HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

UDC: 378.147:94(575.1)

DEVELOPING MEDICAL STUDENTS' HISTORICAL COMPETENCE THROUGH DIGITAL SOURCE-BASED INSTRUCTION: EVIDENCE FROM THE COURSE "THE NEWEST HISTORY OF UZBEKISTAN"

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Doi: https://doi.org/10.5281/zenodo.23540114

Annotatsiya. Maqolada tibbiyot talabalarida tarixiy kompetensiyani raqamli manbalarga asoslangan o'qitish orqali rivojlantirish masalasi ko'rib chiqilgan. Tarixiy manba tanqidi bilan dalilga asoslangan tibbiyot bosqichlari o'rtasidagi tuzilmaviy o'xshashlikka tayangan metodika Namangan, Andijon va Farg'ona viloyatlaridagi tibbiyot oliy ta'lim muassasalarida 600 nafar talaba ishtirokida sinovdan o'tkazildi. Tajriba guruhida yuqori darajadagi talabalar ulushi 28,0% dan 49,0% ga oshdi, nazorat guruhida deyarli o'zgarmadi; farq statistik ishonchli ($t = 6,48$; $\chi^2 = 39,30$; $p < 0,001$; Koen $d = 0,53$).

Kalit so'zlar: tarixiy kompetensiya, tibbiyot ta'limi, raqamli manbalar, manba tanqidi, dalilga asoslangan tibbiyot, lateral o'qish, rubrikali baholash.

Аннотация. В статье рассматривается развитие исторической компетенции студентов-медиков посредством обучения на основе цифровых источников. Методика, опирающаяся на структурное сходство исторической критики источника и этапов доказательной медицины, апробирована в медицинских вузах Наманганской, Андижанской и Ферганской областей с участием 600 студентов. В экспериментальной группе доля студентов высокого уровня выросла с 28,0 до 49,0%, в контрольной группе почти не изменилась; различие статистически значимо ($t = 6,48$; $\chi^2 = 39,30$; $p < 0,001$; d Коэна = 0,53).

Ключевые слова: историческая компетенция, медицинское образование, цифровые источники, критика источника, доказательная медицина, латеральное чтение, рубричное оценивание.

Abstract. The article examines the development of medical students' historical competence through instruction based on digital primary sources. The methodology, grounded in the structural similarity between historical source criticism and the steps of evidence-based medicine, was tested with 600 students of medical universities in the Namangan, Andijan and Fergana regions. In the experimental group, the share of students at the high level rose from 28.0% to 49.0%, while it remained almost unchanged in the control group; the difference is statistically significant ($t = 6.48$; $\chi^2 = 39.30$; $p < 0.001$; Cohen's $d = 0.53$).

Keywords: historical competence, medical education, digital sources, source criticism, evidence-based medicine, lateral reading, rubric-based assessment.

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ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

INTRODUCTION

A physician today works in an environment where information arrives faster than it can be checked. Clinical guidelines change, pharmaceutical promotion imitates the language of research, and patients come to appointments with claims taken from social networks. The ability to ask who produced a piece of information, for what purpose and on what evidence has therefore become part of professional competence rather than a general cultural skill. The international commission on the education of health professionals for the 21st century identified critical thinking and systems analysis as core outcomes of medical training [1], and advocates of the medical humanities have long argued that interpretive skills support clinical reasoning and communication with patients [2; 3].

History is one of the disciplines in which these skills are formed most directly. Research in history education describes historical thinking as a set of learnable operations: sourcing, contextualization and corroboration of documents [4], work with evidence, cause and consequence, continuity and change [5], and the construction of reasoned arguments about the past [6]. These operations do not develop spontaneously; they have to be taught explicitly and practised on real sources [4]. Digital archives, online databases and interactive maps have made primary sources accessible in the classroom [7], while studies of lateral reading have shown that even educated readers judge websites poorly unless they are taught to verify them against independent sources [8].

The steps of source criticism closely resemble those of evidence-based medicine, which Sackett and colleagues described as the conscientious and judicious use of the best available evidence: formulating a question, searching for evidence, appraising its validity, applying it and evaluating the result [9]. This structural similarity suggests that a history course can train the same cognitive operations that clinical practice later requires. However, existing frameworks for teaching historical thinking were designed for school pupils and history majors, and work on history in medical education concentrates mainly on the history of medicine [2].

Medical education has responded to these challenges in different ways. Some schools retain history as a separate course devoted mainly to the history of medicine; others distribute historical content across clinical and basic science courses; a third group keeps a general history course but enriches it with professional cases and links it with other disciplines [2]. The first approach tends to isolate history from professional training in the minds of students, while the second rarely produces a coherent system of historical thinking. The mixed approach seems more promising, but its methodology – what students should do with sources, how their progress should be measured and which digital tools support this work – remains insufficiently described.

In Uzbekistan, all medical students take the course “The Newest History of Uzbekistan” as part of the social and humanities block. The Concept for the development of the higher education system until 2030 sets the task of moving curricula towards measurable learning outcomes and critical thinking [10]. In practice, however, the course is often taught as a sequence of facts and dates and assessed by factual tests, and its connection with the future profession remains unclear to students. A methodology that turns the course into a space for training source-based, evidence-oriented reasoning has not yet been developed and tested.

The aim of the study was to develop a methodology for developing medical students’ historical competence on the basis of digital learning tools and to evaluate its effectiveness in a controlled pedagogical experiment.

MATERIALS AND METHODS

Design and participants. A quasi-experimental design with a pre-test and post-test in experimental and control groups was used. The study involved 600 first-year students of the “General

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Medicine" and "Paediatrics" programmes at medical higher education institutions in the Namangan, Andijan and Fergana regions. In each institution, academic groups of the same year and programme were randomly assigned at the group level to the experimental (n = 304) or control (n = 296) condition. Preparatory work, including the development and piloting of instruments, took place in the 2023–2024 and 2024–2025 academic years; the main experiment was conducted during one semester of the 2025–2026 academic year within the 120 hours set by the syllabus (30 hours of lectures, 30 hours of seminars and 60 hours of independent study).

Conceptual framework. Historical competence was defined as an integrative personal quality that combines a system of historical knowledge, operations of historical thinking and skills of working with sources, a reasoned value attitude, and the ability to apply them independently in social and professional activity. Three components were distinguished and specified for medical education (Table 1). The selection of digital tools followed the TPACK framework, which treats technology, pedagogy and content as interdependent [11]: tools were chosen by their didactic function rather than by their technical features and grouped into source-archive, chronotopic-visual (timelines, maps), analytical-research, collaborative-communicative and assessment-analytical tools. The organization of each topic followed the logic of experiential learning, moving from concrete experience through reflection and conceptualization to active application [12].

Table 1. Components of historical competence and their professional dimension in medical education

Component	General content	Professional dimension
Cognitive	System of historical knowledge, periodization, cause-and-effect relationships	History of the healthcare system, medical legislation, demographic processes and epidemics
Activity-operational	Source criticism, argumentation, analytical and digital skills	Appraisal of medical information, checking the methodology of statistical data, evidence-based conclusions
Value-motivational	Value attitude, intrinsic motivation, reflection	Historical roots of professional ethics and bioethics, empathy for patients, professional identity, academic integrity

Intervention. In the experimental groups, teaching followed a five-block structural-functional model (target-normative, methodological-theoretical, content, process-technological and result-diagnostic blocks). The course topics were kept unchanged, but each topic was enriched with five professional dimensions: the evolution of health policy, demographic processes, the sanitary-epidemiological situation, reforms of medical education, and environmental factors of public health. For every topic, students received a digital source package of five types of sources – a normative legal document, official statistical data, a press article, an audiovisual chronicle and an oral history testimony – accompanied by source-criticism questions. Classes followed a six-stage cycle based on the flipped classroom [13] (Table 2): diagnosis, motivational orientation (fact-checking of a historical claim circulating in the media), work with sources, integration, rubric-based assessment and reflection. Group discussions were organized in the format of a medical council, in which each participant had to defend a position with reference to a source. Control groups studied the same topics with the same number of hours using lectures, seminar presentations and factual tests.

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Table 2. Six-stage didactic cycle used in the experimental groups

Stage	Student activity	Digital support
1. Diagnosis	Entry test, concept map of prior knowledge	LMS quiz, online mind-mapping
2. Motivational orientation	Fact-checking a historical claim from the media	Search engines, lateral reading checklist
3. Work with sources	Analysis of the five-source package, source analysis table	Digital archives, open statistics portals, video chronicles
4. Integration	Comparing document, statistics and testimony as types of evidence; council-style discussion	Shared documents, interactive timeline, map layers
5. Assessment	Rubric-based peer and self-assessment, teacher feedback	Rubric in LMS, comments on drafts
6. Reflection	Answer to the question "Which evidence changed my opinion and why?"	E-portfolio entry

Feedback operated on three levels: an exit ticket at the end of each class, adjustment of the task bank after each module, and revision of the syllabus at the end of the semester. The five requirements of an information hygiene protocol – a full bibliographic description, confirmation by two independent sources, verification of the origin of images and videos, indication of statistical methodology and correct citation – were included in the assessment criteria of independent work.

Instruments. Historical competence was assessed with an analytic rubric covering six criteria: (1) knowledge of historical facts and periodization; (2) work with historical sources; (3) argumentation and justified conclusions; (4) information and media literacy; (5) linking historical content with the professional context; (6) academic integrity and citation. Each criterion was scored on a 100-point scale and converted into a level score: 56–70 points – low (reproductive), 71–85 – medium (analytical), 86–100 – high (creative-synthetic). The overall level of a student was determined by the sum of the six level scores (6–18). Assessment tasks included an entry test, a source annotation task, a concept map, a source analysis table and an e-portfolio.

Statistical analysis. Levels were coded as 3 (high), 2 (medium) and 1 (low). Group means were compared with Student's t-test using Welch's correction; the distribution of levels was compared with Pearson's χ^2 test (df = 2). Because the data are ordinal, the Mann–Whitney U test with correction for ties was also applied. Effect size was expressed as Cohen's d [14] and Cramér's V. The significance level was set at $\alpha = 0.05$.

RESULTS

At the beginning of the experiment, the two groups did not differ. The mean level score was 1.924 in the experimental group and 1.909 in the control group ($t = 0.24$; $\chi^2 = 0.06$; $p \approx 0.97$). After one semester, the distribution in the experimental group shifted markedly towards the higher levels, whereas the control group remained practically at the baseline (Table 3).

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Table 3. Distribution of students by levels of historical competence before and after the experiment

Group	Stage	High	Medium	Low	Mean score
Experimental (n = 304)	Before	85 (28.0%)	111 (36.5%)	108 (35.5%)	1.924
	After	149 (49.0%)	109 (35.9%)	46 (15.1%)	2.339
Control (n = 296)	Before	81 (27.4%)	107 (36.1%)	108 (36.5%)	1.909
	After	83 (28.0%)	112 (37.8%)	101 (34.1%)	1.939

In the experimental group, the share of students at the high level increased by 21.0 percentage points, and the share at the low level decreased by 20.4 points. In the control group, the corresponding changes were 0.6 and 2.4 points. Figure 1 shows the shares at the end of the experiment.

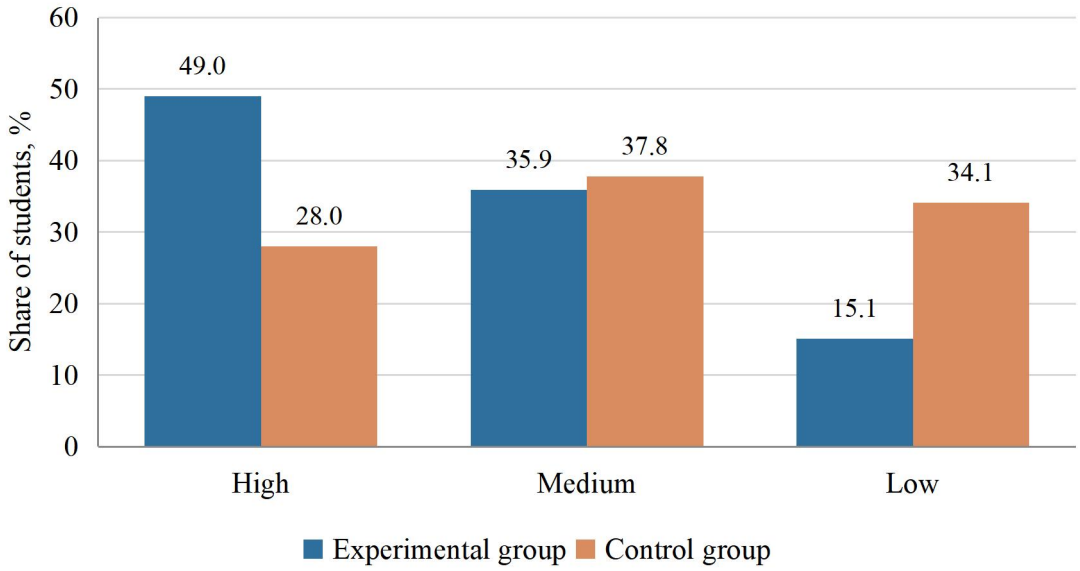


Figure 1. Distribution of students by levels at the end of the experiment, %

All tests confirmed that the difference between the groups at the end of the experiment was statistically significant (Table 4). The effect size was medium (d = 0.53), which, given the length of the intervention, is a substantial result for an educational study.

Table 4. Statistical comparison of the experimental and control groups

Indicator	Before	After
Mean score, experimental / control	1.924 / 1.909	2.339 / 1.939
Student's t (Welch), critical value 1.96	0.24	6.48
Pearson's χ^2 (df = 2), critical value 5.991	0.06	39.30

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ISSN: 2058-5519|Impact factor-15.9
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Mann–Whitney z	0.24	6.22
Cohen's d	0.02	0.53
Cramér's V	0.01	0.26
p-value	0.81	< 0.001

Within-group comparison showed that the mean score rose by 0.415 points in the experimental group ($\chi^2 = 42.48$; $p < 0.001$) and by 0.030 points in the control group ($\chi^2 = 0.37$; $p \approx 0.83$). Qualitative analysis of student work indicated the same tendency. At the start, most students accepted the textbook as the only source, relied on a single document and rarely asked who created a source and why. By the end of the semester, students in the experimental group regularly identified the author and purpose of a source, supported conclusions with at least two independent pieces of evidence, checked websites through lateral reading and formatted citations correctly.

The changes were visible across all six criteria. In periodization, students moved from memorizing isolated dates to dividing the reforms of the independence period into stages and justifying the boundaries of each stage with a normative act or institutional change. In work with sources, they began to distinguish primary and secondary sources and to explain contradictions between them. In argumentation, discussions changed from an exchange of opinions to an exchange of evidence, since every position in the council-style debate had to be backed by a source. In information literacy, students stopped trusting the first search result and learned to check who runs a website. The professional-contextual criterion changed the attitude to the course itself: many students noted in their e-portfolios that the stages of source criticism reminded them of how clinical evidence is appraised. Finally, the share of independent work submitted with a complete and correctly formatted list of sources increased noticeably.

DISCUSSION

The results show that a general history course, usually regarded as secondary in medical training, can make a measurable contribution to professional competence when it is built around work with evidence. The size of the effect is consistent with research showing that historical thinking improves when sourcing and corroboration are taught explicitly rather than expected to emerge from reading [4; 6], and with studies of lateral reading, which demonstrate that verification skills require direct instruction [8].

Three features of the methodology appear to be decisive. First, the professional dimensions gave students a reason to engage with sources: questions about the history of healthcare reforms or epidemiological data were perceived as relevant to their future work. Second, the digital source packages placed several types of evidence side by side, so that contradictions between an official document, statistics and oral testimony became visible and had to be explained. Third, rubric-based formative assessment with feedback after each topic made the criteria of good reasoning transparent, which agrees with the well-documented influence of formative assessment and feedback on learning [15; 16]. The importance of aligning outcomes, activities and assessment [17] was also evident: when the rubric was announced in advance, students' arguments became more structured.

From a practical point of view, the methodology did not require changing the list of topics or the number of hours in the syllabus: the professional dimensions were introduced through seminar tasks and independent work. The main costs were the teacher's time for preparing source packages and rubrics. This suggests that the methodology can be scaled if source packages are prepared

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centrally and shared between departments, and if teachers receive training focused on the methodology of working with digital sources rather than on the technical use of platforms.

The structural similarity between source criticism and evidence-based medicine [9] provides a pedagogical argument for the place of history in the medical curriculum. At the same time, the study did not measure directly whether the skills formed in history classes are transferred to the appraisal of clinical information; this transfer remains a hypothesis that requires a separate design, for example, tasks on the evaluation of pharmaceutical advertising or health misinformation. Other limitations include assignment at the level of academic groups rather than individual students, and the analysis of the integral level only; a criterion-by-criterion analysis and an assessment of inter-rater reliability of the rubric are planned for further work.

CONCLUSION

1. Historical competence of medical students can be described through cognitive, activity-operational and value-motivational components and assessed with a six-criterion, three-level rubric that links historical reasoning with the professional context.

2. Teaching “The Newest History of Uzbekistan” on the basis of digital source packages, a six-stage didactic cycle and formative rubric-based assessment increased the share of students at the high level from 28.0% to 49.0% and reduced the share at the low level from 35.5% to 15.1%, with a statistically significant medium effect ($d = 0.53$).

3. The methodology can be introduced without changing the list of topics or the number of hours in the syllabus and can be adapted to other social and humanities courses in medical and non-specialist programmes; centralized digital source databases and teacher training in digital pedagogy are needed for its wider use.

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