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Reconstructing Vocational Education under Skill Fission: The Transformation of Talent-Cultivation Logic in the Context of Emerging Technologies

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Abstract: ***Emerging technologies, with artificial intelligence foremost among them, are inducing structural change in the global labor market and driving the skill ecosystem from linear evolution toward fission-like restructuring. Adopting the analytical perspective of "skill fission," this paper examines the threefold impact of emerging technologies on the labor market: the technological empowerment of high-skilled groups, the heightened risk of job substitution facing middle- and low-skilled groups, and the temporal lag between educational response and technological change. It then advances a corresponding response on three levels: a human-centered approach to skill-value enhancement at the level of values, an AI-driven architecture for precise educational supply at the level of practice, and a data-enabled platform for trend forecasting at the level of technology. On this basis, the study identifies implementation paths for reconstructing the vocational education system along four dimensions—strategic positioning, the standards system, the governance structure, and the lifelong learning system. The aim is to provide a systematic response to the predicament of skill differentiation and to advance the paradigm shift of vocational education from passive adaptation to active guidance.***

Keywords: Skill fission, Artificial intelligence, Vocational education, Talent cultivation, Reconstruction of vocational education, Educational governance.

1. Introduction

Artificial intelligence is currently advancing at remarkable speed, reshaping the global economic landscape, social structures, and ways of life, and it has become a major driver of the new round of technological revolution and industrial transformation; industrial structures worldwide are undergoing reconstruction on an unprecedented scale. In *The Future of Artificial Intelligence*, the American scholar Ray Kurzweil observes that artificial intelligence is advancing beyond the limits of human comprehension, and that the cycle of skill change it sets in motion has contracted from several years, or even a decade, to as little as one or two years. The *Global Artificial Intelligence Innovation Index Report 2025*, jointly compiled by the Institute of Scientific and Technical Information of China and Peking University, likewise notes that innovation in large models is growing increasingly concentrated worldwide, that AI infrastructure has become a focal concern, that enthusiasm for AI venture capital is rebounding, and that the open-source ecosystem is flourishing globally. In August 2025 the State Council issued the *Opinions on Deeply Implementing the "Artificial Intelligence Plus" Action* (hereafter the *Opinions*), which called for promoting the broad and deep integration of artificial intelligence across all sectors and domains of the economy and society. This step signals that the state now treats the deep integration of emerging technologies—artificial intelligence chief among them—with the real economy as a core strategy for industrial upgrading, one that will accelerate technological penetration and model innovation across fields. This trajectory is, in turn, giving rise to new employment structures and new skill demands.

As the integration of emerging technologies with traditional industries deepens, debate over the employment effects of technological change has coalesced into two representative positions. The employment-creation view holds that emerging technologies, artificial intelligence in particular, have generated new industrial forms, occupational categories, and skill demands, and have thereby created additional employment opportunities. The employment-substitution view contends, by contrast, that the advance of these technologies will hasten the disappearance of repetitive and routine jobs, leaving large numbers of middle- and low-skilled workers exposed to technological or structural unemployment. Differing in emphasis, the two positions nonetheless converge on a single fact: technological progress is profoundly reshaping the employment opportunities and developmental space available to labor groups at different skill levels.

This change is better understood not as a mere increase or decrease in the number of jobs but as a restructuring of the skill composition of the labor market. On one hand, the job changes driven by emerging technologies manifest as the rapid differentiation and continuous upgrading of skill demand, giving rise to the phenomenon of skill fission. On the other hand, labor groups differ markedly in their opportunities and capacities to acquire new skills, producing a practical dilemma in which rising skill demand and lagging skill supply coexist—and exposing the mismatch between the talent that vocational education cultivates and the skills that industry requires. Proceeding from the perspective of skill fission, this paper examines how the development of emerging technologies drives the evolution of the labor market's skill structure, and goes on to discuss the paths by which the talent-cultivation logic and institutional system of vocational education might be transformed.

2. The Acceleration of Skill Iteration Drives Skill Fission

"Skill fission" denotes the rapid, intense, and discontinuous transformation and differentiation of the skill structure demanded by the labor market under the impact of technological revolutions in digital technology, automation, and artificial intelligence. The term emphasizes the speed, depth, and structural rupture of this change: it signifies not a mere "upgrading" of skills but a "reconstruction" of the entire skill system. A worker's existing skill set may be rendered obsolete in a very short span, even as the cycle and the pressure of acquiring new skills intensify to an unprecedented degree. Old skills are retired more quickly, new skills emerge more rapidly, and skill demand bifurcates toward both higher- and lower-end positions. The result is a hollowing out of middle-skilled employment that poses formidable challenges for workers, firms, and the education system alike.

Rather than a single, narrowly defined theoretical term, "skill fission" is an integrative concept that synthesizes several established lines of inquiry into a coherent analytical lens; its meaning is best approached through the theories and observed practices of technological change.

The first and most fundamental is the theory of skill-biased technological change. Since the 1990s, economists have established that progress in information technology is not factor-neutral: it tends to substitute for the routine, procedural cognitive and manual labor characteristic of middle-skilled work, while complementing the non-routine analytical, creative, and interpersonal labor characteristic of high-skilled work, and exerting a comparatively weak substitution effect on low-skilled, place-bound manual services such as caregiving and cleaning. This asymmetry is the direct source of the "polarization" of skill demand.

The second is task-based theory, which decomposes a job into a series of discrete tasks and holds that automation displaces the routine tasks embedded within a job, irrespective of whether the job is classified as blue- or white-collar. This account explains why manufacturing and clerical middle-skilled positions have come under pressure simultaneously.

The third concerns the dynamics of technological innovation at the level of the firm. For technology-driven enterprises, the strategic choice of an innovation path is decisive for growth: it governs not only the return on investment but also the trajectory of a firm's innovative capacity, and effective innovation strategies allow firms to raise productivity, lower costs, and build distinctive competitive advantage. More consequentially for the labor market, these same dynamic drives the extinction of established occupations and the birth of entirely new ones—data analysts and artificial-intelligence trainers among them—at a pace far exceeding that of earlier eras. Taken together, these mechanisms produce the simultaneous "fission" and "rebirth" of skills that the concept is meant to capture.

In sum, skill fission offers a condensed characterization of the profound, technology-driven transformation of the labor market. Scholarship on the subject has expanded from economics into education, sociology, and management, and future work is likely to concentrate on evaluating the effectiveness of response strategies—how to design agile education and training systems, how to construct individual learning accounts and skill-certification regimes, how to advance skill transformation without compromising social equity, and how to manage the inequality and migration pressures that skill fission generates on a global scale. For the individual, embracing lifelong learning and cultivating cross-disciplinary, transferable competencies — meta-skills — remains the fundamental means of responding to this new era.

3. The Formation of Skill Fission: Labor-Market Reconstruction Driven by Emerging Technologies

3.1 Value Differentiation: Technological Integration and the Structural Reorganization of Skill Value

Emerging technologies, and especially the accelerating penetration of generative artificial intelligence, are driving the labor market toward profound restructuring. As labor-market segmentation theory would predict, the prevailing employment pattern is shifting further toward a "primary–secondary" labor structure [1]. The primary labor group, distinguished by higher educational attainment and stronger technical skills, is leveraging both endowed and acquired advantages to secure a sustained rise in skill value through the current technological leap.

A strong educational foundation furnishes this group with the knowledge reserves and structural advantages required to withstand technological shocks; it also sharpens their capacity and sensitivity in accessing technical information, enabling them to assimilate new technologies quickly and convert them into professional competence [1]. The rise of generative artificial intelligence has intensified this tendency further—a phenomenon empirically corroborated in the studies of Xu Guoqing and Zeng Jin [1][2]. Because members of the primary labor group typically occupy the middle and upper tiers of organizational decision-making, they are positioned to help chart the developmental direction of their firms or industries, to engage proactively in technological change, and to reap the resulting gains in promotion and skill advancement.

This upward trajectory for the primary labor group unfolds against a broader transformation of the urban labor market which, as Lu and Feng document, has been reshaped since 2013 by significant shifts on both the demand and supply sides [4]. On the demand side, the rapid growth of the digital economy has generated substantial new labor demand while reconfiguring prevailing employment forms, with the platform economy continuously enlarging the ranks of workers in novel employment arrangements. Here the effect of artificial intelligence—including the deployment of industrial robots—is twofold: a substitution effect that depresses labor demand, set against a productivity effect and an employment-creation effect that raise it.

On the supply side, between 2013 and 2023 the share of China's population aged 15 to 64 fell from 73.9 percent to

68.3 percent, while the old-age dependency ratio climbed from 13.1 percent to 22.5 percent. The ongoing deepening of population aging—a condition set to persist for the foreseeable future—will substantially alter both the scale and the structure of labor supply: after 2030 the working-age population will begin to contract rapidly, and the rising elderly share will depress the labor-force participation rate still further [4]. A contracting, aging labor supply and a digitally transformed pattern of demand together raise the premium on scarce high-level skills, reinforcing the value differentiation described above.

3.2 Job Restructuring: Technological Substitution and the Structural Erosion of Middle- and Low-Skilled Employment

Middle- and low-skilled workers in marginal positions confront far steeper challenges than their primary-sector counterparts. Concentrated in repetitive work that lends itself to proceduralizing and standardization—work demanding relatively modest skill and therefore highly susceptible to substitution—these workers are the most directly exposed to new technologies such as artificial intelligence and automated equipment [5]. By deepening the uneven distribution of technological capital across the labor market, emerging technologies give rise to phenomena such as “technological unemployment” and “structural unemployment” [5].

At the same time, the digital economy markedly raises the probability that workers transition into new occupations. As it matures, the broad application of digital technologies has spawned new products, business forms, and models; the variety and number of jobs have grown, and workers’ digital skills have risen accordingly, prompting a migration of labor from traditional to emerging sectors. The digital economy’s influence on occupational mobility thus operates through both a substitution effect and a creation effect. The wide deployment of digital technologies such as 5G, blockchain, and artificial intelligence has substantially improved the output efficiency of both labor and capital, making the digital economy a key engine of global growth and an important force in accelerating factor integration, guiding industrial restructuring, and stabilizing employment. The *Research Report on the Impact of the Digital Economy on Employment* projects that the digital economy will create 379 million jobs by 2035 [6]. Even so, the structural unemployment and occupational displacement arising from skill mismatch under digital development warrant close attention, for they will impose structural change on the labor market as a whole [6].

3.3 Supply–Demand Mismatch: The Lag between Educational Supply and Skill Demand

The pace at which emerging technologies iterate has far outstripped the responsiveness of the traditional vocational education system. Across many regions and fields, that system continues to operate on a stable, job-oriented logic of skill training whose curriculum design, faculty expertise, and instructional equipment cannot readily keep step with technological change in industry. This structural imbalance — an “educational lag” producing “skill mismatch” — not only leaves some graduates “obsolete on arrival” [1] but also erodes the social adaptability of the vocational education system as a whole. At the same time, it points the way toward the system’s future reconstruction.

Labor-skill mismatch denotes the gap between the skills a job requires and those a worker actually possesses. In the context of new quality productive forces, the advance of industrial digitalization promotes labor mobility and drives both industrial agglomeration and the upgrading of industrial structure; by acting on skill matching from both the supply and the demand side, it tends to reduce labor-skill mismatch.

The mutually reinforcing relationship between industrial - structure upgrading and talent-structure upgrading — the skill-biased technological-progress effect—can be observed in the upgrading of both the employment skill structure and the employment industry structure. Empirical work that aggregates micro-level data on high-, middle-, and low-skilled labor to the regional level, using the (logged) employment share of middle- and high-skilled labor as a proxy for the regional skill structure, finds a significantly positive association with industrial digitalization. In other words, as industrial digitalization advances, the regional employment share of middle- and high-skilled labor rises appreciably, lifting the region’s overall employment skill structure.

Such skill-biased demand reshapes the employment structure and widens workers’ scope for occupational choice, thereby upgrading the labor skill structure and improving the efficiency with which labor resources are allocated. It follows that the methods used to cultivate digital-technology talent must be reinvented: learners need ample opportunity to study and practice with digital technologies, and digital tools should be put to full use so that digital transformation, technological innovation, and talent cultivation advance in concert — yielding an innovative model of talent cultivation that is data-driven, intelligent, and personalized [7].

4. Reconstructing Talent Cultivation: Institutional Support for the Transformation of the Vocational Education System

The foregoing analysis shows that the skill fission triggered by emerging technologies registers not merely in the number of jobs or the turnover of occupational types but, more profoundly, in the continuous readjustment of the labor market’s capability-demand structure. As emerging technologies penetrate ever further into production, firms impose new requirements on workers, and the stable job logic on which traditional vocational education has long relied is breaking down.

This change manifests in three principal respects. First, high-skilled jobs increasingly demand stronger composite capabilities, greater capacity for innovation, and the ability to transfer skills across technologies. Second, as technological iteration accelerates, middle- and low-skilled jobs face the twin pressures of mounting substitution risk and an ever-greater need for skill renewal. Third, the misfit between vocational education’s supply and industry’s demand has grown increasingly conspicuous, and the traditional, job-matching model of talent cultivation can no longer respond adequately to rapidly shifting skill demands.

Confronted with these structural challenges, vocational education reform cannot stop at piecemeal adjustments to programs and curricula; it requires systematic optimization and reconstruction of the talent-cultivation system at the institutional level. The task is to move talent cultivation away from narrow job adaptation and toward sustained capability development, supplied collaboratively by multiple actors across the whole of a working life. Institutional alignment along four fronts—reshaping cultivation goals, updating capability standards, coordinating cultivation actors, and renewing learning systems—can sharpen vocational education's responsiveness to industrial upgrading and employment change and lend continuous support to the building of a skilled society.

Now that emerging technologies—artificial intelligence above all — are deeply embedded in the industrial system, vocational education is no longer a marginal appendage to general education; it performs a core institutional function in implementing the national skills strategy, advancing social equity, and supporting individual development [8]. Faced with the restructuring of job architecture and the redefinition of what "capability" means under skill fission, the system urgently requires comprehensive institutional innovation to rebuild its functional positioning and operating logic. Strategic positioning should clarify vocational education's role in national development and industrial upgrading; a standards system should furnish a dynamically adaptive framework of vocational competencies together with a quality-evaluation mechanism; an optimized governance structure should foster tiered collaboration among government, industry, enterprises, schools, and society; and learning-system innovation should open flexible, diverse pathways spanning lifelong education.

Such systematic reconstruction amounts to more than a redistribution of existing educational resources; more fundamentally, it reshapes the institutional logic of vocational education and expands its functional repertoire. Only thus can the system offer workers stable, continuous developmental support amid the turbulence of skill fission while simultaneously serving the broader goals of strengthening national competitiveness, safeguarding social equity, and fostering individual growth.

Figure 1 sets out the four dimensions of this systematic reconstruction and the division of functions among them, constituting an institutional path framework for the transformation and upgrading of vocational education under skill fission.

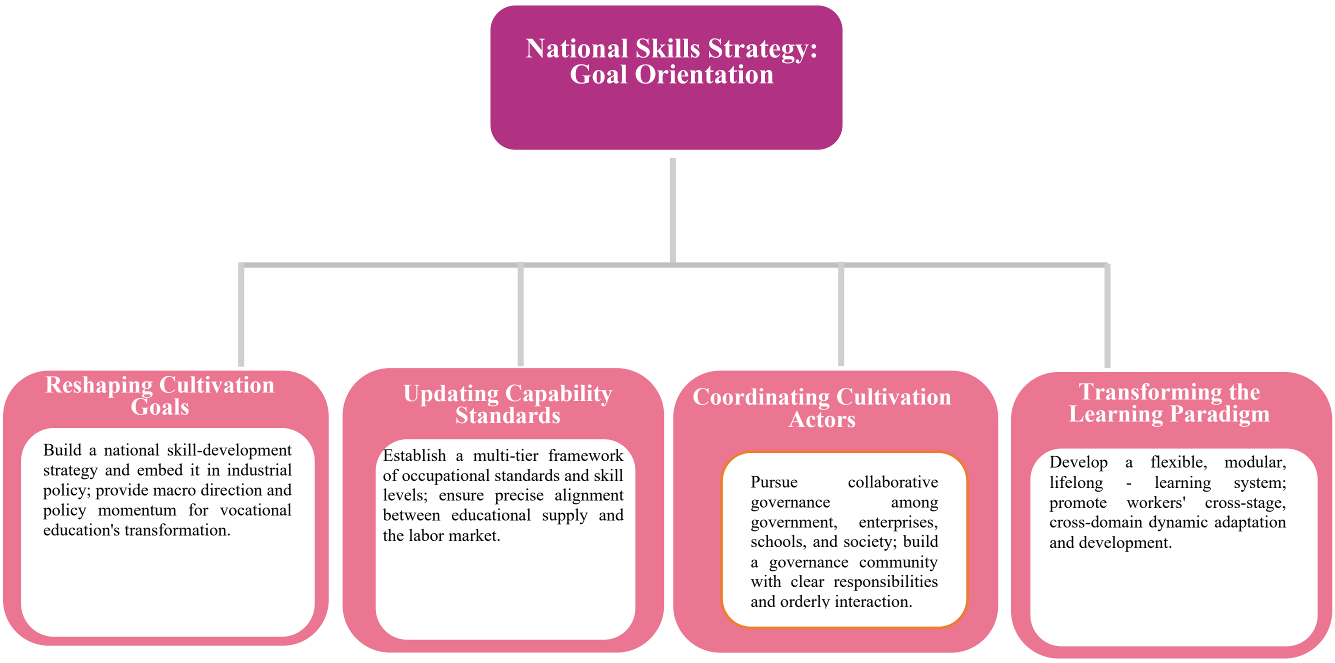

Figure 1: Conceptual path framework for the institutional reconstruction of the vocational education system

4.1 Reshaping Cultivation Goals: Orienting Talent Cultivation toward Future Skill Demand

The skill fission set in motion by the steady penetration of emerging technologies is not a purely destructive force; it is at once creative and dispossessing. In the primary labor market, high-skilled jobs ascend the career ladder through the compounding effects of technology, whereas in the secondary labor market middle- and low-skilled workers confront the risks of technological displacement and job loss. Vocational education must therefore strengthen its regulatory mechanisms at the macro-institutional level, weighing in tandem the industrial diffusion paths of emerging technologies and the avenues for enhancing individual capability, and steering the system from a technology-centered orientation toward a human-centered one.

As emerging technologies continue to recast the industrial division of labor and the structure of jobs, the strategic positioning of vocational education calls for renewed scrutiny and clarification. Vocational education need not be confined to a supplementary, employment-oriented role; it can instead be positioned as a pillar of the national skills strategy and of socioeconomic development—serving not only individual employment but also the elevation of national human capital, the support of industrial upgrading, the strengthening of national competitiveness, and the advancement of social justice [9].

Vocational education should integrate actively into national development strategy, clarify the role of labor under emerging technologies, and build a supply mechanism aligned with industrial planning and technology policy, thereby dynamically coupling the educational structure to the economic structure [10]. Through policy guidance, the state should reinforce the public-policy character of vocational education and use institutional arrangements to improve its balance and accessibility, making it a key lever for responding to skill fission and narrowing the gaps between groups [11].

In terms of strategic planning, vocational education bears three tasks. The first is to enhance national competitiveness by supplying high-level skilled talent to key technological fields and strategic emerging industries. The second is to safeguard social equity by extending retraining opportunities to disadvantaged groups through deliberate institutional planning, thereby reducing the risk of structural unemployment. The third is to foster individual growth by enabling middle- and low-skilled workers to make cross-stage skill leaps and by widening the space for occupational mobility and career development.

4.2 Updating Capability Standards: Building a Dynamically Adaptive Skill-Evaluation System

In the present technological era, the shifts in demand for skills education that skill fission produces require a close coupling between the vocational education system and its methods of evaluation, so that the system can meet the practical imperative of adapting to skill fission. Skill fission is, in essence, a “technological potential difference” created by the rapid penetration of emerging technologies—that is, a widening gap among groups in the speed of skill acquisition, in learning capacity, and in job matching. This gap stems not only from structural imbalances in educational foundation, access to information, and learning capacity; it also exposes the current system’s sluggishness in responding to skill trends. Building a data-driven skill-forecasting system has accordingly become an important means of easing both educational lag and skill rupture.

A concrete difficulty at present is that the relevant policies and resources often fail to reach the middle- and low-skilled workers among whom skill gaps are most pronounced—a failure most evident in the channels of information transmission. Such workers typically lack systematic means of learning about available educational resources, and as AI algorithms come to govern media distribution and user profiling ever more pervasively, these groups are liable to be filtered out of the system by algorithmic curation and shut out of the cognitive horizon of mainstream educational provision. This communication gap not only blunts the effect of educational intervention but also deepens the inequality among workers in the reshaping of skills [12].

The standards system of vocational education serves as both a benchmark for gauging educational quality and a bridge connecting talent cultivation to industrial demand. In an age of rapid skill renewal and job transformation, traditional static occupational standards can scarcely keep pace with industrial change. Vocational education urgently needs to redesign an open standards system—one that is dynamically adaptive and progressively tiered, and backed by a comprehensive quality-evaluation mechanism—so as to sustain a continuous match between educational supply and job demand [13].

National occupational classifications and job-capability standards should be updated in a coordinated fashion, and the mechanism for generating standards around core literacies, professional skills, and cross-domain capabilities should be reinforced [14]. Core literacies encompass cross-industry capabilities such as digital literacy, communication and collaboration, and critical thinking. Professional skills should map onto the knowledge and operational requirements of specific jobs and be updated dynamically as technology iterates. Cross-domain capabilities should foreground the adaptability of composite, interdisciplinary talent, underwriting workers’ mobility across industries.

As for the evaluation mechanism, the aim should be a three-dimensional, synchronized model organized around result, process, and development orientations. The result orientation stresses the fit between learning outcomes and job requirements; the process orientation attends to learning engagement and the trajectory of capability growth; and the development orientation looks to workers’ potential for occupational mobility and lifelong development. Deploying technical means such as big data and artificial intelligence to establish a dynamic skill-monitoring platform makes it possible to track the alignment between talent-capability structures and industrial demand in real time [15], closing the loop among standards updating, curriculum adjustment, and talent output.

A multi-actor standards-and-evaluation system should likewise be established, guiding industry organizations, enterprises, universities, and skill-training institutions to co-construct and share occupational standards and evaluation models—and thereby effecting a substantive shift from diploma-based to capability-based evaluation [16].

The standards system is thus not merely an instrument for measuring educational quality but an institutional means of correcting the mismatch between educational supply and industrial demand, and of moving vocational education from static evaluation toward dynamic guidance.

4.3 Coordinating Cultivation Actors: Building a Multi-Stakeholder Talent-Cultivation Community

The governance logic of vocational education strongly conditions its effectiveness and its adaptive resilience in the face of skill fission. The earlier model, led by the government as sole actor, has gradually betrayed weaknesses—supply lag and misallocated resources among them—when confronted with today’s complex industrial environment and diverse learning needs. Vocational education governance urgently needs to transcend these limits by building a three-tier linkage among central government, local governments, and institutions, and by reconstituting a composite governance structure in which government, industry, enterprises, schools, society, and learners all participate [17][18].

Within this structure, the government remains the leading actor in institutional design and resource allocation, taking primary responsibility for macro-level policymaking, the refinement of laws and regulations, financial support, and the provision of public services [19]. Industry organizations, enterprises, and schools should become the principal actors in demand feedback and practical provision: beyond specifying job standards, they should share industrial information and actively shoulder the training responsibilities of vocational education, achieving “co-constructed governance” within industry–education integration [20]. Third-party evaluation agencies and social organizations should buttress educational quality and public credibility through oversight, certification, and evaluation [21]. Worker groups, too, should be brought into the governance framework, with practical channels for feedback and expression established so that their educational needs are absorbed institutionally.

This tiered, collaborative model of governance carries three implications. First, by delineating the boundaries of authority and responsibility, it forestalls functional conflict among the various actors. Second, through cross-boundary cooperation, it promotes resource sharing within a deeply integrated industry–education system. Third, through feedback mechanisms, it enhances the transparency and responsiveness of governance [22]. Its ultimate aim is collaborative governance, resource sharing, and common development across the vocational education system.

In this technology-led era, a one-dimensional model of vocational education supply can no longer meet the increasingly complex challenges of skill fission. The system must reshape its talent-supply apparatus as a whole, shifting toward a richly interactive configuration underpinned by systemic coordination, actor linkage, and technological embedding, so as to strengthen its self-adaptive capacity and resilience [23].

At the level of governance philosophy, a complex-systems perspective should be adopted, treating vocational education as a dynamic, open system: the interconnection of its institutional modules should be accelerated, and the synergy among education, industry, and policy improved. As for the means of supply, emerging technological tools—artificial intelligence, big data, and virtual training—should be fully integrated, the curriculum and practical-training models reorganized, and a flexible, modular, multi-path system of skill growth created to offer workers at different levels a variety of developmental routes. As for implementation, a multi-party consultative mechanism encompassing government, enterprises, educational institutions, and workers should be established to foster interaction among policymaking, educational supply, and industrial demand, yielding a pattern of co-created governance. The goal of this systemically coordinated reshaping is an educational-supply system capable of adapting dynamically to industrial change and responding actively to the risks of skill fission—one that allows vocational education to become a genuine bulwark for labor groups facing technological shocks.

4.4 Transforming the Learning Paradigm: Building a Skill-Growth System for Lifelong Development

In this era of skill fission and job recombination, learning is no longer a discrete process confined to a stage of formal education but a routine necessity throughout a worker’s career. Vocational education must therefore drive a fundamental reform of the learning system, moving it toward lifelong, flexible, and diversified development [24].

The learning system needs to open vertical channels linking academic education, vocational training, and continuing education, allowing workers to switch paths flexibly at different stages and effecting vocational education’s functional shift from “one-off education” to “periodic empowerment” [25].

The digital transformation of learning resources must be vigorously advanced. Artificial intelligence, big data, and virtual-simulation technologies should be harnessed to build personalized learning platforms, improving both the accessibility of resources and the feasibility of hands-on practice and enabling precise matching and adaptive delivery for different groups. This furnishes individuals with diversified, modular, and finely targeted learning-support services and forges a real-time, efficient connection between vocational education and the labor market [26].

Attention should also be paid to building social-support mechanisms around the learning process. A “micro-credential plus digital learning portfolio” system, jointly underwritten by platforms, communities, and enterprises, should be promoted [27]; encompassing credit recognition, certification of learning outcomes, and the development of public learning platforms, it can lower the institutional barriers to workers’ continuing study. Particular care should be taken to support the career development of low-skilled groups, job changers, and workers in flexible employment.

Ultimately, reforming the learning system aims to provide workers with flexible, diverse, and resilient pathways for growth—pathways that meet their varied needs at different career stages while helping them sustain the motivation to learn amid a shifting, uncertain employment environment, accomplish skill leaps and renewal, and enter a virtuous cycle in which learning is put to use and use spurs further learning. In so doing, it supports the accumulation and continuous enhancement of national human capital, raises the overall competitiveness of society, and lays a firm foundation for the nation’s long-term development and prosperity.

5. Conclusion

Emerging technologies, artificial intelligence foremost among them, are accelerating change in the structure of the labor market. Their influence has moved beyond job substitution and occupational turnover to reach deeper adjustments in the structure of skill demand. Skill fission both creates new employment opportunities and sharpens the differentiation among labor groups, placing vocational education under the dual challenge of recalibrating its talent-cultivation logic and reconstructing its institutional system [28]. The traditional logic, preoccupied with meeting immediate job demands, can no longer satisfy the real needs of labor development under rapid technological change.

Accordingly, vocational education must take the reality of skill fission as its starting point and advance several shifts in talent cultivation: from static adaptation to dynamic development, from a single channel of educational supply to collaborative provision by multiple actors, and from stage-based training to lifelong learning support. Through the systematic integration and reconstruction of cultivation goals, capability standards, governance mechanisms, and learning systems, the vocational education system can steadily improve its capacity to adapt to technological change and serve industrial upgrading. It can, moreover, transform itself from a marginal, supplementary form of education into a core, empowering one—becoming a vital institutional foundation for building a skilled society, fostering people's all-round development, and achieving high-quality employment.

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References

[1] Xu Guoqing, Cai Jinfang, Jiang Beijia, et al. ChatGPT/Generative Artificial Intelligence and Future Vocational Education [J]. Journal of East China Normal University (Educational Sciences), 2023, 41(7): 64-77.
[2] Zeng Jin. Application Scenarios of Generative Artificial Intelligence ChatGPT in Promoting the Digital Development of Vocational Education [J]. Contemporary Vocational Education, 2023(4): 37-44.
[3] Zhou Rujun. Generative Artificial Intelligence Empowering Teaching Reform in Vocational Education: Main Dimensions and Development Paths [J]. Contemporary Vocational Education, 2024(4): 22-31.
[4] Lu Jingliang, Feng Shuaizhang. The Evolution of China's Urban Labor Market: 1984-2024 [J]. China Economic Quarterly, 2025(5): 547-564.
[5] Ye Wen, Wu Junyi. The Era of Generative AI: Reshaping the Digital Growth Path of Vocational Education Based on Life Cycle Theory [J]. Journal of Wuhan Polytechnic, 2024, 23(4): 44-51.
[6] Chen Xuan, Li Guoping. Digital Economy and Labor Occupational Mobility: Micro Evidence Based on the China Family Panel Studies [J]. Statistics & Decision, 2025(19): 78-82.
[7] Bai Peiwen, Lin Shiyi. Industrial Digitalization and Labor Skill Matching in the Context of New Quality Productive Forces [J]. Economic Perspectives, 2025(10): 37-56.
[8] Wang Mingzhi. Skills First: The Strategic Positioning of Vocational Education in the New Era [J]. Chinese Vocational and Technical Education, 2023(1): 5-10.
[9] Zhang Fengrong. Rethinking the Strategic Positioning of Vocational Education in the Context of Technological Change [J]. Education and Vocation, 2023(24): 25-30.
[10] Brynjolfsson E., McElheran K., Jin W. The Reskilling Revolution: Automation and the Future of Work [J]. Brookings Papers on Economic Activity, 2023(2): 1-40.
[11] Zhou Jing. Research on the Dynamic Construction of Vocational Competence Standards [J]. Education and Vocation, 2024(3): 44-50.
[12] Wang Huan. Innovation of Educational Governance Mechanisms in the Pseudo-Environment [J]. Chinese Vocational and Technical Education, 2024(6): 34-39.
[13] OECD. Skills Outlook 2023: Building a Resilient Workforce in the AI Era [R]. OECD Publishing, 2023.
[14] Chen Xiaochun. The Iteration Mechanism of Occupational Standards from the Perspective of Changes in Occupational Posts [J]. Research in Vocational and Technical Education, 2023(7): 30-36.
[15] Hu Ping. Construction of an Employment Skill Forecasting Mechanism Assisted by Artificial Intelligence [J]. Education and Vocation, 2024(10): 40-46.
[16] Wu Xiaomin. The Capability-Oriented Transformation of the Vocational Education Evaluation System [J]. Chinese Vocational and Technical Education, 2022(21): 15-19.
[17] Ouyang Kang. The Logical Path of Modernizing the Governance System of Vocational Education in the New Era [J]. Exploration of Higher Education, 2023(9): 55-62.
[18] Li Wen. Reconstruction of the Vocational Education Governance Ecology in the Context of Building a Skilled Society [J]. Theory and Practice of Education, 2024(1): 52-58.
[19] Hu Jing. Research on the National Digital Education Strategy and the Modernization of Vocational Education Governance [J]. China Educational Technology, 2023(6): 72-78.
[20] UNESCO. TVET Governance in the Age of Digitalization: Global Trends and National Responses [R]. 2022.
[21] Lü Lin. An Analysis of Platform-Based Educational Organizations and the Co-Construction Mechanism of Vocational Education Resources [J]. Vocational Education Forum, 2023(8): 33-39.
[22] Chen Yu. Research on the Possibility of Blockchain Technology Empowering the Skill Governance System [J]. Education Modernization, 2024(15): 61-66.
[23] Zhang Jing. Research on the Transformation of Vocational Education Governance in the Context of an Intelligent Society [J]. Vocational and Technical Education, 2024(5): 23-30.
[24] Li Hui. Relearning Mechanisms in Vocational Education from the Perspective of Lifelong Education [J]. Education and Vocation, 2023(19): 48-54.
[25] Pan Nan. Construction of Lifelong Learning Pathways in the Modern Vocational Education System [J]. Chinese Vocational and Technical Education, 2023(5): 11-16.
[26] Wei Ziwen. Integration of National Vocational Education Platform Construction and Multiple Learning Pathways [J]. Continuing Education Research, 2024(2): 18-23.
[27] Dede C., Richards J. Lifelong Learning and Microcredentials in a Digital Economy [J]. Journal of Learning Analytics, 2023, 10(1): 23-34.

[28] Zhang Xiaomeng. Intelligent Manufacturing, Vocational Education, and the Upgrading of the Labor Skill Structure [J]. Labor Economics Research, 2025(6): 11-31.

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