Region - Educational Research and Reviews, 2026, Volume 8, Issue 2
DOI: 10.32629/rerr.v8i2.5093
ISSN Online: 2661-4634
ISSN Print: 2661-4626

From type embeddedness to functional integration: a comparative and integrative study of the mentorship system and modern apprenticeship in vocational undergraduate education

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Abstract: As a new education type in China, vocational undergraduate education faces dual tensions: absorbing the general undergraduate mentorship system (academic guidance, personalized development) while drawing on the modern apprenticeship system (industry-education integration, workplace competence). This paper compares the logic, structure, and functions of the two models, revealing discipline-based versus work-based epistemologies and the division and coupling between knowledge transformation competence and job adaptability competence. It proposes "dual-mentor integration" via model embeddedness, mechanism synergy, and evaluation reconstruction, arguing for deep functional integration rather than superposition, forming a new paradigm combining academic depth with vocational characteristics.

Keywords: vocational undergraduate education; mentorship system; modern apprenticeship; dual-mentor system; industry-education integration

1 Introduction

In 2019, the State Council initiated undergraduate-level vocational education pilots. By April 2026, China had 102 vocational undergraduate universities. A fundamental question arises: what talent cultivation model can uphold the typological positioning of vocational education while meeting the quality standards of general undergraduate education?

Vocational undergraduate education faces dual frameworks. As undergraduate education, it must absorb the academic guidance function of the mentorship system, personalized cultivation, and innovation stimulation. Some scholars note that implementing undergraduate mentorship in vocational colleges "helps strengthen all-round high-quality cultivation". As vocational education, it must embody industry-education integration and school-enterprise cooperation. The modern apprenticeship system, featuring "dual education and dual identity", provides a mature framework. The *2026 Opinions* issued by the Ministry of Education calls for establishing an "industry mentor system" in vocational institutions [1]. This signals a national-level demand for institutional model innovation.

Existing research lacks systematic responses. Studies on vocational undergraduate mentorship remain at the professional practice level, lacking horizontal comparison. Research on modern apprenticeship mainly focuses on associate degrees education, while scant attention has been paid to model integration at the undergraduate level. Newly upgraded vocational colleges often carry over associate-degree management models, thus forming the inertia of "skill lock-in" [2].

This paper places both systems in a comparative framework, analyzes their internal logic, and proposes "dual-mentor integration".

2 Historical context and internal logic

2.1 The undergraduate tradition of the mentorship system

The classic paradigm of the mentorship system originated at Oxford University in 14th-century England [3]. Its core is "establishing a close teacher-student relationship that stimulates independent thinking". Comparative research on Oxford and Harvard systems reveals differences in development, operations, and mentor qualification requirements, providing implications for China in three aspects: comprehensive understanding, sound incentives, and institutionalized assessment [4]. In China, the system gradually diffused from elite to mass institutions. Some scholars have reviewed the adoption of the Oxford and Harvard mentorship systems in early 20th-century China [5]. However, implementation faces "local inadaptability"—as an "imported product", it has not fully played its role [3], due to the structural contradiction between mass higher education and the small-class, elite conditions the traditional system depends on.

2.2 The vocational tradition of the modern apprenticeship

The modern apprenticeship system serves as the core carrier for the work-study integration of vocational education. Based on dual-subject education, dual student identity, and workplace competency development, its core lies in dual education and dual-teacher collaborative teaching. This model has further extended to higher education: Germany established its first dual-system university in 2009, offering bachelor's and master's degree programs; the UK launched degree apprenticeships in 2015. This "high-level apprenticeship" provides an important perspective for studying vocational undergraduate talent cultivation [6].

3 Comparative analysis of the two models

3.1 Epistemological differences: discipline-based vs. work-based

The epistemology of the mentorship system is "discipline-based": knowledge has a disciplinary logic; students learn systematically; the mentor guides independent, critical thinking. This fosters knowledge transfer and lifelong learning but may disconnect from real work.

The epistemology of the modern apprenticeship system is "work-based": truly valuable knowledge is tacit, embedded in work practices; students learn by doing. Based on the SECI model, some studies note that traditional teaching models face difficulties in improving knowledge transformation [7].

Vocational undergraduate education aims to cultivate "high-level technical and skilled talents"—above associate-degree "high-skilled talents". Students must master job skills while understanding technical principles and solving complex problems. It is a new model distinct from general undergraduate and higher than associate-degree vocational education, cultivating front-line talents with excellent practical ability and professional quality. Thus, teaching reform must adhere to "vocationality" [8]. Vocational undergraduate education must transcend epistemology—neither copying the discipline-based model of general undergraduate education nor mechanically applying the work-based model of associate-degree colleges.

3.2 Differences in relational structure: teacher–student dyad vs. school–enterprise triad

The structure of the mentorship system is a "teacher-student dyad": a one-to-one or one-to-a-small-group mentoring relationship at school, which is emotionally bonded and long-term oriented.

The structure of the modern apprenticeship system is a "school-enterprise triad": an interactive network among school, enterprise, and student, forming a "dual-mentor" system. Some scholars propose developing a modern apprenticeship system with Chinese characteristics by clarifying its positioning, constructing a "job-course alignment" curriculum, and

establishing a dual-mentor teaching team. The three-dimensional synergy of the dual-mentor system involves knowledge, skill, and professionalism: the on-campus mentor builds a systematic knowledge framework; the enterprise mentor acts as a "sensor" and "interpreter" of cutting-edge technology, constructing a "basic training—project practice—innovation trial and error" growth path [9]. No single model can independently bear the complex tasks of vocational undergraduate education.

3.3 Differences in model functions: knowledge transformation vs. job adaptability

The core function of the mentorship system is cultivating "knowledge transformation ability"—transforming theoretical knowledge into the ability to solve practical problems. The spiral progressive teaching model based on SECI promotes this through academic mentorship [7]. Students must understand "why" and "how to do better".

The core function of the modern apprenticeship system is to cultivate students' "job adaptability"—enabling them to quickly adapt to specific positions and master work norms. Its advantage lies in continuously optimizing vocational skills. In vocational undergraduate education, job adaptability remains important—graduates should directly take up technical positions.

The dialectical relationship between these two abilities is the core. Low-level skill training can be realized through simple practice, while the cultivation of high-level technical and skilled talents—understanding principles as well as mastering skills—must integrate both abilities. This is precisely how vocational undergraduate education differs from associate-degree education.

4 "Dual-mentor integration": a path to model integration

This paper proposes "dual-mentor integration" for vocational undergraduate education: not simply superimposing the two models, but achieving deep integration through model embeddedness, mechanism synergy, and evaluation reconstruction.

4.1 Model embeddedness: functional differentiation and synergy of academic and industry mentors

Two interconnected mentor roles are established.

Academic mentor—for academic guidance, theoretical learning, and personalized development. This role inherits from general undergraduate mentorship but requires vocational adaptation: focusing on an in-depth understanding of "technical knowledge" and "engineering principles", building a solid theoretical foundation and knowledge transfer ability.

Industry mentor—for workplace practice, skills training, and professional quality cultivation. This role derives from the traditional "enterprise master-apprentice" model and is set with higher requirements: guiding students to understand technology principles and engage in practical problem-solving and innovation. Some vocational colleges have explored the model of "school-enterprise dual-mentor co-teaching", where both mentors complement each other, linking theory and practice.

The two mentors' functions reflect hierarchical, phased synergy: in the early stage, academic mentor dominates; in the later stage, the industry mentor plays an increasingly important role. A normalized communication mechanism ensures organic articulation. In practice, the "dual-college collaborative education model" has improved quality by establishing an online collaboration platform for the dual-mentor system [10].

4.2 Mechanism synergy: coupling academic guidance and workplace training chains

Two mutually coupled talent training chains are constructed.

Academic guidance chain—from admission adaptation, professional cognition, academic training, to graduation project. It inherits the essence of personalized cultivation yet requires new connotations, e.g., academic mentors guiding students in competitions and innovation projects.

Workplace training chain—from cognitive internship, shadowing internship, to on-the-job internship. It inherits the work-study integration model but requires enhanced depth and technical content: guiding students in technical transformation, process optimization, and product development to deepen their understanding of technical principles. Some studies propose assigning "dual mentors" to provide all-round guidance in learning, career planning and psychological support.

The coupling requires curriculum integration: academic mentors design theoretical and basic experimental courses; industry mentors design practical training and workplace project courses, forming a "theory-practice-theory-practice" spiral. Through joint school-enterprise course development, shared training resources, and the transformation of real cases into teaching materials, the integration of "job-course-competition-certificate" is achieved.

4.3 Evaluation reconstruction: process and outcome assessment

A scientific evaluation system is essential. Under dual-mentor integration, a diverse system combining process and outcome evaluation is required.

For process evaluation, normalized recording and feedback of mentor guidance behaviors should be established. Effective dual-mentor implementation hinges on solving matching and evaluation challenges, requiring intelligent matching algorithms and a sound quality monitoring system. For outcome evaluation, students are assessed across three dimensions: academic performance (theoretical knowledge mastery), practical competence (occupational skills and problem-solving capabilities), and comprehensive literacy (professional ethics, innovation, teamwork).

Information sharing and joint feedback between academic and industry mentors ensure that evaluation results feed back into cultivation improvement, forming an "evaluation-feedback-improvement" closed loop. Current difficulties include the selection of enterprise mentors and the improvement of policy support. Further policy support is needed, including the allocation of special funds for apprenticeship teacher subsidies.

5 Conclusion

Vocational undergraduate education is a new type in China. Its talent cultivation model can neither simply copy general undergraduate mentorship nor mechanically transplant associate-degree apprenticeship. Through comparative analysis, this paper has revealed their fundamental differences and complementarities in epistemology, relational structure, and functions, and proposed "dual-mentor integration".

The core argument is that model innovation should not be limited to simple superposition instead, it should realize in-depth functional integration grounded in the "theory of educational types". The academic mentor focuses on theoretical literacy and knowledge transformation; the industry mentor on practical ability and job adaptability. Through embeddedness, synergy, and evaluation reconstruction, they form a joint educational force supporting the cultivation of "high-level technical and skilled talents". This integration aligns with national policy guidelines. The Ministry of Education's *2021 Opinions* explicitly uphold the principle that vocational undergraduate education and general undergraduate education are two distinct types with different characteristics yet equivalent in quality. Meanwhile, regarding degree-awarding criteria, the document advocates "strengthening the distinctive features of vocational education and highlighting vocational competencies and professional practical capabilities". The dual-mentor integration model is precisely a targeted practice developed in response to this policy orientation.

As an emerging form of education, vocational undergraduate education faces challenges—path dependence, interest gaming, and social legitimacy recognition. To foster the solid development of dual-mentor integration, three major developmental directions deserve further exploration: (1) selection criteria and incentive mechanisms for industry mentors; (2) effective collaborative synergy mechanisms to avoid responsibility overlap or supervisory gaps; (3) sound management

and evaluation systems to facilitate the transition from theoretical design to practical implementation. All these aspects remain worthy of in-depth exploration in future research.

Acknowledgments

Beijing Education Science "14th Five-Year Plan" 2022 General Project (CDDB22223).

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

References

[1] Rao B. Policy motivations and action directions for the linkage reform of key elements in vocational education teaching[J]. Education and Vocation, 2026(07): 15-24.

[2] Lu YZ. Dilemmas and pathways of teaching quality governance in newly upgraded vocational undergraduate colleges in China[J]. Higher Vocational Education Exploration, 2025, 24(04): 1-6.

[3] Wang J, Yang B R, Li J Q, et al. The development models of the British and American undergraduate mentorship systems and their implications[J]. Industry and Technology Forum, 2023, 22(06): 244-245.

[4] Fan S Z. A comparative study of the tutorial systems at Oxford and Harvard universities and its implications[J]. New West (Theory Edition), 2013(07): 171+170.

[5] Jin J. Elite university undergraduate mentorship system: international experience and a case study of China[D]. Shanghai Jiao Tong University, 2011.

[6] Liu Y F. Degree apprenticeships in the UK: content, reasons, and lessons for China[J]. China Vocational and Technical Education, 2020(36): 58-64.

[7] Wang C. Optimization logic of the spiral progressive teaching model in vocational undergraduate colleges based on "SECI + Academic Mentorship System"[J]. China Management Informationization, 2022, 25(23): 195-200.

[8] Zuo Y X, Xu H. Realistic dilemmas, practical dimensions, and model construction of vocational undergraduate talent cultivation—based on the perspective of high-level apprenticeship with Chinese characteristics[J]. Modern Education Management, 2023(02): 94-103.

[9] Liang J. The mechanism of the dual-mentor system in cultivating new-quality craftsmen through industry-education joint training[N]. China Industry News, 2026-03-02(019).

[10] Xiong Y, Zhang Z Y, Zhang Y D. Research on the dual-college collaborative general education model of academies and colleges[J]. Education and Teaching Forum, 2025(53): 29-32.

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