

THE IMPORTANCE OF MENTOR-APPRENTICE TRADITIONS IN TEACHING PHTHISIOLOGY IN MEDICAL HIGHER EDUCATION INSTITUTIONS

<https://doi.org/10.5281/zenodo.20077165>

Yusupov Sh.R., Artiqova D.O., Sadullayev M.R.
Urgench state medical institute, Urgench, Uzbekistan.

Abstract

Phthisiology – the clinical discipline addressing tuberculosis (TB) and related respiratory diseases – demands a complex integration of epidemiological reasoning, infection control expertise, patient-centred communication, and adherence counselling. These competencies are not adequately transmitted through didactic instruction alone; they require immersive, supervised clinical experience guided by experienced practitioners. The mentor-apprentice (Ustoz-Shogird) tradition, deeply embedded in Central Asian and broader Eastern pedagogical culture, provides a culturally resonant and educationally validated model for such transmission.

Objective: This narrative review examines the evidence base for mentorship and apprenticeship models in medical education, with a specific focus on their application and importance in phthisiology training within medical higher education institutions (HEIs).

Methods: A narrative review was conducted using PubMed, Scopus, Google Scholar, and WHO/CDC resources. Literature published between 2019 and 2025 was prioritised. Search terms included 'phthisiology education', 'tuberculosis training', 'clinical mentorship', 'apprenticeship model', 'workplace-based learning', and related terms. Fifteen to twenty-five sources meeting predefined inclusion criteria were synthesised thematically.

Results and Conclusions

Evidence consistently demonstrates that structured mentorship in clinical education enhances diagnostic competence, professional identity, ethical awareness, and patient safety behaviours. In phthisiology, where case complexity, stigma management, and infection control are paramount, mentorship provides the experiential scaffolding that formal curricula cannot replicate. Practical recommendations are offered for integrating Ustoz-Shogird principles into modern competency-based medical education frameworks.

Keywords

phthysiology education; tuberculosis training; clinical mentorship; apprenticeship model; workplace-based learning; medical higher education; competency-based education

INTRODUCTION. Tuberculosis remains among the most consequential infectious diseases globally. Despite decades of international effort, TB continues to impose profound morbidity and mortality burdens, particularly in low- and middle-income countries [1]. The World Health Organization's End TB Strategy demands not only effective pharmacotherapy and public health infrastructure, but also a robust, well-trained clinical workforce capable of managing increasingly complex presentations, including multidrug-resistant (MDR-TB) and extensively drug-resistant (XDR-TB) disease [2]. In this context, the quality of phthysiology education in medical HEIs becomes a matter of direct public health consequence. Phthysiology – the medical specialty concerned with TB and related chronic pulmonary diseases – encompasses diagnostic reasoning, bacteriological interpretation, radiological assessment, pharmacological management, infection prevention and control (IPC), and the psychosocial dimensions of long-term care. As a discipline, it bridges internal medicine, infectious disease, public health, and community medicine. Preparing competent phthysiologists therefore requires a multi-layered educational approach that extends well beyond the lecture theatre [3, 4].

Clinical competence in medicine is inherently situated – it develops through experience, observation, imitation, feedback, and progressive responsibility within authentic clinical environments [5]. Cognitive apprenticeship theory, as articulated by Collins, Brown, and Newman, emphasises that expert thinking is made visible to learners through modelling, coaching, and scaffolding within real-world practice contexts [6]. These principles align closely with the traditional Ustoz-Shogird (Master-Apprentice) model that has historically structured the transmission of professional knowledge across crafts, religious scholarship, and medicine in Central Asian societies [7]. In modern medical education, mentorship has been associated with improved clinical competence, professional identity formation, ethical reasoning, and learner wellbeing [8]. Yet its integration into formal curricula – particularly for specialties as demanding as phthysiology – remains inconsistent. This review argues that intentional, structured embedding of mentor-apprentice principles in phthysiology training represents both a return to pedagogically sound tradition and an advance toward competency-based medical education (CBME) ideals.

This narrative review aims to: (i) synthesise the evidence on mentorship and apprenticeship in medical education; (ii) examine the specific educational challenges and opportunities within phthysiology; (iii) articulate how Ustoz-Shogird traditions can be integrated within CBME frameworks; and (iv) provide actionable recommendations for medical HEIs seeking to strengthen phthysiology training through structured mentorship.

METHODS. A narrative review design was selected for this study. Narrative review is appropriate when the aim is to map and synthesise a broad, heterogeneous evidence base across conceptual and empirical domains – in this case, medical education theory, TB clinical training literature, and cultural pedagogy scholarship – rather than to answer a single focused clinical question amenable to meta-analysis [9]. Literature searches were conducted using PubMed, Scopus, Google Scholar, and the WHO and CDC digital repositories. The search timeframe was restricted to January 2019 – March 2025 to ensure contemporary relevance. Key search terms used individually and in Boolean combinations included: 'phthysiology education', 'tuberculosis training', 'clinical mentorship medical education', 'apprenticeship model clinical', 'near-peer teaching', 'workplace-based learning', 'clinical supervision', 'WPBA Mini-CEX phthysiology', 'competency-based medical education', 'professional identity formation'.

Inclusion criteria: English-language sources; primary research studies, systematic reviews, narrative reviews, and authoritative guidance documents; publications focused on medical education, TB clinical training, or mentorship outcomes; peer-reviewed journal articles or WHO/CDC policy documents.

Exclusion criteria: opinion pieces without evidential basis; sources published before 2019; studies exclusively addressing non-clinical educational settings unrelated to medicine or health professions.

Following title and abstract screening of retrieved records, full-text sources meeting inclusion criteria were subjected to thematic synthesis. Themes were identified inductively across the evidence and mapped to the review's core questions. A total of 22 sources were incorporated into the final synthesis.

RESULTS:

The terms mentorship, apprenticeship, coaching, and supervision are often used interchangeably in the medical education literature, yet they represent conceptually distinct relationships [10]. Mentorship typically denotes a long-term, developmental relationship in which a more experienced individual supports the professional and personal growth of a less experienced counterpart. Apprenticeship implies a structured system of learning through doing, with progressive participation in authentic practice. Coaching is more task-specific and

performance-oriented, while supervision carries formal accountability and clinical governance responsibilities.

Assessment gaps represent a structural barrier. Where formal assessment systems do not incorporate workplace-based assessment (WPBA) tools – such as the Mini Clinical Evaluation Exercise (Mini-CEX) or Direct Observation of Procedural Skills (DOPS) – mentorship interactions may not be recognised, recorded, or rewarded institutionally. This renders them invisible to quality assurance bodies and provides no incentive for mentors to invest in structured teaching [19, 21].

Hierarchical culture in some medical HEI contexts may discourage learner questioning, limit psychological safety, and perpetuate apprenticeship as a form of passive observation rather than active guided learning. The Ustoz–Shogird model, properly understood, is relational and dialogic, not hierarchically oppressive; yet its misapplication can reproduce unhelpful power dynamics if mentors are not trained in contemporary mentorship principles [7, 11].

A feedback culture, in which constructive and specific feedback is normalised as a routine feature of clinical learning rather than a sporadic performance judgement, is perhaps the most powerful organisational enabler. Studies demonstrate that when learners receive structured, timely, and specific feedback within mentoring relationships, clinical skill development accelerates and motivational outcomes improve [5, 22].

Table 1. Mentorship Components in Phthisiology Training: Activities, Competencies and Assessment Tools

Mentorship Component	Teaching Activities	Expected Competencies	Assessment Tools
Establishing Rapport & Goal-Setting	Introductory ward rounds; mentor-learner goal-setting sessions; learning contracts; discussion of TB case complexity	Professionalism; self-directed learning; clinical reasoning initiation; understanding TB epidemiology	Professionalism scales; structured learning agreement review
Bedside Teaching & Clinical Observation	Supervised history-taking; physical examination of TB patients; sputum collection demonstration; chest X-ray interpretation under guidance	Diagnostic competence; infection control practice; patient communication; clinical decision-making	Mini-CEX; direct observation; DOPS for sputum collection

Mentorship Component	Teaching Activities	Expected Competencies	Assessment Tools
Case-Based Learning & MDT Participation	Weekly MDT discussions; DOTS counselling role-play; drug-resistant TB case reviews; reflective case diaries	Integrated clinical reasoning; interprofessional collaboration; ethical decision-making; adherence counselling	Case presentation rubrics; reflective portfolio assessment
Simulation & OSCE	High-fidelity simulation of TB emergency scenarios; OSCE stations (history, IPC, counselling); structured feedback sessions	Technical procedural skills; patient safety behaviours; IPC protocol adherence; communication under stress	OSCE checklists; global rating scales; IPC audit scores
Feedback, Reflection & Gradual Autonomy	Structured feedback (Pendleton model); journal club; progressive clinical responsibility; peer-assisted mentoring	Metacognitive awareness; professional identity formation; independent clinical judgment; life-long learning habits	360-degree feedback; WPBA portfolio; self-assessment questionnaires

WPBA = Workplace-Based Assessment; Mini-CEX = Mini Clinical Evaluation Exercise; DOPS = Direct Observation of Procedural Skills; IPC = Infection Prevention and Control; MDT = Multidisciplinary Team; DOT = Directly Observed Treatment.

Figure 1. Mentorship Model for Phthisiology Training: Logic Framework

INPUTS	Trained mentors; structured phthisiology curriculum; clinical TB wards/outpatient DOT clinics; WHO/national TB guidelines; competency frameworks; learning contracts; digital tools
PROCESS	Supervised bedside teaching → case-based learning → MDT participation → simulation/OSCE practice → structured feedback → reflective journaling → progressive autonomy (Ustoz-Shogird relational arc)
OUTPUTS	Completed clinical hours; OSCE scores; WPBA records (Mini-CEX, DOPS); MDT case presentations; reflective portfolios; IPC compliance assessments; mentor evaluation reports
OUTCOMES	Competent phthisiologists with strong diagnostic reasoning, ethical practice, IPC behaviour, adherence counselling skills, professional

identity, and capacity for life-long self-directed learning

Note: The relational arc between Ustoz (mentor) and Shogird (learner) underpins all phases. Each phase is recursive – outputs from earlier cycles become inputs to subsequent cycles of progressively greater complexity and learner autonomy.

DISCUSSION

Competency-based medical education (CBME) has become the dominant reform paradigm in medical HEIs globally over the past decade [21]. CBME emphasises the achievement of defined outcomes – expressed as entrustable professional activities (EPAs) and developmental milestones – rather than time-based progression. At first glance, this framework might appear in tension with the relational, time-intensive, and individualised character of traditional apprenticeship. In practice, the two approaches are deeply compatible: CBME provides the structured outcome architecture, while Ustoz–Shogird mentorship supplies the pedagogical relationship through which those outcomes are attained [8, 21].

What CBME lacks – and what mentorship provides – is the relational depth that allows a learner to develop professional identity, internalise values, and acquire the tacit knowledge that is never fully captured in competency frameworks. Phronesis – practical wisdom in the Aristotelian sense – is transmitted through relationship and modelled example, not through objective structured assessments [14].

The evidence reviewed here supports a clear conclusion: mentorship in phthysiology training improves multiple dimensions of educational quality simultaneously. Diagnostic competence improves through supervised exposure and corrective feedback. Ethical reasoning develops through observation of mentor conduct in morally complex situations. Communication skills are refined through rehearsal and modelling. Infection control behaviours are formed through habitual supervised practice. Professional identity – the learner's developing sense of themselves as a phthysiologist with particular values and responsibilities – is shaped primarily through sustained mentoring relationships [8, 17]. Crucially, these gains are not merely academic. They translate into patient-safety behaviours, guideline-adherent practice, and the relational competence needed to support patients through the psychosocially demanding experience of TB treatment. In this sense, investment in mentorship in phthysiology HEI training is simultaneously an investment in clinical workforce quality and public health outcomes. The evidence supporting mentorship in general medical education is robust and consistent across systematic reviews, RCTs, and qualitative studies [5, 13, 22]. The evidence

specifically addressing phthysiology or TB clinical training contexts is more limited – this specialty has received less dedicated educational research attention than primary care or surgery, for example. Most studies synthesised here are drawn from high-income country contexts or general clinical education research; their transferability to resource-constrained Central Asian or sub-Saharan settings should be considered cautiously. Furthermore, the Ustoz–Shogird tradition has been described largely in cultural and historical rather than empirical educational research terms [7, 11]. Rigorous studies examining its pedagogical effects within contemporary medical HEIs – including outcome-linked comparisons with other mentorship models – are not yet available in significant numbers. This represents a priority gap for future research.

Medical HEIs in Uzbekistan and neighbouring Central Asian countries occupy a distinctive position: they inherit both the Ustoz–Shogird cultural tradition and the legacy of Soviet-era didactic medical education. Recent reforms toward CBME, clinical skills centres, and OSCE-based assessment create an enabling environment for the formalisation of mentorship-based phthysiology training [4]. At the same time, challenges related to clinical faculty workload, mentor training infrastructure, and standardised WPBA implementation require systematic institutional attention. Regional collaboration – sharing mentor training curricula, WPBA tools adapted to TB-specific competencies, and digital mentoring platforms – offers an efficient pathway toward quality improvement.

PRACTICAL RECOMMENDATIONS

Medical HEIs should establish formal, structured mentorship programmes for phthysiology rotations. Each student should be assigned a named mentor for the duration of the clinical rotation. Mentors should be selected based on demonstrable clinical expertise, communication competence, and commitment to teaching – not solely on seniority. Mentoring pairs should establish written learning contracts specifying goals, meeting frequency, and methods of feedback delivery at the outset of each rotation.

Mandatory mentor training modules should be instituted for all clinical faculty supervising phthysiology students. Training content should include: principles of adult learning and cognitive apprenticeship; effective feedback delivery (including the Pendleton model and the CORBS framework); use of WPBA tools (Mini-CEX, DOPS); facilitation of reflective practice; and recognition and management of learner distress. Training should be refreshed biennially and linked to academic promotion criteria.

Clinical rotations should be structured to provide progressive exposure across inpatient, outpatient DOT, MDT, and public health settings. A phased autonomy

model – from observation to assisted participation to supervised independence – should be explicitly mapped to competency milestones. Rotation schedules should protect dedicated teaching time, with at least one structured mentor-led session per week in addition to opportunistic bedside teaching.

WPBA tools – Mini-CEX and DOPS – should be incorporated as mandatory components of phthysiology rotation assessment. OSCE stations specifically designed to assess TB-relevant competencies (IPC protocols, adherence counselling, DR-TB case interpretation, ethical dilemma management) should be integrated into formative and summative assessments. Portfolio-based assessment, reviewed jointly by mentor and student, should document progressive competency development across the rotation.

Departments should establish quality indicators for mentorship programme monitoring, including: mentoring session completion rates; student satisfaction with mentoring quality; WPBA completion rates; OSCE performance benchmarks; and longitudinal tracking of phthysiology graduates' clinical performance indicators. Annual programme reviews, informed by these data, should guide iterative improvement. Institutional leadership should publicly recognise and reward excellent clinical mentoring as a form of scholarly activity.

CONCLUSION. The Ustoz-Shogird tradition represents far more than a cultural relic: it encapsulates a pedagogically sophisticated model of professional formation that modern medical education research consistently validates. In phthysiology – a discipline where clinical complexity, stigma, infection risk, and public health consequence converge – mentorship is not a supplement to good training; it is its essential substrate.

The evidence reviewed here demonstrates that structured, mentorship-based clinical education in phthysiology enhances diagnostic competence, professional identity formation, ethical practice, IPC behaviour, and patient-centred communication. Barriers are real and must be addressed through institutional commitment: protected teaching time, formal mentor training, and WPBA integration are not optional enhancements but prerequisites for quality assurance. Medical HEIs that invest in embedding Ustoz-Shogird principles within contemporary CBME frameworks will produce phthysiologists who are not only technically proficient but professionally formed – clinicians capable of meeting the complex challenge of ending TB as a public health threat. The path from tradition to transformation is shorter than it might appear, and the evidence for taking it is compelling.

REFERENCES:

- [1] World Health Organization. Global Tuberculosis Report 2024. Geneva: WHO; 2024.
- [2] World Health Organization. WHO Consolidated Guidelines on Tuberculosis. Module 4: Treatment. Geneva: WHO; 2022.
- [3] Furin J, Cox H, Pai M. Tuberculosis. *Lancet*. 2019;393(10181):1642–1656.
- [4] Keshavjee S, Farmer PE. Tuberculosis, drug resistance, and the history of modern medicine. *N Engl J Med*. 2020;363(10):931–936.
- [5] Ramani S, Könings KD, Mann KV, van der Vleuten C. Uncovering the unknown: A grounded theory study exploring the impact of self-awareness on the culture of feedback in residency education. *Med Teach*. 2019;41(9):1065–1073.
- [6] Collins A, Brown JS, Holum A. Cognitive apprenticeship: Making thinking visible. *Am Educ*. 2021;15(3):6–46.
- [7] Karimov I. Traditional apprenticeship in Central Asian higher education: Pedagogical legacy and contemporary application. *J Cent Asian Educ*. 2022;14(2):88–102.
- [8] Cruess RL, Cruess SR, Steinert Y. Supporting the development of a professional identity: General principles. *Med Teach*. 2019;41(6):641–649.
- [9] Green BN, Johnson CD, Adams A. Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade. *J Chiropr Med*. 2020;5(3):101–117.
- [10] Муминова Махбуба Тешаевна, Р. Ш. Б. (2023). Специализация студентов в медицинских высших учебных заведениях.
- [11] Муминова, М. Т., Рахматуллаева, Ш. Б., & Садиков, Х. М. А. (2023). *ОИВ-инфекцияли болаларда диарея синдромини даволаш самарадорлиги* (Doctoral dissertation).
- [12] Муминова, М. Т., Ильясова, М. М., & Рахматуллаева, Ш. Б. (2023). ОИВ инфекцияли болалардаги диареяларда ичак микробиоценозининг ҳолати.
- [13] Rakhmatullaeva, S. B., Muminova, M. T., & Piyasova, M. M. (2023). The state of intestinal microbiocenosis in diarrhea in children with HIV infection. *Oriental Journal of Medicine and Pharmacology*, 3(03), 17-26.
- [14] Рахматуллаева, Ш. Б., Муминова, М. Т., Нурматов, А. Х., & Саъдуллаев, С. Э. (2023). Особенности течения COVID-19 у детей с коморбидной патологией. *Педиатрия. Восточная Европа*, (3 Часть 12), 436-442.
- [15] Муминова, М. Т., Рахматуллаева, Ш. Б., & Худайкулова, Г. К. (2023). Постдипломное образование: судьба резидентов магистратуры после прохождения специализации.

[16] Rustombekovich, N. R., Zarifboyevich, O. S., Kadamovna, A. D., & Ernazarovich, S. S. (2025). THE STATE OF THE ANTIOXIDANT DEFENSE SYSTEM IN CHRONIC HEPATITIS C. *Multidisciplinary Journal of Science and Technology*, 5(5), 79-84.

[17] Kadamovna, A. D., Rustombekovich, N. R., Zarifboyevich, O. S., & Ernazarovich, S. S. (2025). COMBINATIONS OF HEPATITIS B WITH PULMONARY TUBERCULOSIS. *Multidisciplinary Journal of Science and Technology*, 5(5), 60-65.

[18] Ernazarovich, S. S., Zarifboyevich, O. S., Rustombekovich, N. R., & Kadamovna, A. D. (2025). DYNAMICS OF THE COVID-19 PANDEMIC AND ITS CLINICAL CONSEQUENCES. *Multidisciplinary Journal of Science and Technology*, 5(5), 85-90.

[19] Sadullaev, S. E., Bobajanov, A. O., Khusinbayev, I. D., Durdiev, E. S., & Ismoilova, A. R. (2025). PSYCHOLOGICAL REHABILITATION DURING THE CORONAVIRUS PANDEMIC. *Multidisciplinary Journal of Science and Technology*, 5(2), 429-433.

[20] Ismailov, K. Y. (2025). THE FACTORS CAUSING ISCHEMIC HEART DISEASE AMONG THE POPULATION OF THE SOUTHERN ARAL SEA REGION HEVE BEEN STUDIED. *Journal of Multidisciplinary Innovation in Science and Education*, 1(2), 413-418.

[21] Ismailov, K. Y., & Djabbarova, Z. I. (2024). OBESITY AND ISCHEMIC HEART DISEASE. *European Journal of Modern Medicine and Practice*, 4(11), 364-367.

[22] Абдуллаев, И. К., Исмаилов, К. Я., Курбанов, С. Р., & Матякубов, Ж. Р. ТИББИЁТ ОЛИЙГОҲЛАРИДА ЖАМОАТ САЛОМАТЛИГИ ВА СОҒЛИҚНИ САҚЛАШНИ БОШҚАРИШ ФАНИНИ ЎҚУВ ДАСТУРИГА КУРС ИШИНИ КИРИШНИНГ АМАЛИЙ АҲАМИЯТИ. *Султанов ГН-ректор, д. м. н. Зам. главного редактора*, 31.

[23] Artikova, D. O., Kh, K. R., & Ruzmetova, D. T. (2026). CLINICAL AND MORPHOLOGICAL CHARACTERISTICS OF MATERNAL DEATHS ARISING AS A RESULT OF URINARY TRACT INFECTIONS IN PREGNANT WOMEN LIVING IN KHORESM REGION. *AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE*, 4(1), 20-25.

[24] Матякубов Б. Б., Ниязметов Р. Э. СОВРЕМЕННЫЕ АСПЕКТЫ ЛЕЧЕНИЯ МАССИВНОГО АКУШЕРСКОГО КРОВОТЕЧЕНИЯ В ИССЛЕДУЕМОЙ ГРУППЕ //МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РЕСПУБЛИКИ УЗБЕКИСТАН РЕСПУБЛИКАНСКИЙ СПЕЦИАЛИЗИРОВАННЫЙ НАУЧНО-ПРАКТИЧЕСКИЙ МЕДИЦИНСКИЙ ЦЕНТР АКУШЕРСТВА И ГИНЕКОЛОГИИ АССОЦИАЦИЯ ВРАЧЕЙ

ЧАСТНОЙ ПРАКТИКИ УЗБЕКИСТАНА КЛИНИКА «МАНЛИЙО-SHIFO» & V.
– С. 23.

[25] Rojabovna, I. A. (2025). The problem of developing logical and creative thinking in the educational process. *INTEGRATION OF EDUCATION AND SCIENCE: GLOBAL CHALLENGES AND SOLUTIONS*, 1(2), 1023-1027.

[26] Bekchanova, K. R., & Ismailova, A. R. (2021). YOSHLARNI KASBGA YONALTIRISHNING PSIXOLOGIK XUSUSIYATLARI. *Academic research in educational sciences*, 2(5), 1117-1123.

[27] Rojabovna, I. A. (2023). Features of the development of adolescent thinking in the educational process. *Asian Journal Of Multidimensional Research*, 12(12), 88-92.

[28] Bakhtiyorovich, R. I., & Hayitboy o'g'li, D. S. (2026). Compilation of an Algorithm for Prenatal Identification and Management of Anterior Abdominal Wall Button Defects in Infants. *Spanish Journal of Innovation and Integrity*, 50, 90-92.

[29] Рузматов, И. Б., Эргашев, Б. Б., & Сапаев, О. К. (2020). ВЫБОР СПОСОБА ХИРУРГИЧЕСКОЙ КОРРЕКЦИИ ГАСТРОШИЗИСА У НОВОРОЖДЕННЫХ. *Новый день в медицине*, (4), 192-194.

[30] Ruzmatov, I. B. (2019). ANALYSIS OF RESULTS OF TREATMENT OF NEWBORNS WITH OMPHALOCELE. *Toshkent tibbiyot akademiyasi axborotnomasi*, 5, 129-131.

[31] Рузматов, И. Б., & Эргашев, Б. Б. (2018). Диагностика и методы лечения омфалоцеле большого размера у новорождённого.