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CONTENT AND IMPLEMENTATION STAGES OF EXPERIMENTAL WORK ON DEVELOPING UROLOGICAL DIAGNOSTIC AND TREATMENT SKILLS IN MEDICAL STUDENTS

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Annotation: This article provides a scientific and pedagogical foundation for the content, structure, and implementation stages of experimental work aimed at developing urological diagnostic and treatment skills in medical students.

Keywords: experimental work, pedagogical experiment, urology education, diagnostic thinking, therapeutic decision-making, simulation-based training, clinical competence, OSCE, interactive methods, assessment criteria.

Introduction. The effectiveness of developing urological diagnostic and treatment skills in medical students has been significantly increased through evidence-based analysis of clinical situations using Scenario-Based Decision Technology, comparative diagnostic reasoning, and directing reflective-practical reasoning indicators directly to the content of clinical activity. The effectiveness of this approach was also confirmed in practice during the experimental trials.

Specifically, in group and individual tests, students were required to conduct a comprehensive analysis of simulated urological clinical cases, identify cause-effect relationships between symptoms and laboratory-instrumental indicators, substantiate the diagnosis based on evidence, and independently select a treatment strategy. In this process, the student did not simply repeat a prepared answer, but developed a clinical decision based on the available information. This process served to develop diagnostic thinking and therapeutic decision-making competencies in real-world activity conditions.

The results of the experimental work demonstrated that in classes organized based on CCDT, students achieved significantly higher results in analytically processing clinical data, comparing alternative diagnoses, and selecting optimal treatment strategies. In the process of drawing evidence-based clinical conclusions, they learned to scientifically substantiate diagnoses and compare various clinical variants during differential assessment. This notably enhanced their clinical independence and professional confidence.

Additionally, the reflective-practical analysis method was widely employed throughout the experimental process. At the conclusion of each scenario, students reviewed their actions, identified errors, evaluated the effectiveness of their decisions, and worked on developing alternative approaches. This reflective mechanism served to deepen their clinical thinking process and improve therapeutic management strategies.

Experimental trials were conducted from 2022 to 2024 at the Fergana Institute of Public Health, Andijan State Medical Institute, and Bukhara State Medical Institute, involving students in the "Medical Affairs" program. The aim was to determine the effectiveness of a methodology for developing urological diagnostic and treatment skills based on interactive technologies, particularly Scenario-Based Decision Technology (SBDT), among medical students.

The selection of these higher education institutions is not without reason. Their locations in various regions of the republic, equipped with clinical facilities and simulation centers, and operating on the basis of identical curricula for teaching urology, ensured the objectivity and generalizability of the experimental results. This allowed for testing the effectiveness of the developed methodology in diverse pedagogical conditions.

A total of 485 respondents were involved in the experimental trials. When selecting participants, their initial level of preparation, academic performance, and stage of urology subject mastery were taken into account. To ensure the scientific integrity of the research, two

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academic groups were selected from the relevant courses and levels of each educational institution, with one formed as the experimental group and the other as the control group. The numerical equality of the groups and the similarity of their initial knowledge levels were predetermined based on diagnostic tests.

In the control groups, the subject of urology was taught using traditional lecture-practical lesson formats, that is, based on a reproductive approach. In the experimental groups, the educational process was restructured based on Scenario-Based Decision Technology: clinical scenarios, virtual patient modules, simulation trainers, problem situations, and interactive discussions were systematically applied. Each lesson was directed towards the student's activities in analyzing clinical situations, diagnosing, and making therapeutic decisions.

This experimental design allowed for comparative analysis between the control and experimental groups, that is, to determine the real pedagogical effectiveness of the methodology based on SBDT. At the beginning, intermediate stage, and end of the educational process, students' diagnostic thinking, procedural-practical actions, and therapeutic decision-making levels were evaluated based on special criteria. The obtained results are presented in Table 3.1, which showed that the developmental dynamics of urological diagnostic and treatment skills in the experimental groups were higher compared to the control groups.

Table 1.

Student-respondents who participated in the experimental work

Universities	**Experimental**	**Control**	**Total**
Fergana Institute of Public Health	80	82	162
Andijan State Medical Institute	83	81	164
Bukhara State Medical Institute	79	80	159
Total	**242**	**243**	**485**

The content of the experimental work comprised a complex set of pedagogical activities aimed at systematically, gradually, and practically developing students' skills in urological diagnostics and treatment. In this process, educational activities were not limited to the acquisition of theoretical knowledge but were also directed towards modeling, analyzing, and making independent decisions in real clinical situations.

Specifically, experimental classes were organized based on Scenario-Based Decision Technology, where students were presented with scenario-based clinical cases of various urological diseases. In each situation, students performed a step-by-step analysis of the patient's complaints, medical history, physical examination data, and laboratory-instrumental results to justify the diagnosis and determine the treatment strategy. This process enhanced their clinical logical thinking and ability to draw evidence-based conclusions.

Additionally, procedural and practical skills were improved through simulation exercises. Students had the opportunity to perform urological manipulations in an algorithmic sequence in a simulated environment, adhere to aseptic rules, and reinforce safe working practices. As a result of repeated practice, their technical accuracy and stability of movements increased significantly.

Additionally, the sessions were enriched with elements of reflective analysis. After completing each clinical task, students engaged in reviewing their decisions, identifying mistakes made, and developing alternative approaches. This served to develop their competencies in independent thinking and conscious self-management of their activities.

The process of conducting experimental work was organized in sequential and interconnected stages. In the initial stage, the baseline level of students' clinical preparedness was determined, and existing problems and developmental needs were analyzed. In the subsequent stage, the methodology developed based on interactive technologies was implemented in the

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educational process, and students' performance in clinical tasks was observed and evaluated. In the final stage, the obtained results were analyzed to determine the effectiveness of the methodology, changes in students' clinical competencies, and their level of readiness for independent clinical practice.

To consistently determine the scientific validity and practical effectiveness of the methodology, the experimental work was organized in three logical, sequential stages - preparatory, main, and final (analytical). This staged approach allowed for systematic planning of the experimental process, setting specific tasks for each period, and step-by-step monitoring of the obtained results.

During the preparatory stage, the methodological and organizational foundations for the experimental work were established. In this period, the goals and objectives of the study were clarified, control and experimental groups were formed, and the initial levels of students' knowledge, skills, and competencies were assessed through diagnostic tests and practical tasks. Additionally, a set of educational materials based on Scenario-Based Decision Technology, a bank of clinical scenarios, simulation exercises, assessment criteria, and indicators were developed. This stage laid the necessary scientific and methodological groundwork for the effective implementation of the methodology in subsequent processes.

The main stage was the central and most active period of the experimental work, during which the developed methodology was directly applied to the educational process. In the experimental groups, the teaching of urology was organized based on SBDT technology, systematically employing clinical situation modeling, problem-solving tasks, virtual patients, simulation trainers, and interactive discussions. In each session, students independently analyzed patient conditions, substantiated diagnoses, conducted differential assessments, and made therapeutic decisions. This approach consistently developed their diagnostic thinking, procedural and practical actions, and clinical management potential. In the control groups, classes were conducted using traditional methods, and the results provided a basis for comparative analysis.

In the final (analytical) stage, the data obtained during the experiment were synthesized and subjected to scientific and statistical analysis. Students' learning outcomes were compared with initial diagnostic indicators, and the growth dynamics were assessed in terms of diagnostic accuracy, validity of therapeutic decisions, speed of procedural actions, and level of independence. The differences between the results of the control and experimental groups were verified using mathematical and statistical methods, thus proving the effectiveness of the methodology.

The diversity of these higher education institutions in terms of regional, organizational, and educational processes allowed for comparing the experimental results across different educational environments and evaluating the universality of the methodology. The sufficiently large number of students created the necessary conditions for statistical and qualitative analysis of the effectiveness of the methodology for developing urological diagnostic and treatment skills.

Conclusion. The conducted experimental work demonstrated that organizing the process of developing urological diagnostic and treatment skills based on a scientifically grounded, competency-based, and interactive methodology significantly increases the effectiveness of education. The pedagogical experiment, implemented in stages, ensured a steady improvement in students' clinical thinking, diagnostic accuracy, and speed of therapeutic decision-making.

Additionally, the simulation and practice-oriented learning environment strengthened students' independent thinking, professional confidence, and sense of responsibility, while improving their level of preparation for real clinical activities. Thus, the developed experimental methodology is recommended as an effective and reliable model for developing clinical competencies in the teaching of urology.

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