progress. However, AI-generated content may contain factual inaccuracies, oversimplified explanations, or incorrect interpretations of histological images. Its use should therefore remain under academic supervision, and students should be trained to verify AI-generated information using reliable educational and scientific sources.

A valid and transparent assessment system is a key component of educational quality. Assessment in a blended format should be aligned with the intended learning outcomes and include complementary methods such as image-based tests, oral questioning, analysis of digitized histological specimens, problem-solving assignments, and interpretation of clinical and morphological cases. Their combined use enables

the evaluation of theoretical knowledge, visual identification skills, spatial understanding, morphological reasoning, and practical competencies.

Formative assessment should identify learning difficulties and provide timely corrective feedback rather than merely assign grades. Summative assessment should determine whether students have achieved the expected competencies upon completion of a module or course. Clearly defined criteria, standardized tasks, and transparent grading scales enhance assessment reliability. During online assessment, particular attention should be paid to identity verification, academic integrity, appropriate time limits, and questions requiring interpretation and reasoning rather than simple reproduction of information.

Conclusions. The quality of teaching Histology, Cytology and Embryology in a blended learning environment depends on the systematic integration of conventional and innovative educational methods. No digital tool can independently guarantee high-quality education or completely replace direct interaction with the teacher and practical work with an optical microscope. The most effective approach combines online theoretical preparation, interactive digital learning, continuous formative assessment, and face-to-face practical training.

The blended online–offline model developed under wartime conditions should be regarded not only as an emergency measure but also as an opportunity for the sustainable modernization of medical education. Supported by systematic quality assurance, appropriate technological infrastructure, academic staff training, transparent assessment, academic integrity, and equitable access to resources, this model can ensure educational continuity and contribute to the high-quality professional training of future physicians.

References

Хмелюк В. С. СПОСОБИ СТАБІЛІЗАЦІЇ ЯКОСТІ ОСВІТИ В УМОВАХ ВОЄННОГО СТАНУ. Таврійський науковий вісник. Серія: Публічне управління та адміністрування. 2023. №3. С. 67-73.

Popovich, A., Aliyeva, O. Analysis of the effectiveness of using digital technologies in teaching first-year medical students. Educational Challenges, 2024. № 29(2). P. 327–338.

Aliyeva O, Zviahina H, Pototska O, Makheyeva L, Hromokovska T. The use of artificial intelligence in medical morphology and medical education. Morphologia. 2025. № 19(3). P.191-195.

Braun D. Virtual Microscopy Training Demonstration. Available from: <https://webslide2.med.wayne.edu/webslide/index.html>.

Sorenson R.L., Brelje T.C. A Guide to Microscopic Structure of Cells, Tissues and Organs. 2014. Available from: <https://histologyguide.com>.