Research on the Enhancement Pathways of Digital-Intelligent Literacy for "Dual-Qualified" Teachers in Intelligent Finance at Vocational Undergraduate Education

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Abstract: *The very fast convergence of digital economy with intelligent technologies has radically transformed the meaning of competence—now termed"dual-qualified"——for a teacher of intelligent finance at the vocational undergraduate level.The present article identifies gaps (conceptual and structural) in current teaching practice and proposes a multi-layered strategy for increasing digital-intelligent literacy among such teachers.By means of an analysis of vocational pedagogy and of the specific needs of intelligent finance training,it outlines four levers—each potentially useful—for action:institutions,training plans,assessment formats,and ecosystem development.The intention is to lay out a theory-informed basis as well as a practical guide for strengthening this educational workforce.*

Keywords: *vocational undergraduate education; intelligent finance; dual-qualified teachers; digital-intelligent literacy; enhancement pathways*

1. Introduction

China's 2022 revision of the Vocational Education Law gave an unmistakable message:it is time to build a high-quality,specialized teaching staff.That idea has acquired even greater urgency with the arrival of artificial intelligence,of big data,of cloud computing—and of RPA as standard tools in the financial world.The traditional tasks—bookkeeping, manual reconciliation, rule-driven reporting—are being replaced by much more complex realities.Financial work today calls for strategic foresight, for risk anticipation, and for automatic controls.Enterprises now desperately want"field engineers"with both business and digital competence, and vocational undergrads are expected to provide them.

The teaching workforce has not kept pace with change.The prevailing model—a teacher trained in traditional accounting or in finance/economics—offers substantial theoretical background but runs into difficulty when it comes to Python coding,to data pipelines,or to RPA workflow planning.Many such people hesitate to teach the newer type of"finance+technology"courses confidently.On the other hand,industry experts with highly developed digital skills often lack a clear path to teaching—i.e., to pedagogical clarity.Their competence tends to be unstructured,not easily broken down,and hard to convey in class.The result is an actual structural gap:neither group meets fully the present-day expectations of students or employers.

This paper argues that closing that gap requires more than ad-hoc workshops or the occasional industry visit. It demands a clear-eyed look at what digital-intelligent literacy actually means for "dual-qualified" teachers, an honest assessment of where the gaps are, and a coherent strategy for filling them. We set out to define the core construct, diagnose the main problems, and map out enhancement pathways that are both systematic and operational—something institutions can actually implement, not just admire in theory.

2. Defining the Connotation of Digital and Intelligent Literacy for "Dual-Qualified" Teachers in Undergraduate Vocational Intelligent Finance

2.1 Core Concepts

The term"digital-intelligent literacy"brings together two related capacities.Digital literacy implies the capacity to handle,to modify,and to evaluate critically such things as data or tools of digital use.Intelligent literacy builds upon this—it is about making productive use of AI-driven systems,of automation,or of analytic

techniques to produce added value—not only to consume what exists.In 2024,China ' s Ministry of Education revised the rules it applies to"dual-qualified"vocational teachers and now openly acknowledges digital literacy as part of the basic evaluation framework,no longer treating it as an option.

With regard specifically to intelligent finance at the vocational undergraduate level,digital-intelligent literacy is defined as a composite competency.It gives a teacher room to act effectively in an AI-shaped financial environment： whether or not to apply digital-intelligent tools, how to use them well, how to link them to pedagogy or to research, and how to collaborate—across the industry-academia boundary—to make knowledge jointly realizable.It is not one isolated skill, but an organized synthesis of awareness, of technique, of planning, and of ethical judgment.

2.2 Dimensional Composition

Rather than treating digital-intelligent literacy as a monolith, we break it into four interacting dimensions.

2.2.1 Digital-Intelligent Cognition and Awareness

At the foundation lies a mindset shift. Teachers need more than passive awareness; they need an active inclination to ask how intelligent technologies could reshape a given financial process. This means thinking in data-driven terms when designing lessons, recognizing where automation can—and cannot—substitute for human judgment, and grasping why intelligent finance matters for the future direction of vocational education. A teacher who has internalized this dimension sees technology not as an add-on but as integral to "how finance gets done" in the contemporary workplace.

2.2.2 Digital-Intelligent Technology and Application

Here we are dealing with the hands-on dimension.It refers to the actual command of Python for financial data handling,SQL for querying a database,BI visualization platforms—such as Power BI or Tableau—RPA tools of automation,ERP modules of finance-related software,as well as cloud-based smart finance and tax systems.Beyond the use of individual tools,it presumes skill in gathering unstructured data,in cleaning it up,in modeling it, in presenting results graphically, and in deploying AI methods—whether by means of AIGC for content generation, of RPA robots for routine work, or of large financial models applied to real cases.

2.2.3 Digital Teaching Competency

Technical skill alone does not make a good teacher. The crucial step is instructional transformation—turning real enterprise projects into teachable units. This includes authoring digital textbooks and courseware, designing "finance + technology" integrated lesson plans, building virtual simulation labs, running scenario-based intelligent teaching sessions, mentoring students through digital transformation consulting projects, and harnessing data analytics plus AI tools to track and evaluate student progress. In short, it is the capacity to make digital-intelligent content pedagogically legible.

2.2.4 Digital Ethics Awareness

The fourth dimension is now—though still too often—overlooked; it is growing in importance.Teachers need to know about the issues of security,of bias,and of accountability raised by the use of algorithms to make financial choices.This involves data privacy,recognition of possible algorithmic prejudice,legally acceptable uses of automated money advice,and the wider notion of responsible behavior online.Considering such matters in routine teaching helps one to build both competence and moral clarity in students.

3. Main Existing Problems

3.1 Structural Shortcomings and the "Knowledge Silo" Problem

Walk into most intelligent finance departments at vocational undergraduate colleges and you will find a faculty dominated by graduates of traditional accounting, finance, and economics programs. They are well-credentialed—most hold master's or doctoral degrees—and they know their ledger entries. But their training predates the current technological shift. Few have taken formal coursework in programming, data structures, or database theory, which leaves them with a fuzzy grasp of how big data systems or machine learning models actually work under the hood.

The numbers tell a stark story. Our informal surveys suggest that fewer than 20% of these teachers can comfortably use Python for tasks such as scraping financial data from websites, cleaning messy datasets,

running statistical analyses, or building even simple predictive models. The proportion who can design, deploy, and maintain an RPA financial robot end-to-end is even smaller. The practical consequence is predictable: when teaching courses like “Python Financial Data Analysis” or “Intelligent Financial Decision-Making,” many instructors stay at the level of demonstrating software menus. They can show students which button to click but struggle to explain the business logic underneath or to discuss failure modes, edge cases, and real-world risks. Student learning suffers accordingly.

A second, more stubborn problem is what we call the “knowledge silo” effect. Teachers may pick up isolated skills—say, producing a dashboard in Power BI after a three-day workshop—but cannot connect that skill to substantive financial work such as budgeting, cost allocation, or risk assessment. Classrooms may feature interactive whiteboards and online portals, but those are surface-level adoptions. The deeper capabilities—building a machine-learning-based credit-risk model, applying natural language processing to sentiment analysis of corporate disclosures, or architecting a secure data-governance framework—remain out of reach for most. Without the ability to author their own intelligent teaching materials, faculty fall back on off-the-shelf vendor packages, which makes instruction rigid and ill-suited to inquiry-based or personalized learning. The catchphrase sums it up: finance people do not speak tech, and tech people do not speak pedagogy.

3.2 A Training System That Is Fragmented, Reactive, and Shallow

When the problem is structural,an obvious solution is systematic training.Unfortunately,many of today’s training programs fail on three separate counts.First,they are fragmented.Sessions tend to be single-case examples—demonstrations of one item or one method—with no real effort at curricular coherence.Teachers come away with isolated“knowledge points”that are hard to fit together logically.Second,training is reactive.It arrives too late: it is planned only after a program must be approved,after a class starts,or after an evaluation date nears—not as part of steady growth over time.Third,it is shallow.Most of the sessions deal with“what does this tool do”and“which menu do I click,”but not with“why does this work this way”or“how would I adapt this to an unfamiliar problem.”Skills taught on Friday may be forgotten by the next month.

Compounding this is a lack of differentiation. New hires, mid-career backbone teachers, and program leaders are frequently herded into the same sessions—a one-size-fits-all approach that fits nobody well. Novices need grounding in digital pedagogy and basic tool use; they are not getting a structured onboarding. Backbone teachers need deep dives into frontier technologies and curriculum redesign; those opportunities are scarce. Program leaders need strategic vision and the ability to orchestrate industry-academia partnerships; that kind of leadership development is rarely on offer. To make matters worse, training content lags behind industry. The technology stacks, project types, and pain points that enterprises actually grapple with are slow to filter into faculty development programs, so teachers end up learning tools that do not match the ones employers use.

3.3 Industry-Education Integration That Looks Good on Paper

A mantra in vocational education, “industry-education integration” often lacks depth in the intelligent finance space. One issue is time. Teaching loads and performance pressures mean few faculty can spare one or two uninterrupted months to work inside an enterprise financial shared-service center, a digital finance unit, or a fintech firm. When placements do happen, they tend to be brief site visits or shadowing exercises—informative, perhaps, but not the kind of immersion that builds genuine technical muscle.

The second issue is the “translation gap.” Enterprises may supply desensitized datasets or sanitized case studies, but these strip away the messiness and trade-offs that make real financial work interesting. Instructors, lacking intimate familiarity with live enterprise environments, find it hard to rebuild that complexity into their teaching materials. Enterprise mentors, for their part, know the work but not the classroom—their explanations tend to be jargon-heavy and poorly scaffolded for students. The net effect is that school-enterprise cooperation stalls at the level of resource exchange (a guest lecture here, a dataset there) without reaching genuine co-construction of capabilities.

3.4 Evaluation and Incentive Mechanisms That Fail to Motivate

The old adage says: What gets measured gets done.Yet most vocational undergraduate institutions do not yet have well-defined,operational measures of digital-intelligent literacy.Recruitment practices,title evaluations,and yearly performance reviews mention“digital capability”in passing but rarely specify it with clarity.Reviewers may consider whether a teacher uses digital media or prepares slides for class,but they tend to ignore whether the teacher is able to plan curricula around intelligent tools,to generate novel digital content,or to coach students in complicated finance-technology work.Evaluation methods themselves are out-of-date—too dependent on

forms filled out by individuals or on written reports rather than on observation or on documented results.The outcome is a feedback loop offering minimal help toward progress and very little motive to commit time to digital-intelligent upskilling.

4. Pathways for Enhancing Digital-Intelligent Literacy

To meet the problems listed it is necessary to go beyond partial solutions.The present proposal offers a five-fold model (institutional design,training,application,assessment,and ecosystem assistance) which, taken together, makes improvement sustainable.

4.1 Strengthen Top-Level Institutional Design

The first lever to consider is policy.Digital-intelligent literacy needs to be incorporated explicitly in the standards that regulate teacher recruitment,promotion by title,assignment to posts,and evaluation of performance—not as an abstract ideal but as a series of benchmarks.For intelligent finance in particular,it is helpful to lay down specific thresholds:Python-based mastery of financial analysis,RPA process development,or intelligent use of tax/finance systems.Institutions must commit funds to training,to platform access,and to work involving real-world applications.A“dual-track”staffing idea—bringing in outside digital specialists alongside a planned upskilling of present staff—can help to rebalance the department’s interdisciplinary character.To guarantee accountability,departmental progress on digital-intelligent literacy should be part of the review process (at school, university, or section level),so that improvement becomes habitual rather than occasional.

4.2 Build a Tiered and Categorized Training System

The second lever is replacing today’s fragmented workshops with a structured progression. Training should be differentiated by career stage. New teachers receive foundational instruction in digital pedagogy, basic tool use, and instructional design—the essentials they need to be competent from day one. Mid-career backbone teachers move on to more advanced content: financial big-data analytics, RPA application engineering, and the operation and maintenance of intelligent finance systems. Program leaders, meanwhile, focus on curriculum innovation, teaching-reform research, and the orchestration of industry-education collaborative projects. Pedagogically, blended online-offline formats, context-rich hands-on labs, and case-based instruction should replace the old lecture-and-demo model. And the content itself must be kept current—regularly refreshed to reflect what enterprises are actually doing, so that the disconnect between “what is taught” and “what is used” gradually disappears.

4.3 Deepen Industry-Education Integration and Practice

The third lever is authentic practice.Institutions need to create long-standing,sustained bases of practice within intelligent finance enterprises and to arrange regular rotations of teachers who will spend not just a day or two but substantial time working—actually helping—to shape real projects at financial shared-service centers,in digital finance roles,or in fintech ventures.The idea is to have faculty directly involved in such matters as digital transformation,system intelligence,or data organization—not merely to watch them happen.Schools and companies can—and should—develop joint curricula and practical investigations, turning actual enterprise issues into teaching cases or lab-based assignments.A collaborative“dual-qualified”teacher cultivation alliance—linking campus academics with enterprise digital experts as co-instructors—may eliminate or minimize the translation gap and help to make tacit knowledge teachable.

4.4 Build a Digital-Intelligent Development Ecosystem

The fourth lever is environment. Hardware alone is not enough, but it matters: intelligent finance labs, big-data analytics centers, and RPA training studios provide the physical and technical substrate for experimentation. On top of that, institutions should pool high-quality resources—both internal and industry-sourced—into a shared digital-intelligent teaching resource library covering courses, cases, technical standards, and reusable teaching assets. Regular events such as digital-intelligent teaching competitions, academic salons, and skills showcases can help normalize a culture in which technological fluency is valued and visible. Finally, education in digital ethics, data security, and professional norms must be woven into the fabric of faculty development, ensuring that as teachers become more capable with intelligent technologies they also become more reflective about their responsible use. The overarching aim is an ecosystem characterized by technology empowerment, ethics protection, and innovation leadership—one that sustains digital-intelligent literacy enhancement as a

collective, ongoing endeavor rather than a one-time initiative.

Fund Projects

2026 Shenzhen Polytechnic University Quality Project: Teaching Quality and Teaching Reform Program. "Research on the Talent Cultivation Model for Intelligent Finance in Vocational Undergraduate Programs under the Background of New Quality Productive Forces" (Project Number: 7026310835)

A Study on the Construction of a Vocational Education-Industry Alignment Model: An Empirical Study Based on Talent Cultivation in Big Data and Accounting (Project Number: 7026310858)

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