

Developing the Educator Workforce for Open and Flexible TVET Systems: A Critical Integrative Review and Policy Framework for Viet Nam

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ABSTRACT: Open and flexible technical and vocational education and training (TVET) is increasingly organized around a set of open modular pathways delivered through a blend of learning settings and contexts, making use of recognition of prior learning and new forms of small scale credentials, increasingly located in and around the world of work. The educator workforce is seen as merely a delivery mechanism in most of the current TVET reform agendas. This workforce is in fact the central condition that determines the quality of education, the equity of access and the overall system coherence. This critical integrative review examines the capabilities and enabling conditions required across institution-based teachers, workplace trainers, assessors, guidance personnel, instructional leaders, digital learning specialists, and industry experts. A structured purposive review brought together 49 scholarly and policy sources, interpreted through four lenses: system openness, flexibility, workforce capability, and contextual transfer. The synthesis identifies an interconnected development architecture spanning initial preparation, induction, occupational renewal, reciprocal industry engagement, collaborative professional learning, career progression, and evidence-informed quality assurance. It also reveals persistent tensions. Flexibility can fragment curricula; digital provision may marginalise the material and social dimensions of vocational learning; employer responsiveness can narrow educational purposes; and formal standards may displace professional judgement when they become compliance-oriented. In Viet Nam, recent legislation and governance reform create an important policy window, although available evidence does not yet show how consistently occupational currency, professional learning, industry mobility, and workplace learning are supported across institutions and regions. The article therefore proposes a heuristic Open and Flexible TVET Educator Workforce Development Framework and a three-phase policy roadmap for 2026–2045. It concludes that open and flexible TVET becomes credible only when those who teach, assess, mentor, design, and connect learning with work are themselves supported through coherent systems of lifelong professional learning.

KEYWORDS: technical and vocational education and training; educator workforce development; open and flexible education; lifelong learning; industry partnerships; Viet Nam

I. INTRODUCTION

TVET is expected to fulfill a broad and diverse range of goals and objectives for young people and adults alike. Not only should it enable first-time entrants to the labor market to acquire the necessary skills, it should also enable people already in the labor market to switch to other occupations as needed in order to facilitate the digital and green transition and to boost regional economic activity. TVET must also be geared to increasing opportunities on the labor market for a wide range of people and thus become more open. This change in focus on openness and flexibility in TVET has shifted from the periphery to the very center of current TVET reform. The term openness is no longer confined to the issue of access to TVET; rather it also encompasses movement between different levels and types of provision as well as the recognition of informal and non-formal learning. In addition, TVET systems must become more flexible with regard to a range of different parameters, including the opportunity to join and leave a program at different points, a range of different scheduling options, a range of different learning locations including the workplace and the possibility of using digital media, and finally the portability of qualifications to be used throughout people's lives (Council of the European Union, 2022a, 2022b; UNESCO Institute for Lifelong Learning, 2022).

The policies, however, move faster than the workforce. Digital platforms, micro-credentials, work-based learning, National Qualifications Frameworks and employer partnerships are key to the changes under way. All of these will rely on the professional judgment of those who develop, implement and monitor them. Those responsible for advising learners taking non-traditional routes into learning will need to be able to interpret the latter's prior learning. Those responsible for designing and delivering blended programs will need to be able to decide whether particular learning outcomes can be delivered online or whether they require material practice under supervision. Industry-aligned curricula need staff who remain occupationally current without reducing education to the next vacancy. Recognition of prior learning depends on assessors who can make defensible decisions across formal,

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non-formal, and workplace evidence. The integrity of an open system consequently rests on a professional workforce whose influence extends well beyond classroom instruction.

In the international research on TVET, teachers and trainers in vocational education and training are frequently identified as crucial but vulnerable groups influencing the quality of the sector. Their role requires the combination of their vocational experience and pedagogical knowledge, which is described by several authors as dual professionalism (Cedefop, 2022; Grollmann, 2008; OECD, 2021; Subrahmanyam, 2020). The range of capabilities that teachers and trainers need to master is increasing. Besides the classic digital, inclusive, green and other capabilities of teachers and trainers, assessment, guidance, partnership and leadership capabilities are also required. However, the recruitment of skilled teachers and trainers for TVET institutions is difficult, because also in industry their lack of skills is felt. Furthermore, the need for Continuing Professional Development (CPD) of teachers and trainers is often not systematic and not related to changes in the work place. Often there is no relation with career development of teachers and trainers. Workplace trainers are prepared less for their role as teachers than full time teachers in institutions for vocational education and training (OECD, 2022; World Bank et al., 2023).

The case of Vietnam is particularly relevant. The vocational education and training (VET) development strategy up to 2030, with a vision towards 2045, outlines an open, flexible, inclusive, modern, demand-driven and internationally connected education and training system. Digital transformation and workforce development are declared as two key areas where breakthroughs are required (Prime Minister of Viet Nam, 2021). The institutional network of educational institutions and the national education development strategy aim to connect the system and to foster lifelong learning, connections to work and improved quality (Prime Minister of Viet Nam, 2023, 2024). There is, however, also evidence of gaps in relation to the occupational skills of graduates, integrated learning, practical experience, capacity in regions outside of Hanoi and Ho Chi Minh City, and continuing professional development (Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ], 2023).

Across the literature reviewed, valuable insights can be found in several closely related areas, including vocational teacher development, workplace learning, digital education, qualification reform, and system governance. However, these strands of research are often discussed separately. As a result, they offer only a partial explanation of how educator roles, professional learning, institutional work design, and industry participation need to interact if open and flexible TVET is to remain coherent, equitable, and educationally credible. Against this background, the article addresses three questions: (1) What capabilities and enabling conditions are required across the distributed educator workforce of an open and flexible TVET system? (2) How do contrasting international workforce arrangements support flexibility, quality, and equity, and under what contextual conditions do these mechanisms operate effectively? (3) Which design principles can be adapted into a feasible workforce development framework and a staged policy agenda for Viet Nam? In response, the article develops an analytically grounded capability architecture, offers a context-sensitive comparison of international mechanisms, and proposes a heuristic roadmap to guide policy development and future research.

II. REVIEW APPROACH AND CONCEPTUAL BOUNDARIES

This article uses a critical integrative review to connect heterogeneous scholarly and policy evidence that cannot be meaningfully reduced to a single effect estimate. The aim is conceptual integration and theory building rather than exhaustive retrieval or causal estimation (Snyder, 2019; Torraco, 2016). Accordingly, the review used a structured purposive selection strategy, not a PRISMA-style systematic review.

Candidate sources were identified through Google Scholar, ERIC, and the repositories of UNESCO, UNESCO-UNEVOC, the International Labour Organization, OECD, Cedefop, the World Bank, European institutions, the Australian National Centre for Vocational Education Research, and Vietnamese government and sector agencies. Searching was completed on 19 July 2026. Search combinations linked TVET or vocational education with teachers, trainers, assessors, mentors, educator workforce, professional development, occupational currency, open and flexible learning, blended learning, recognition of prior learning, micro-credentials, industry partnership, digital transformation, green transition, and Viet Nam. The principal publication period was 2010-2026; earlier sources were retained when they provided foundational concepts. English-language scholarly sources and official Vietnamese legal or policy documents were eligible.

Sources were selected when they contributed directly to at least one review question and offered sufficient methodological, conceptual, or institutional detail to support interpretation. They were excluded when they concerned general education without a transferable TVET mechanism, addressed technology or credentials without workforce implications, duplicated a more complete source, or lacked identifiable provenance. The final interpretive corpus comprised 49 sources. Appraisal considered methodological transparency, source authority, relevance, recency, contextual specificity, and the fit between the claim and the evidence. No composite quality score was used. Empirical studies and primary legal or policy documents carried the greatest weight for factual claims; conceptual and comparative sources were used principally to identify mechanisms, tensions, and transfer conditions.

A structured extraction matrix recorded jurisdiction, source type, educator role, dimension of openness or flexibility, capability domain, development mechanism, enabling condition, reported outcome, limitation, and transfer implication. Synthesis proceeded through constant comparison across four lenses: system openness, flexibility, workforce capability, and contextual transfer.

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Recurring mechanisms informed the capability domains and the five layers of the proposed framework, while contradictory findings and implementation risks were retained rather than averaged away. All stages were conducted by the author; the resulting single-reviewer design is recognised as a possible source of interpretive bias.

To strengthen auditability, the sources were mapped against the review questions and the emerging synthesis. The map distinguishes direct empirical evidence, comparative description, conceptual argument, legal or policy mandate, and the author's interpretive proposition. This distinction matters because the framework does not treat all source types as equivalent: primary evidence supports descriptive claims, while conceptual and comparative material informs mechanism identification and theory development. Table I presents a concise evidence-to-framework audit trail.

Table I. Evidence-to-Framework Map of the Review Corpus

Source cluster	Workforce roles	Representative sources	Primary contribution	Principal limitation	Framework layer(s)
Vocational professionalism and professional learning	Institution-based teachers, leaders	Grollmann (2008); Köpsén (2014); Andersson and Köpsén (2015); OECD (2021, 2022); Borko (2004); Kennedy (2016)	Dual professionalism, identity, induction, sustained practice-connected learning	Evidence favours institution-based teachers; limited longitudinal outcome evidence	Professional learning; institutional capacity
Workplace learning and boundary crossing	Teachers, workplace trainers, mentors	Billett (2011); Eraut (2004); Tynjälä (2008); Akkerman and Bakker (2011); Wenger (1998)	Situated participation, transfer, tacit knowledge, communities and boundary work	Mechanisms are well theorised but unevenly tested at system scale	Co-development with work; professional learning
Openness, flexibility, recognition, and lifelong learning	Assessors, advisers, curriculum staff	Collis and Moonen (2001); Cronin (2017); Werquin (2010); Council of the European Union (2022a, 2022b); UNESCO Institute for Lifelong Learning (2022)	Dimensions of flexibility, RPL, micro-credentials, portability, guidance	Some evidence originates outside TVET and requires contextual transfer	System stewardship; evidence and renewal
Digital, AI, and green transitions	Teachers, designers, leaders, industry experts	International Labour Organization [ILO] and UNESCO (2020); Comyn et al. (2021); Redecker (2017); UNESCO (2022, 2023); European Commission (2020); OECD (2025a).	Blended design, digital governance, AI judgement, sustainability capability	Technology and AI evidence is fast-moving; outcomes remain context dependent	All five layers
Contrasting international architectures	Distributed workforce roles	Cedefop (2022); OECD (2025b); Joyce (2019); Misko and Circelli (2022); World Bank et al. (2023)	Governance mechanisms, quality infrastructure, social partnership, scale and financing	Cases illustrate mechanisms; they are not performance rankings	System stewardship; institutional capacity; co-development
Viet Nam policy, law, and sector evidence	Teachers, trainers, institutions, authorities	Prime Minister of Viet Nam (2021, 2023, 2024); GIZ (2023); National Assembly of Viet Nam (2025a, 2025b); Government of Viet Nam (2026a, 2026b, 2026c)	Policy window, legal roles, institutional network, implementation gaps and monitoring priorities	Current implementation evidence is incomplete and uneven across regions	All five layers; roadmap

Note. The table is a representative audit trail, not an exhaustive source-by-source inventory. RPL = recognition of prior learning. Source: Author's synthesis.

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A. Defining an Open and Flexible TVET System

TVET has fluid boundaries across countries, sectors, and levels (Moodie, 2002). For the purposes of this review, open and flexible TVET is conceptualised through seven connected dimensions. Access concerns who may enter and whether admission recognises diverse educational and occupational histories. Pathway flexibility concerns movement among levels, providers, occupations, and academic and vocational routes. Temporal and spatial flexibility concerns when and where learning occurs. Curricular flexibility concerns modularisation, elective choice, and adaptation to regional or sectoral needs. Recognition flexibility concerns credit transfer, recognition of prior learning, and stackable credentials. Partnership openness concerns how teaching, assessment, and innovation are distributed across institutions, workplaces, professional bodies, and communities. Resource and data openness concerns the accessibility, reusability, interoperability, and responsible use of materials, platforms, simulations, and evidence systems (Collis & Moonen, 2001; Cronin, 2017).

These dimensions are mutually dependent. Modular credentials without reliable recognition do not create mobility. Online delivery without learner support does not create equitable access. Workplace learning without prepared mentors does not assure learning. Institutional autonomy without shared standards can produce inconsistency. The educator workforce is implicated in every dimension, which is why workforce development cannot be separated from the architecture of the open system itself.

B. Vocational Educators as a Distributed Workforce

The term TVET educator workforce is used deliberately. It includes teachers in colleges and vocational schools, trainers and mentors in enterprises, curriculum specialists, assessors, career guidance personnel, digital learning designers, instructional leaders, and industry experts who contribute part-time or episodically. Restricting the workforce to full-time teachers obscures how contemporary TVET is actually delivered. In dual and work-based systems, substantial learning occurs under workplace supervision. In digitally supported systems, designers and technical staff shape the learner experience. In flexible recognition systems, assessors and advisers may influence progression as strongly as lecturers.

A distributed workforce offers access to richer expertise, but it also creates coordination problems. Roles may be unclear, standards uneven, and professional learning inaccessible to contributors outside conventional employment categories. A coherent strategy therefore requires common capability expectations alongside role-specific pathways. It also needs reliable mechanisms for boundary crossing because vocational knowledge moves among colleges, enterprises, professional communities, technology providers, and learners' prior experience (Akkerman & Bakker, 2011).

Table II. Dimensions of an Open and Flexible TVET System and Workforce Implications

System dimension	Operational meaning	Workforce requirement	Critical risk
Access	Entry for diverse ages, backgrounds, and employment situations	Inclusive pedagogy, advising, diagnostic assessment, and learner support	Admission expands without support for participation and completion
Pathways	Movement across levels, providers, occupations, and academic and vocational routes	Curriculum mapping, credit advice, and cross-institutional coordination	Learners accumulate disconnected modules or encounter dead ends
Time, place, and pace	Blended, workplace, part-time, asynchronous, and accelerated options	Learning design, digital facilitation, and realistic workload planning	Flexibility shifts time, cost, and risk burdens to learners and staff
Curriculum	Modular and locally responsive content within transparent outcomes	Occupational currency, curriculum co-design, and pedagogical sequencing	Short-term employer demand narrows educational breadth
Recognition	Credit transfer, RPL, micro-credentials, and stackability	Assessment literacy, moderation, and credential guidance	Weak assessment undermines trust and portability
Partnership	Shared provision across institutions, enterprises, and communities	Boundary spanning, mentoring, and partnership governance	Unequal power or dependence on large firms
Resources and data	Accessible resources, simulations, interoperable platforms, and evidence systems	Digital, ethical, data, and AI capability	Digital exclusion, privacy risks, and tool-driven pedagogy

Note. RPL = recognition of prior learning; AI = artificial intelligence. *Source:* Author's synthesis.

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III. THE CHANGING CAPABILITY PROFILE OF THE TVET EDUCATOR WORKFORCE

A. Dual Professionalism, Identity, and Occupational Currency

The defining feature of vocational teaching is its relationship to an occupation. Credibility depends partly on whether educators understand contemporary tools, processes, standards, safety requirements, work organisation, and occupational cultures. Yet occupational expertise depreciates when educators spend long periods away from practice. New machinery, software, environmental regulation, and business models can make yesterday's competence insufficient. Industry attachments, joint projects, practitioner networks, certification, and part-time movement between college and workplace are therefore mechanisms for maintaining the epistemic basis of vocational teaching rather than optional enrichment (Grollmann, 2008; OECD, 2021).

Occupational currency should not be confused with narrow task familiarity. Educators need to understand why practices change, how technology reorganises work, and how learners can transfer knowledge across settings. Billett (2011) emphasises the interaction of occupational concepts, individual engagement, and situated practice. Eraut (2004) shows that workplace learning is often informal, socially distributed, and difficult to articulate. Wheelahan (2015) warns that curricula organised around atomised competencies can deprive learners of the conceptual knowledge needed to adapt beyond the immediate job. The educator's task is to connect current practice with the deeper resources that support judgement and future learning. This occupational–pedagogical integration is also an identity task: educators need continuing recognition within both institutional and occupational communities (Köpsén, 2014).

B. Vocational Pedagogy for Practice, Judgement, and Transfer

Vocational pedagogy is distinctive because much of what learners must acquire is embodied, tacit, social, and consequential. The quality of a weld, a clinical procedure, a machine diagnosis, or a hospitality interaction cannot be learned through verbal explanation alone. Effective teaching combines modelling, coached practice, questioning, simulation, reflection, feedback, and progressively more authentic participation. It helps learners see not only what experts do, but what they notice, anticipate, and judge (Lucas et al., 2012).

Flexibility makes this work more demanding. When learning is distributed across online modules, workshops, enterprises, and independent projects, educators must create coherence across experiences that learners may encounter in different sequences. They need to make tacit knowledge discussable, connect theory with practice, and recognise when variation in delivery threatens the integrity of outcomes. Workplace learning research shows that transfer is not automatic; it depends on participation, guidance, reflection, and the capacity to recontextualise knowledge across settings (Tynjälä, 2008). Digital simulation can expand safe practice and repeated access, but it is not a universal substitute for material experience. The key question is pedagogical fit: which medium enables which kind of learning, for which learner, and at which stage?

C. Digital, Open, and Artificial Intelligence Capability

For vocational educators, digital capability has at least three layers. Operational competence concerns platforms, devices, simulations, and sector technologies. Design competence concerns the construction of coherent blended sequences and accessible resources. Critical competence concerns privacy, bias, intellectual property, data quality, and the limits of algorithmic tools. At system level, digitalisation also requires interoperability, institutional support, and governance rather than individual tool use alone (Comyn et al., 2021).

Generative artificial intelligence sharpens these requirements. Educators may use AI for lesson planning, adaptive support, simulation, assessment preparation, and labour-market guidance while also preparing learners for AI-transformed occupations. The same tools can reproduce bias, disclose sensitive information, generate inaccurate technical advice, and encourage superficial assessment practices. UNESCO (2023) therefore places human agency, transparency, inclusion, privacy, and pedagogical purpose at the centre of responsible use. Professional learning should move beyond demonstrations of tools towards disciplined judgement about when AI augments expertise, when it distorts evidence, and when human supervision is non-negotiable.

D. Assessment, Recognition, and Credential Literacy

An open system depends on trust. Learners, employers, institutions, and regulators must understand what a qualification or micro-credential represents. Assessors consequently carry substantial responsibility. They must interpret standards, gather evidence from varied settings, distinguish authentic competence from coached performance, and make decisions that are consistent, transparent, and appealable. Recognition of prior learning adds complexity because evidence may be informal, incomplete, or embedded in work products rather than conventional examinations (Werquin, 2010).

Micro-credentials can make continuing education more responsive and stackable, but only when learning outcomes, workload, assessment, level, quality assurance, and portability are transparent (Council of the European Union, 2022a). Individual learning accounts may widen access, yet funding entitlements do not create coherent pathways without guidance and recognised standards (Council of the European Union, 2022b). Educators therefore need credential literacy: an understanding of how small units relate to broader occupational profiles, how credits accumulate, and when modularisation fragments holistic competence. The workforce

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itself may benefit from stackable professional credentials, provided that they contribute to recognised roles and progression rather than an endless sequence of low-value certificates.

E. Inclusion, Guidance, and Relational Work

Opening access changes the learner population. Adults returning after long absences, rural learners, people with disabilities, migrants, workers in precarious employment, and learners from low-income backgrounds may require different forms of support. Inclusion is not achieved by admission alone. Educators need capability in differentiated instruction, universal design, culturally responsive practice, language support, psychosocially responsive engagement, and referral. They must also recognise that flexible learners frequently manage employment and family responsibilities and may disengage when institutions assume unlimited time, connectivity, or confidence.

Career guidance increasingly becomes part of pedagogy. Vocational educators are often trusted sources of information about occupations, progression, and workplace expectations, yet guidance based only on personal experience can reproduce outdated assumptions. Staff need access to labour-market intelligence and the ability to discuss uncertainty honestly, including the likelihood that learners will move across several occupations rather than enter a single stable trade. Guidance should make visible the relationships among modular pathways, further study, and emerging green and digital occupations (OECD, 2025a).

F. Green and Sustainability Capability

The green transition should be treated as a distinct, cross-cutting capability rather than as a minor extension of occupational currency. Vocational educators need sector-specific knowledge of environmental standards, resource efficiency, circular production, low-carbon technologies, occupational health and safety, and the distributional consequences of transition. They also require pedagogical capability to help learners analyse trade-offs, redesign work processes, and transfer sustainability principles across technologies and workplaces (European Commission, 2020; OECD, 2025a; UNESCO, 2022).

G. Partnership, Boundary Spanning, and Collective Agency

Because no individual can maintain expertise across all of these domains, collective agency is essential. Communities of practice, mentoring, team teaching, curriculum co-design, and applied research distribute expertise and renew it through participation (Wenger, 1998; Borko, 2004; Desimone, 2009; Kennedy, 2016; Opfer & Pedder, 2011). In TVET, educators must also negotiate the boundary between education and production rather than merely receive employer instructions. They translate workplace change into curriculum while questioning practices that are unsafe, exclusionary, environmentally harmful, or excessively narrow. Structured initiatives can support this work, but their influence depends on opportunities to adapt, apply, and share learning within institutions (Andersson & Köpsén, 2015).

H. Leadership and Organisational Learning Capability

Open and flexible TVET requires leadership that makes professional learning part of institutional work rather than an additional individual obligation. Principals, middle leaders, and programme coordinators need to align workforce planning, workload allocation, partnership governance, digital and green infrastructure, mentoring, and evidence use. They also need to create conditions in which educators can test, discuss, and refine practice without reducing professional development to attendance or compliance. Research on teacher learning suggests that professional development is more likely to influence practice when organisational routines, leadership support, and opportunities for collective sense-making reinforce individual learning (Kennedy, 2016; Opfer & Pedder, 2011). Evidence of leadership capability should therefore include protected learning time, mentoring coverage, the use of evidence in programme improvement, and the diffusion of learning across teams. Leadership is not a separate administrative layer added after professional learning; it is one of the conditions that determines whether learning becomes institutional capability.

Table III. Future-Ready Capability Domains for The TVET Educator Workforce

Capability domain	Illustrative capabilities	Preferred development modes	Evidence of capability
Occupational expertise and identity	Current technologies, standards, safety, work organisation, professional identity	Industry attachments, practitioner projects, certification, occupational networks	Workplace project, supervisor validation, updated portfolio
Vocational pedagogy	Modelling, coached practice, theory–practice integration, feedback, transfer	Practice-based courses, mentoring, lesson study, peer observation	Observed teaching, learner work, reflective analysis
Digital, open, and AI learning	Blended design, simulation, accessibility, data and AI judgement	Design studios, supported experimentation, online communities	Blended unit, accessibility audit, implementation evidence

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Capability domain	Illustrative capabilities	Preferred development modes	Evidence of capability
Assessment and recognition	Standards interpretation, authentic assessment, RPL, moderation	Assessor training, calibration workshops, supervised decisions	Moderated decisions, assessment portfolio, reliability review
Inclusion and guidance	Differentiation, universal design, career guidance, referral, adult learner support	Case-based learning, coaching, interdisciplinary teams	Learner support plan, progression and equity evidence
Green and sustainability	Environmental standards, resource efficiency, circular practices, low-carbon technologies	Industry projects, sustainability audits, sector-expert collaboration	Revised tasks, learner projects, environmentally informed assessment
Partnership and boundary spanning	Curriculum co-design, employer communication, reciprocal partnership, applied innovation	Joint industry teams, co-teaching, practitioner networks, boundary-crossing roles	Partnership outputs, curriculum change, reciprocal participation
Leadership and organisational learning	Workforce planning, protected time, mentoring systems, evidence use, diffusion of learning	Leadership pathways, inquiry communities, network coordination	Team improvement, mentoring coverage, institutional learning evidence

Note. Entries are proposed examples derived from the review; they are not validated competency standards or assessment instruments. RPL = recognition of prior learning; AI = artificial intelligence. Source: Author's synthesis.

IV. INTERNATIONAL EXPERIENCE: PROMISING ARCHITECTURES AND THEIR LIMITS

International comparison offers design principles, but visible systems are often misunderstood. Their outcomes do not arise from a single feature such as apprenticeship, teacher licensing, or employer participation. They emerge from interacting institutions, labour-market arrangements, financing mechanisms, and professional cultures. The relevant question for Viet Nam is not which model to copy, but which functions must be performed and which arrangements could perform them credibly under Vietnamese conditions. The cases reviewed here were selected for analytic contrast, not as a ranking. The dual-system cluster illustrates institutionalised social partnership and differentiated school-workplace roles; Singapore illustrates coordinated workforce planning and institution-led professional learning; Australia illustrates the opportunities and risks of modular, competency-based, and market-oriented provision; European initiatives illustrate supranational approaches to portability and validation; and international development programmes illustrate implementation under constrained institutional capacity. Germany, Switzerland, and Denmark are treated as a family of dual arrangements rather than as a homogeneous model. Their federal structures, trainer regulation, financing, and employer institutions differ in ways that matter for transfer.

A. Dual Systems: Structured Connections Between School and Work

Germany, Switzerland, Denmark, and related systems illustrate the value of making workplace participation a formal component of vocational learning. Teachers in schools and trainers in enterprises hold differentiated but complementary responsibilities. Occupational standards are shaped through social partnership, and workplaces are treated as learning sites rather than destinations after graduation. This architecture supports relevance because curriculum renewal, assessment, and training capacity are connected to employer and occupational institutions (OECD, 2022, 2025b).

The workforce lesson is not simply to send teachers on occasional industrial visits. Dual arrangements create recurring interfaces among educators, firms, chambers, unions, and public authorities. They also recognise workplace trainers as a professional group whose preparation matters. Even so, dual systems face shortages of training places, variation in firm quality, difficulty engaging small enterprises, and pressure to update trainers during digital and green transitions. Transfer therefore requires quality assurance, intermediary organisations, and sustainable financing, not only agreements encouraging cooperation.

B. Singapore: Institutionalised Professional Learning and Industry Engagement

Singapore's Institute of Technical Education illustrates a different mechanism. Relatively centralised governance supports alignment among national economic strategy, institutional planning, educator development, and learner support. Lecturers are commonly recruited with substantial industry experience and then receive structured pedagogical preparation. Industry attachments, applied projects, modern learning environments, and efforts to raise the status of vocational pathways reinforce one another (OECD, 2025b).

C. Australia and Europe: Flexibility, Recognition, and Quality Infrastructure

Australia's long experience with competency-based training, recognition of prior learning, public and private provision, and modular delivery shows both the potential and the risks of flexibility. Modularisation may improve access for adults and employers, but

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provider competition, fragmented qualifications, variable assessment, and compliance burden can weaken trust. The Australian expert review called for stronger system architecture and quality assurance, while later research questioned whether narrow formulations of competence adequately capture transferable, interpersonal, and judgement-based capability (Joyce, 2019; Misko & Circelli, 2022). The broader lesson is that flexibility requires a professionally supported assessor workforce and quality systems concerned with learning rather than paperwork alone.

European initiatives on qualification frameworks, validation, credit, micro-credentials, and individual learning accounts seek to create portable opportunities for lifelong learning. Their value lies in common descriptors and quality principles that make small units more interpretable across providers (Council of the European Union, 2022a, 2022b). Cedefop adds a workforce perspective: teachers and trainers require sustained development for inclusive, digital, and green TVET, yet access remains uneven and workplace trainers are often less regulated or supported than institution-based teachers (Cedefop, 2022). A flexible credential ecosystem is therefore only as credible as the professional judgement underpinning design, guidance, and assessment.

D. International Development Experience: Reform Beyond Equipment and Projects

In low and middle income countries, TVET reform has often been organised around facilities, equipment, curriculum packages, or donor-funded centres of excellence. Such investments can be valuable but frequently underperform when workforce development is treated as an accompanying activity rather than as a core reform. The World Bank, ILO, and UNESCO emphasise that stronger formal systems require clear mandates, sustainable financing, accountability, labour-market relevance, and capable institutions (World Bank et al., 2023). UNESCO-UNEVOC similarly identifies industry exposure, future-skills information, coordinated stakeholder action, and career-linked professional development as recurring conditions for effective staff development (Subrahmanyam, 2020).

Table IV. International Workforce Architectures and Transferable Lessons

Illustrative context	Workforce architecture	Transferable lesson	Caution for policy transfer
Germany, Switzerland, and Denmark	Complementary school teachers and workplace trainers; social partnership; formal work-based learning	Create recurring interfaces, shared standards, and support for workplace trainers	Depends on employer capacity, collective institutions, trainer regulation, and sustainable financing
Singapore	Industry-experienced lecturers; coordinated induction, attachments, and applied projects	Integrate recruitment, pedagogy, industry renewal, and institutional strategy	Centralised governance and high investment are difficult to reproduce directly
Australia	Competency-based qualifications, flexible providers, RPL, and modular delivery	Flexibility needs strong assessment, moderation, and provider accountability	Marketisation and fragmentation can weaken trust and educational coherence
European Union	Qualification frameworks, validation, credit, micro-credential principles, and learning accounts	Use common descriptors and quality principles to support portability	Formal frameworks do not guarantee recognition, guidance, or staff capacity in practice
International development programmes	Centres of excellence, equipment investment, teacher training, and donor partnerships	Build scale through networks, trainer development, incentives, and institutional work design	Project islands may disappear when funding ends or trained staff leave

Note. Cases are selected for analytic contrast, not performance ranking. RPL = recognition of prior learning. Sources: OECD (2022, 2025b), Joyce (2019), Misko and Circelli (2022), Cedefop (2022), and World Bank et al. (2023).

V. CRITICAL TENSIONS IN WORKFORCE DEVELOPMENT FOR OPEN AND FLEXIBLE TVET

The reviewed literature supports a broader and more connected approach to workforce development, but it also reveals tensions that reform language can easily conceal. These tensions are not arguments against openness or flexibility. They identify the safeguards required if reform is to remain educationally credible.

A. Flexibility Versus Coherence

Multiple entry points, modular courses, online delivery, and provider diversity can make programmes difficult to navigate. Learners may accumulate disconnected certificates without a clear occupational pathway, while educators may teach isolated units without understanding the whole qualification. The answer is not a return to rigid programmes, but curricular maps, guidance, credit rules, and professional collaboration that preserve coherence across flexible components. Modularity becomes educationally defensible

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only when it remains connected to a recognisable occupational pathway (Council of the European Union, 2022a, 2022b; Wheelahan, 2015).

B. Industry Responsiveness Versus Educational Breadth

Employer participation is indispensable, but immediate demand is not identical to long-term learner interest. Firms may prefer narrow skills tailored to current processes, whereas workers need conceptual knowledge, safety awareness, digital adaptability, sustainability judgement, and capacity for further learning. Vocational educators occupy the difficult space between responsiveness and educational stewardship. The professional task is to translate labour-market change into education without surrendering breadth, safety, sustainability, or learners' longer-term mobility (Billett, 2011; UNESCO, 2022; Wheelahan, 2015).

C. Digital Access Versus the Materiality of Vocational Learning

Digital delivery can reduce travel, support employed learners, and provide repeated access to demonstrations. It can also obscure the material character of occupations. Touch, force, timing, sound, smell, spatial coordination, and interpersonal presence are not fully captured on a screen. A mature strategy distinguishes substitution from augmentation. Online resources may support preparation, theory, visualisation, reflection, and feedback, but competence that depends on material and social interaction still requires authentic practice. Digital provision should therefore be judged by pedagogical fit and by its capacity to augment, rather than indiscriminately replace, occupational experience (Comyn et al., 2021; ILO & UNESCO, 2020).

D. Standardisation Versus Professional Judgement

Standards support portability and fairness, yet they can become compliance checklists. Competence is rarely demonstrated through isolated behaviours alone. Assessors must interpret performance in context and judge consistency, independence, safety, transfer, and ethical conduct. If professional judgement is weak, more detailed standards may generate more paperwork rather than more reliable decisions. Portability therefore depends not only on written specifications but also on assessor preparation, moderation, and defensible judgement (Cedefop, 2022; Werquin, 2010).

E. Workforce Flexibility Versus Decent Professional Conditions

Open systems often rely on part-time experts, short contracts, and workplace contributors. This can bring current expertise into education, but it may also create a peripheral workforce with limited access to induction, professional learning, or institutional voice. A system that offers flexible learning through insecure teaching arrangements risks weakening continuity and quality. Role flexibility is sustainable only when peripheral contributors receive proportionate preparation, access to learning, and recognised participation in the professional community (OECD, 2022; World Bank et al., 2023).

VI. VIET NAM: A NEW POLICY WINDOW AND CONTINUING IMPLEMENTATION RISKS

Viet Nam's policy environment for TVET workforce development changed substantially between 2021 and 2026. Decision No. 2239/QĐ-TTg established the vocational education development strategy for 2021–2030, with a vision to 2045; Decision No. 73/QĐ-TTg approved the institutional network plan; and Decision No. 1705/QĐ-TTg connected these ambitions to the national education development strategy (Prime Minister of Viet Nam, 2021, 2023, 2024). More recent legislation is directly relevant to the educator workforce. The Law on Teachers No. 73/2025/QH15 and the Law on Vocational Education No. 124/2025/QH15 took effect on 1 January 2026, while Decrees No. 93/2026/ND-CP and 95/2026/ND-CP provide implementing provisions for the two laws (National Assembly of Viet Nam, 2025a, 2025b; Government of Viet Nam, 2026a, 2026b). Decree No. 279/2026/ND-CP further defines the functions and organisational structure of the Ministry of Education and Training, including state management of vocational education (Government of Viet Nam, 2026c).

Taken together, these instruments create a new statutory and governance window for clarifying educator roles, professional standards, rights and duties, career development, institutional responsibilities, technology use, and system connectivity. They also create transition risks involving regulatory alignment, data systems, staffing, financing, and coordination across levels of government and institutions. The legal changes should be treated as enabling conditions whose implementation requires empirical monitoring, not as evidence that professional coherence or workforce capability has already been achieved.

The strongest available sector evidence still points to a gap between formal qualifications and the capabilities required for practice-oriented provision. The Viet Nam Vocational Education and Training Report 2021 documented a decline in teacher numbers, disruption to in-service development, and uneven occupational and integrated teaching capability. In the latest assessment reported there, approximately 70% of teachers met relevant occupational skill requirements for practical subjects, while around half of teachers in colleges and secondary vocational schools were qualified to teach integrated subjects (GIZ, 2023). These figures largely reflect conditions measured before publication and should not be treated as a real-time description of 2026. They nevertheless illustrate an enduring policy question: credentials held by educators do not automatically demonstrate current occupational competence or readiness for integrated and flexible delivery.

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Beyond these documented indicators, recent national evidence is not yet sufficient to estimate the system-wide prevalence of fragmented professional development, protected learning time, industry mobility, career-linked recognition, or regional partnership capacity in 2026. The discussion that follows therefore treats these issues as implementation risks and monitoring priorities supported by the reviewed policy and programme evidence, rather than as uniform conditions across all institutions.

A second risk concerns regional and institutional inequality. Well-connected colleges in major economic centres are more likely to have access to large firms, specialist equipment, and industry experts. Smaller, rural, and mountainous institutions may face thinner labour markets and fewer potential partners. A uniform partnership requirement could therefore widen rather than reduce capability gaps. Networked responses deserve priority: regional practice hubs, shared simulation facilities, mobile teams, pooled experts, cross-institutional communities, and funded access to occupational placements.

The growth of short courses, micro-credentials, and online provision creates a third governance challenge. Demand for employment-relevant learning is plausible and likely to grow, but robust national evidence on recognition, accumulation, and labour-market value remains limited. Without common descriptors, credit rules, assessment standards, guidance, and data systems, short courses may proliferate without meaningful portability. Flexibility should not be equated with lower standards or shorter duration alone. A credible micro-credential must represent assessed learning, fit within a transparent progression architecture, and be explained by educators who understand both its occupational value and its educational limits.

VII. AN OPEN AND FLEXIBLE TVET EDUCATOR WORKFORCE DEVELOPMENT FRAMEWORK

The cross-source synthesis generated five recurrent and interacting layers of workforce development. Figure 1 presents them as a heuristic architecture for organising policy design and future empirical testing in Viet Nam. The central premise is straightforward: professional capability is not solely an individual attribute. It is produced, renewed, and sometimes constrained by the surrounding system.

The first layer is system stewardship. National authorities define role families, capability expectations, qualification and credit rules, funding incentives, data requirements, and quality assurance. Standards should recognise differentiated roles while making occupational, pedagogical, digital, assessment, inclusive, sustainability, partnership, and leadership capability visible. Policy must also establish rights and expectations for continuing professional learning and credible processes through which professional recognition can be renewed.

The second layer is institutional capacity. Colleges and training centres need leadership, staffing models, digital infrastructure, partnership capability, and protected time that make professional learning possible. Workforce plans should identify occupational risks, succession needs, emerging programmes, and fields in which staff currency is deteriorating. Professional learning budgets should be connected to institutional strategy and evaluated through changes in practice rather than attendance alone.

The third layer is co-development with work. Enterprises, occupational associations, unions, public institutions, and intermediary bodies should participate in curriculum, assessment, equipment use, staff attachments, mentoring, and applied innovation. Partnership quality should be judged by reciprocity. Institutions contribute pedagogical and research expertise; workplaces contribute occupational knowledge, authentic problems, and access to practice. Small firms need intermediary support because they may lack the capacity to organise training independently.

The fourth layer is a professional learning architecture. Initial preparation, induction, mentoring, industry immersion, collaborative inquiry, digital learning, sustainability development, and leadership pathways should form a connected continuum. Stackable credentials can provide flexibility, but they should accumulate towards recognised professional roles. Recognition of prior learning can accelerate preparation for experienced practitioners entering education while still requiring evidence of pedagogical and assessment capability.

The fifth layer is an evidence and renewal loop. Workforce data, learner outcomes, employer feedback, assessment reliability, graduate transitions, staff retention, and equity indicators should inform periodic review. Evidence is most useful when it supports improvement rather than punitive ranking. The system needs to learn which forms of development change teaching, renew occupational knowledge, improve workplace learning, and support learner progression.

These layers are mutually dependent. Capability standards have little effect when institutions cannot release staff for learning. Industry attachments lose value when insights are not translated into curriculum. Digital platforms do not create openness when credentials remain non-portable. Data systems cannot support renewal when they measure enrolment while ignoring teaching quality, workplace learning, or learner mobility. Coordination capacity therefore sits at the centre of the framework. National steering, institutional leadership, intermediary organisations, and professional networks must align incentives and solve problems that no single college or enterprise can address alone.

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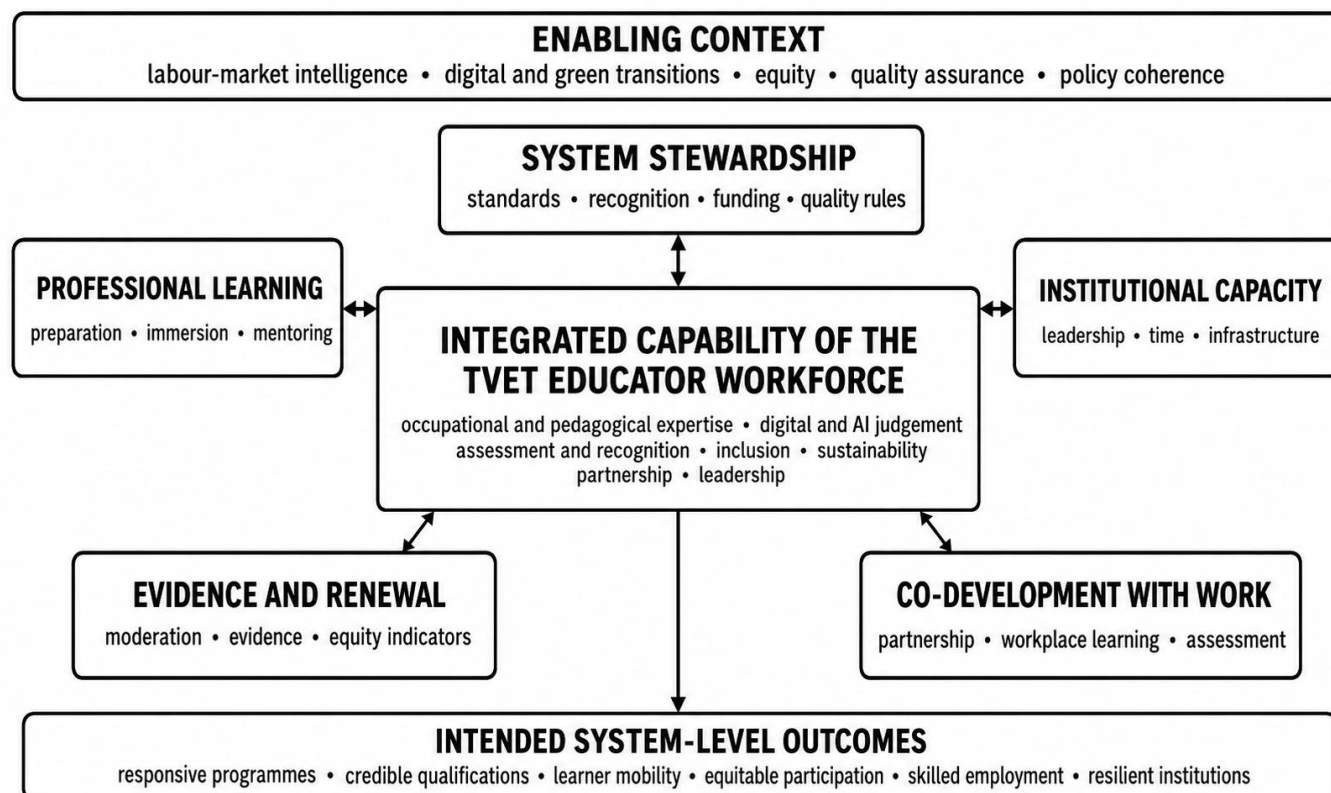


Figure 1. Open and Flexible TVET Educator Workforce Development Framework

Note. The five layers are reciprocal and non-sequential; the evidence and renewal loop informs all layers. Arrows represent hypothesised relationships rather than estimated causal effects. The framework is a heuristic architecture, not an empirically validated causal model. Source: Author's synthesis.

The framework identifies relationships for future examination rather than asserting a validated causal sequence. Proposition 1: protected learning time and leadership support strengthen the relationship between participation in professional learning and observable change in teaching and assessment. Proposition 2: structured and reciprocal industry engagement is more strongly associated with occupational currency and curriculum renewal than one-off industrial visits. Proposition 3: assessor calibration and moderation strengthen trust in recognition of prior learning and micro-credentials by improving consistency and transparency. Proposition 4: regional networks and intermediary organisations reduce capability gaps between well-connected institutions and smaller or rural providers by pooling expertise, facilities, mentoring, and access to workplaces. These propositions require testing through longitudinal, comparative, and design-based implementation research.

VIII. A THREE-PHASE POLICY ROADMAP FOR VIET NAM

Implementation should proceed in stages because the desired system cannot be created through a single standard or national training programme. The roadmap is a policy heuristic rather than a forecast. It proposes three phases: 2026-2030 for standards, pilots, baseline data, and demonstrator networks; 2031-2035 for scaling, portable professional recognition, and recurrent financing; and 2036-2045 for system-wide renewal and mobility across education, industry, and applied research. Evaluation should precede nationwide mandates, particularly for professional recognition, micro-credentials, digital platforms, and industry immersion. Implementation responsibility should be distributed but explicit. The Ministry of Education and Training should lead national capability expectations, professional recognition, data standards, and quality assurance. Provincial authorities and institutions should lead workforce planning and protected professional learning, while employer associations, enterprises, occupational bodies, and relevant public agencies should co-develop occupational standards, placements, assessment, and applied innovation. Universities of technical teacher education and high-capacity colleges can coordinate regional hubs, mentor preparation, and assessor moderation. Financing should combine recurrent public allocations, institutional workforce-development budgets, employer co-financing for reciprocal activities, and time-limited development support for pilots and rural outreach. National scaling should follow evidence from evaluated pilots rather than precede it.

Across the three phases, six practical moves should remain connected: a national capability framework with role-specific pathways; stackable professional learning linked to recognised careers; funded and reciprocal industry immersion; regional occupational

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networks that pool expertise; leadership and workload arrangements that protect learning time; and quality assurance based on applied professional and learner evidence. Portfolios, observation, moderation, workplace projects, mentoring records, and curriculum application should complement certificates. Scaling should be conditional on evidence that pilots improve practice, occupational currency, assessment consistency, learner progression, and regional equity rather than merely increasing participation counts.

Table V. Three-Phase Implementation Roadmap for TVET Educator Workforce Development in Viet Nam

Policy pillar	2026-2030: Foundation and pilots	2031-2035: Scaling and institutionalisation	2036-2045: System renewal
Capability and role standards	Define core and role-specific capabilities; establish baselines; pilot performance-based recognition	Scale validated standards; link recognition to career mobility and workforce planning	Institutionalise periodic capability renewal across the distributed workforce
Professional learning pathways	Develop induction, mentoring, stackable modules, and RPL for industry entrants	Establish portable professional qualifications and recurrent funding	Enable personalised lifelong pathways linked to advanced roles
Industry co-development	Fund attachments, co-teaching, curriculum teams, and employer networks	Scale two-way mobility and SME participation through intermediaries	Normalise mobility among education, industry, and applied research
Regional learning networks	Create occupational hubs, mentor pools, shared resources, and assessor calibration	Connect regional hubs nationally and expand rural outreach	Maintain specialist ecosystems and cross-border collaboration
Digital, open, and green infrastructure	Set standards for blended TVET, accessibility, simulations, data, AI, and sustainability	Build interoperable platforms, trusted digital credentials, and shared simulation capacity	Use adaptive evidence systems and continuously renewed sector technologies
Leadership, workload, and incentives	Train leaders; protect time; recognise mentoring and innovation in workload	Embed workforce development in appraisal, financing, and promotion	Reward collective impact, mobility, and sustained occupational renewal
Evidence and quality assurance	Track workforce capability, learner mobility, workplace learning, and equity	Use longitudinal and comparative data for improvement and accountability	Institutionalise feedback-driven system renewal

Note. The roadmap is illustrative and should be revised through evaluated pilots and stakeholder consultation. RPL = recognition of prior learning; SME = small and medium-sized enterprise; AI = artificial intelligence. Source: Author's synthesis.

Table VI. Governance, Financing, and Monitoring Matrix

Policy pillar	Lead and co-responsible actors	Indicative mechanism	financing	Core monitoring indicators
Capability and role standards	Ministry of Education and Training; provincial authorities; institutions; occupational bodies	Recurrent public allocation; institutional implementation budgets		Roles covered; validated portfolios; moderation results; regional participation
Professional learning pathways	Ministry; teacher-education universities; institutions; professional networks	Public and institutional budgets; co-funded advanced pathways		Completion and stacking rates; observed practice change; retention
Industry co-development	Institutions; employer associations; enterprises; occupational bodies; intermediaries	Employer co-financing; replacement-teaching funds; pilot grants		Attachment quality; co-designed units; SME participation; curriculum application
Regional learning networks	Provincial authorities; hub institutions; universities; associations	Regional allocations; pooled institutional resources; rural outreach funds		Network participation; shared modules; mentoring coverage; equity gaps

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Policy pillar	Lead and co-responsible actors	Indicative mechanism	financing	Core monitoring indicators
Digital, open, and green infrastructure	Ministry; institutions; technology and sector partners	Capital and recurrent digital budgets; shared procurement; targeted development funds		Access, usage, completion, accessibility, privacy, sustainability, and quality audits
Leadership, workload, and incentives	Ministry; provincial authorities; institutional governing bodies	Recurrent staffing budgets; workload allocation; performance and promotion mechanisms		Protected hours; staff engagement; promotion patterns; leadership capability
Evidence and quality assurance	Ministry; quality agencies; institutions; employer and learner representatives	Dedicated data and evaluation budgets		Learner progression; employer confidence; assessment reliability; equity trends

Note. Indicators are proposed monitoring domains, not validated measures. Each requires a baseline, target, data source, reporting interval, and assigned institutional responsibility. Source: Author's synthesis.

IX. LIMITATIONS OF THE REVIEW

Several limitations qualify the interpretation of this review. First, it is a critical integrative review rather than an exhaustive systematic review, and purposive inclusion of policy and institutional reports may favour highly visible international organisations and well-documented systems. Second, the predominance of English-language scholarship may underrepresent evidence published in national languages and practitioner outlets. Third, the literature is uneven across workforce roles: institution-based teachers are studied more frequently than workplace trainers, assessors, guidance personnel, or digital learning specialists. Fourth, the international cases are illustrative and analytically contrasting; they do not represent all viable TVET architectures and should not be read as a performance ranking. Fifth, current evidence for Viet Nam relies substantially on administrative and sector sources, some of which describe conditions measured several years before publication. Finally, all selection, appraisal, and synthesis decisions were made by one author, and the proposed framework and roadmap remain theory-building outputs requiring stakeholder consultation and empirical validation. These limitations reinforce the need to distinguish direct evidence from interpretive synthesis and policy proposition.

X. RESEARCH AGENDA

The evidence base on TVET educator development remains less mature than its policy importance suggests. Longitudinal studies are needed to examine how occupational currency changes over time and which forms of industry engagement influence curriculum and teaching. Participation counts are insufficient. Research should investigate whether attachments alter knowledge, professional networks, confidence, instructional decisions, and learner outcomes. Professional development research should move beyond satisfaction surveys. Designs should compare combinations of workshops, mentoring, collaborative inquiry, online modules, sustainability projects, and workplace assignments. Outcomes should include observed practice, assessment quality, retention, collective capability, and learner progression. Particular attention is needed to the interaction between individual learning and institutional conditions because trained educators cannot sustain new practice when workload, equipment, leadership, or incentives remain unchanged.

Research on workplace trainers is especially urgent. Their roles, preparation, incentives, and influence on learner experience are poorly documented in many systems, including Viet Nam. Studies should include small and medium-sized enterprises, informal and community settings, and emerging technology industries rather than focusing only on large partner firms. Comparative work should examine when concise role-specific preparation is sufficient and when more substantial professional recognition is necessary. The expansion of micro-credentials requires research on trust, accumulation, and labour-market value. Questions include whether learners understand progression routes, whether employers recognise different providers, how assessment quality varies, and whether small credentials support or delay completion of broader qualifications. Similar scrutiny is needed for professional micro-credentials offered to educators. The framework also creates a governance agenda. Studies should test whether protected learning time, structured industry immersion, assessor moderation, regional networks, and intermediary support explain variation between policy adoption and implementation quality. Design-based implementation research involving policymakers, institutions, educators, enterprises, and learners could refine the framework while producing evidence that is immediately useful for scale. Comparative work should focus on mechanisms rather than decontextualised rankings and should examine how those mechanisms operate under Vietnamese governance, financing, labour-market, and institutional conditions.

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XI. CONCLUSION

The transition towards open and flexible education changes the purpose, organisation, and boundaries of TVET. It enables learning across institutions, workplaces, digital environments, and different stages of life. It also creates risks of fragmentation, uneven quality, credential confusion, and exclusion. The decisive factor is not the existence of flexible programmes alone, but the professional capacity that holds them together. International experience suggests that capable vocational educators are developed through coherent systems. They enter through flexible but rigorous routes, receive strong induction, maintain occupational connections, learn collaboratively, gain recognised opportunities for advancement, and work within institutions that allocate time and resources for renewal. Employers and occupational bodies participate, but educational professionals retain responsibility for broad, transferable, safe, and sustainable learning. Standards provide direction, while professional judgement and moderation sustain quality. For Viet Nam, the review yields three conclusions. First, open and flexible TVET requires a distributed educator workforce with integrated occupational, pedagogical, digital, assessment, inclusive, sustainability, partnership, and leadership capabilities. Second, international experience indicates that these capabilities are sustained through protected professional learning, structured workplace engagement, assessor moderation, coherent career pathways, and intermediary support, but their effects depend on governance, financing, employer capacity, and professional conditions. Third, translation to Viet Nam should proceed through a staged and evaluative architecture aligned with the new teacher and vocational education legislation, rather than through isolated training projects or direct replication of foreign models. The proposed framework makes these interdependencies visible while remaining a heuristic that requires empirical validation. An open system is ultimately a promise that people can enter, return, progress, and have their learning recognised without sacrificing quality. That promise will remain rhetorical unless teachers, trainers, assessors, mentors, designers, and leaders are themselves treated as lifelong learners and central actors in educational change.

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