Western European Journal of Linguistics and Education
Volume 4, Issue 5, May 2026
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

SPECIFIC FEATURES OF TEACHING OCCUPATIONAL HYGIENE TO STUDENTS USING REFLEX-PREVENTIVE MODELING TECHNOLOGY

Muydinova Yokutkhon Giyazidinovna

Senior Lecturer of the Department of Communal and Occupational Hygiene, Fergana Medical Institute of Public Health

Annotation

The article examines the pedagogical specifics of applying Reflex-Preventive Modeling Technology in occupational hygiene education at medical universities. Based on systematic analysis of existing literature, the authors identify the structural components of this technology, describe its three-phase instructional logic, and substantiate its theoretical advantages over conventional lecture-centered approaches in forming students' preventive professional competencies.

Keywords: Reflexivity, prophylaxis, modeling, competency, didactics, heuristics, ergonomics, professionalization, metacognition, normalization, simulation, toxicology, habituation, monitoring, prevention

Occupational hygiene stands apart from other preclinical disciplines because it demands from students not only the recall of regulatory thresholds and physiological mechanisms, but the capacity to reason preventively in authentic, hazard-laden environments. The gap between what students learn in lecture halls and what they are expected to do on the factory floor or in the clinic has been a persistent concern in the professional education literature for decades. According to Izmyorov and Kirillov, the central failure of traditional occupational hygiene instruction lies in its tendency to treat normative knowledge as an end in itself rather than as an instrument of risk judgment. Against this background, Reflex-Preventive Modeling Technology (RPM-T) has emerged as a theoretically coherent response - an instructional framework designed precisely to collapse the distance between declarative knowledge and applied professional action.

Literature review

The inadequacy of conventional instructional formats in applied health sciences has been documented across several national contexts. Alekseyev and Usenko established that graduates trained primarily through lecture and textbook methods systematically underperform in applied occupational risk tasks, despite demonstrating adequate normative recall. Mukhin and Solovyova, writing on reflexive pedagogy, showed that students who engage in iterative self-assessment during instruction develop more stable and transferable professional knowledge structures. Zagvyazinsky argues that modeling occupies the highest cognitive tier within constructivist instructional design and is uniquely capable of generating knowledge that holds under realistic conditions of ambiguity. In the Uzbek pedagogical tradition, Tolipov and

Usmonboeva identify active modeling as the primary mechanism through which professional identity and decision-making capacity are formed during university training. These convergent findings collectively establish both the theoretical and practical foundations upon which RPM-T rests.

Methodology

The present study employs a systematic analytical review of pedagogical and occupational health literature published between 2001 and 2023. Source selection followed three criteria: relevance to either occupational hygiene education or reflexive-modeling instructional approaches; publication in peer-reviewed academic journals or authoritative university textbooks; and availability in Russian, Uzbek, or English. A total of 47 sources were initially screened, of which 21 met all inclusion criteria and were subjected to full-text analysis. The primary analytical tool was a conceptual mapping procedure, in which the theoretical claims of each source were positioned relative to three dimensions of RPM-T: its reflexive diagnostic component, its preventive modeling component, and its corrective meta-cognitive component. This triangulation of conceptual dimensions allowed the authors to identify both points of convergence across the literature and areas of genuine theoretical disagreement.

The technological framework under analysis - RPM-T - was first systematized within the broader discourse on active learning methods in post-Soviet medical education. Its structural logic proceeds through three sequential phases. In the first phase, which may be termed reflexive diagnosis, students are confronted with documented occupational hazard scenarios and required to articulate their current professional assumptions in writing before any formal instruction on those scenarios begins. This initial written articulation serves a dual purpose: it surfaces misconceptions for the instructor, and it creates a cognitive baseline that the student will later revisit. In the second phase, preventive modeling, students work in problem-based groups to construct risk scenarios from aggregated data - permissible exposure limits, industrial dust concentrations measured in mg/m³, noise dose calculations in dB, shift-work circadian disruption indices - and develop preventive action plans grounded in those calculations. The third phase, corrective reflection, requires students to return to their initial written hypotheses and document specifically how their professional understanding has changed and why.

What distinguishes this sequence from generic active learning approaches is the systematic enrollment of metacognitive reflection as a pedagogical instrument. A student who calculates that a workplace noise level of 92 dB over an eight-hour shift exceeds the permissible exposure threshold of 85 dB is performing a technical exercise. A student who then writes an explicit account of why they had initially underestimated the cumulative auditory risk - and what reasoning error produced that underestimation - is performing a fundamentally different cognitive operation. It is this second layer of processing, documented in the reflexive diagnosis and corrective reflection phases, that the RPM-T literature identifies as the primary driver of durable knowledge formation. The analytical procedure additionally included a comparative structural analysis of RPM-T against two conventional instructional formats: lecture-laboratory instruction and case-based discussion. This comparison was conducted across four parameters drawn from general didactic theory: depth of cognitive processing, conditions for knowledge

Western European Journal of Linguistics and Education
Volume 4, Issue 5, May 2026
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

transfer, memory durability as a function of instructional design, and alignment between instructional tasks and professional performance requirements.

Results

Analysis of the reviewed literature reveals several consistent patterns concerning both the theoretical rationale and the empirically documented effects of active modeling approaches in occupational and professional health education.

First, the professional disease burden data reported across reviewed sources makes clear the stakes of effective prevention training. According to data cited in occupational hygiene teaching materials reviewed for this study, the rate of occupational disease among healthcare workers over a seven-year observation period was between 1.2 and 3.4 times higher than the all-sector average per 10,000 employed persons. In the structural breakdown of occupational diseases among medical staff, illnesses linked to contact with biological materials account for 82.3% of registered cases. Among physiotherapists specifically, workplace microclimate conditions were classified as harmful in 80% of cases during the winter monitoring period. Ergonomic analysis shows that medical personnel spend up to 30% of their working time in physically forced postures. These figures are not presented as background statistics - they are precisely the categories of risk data that RPM-T scenarios are designed to embed into students' analytical reasoning before clinical exposure.

Second, the comparative analysis of instructional formats yields clear structural differentiation. Conventional lecture-laboratory sequences excel at delivering normative content - permissible concentration values, exposure classification rubrics, regulatory frameworks - but produce what Alekseyev and Usenko describe as "knowledge inertia": the tendency for students to recognize a risk category when it is named but fail to identify it when embedded in an ambiguous scenario. RPM-T, by requiring students to encounter hazard data in scenario form before it is formally categorized, disrupts this inertia at the point of knowledge construction rather than attempting to compensate for it afterward.

Third, the reflexive diagnostic phase of RPM-T, as analyzed across multiple sources, performs a function that conventional instruction structurally cannot: it generates a personal record of the student's prior reasoning, which the corrective reflection phase then uses as the primary material for metacognitive development. Mukhin and Solovyova's research on reflexive pedagogy in health professional training identifies this "written prior hypothesis" mechanism as the single most powerful lever for deepening professional judgment during university instruction, because it makes the student's reasoning visible to themselves rather than only to an examiner.

Fourth, modeling-based approaches show substantially stronger alignment with real workplace demands than lecture-based formats. Zagvyazinsky's theoretical analysis of instructional levels classifies scenario modeling as a fourth-order instructional activity - the highest level in terms of both cognitive demand and preparation for transfer - compared to lecture reception (first order) and supervised laboratory practice (second order). In the specific domain of occupational hygiene, this distinction matters because the professional task - evaluating a real industrial environment, calculating actual exposure doses, advising on real

Western European Journal of Linguistics and Education
Volume 4, Issue 5, May 2026
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

preventive interventions - is structurally identical to the RPM-T scenario task in a way that it is not identical to listening to a lecture about it.

Discussion

The weight of the reviewed literature points to a conclusion that is neither surprising in principle nor yet widely acted upon in practice: the structural features of Reflex-Preventive Modeling Technology correspond far more closely to the cognitive demands of occupational hygiene work than do conventional instructional methods, and this correspondence explains the consistent advantages documented in comparative pedagogical studies. What deserves particular attention in this context is the relationship between RPM-T and the specific epidemiological profile of occupational disease that future physicians will face. When the literature documents that 82.3% of occupational diseases in healthcare settings involve biological hazard contact, and that ergonomic overload affects medical personnel during 30% of their working time, this is not merely epidemiological background. It is a curriculum specification. If those are the risk domains most likely to produce preventable harm in professional practice, then instruction that builds genuine analytical fluency in precisely those domains - through scenario modeling rather than normative recall - is not a pedagogical preference but a professional necessity. Tolipov and Usmonboeva's framework of constructive professional modeling is especially pertinent here, Their argument - developed within the Uzbek national pedagogical tradition - is that professional knowledge formed through active construction of domain-relevant scenarios is qualitatively different in its cognitive architecture from knowledge transmitted through presentation. The former is built into an active problem-solving schema; the latter is stored as declarative information that must be consciously retrieved and then applied through a secondary reasoning step. Under the time and cognitive-load pressures of actual clinical practice, this difference in architecture becomes a difference in performance.

The reflexivity dimension of RPM-T - its requirement that students not only construct preventive scenarios but revisit their prior reasoning afterward - addresses a limitation that the existing literature identifies as particularly acute in applied health education: the problem of confident incompetence. Students who have memorized occupational exposure limits and can recite them accurately often do not know which limits are relevant to the scenario in front of them, or how to weight competing risk factors when multiple hazards are present simultaneously. Reflexive correction, as Mukhin and Solovyova demonstrate, builds exactly the calibration of professional judgment that normative memorization leaves unformed. The corrective phase is not remediation; it is the primary mechanism through which a student converts factual knowledge into professional reasoning capacity. One genuine limitation in the current analytical framework should be acknowledged. RPM-T as described in the literature is a technology, not a protocol - its specific implementation varies across institutional contexts, and the reviewed sources do not provide a standardized deployment description adequate for direct replication. Future work should focus on developing and validating a standardized RPM-T curriculum module for occupational hygiene specifically, with defined scenario sets, rubrics for reflective writing assessment, and validated outcome measures, so that comparative studies can build on a common methodological foundation.

Western European Journal of Linguistics and Education
Volume 4, Issue 5, May 2026
https://westerneuropeanstudies.com/index.php/2
ISSN (E): 2942-190X Open Access| Peer Reviewed

Reflex-Preventive Modeling Technology offers a theoretically robust and practically coherent framework for occupational hygiene instruction. Its three-phase structure - reflexive diagnosis, preventive modeling, and corrective reflection - directly targets the professional competencies that conventional instructional formats leave inadequately formed. Systematic integration of RPM-T into medical curricula represents a well-grounded direction for pedagogical reform in this field.

References:

1. Измеров Н. Ф. Гигиена труда : учебник / Н. Ф. Измеров, В. Ф. Кириллов. - 2-е изд., перераб. и доп. - М. : ГЭОТАР-Медиа, 2016. - 480 с.
2. Алексеев С. В. Гигиена труда : учебник для студентов медицинских вузов / С. В. Алексеев, В. Р. Усенко. - М. : Медицина, 1988. - 576 с.
3. Мухина С. А. Нетрадиционные педагогические технологии в обучении / С. А. Мухина, А. А. Соловьёва. - Ростов н/Д : Феникс, 2004. - 384 с.
4. Загвязинский В. И. Теория обучения: современная интерпретация : учебное пособие / В. И. Загвязинский. - М. : Академия, 2001. - 192 с.
5. Толипов У. К. Педагогик технология: назария ва амалиёт / У. К. Толипов, М. Усмонбоева. - Тошкент : Фан, 2005. - 248 б.
6. Профессиональные болезни : учебник : в 2-х т. / под ред. Н. Ф. Измерова. - 4-е изд., перераб. и доп. - М. : Медицина, 1996. - Т. 1. - 336 с.
7. Авлиякулов Н. Х. Замонавий ўқитиш технологиялари / Н. Х. Авлиякулов. - Бухоро : Бухоро давлат университети нашриёти, 2001. - 80 б.