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Research on Talent Cultivation Path and Guarantee Mechanism of Higher Vocational Finance and Accounting Digital Craftsmen under the Background of Industry-Education Integration

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Abstract: Digital technology, artificial intelligence and industry-finance integration systems are reshaping the form of finance and accounting work, and have also put forward new requirements for the professional competence of higher vocational graduates. This paper focuses on the connotation definition and cultivation path of higher vocational finance and accounting digital craftsmen under the background of industry-education integration. Based on theories related to professional competence, workplace learning and boundary crossing, and adopting methods of literature research, policy text analysis and normative analysis, this paper proposes that finance and accounting digital craftsmen are high-skilled practitioners who can integrate finance and accounting professional knowledge, digital technology application and craftsmanship criteria in complex tasks. Their competence cultivation requires not only proficient use of digital tools, but also professional judgment ability, technical output verification ability, data and process understanding ability, risk management and control ability, communication and collaboration ability, and continuous improvement ability. Industry-education integration integrates real workplace tasks, digital work processes, industry quality standards and practical experience into the curriculum system through teaching system reform, real task participation, and school-enterprise joint evaluation. Accordingly, higher vocational colleges should adjust training objectives in alignment with changes in workplace tasks, promote integrated teaching of professional knowledge and digital technology, strengthen real task-driven and human-machine collaborative learning, improve the work quality evaluation system, and support the implementation of various reforms through collaborative governance mechanisms, in-depth enterprise participation, improvement of teachers' practical ability, supply of real data resources and continuous quality feedback.

Keywords: Industry-Education Integration; Higher Vocational Education; Finance and Accounting Digital Craftsmen; Digital Transformation; Craftsmanship; Talent Cultivation

1. Introduction

The digital economy continues to reshape the professional boundaries of finance and accounting work. The wide application of cloud computing, big data, Robotic Process Automation (RPA), artificial intelligence and Enterprise Resource Planning (ERP) systems has gradually enabled the automation or semi-automation of work such as voucher processing, bookkeeping, data reconciliation, financial statement preparation, and rule-based matching. Kokina and Blanchette found that finance and accounting tasks that are highly structured, repetitive, rule-based and supported by digital input are particularly suitable for automation. Meanwhile, after enterprises deploy these technologies, they often need to redesign business processes, internal controls and governance structures [1]. Moll and Yigitbasioglu also pointed out that cloud computing, big data, blockchain and artificial intelligence have changed the daily work content and professional boundaries of accountants [2]. Therefore, the impact of digitalization on the finance and accounting field is far more than the replacement of work tools, but also reshapes the way tasks are allocated and the logic of creating professional value.

For higher vocational finance and accounting education, the challenges brought by this transformation are far beyond ordinary technological upgrading. The talent cultivation of traditional finance and accounting majors

focuses on relatively stable tasks such as accounting calculation, tax declaration, cost calculation and software operation, and highly emphasizes process compliance, result accuracy and operational proficiency. These abilities are still the core foundation to ensure the reliable operation of finance and accounting work. However, as standardized operations are gradually undertaken by digital systems, human work increasingly focuses on identifying the economic substance of transactions, interpreting data correlations, judging exceptions, verifying technology-generated results, managing risks, and supporting management decisions. Richins et al. proposed that big data analysis may not weaken the professional value of accountants, because accounting knowledge and business cognition are still crucial for data analysis and decision support [3]. Steens, Bots and Derks further pointed out that digital work requires not general technical knowledge divorced from practice, but digital capabilities embedded in specific work tasks [4].

China's policy has made continuous responses to the above developments. The 14th Five-Year Plan for Accounting Reform and Development lists technology application, expansion of accounting functions and competence improvement as key reform priorities. The Accounting Informatization Development Plan (2021-2025) further proposes to promote the digital transformation of accounting, improve accounting data governance, deepen industry-finance integration, and clearly cultivate compound talents who understand accounting, business and information technology. The Accounting Talent Plan (2021-2025) also emphasizes that accountants need to actively adapt to new technologies, new business forms and new career development requirements. The Outline for Improving National Digital Literacy and Skills expands digital capabilities into multiple dimensions such as acquisition, use, evaluation, security and ethics. The revised professional teaching standards for vocational education issued by the Ministry of Education in 2025 further strengthens the cultivation of comprehensive professional quality and action ability, requires professional development to keep pace with industrial and technological changes, and encourages digital and intelligent teachin.

At the same time, craftsmanship and high-skilled talent development have become prominent objectives in the modern vocational education system. The revised Vocational Education Law of the People's Republic of China requires vocational education to combine moral development with technical competence, deepen industry–education integration and school–enterprise cooperation, and cultivate high-quality technical and skilled personnel, highly capable craftspeople, and master craftspeople. The Outline for Building a Leading Country in Education (2024–2035) likewise calls for a vocational education system characterised by stronger articulation across educational tracks and deeper industry–education integration, with particular attention to master craftspeople and high-skilled talent. In higher vocational finance and accounting education, these policy objectives cannot be satisfied merely by adding the words digital and craftsmanship to programme objectives. They require a clearer account of what craft-based professional excellence means in digitally mediated finance and accounting work.

In recent years, the concept of digital craftsmen has gradually entered the field of vocational education research in China. Li and Guo discussed the cultivation of digital craftsmen in combination with the background of Digital China construction, and proposed to combine digital skills with digital craftsmanship [5]. Tang, Guo and Yang did studies on the adaptability of training objectives, teachers' digital competence and talent cultivation models in higher vocational colleges under the background of digital transformation [6]. Huang and Su further analyzed the industrial attribute, standard attribute and cultural attribute of digital craftsmen in regional vocational education [7]. These studies extend traditional craftsmanship research to technical scenarios, but the finance and accounting field has distinct professional characteristics: its work outputs are presented in the forms of accounting information, analysis reports, budget plans, tax handling, audit evidence, risk judgment and management suggestions, and its quality is strictly constrained by accounting standards, tax regulations, internal control requirements, data integrity and professional ethics. Therefore, finance and accounting digital craftsmen cannot be simply defined as a group with digital skills & craftsmanship. Their professional particularity must be explained in combination with the professional norms, digital work practices and

quality responsibilities in the finance and accounting field.

Industry-education integration provides important conditions for cultivating such talents, but enterprise participation will not automatically translate into students' abilities. Research on vocational education in China has expanded from general school-enterprise cooperation to municipal industry-education consortia, industry-wide industry-education integration communities and multi-stakeholder collaborative governance, expanding the institutional space for enterprises to participate in professional planning, curriculum development, internship training and assessment. However, for the cultivation of finance and accounting digital craftsmen, there are still a series of specific problems to be solved: How do colleges and universities identify changes in enterprise work tasks? How to transform the professional requirements of digitalized finance and accounting work into curriculum content? How do students form professional judgment and craftsmanship criteria through real or high-fidelity tasks? How do enterprise quality standards enter the evaluation system and feed back to continuous curriculum updating?

This study therefore takes digital craft professionals in finance and accounting in higher vocational education as its object of analysis and addresses three issues. First, it clarifies the occupational meaning and principal capability requirements that distinguish these professionals from other digitally skilled finance and accounting personnel. Second, it examines how industry–education integration can translate industrial tasks, technologies, rules, and quality requirements into students' learning experiences and facilitate the formation of relevant capabilities. Third, it considers how higher vocational colleges should adjust cultivation pathways and establish corresponding support mechanisms. Research on integrated vocational competence, workplace learning, and boundary crossing is used here to explain these processes rather than to construct a theoretical framework detached from finance and accounting practice.

2. Literature Review

2.1 Industry–Education Integration: From Organisational Coordination to the Process of Talent Development

Industry–education integration has been a sustained institutional priority in China's vocational education reform. The 2017 Opinions on Deepening Industry–Education Integration called for closer alignment between education and talent chains on the one hand and industrial and innovation chains on the other, while affirming enterprises as major participants in integration. The 2019 National Implementation Plan for Vocational Education Reform further emphasised deeper industry–education integration and school–enterprise cooperation and stronger enterprise participation in vocational education. The 2022 Opinions on Deepening Reform of the Modern Vocational Education System went further by promoting city-level industry–education consortia and sectoral industry–education communities and encouraging enterprise participation in programme planning, determination of training specifications, curriculum development, teacher development, and student assessment. This policy trajectory indicates that the institutional focus of industry–education integration has gradually shifted from resource-based cooperation towards the core processes of talent development.

Academic research has also shown a similar shift. Liu, Pan and Liu, combined with local practices under the background of Chinese-style modernization, emphasized the inherent correlation between industry-education integration and regional development, vocational culture and human development [8]. After sorting out the research progress in 2024, Pan et al. pointed out that relevant research has expanded from individual school-enterprise projects to the collaboration of four chains of education, talent, industry and innovation, forming a more complex multi-level and multi-stakeholder governance pattern [9]. Xie and Fan empirically tested based on the annual quality reports of 1,003 higher vocational colleges and found that industry-education integration significantly improves the employment quality of graduates, providing empirical evidence for its educational effectiveness [10].

Yet research on industry–education integration has traditionally been better at explaining who collaborates with whom, through which organisational arrangements, and how governance can be stabilised than at explaining how such collaboration becomes student learning. Workplace learning research helps to address this gap. Billett argues that learning in

the workplace depends on the opportunities for participation made available to learners and on how learners engage with those opportunities [11]. His later work further shows that workplaces selectively distribute opportunities for participation; access to developmentally valuable tasks does not occur automatically [12]. Guile and Griffiths similarly argue that the educational value of work experience lies not simply in entering a workplace, but in connecting educational and work contexts [13]. Tynjälä likewise stresses the need to connect formal school-based learning with workplace learning [14]. Thus, to explain the cultivation of digital craft professionals in finance and accounting, research on industry–education integration must move more explicitly into the conversion of workplace tasks into learning tasks and the formation of occupational capability through participation in those tasks.

2.2 Digital Craft Professionals: From Digital Skills to the Quality of Occupational Practice

The relevance of craftsmanship to modern vocational education has long extended beyond traditional manual work. Kuang and Jing argue that reducing craftsmanship to notions such as slow work produces fine work, mechanical repetition, or the ethos of particular occupations obscures its modern meanings of quality, innovation, and collaboration [15]. Digitalization has further changed the objects and methods of craftsman practice: work objects have expanded to data, information systems and digital platforms; work processes are increasingly shaped by algorithms, rule bases and automation systems; quality evaluation standards include not only operational accuracy, but also data reliability, process traceability, system output verifiability and risk management level.

Chinese research on digital craftsmen has begun to respond to these changes. Li and Guo proposed that the cultivation of digital craftsmen should shift from quantity expansion to quality improvement, and take the relationship between digital craftsmanship and digital skills as the link to realize the unity of technical ability and professional quality [5]. Tang et al. listed training objective adaptation, teachers' digital competence and talent cultivation models as core issues in higher vocational education [6]. Huang and Su further pointed out that the cultivation of digital craftsmen needs to balance industrial demand and educational supply, instrumental rationality and craftsman value [7]. Combined with the Outline for Improving National Digital Literacy and Skills, which emphasizes digital evaluation, security and ethics, it is easy to see that the concept of digital craftsmen has gone beyond the narrow scope of being able to use digital tools.

The limitation of existing research is that digital craftsmen are mostly discussed as a cross-industry general concept, and their professional characteristics are mainly explained through the combination of digital skills & craftsmanship, with insufficient attention to differences in work objects, regulatory systems and quality responsibilities across industries. The finance and accounting industry has strong regulatory constraints and fiduciary responsibility attributes. High-quality practice depends not only on operational proficiency, but also on data authenticity, prudent judgment, handling compliance and professional verify ability of results. Therefore, when the concept of digital craftsmen is applied to the finance and accounting field, it needs to be further defined in combination with industry characteristics.

2.3 Digital Transformation of Finance and Accounting Education: From Technical Capability to Task-Specific Competence

Research on digital capability in accounting and finance education is relatively well developed. Lawson et al. propose an integrated competency framework oriented towards accounting students' long-term careers and emphasise the integration of accounting, foundational, and management competencies [16]. Pan and Seow argue that cloud computing, XBRL, and business analytics are changing corporate financial reporting and decision processes, requiring corresponding updates in information-technology competence [17]. Sledgianowski, Gomaa, and Tan further propose embedding big data, technology, and information-systems competencies across the accounting curriculum rather than confining them to stand-alone information-systems courses [18]. In 2019, revisions to International Education Standards 2, 3, 4, and 8 by the International Accounting Education Standards Board also incorporated learning outcomes related to information and communication technology and professional scepticism into professional accounting education [19].

Studies of professional practice further

demonstrate the task-specific nature of digital competence. Richins et al. argue that big data does not simply replace accountants; accountants' business knowledge and experience with structured data can continue to create value in analytical work [3]. Moll and Yigitbasioglu show that internet-related technologies both automate certain accounting activities and transform accountants' work practices and capability requirements [2]. Kokina and Blanchette find that RPA is especially suitable for structured, repetitive, rule-based activities, while its implementation also demands redesign of processes and internal controls [1]. Steens et al. made a clearer point: the development of financial controllers' digital competence depends on knowledge bound to specific tasks, rather than abstract general digital skills [4]. In summary, in digitalized finance and accounting work, professional competence and technical competence are becoming inseparable.

The popularity of artificial intelligence further highlights this issue. Ballantine, Boyce and Stoner criticized technological reductionism in accounting education and called for renewed attention to judgment, responsibility and the social attributes of accounting in an environment of deep penetration of artificial intelligence [20]. Blondeel et al. conducted a study on an accounting data analytics course and found that students often use generative artificial intelligence to complete tasks, but human support is still indispensable in scenarios requiring high accuracy [21]. The educational implication is not simply to add AI courses. Students need to learn to select, use, and verify technology-generated outputs within specific finance and accounting tasks. The deeper technology becomes embedded in professional activity, the more important it becomes to constrain its use through professional knowledge and responsibility.

2.4 Review of the Literature

Across these three strands of research, several advances are evident. Research on industry–education integration has expanded from school–enterprise cooperation to multi-actor collaborative governance; research on digital craft professionals increasingly stresses the unity of digital skills and occupational quality; and research on the digital transformation of accounting education has moved from generic technical skills towards digital competence embedded in specific tasks. These developments provide an important basis for analysing digital craft professionals in finance and accounting. However, the three strands remain insufficiently connected. Research on industry–education integration seldom explains in detail how industrial knowledge is transformed into curriculum content and learning experience. Research on digital craft professionals pays limited attention to sectoral differences in professional regulation. Research on accounting education digitalisation, meanwhile, focuses primarily on curricula and capability requirements and has paid less attention to how craftsmanship-oriented work standards become part of professional practice and learning.

A further limitation is that talent-development studies often rely on an additive logic, listing the knowledge, skills, and qualities learners should possess. Baartman and de Bruijn argue that the central issue in vocational competence is not the separate existence of knowledge, skills, and attitudes, but their integration in complex professional tasks [22]. This suggests that research on digital craft professionals in finance and accounting should move from asking what capabilities are required to examining how these capabilities work together in finance and accounting tasks. The purpose is therefore not to construct an artificially symmetrical specification of talent, but to explain how professional judgement, digital technology use, understanding of data and processes, quality and risk awareness, communication, and continuous improvement become interconnected through task performance.

Accordingly, this study foregrounds the regulatory, data-intensive, and responsibility-laden character of finance and accounting and examines industry–education integration as part of the capability-formation process. The focus is not on adding another label to the concept of the digital craft professional, but on explaining how typical enterprise tasks, digital workflows, and quality standards can be educationally transformed and incorporated into college learning, and how students can convert professional knowledge, digital technology, and craftsmanship-oriented work standards into occupational action through authentic task participation and sustained feedback.

3. Capability Requirements and Conditions for the Development of Digital Craft

Professionals in Finance and Accounting

3.1 Conceptualising Digital Craft Professionals in Finance and Accounting

Finance and accounting differs from fields such as manufacturing, construction, and transportation in that its outputs are less often physical products than accounting information, financial reports, operating analyses, budgets, tax treatments, audit evidence, risk judgements, and management recommendations. Digitalisation has further expanded the objects of finance and accounting work from vouchers, ledgers, and regulatory texts to structured and unstructured data, information systems, business processes, rule bases, and algorithmic outputs. In this context, craft-based excellence in finance and accounting is expressed primarily through the quality of information processing and professional judgement rather than through standards of physical precision.

Combined with the aforementioned literature, this paper defines higher vocational finance and accounting digital craftsmen as: high-skilled practitioners who are trained on the basis of higher vocational education, develop and mature in continuous professional practice, and can integrate finance and accounting professional knowledge, digital technology application and craftsmanship criteria in complex tasks. They can understand the economic substance of transactions and relevant professional rules, properly handle data, prudently use tools, maintain necessary professional prudence, and create professional value through quality control, risk prevention and continuous improvement.

This definition establishes three boundaries: First, finance and accounting digital craftsmen are first and foremost finance and accounting professionals, and secondly digital appliers. Digital technology must serve professional tasks and be constrained by professional rules. Second, digital competence is not equivalent to the number of software mastered or programming level, but a comprehensive ability to select tools according to task requirements, understand data, verify outputs, and take responsibility for the consequences of technology use. Third, craftsman is not an identity that students can automatically obtain upon graduation. Higher vocational education can provide core competence and professional preparation, and mature craftsman literacy needs to be gradually formed in continuous work practice and career development. This definition neither equates finance and accounting digital craftsmen with general digital talents, nor overestimates the ability of college education to shape mature craftsman identity at the graduation stage.

3.2 Capability Requirements

The competence requirements of finance and accounting digital craftsmen should first be understood in combination with finance and accounting work itself under digitalized conditions. Finance and accounting work has clear professional norms and responsibility boundaries. Accounting standards, tax regulations, internal control requirements, audit standards and organizational systems are the basic basis for professional judgment. Digital technology has changed the ways of data acquisition, transaction processing, analysis development and decision support, making finance and accounting personnel increasingly immersed in the environment built by information systems, data platforms and artificial intelligence. However, technology has not relieved the responsibility for work quality. Data reliability, handling compliance, prudent judgment and result verifiability are still the core standards of professional performance.

Therefore, finance and accounting digital craftsmen cannot be defined by isolated competence labels. Professional knowledge, digital technology and craftsmanship criteria only constitute professional competence when they are mobilized synergistically in tasks. Taking students completing financial analysis with the help of artificial intelligence as an example: to judge their digital ability, we should not only look at the generation speed, but also whether they understand indicator definitions, verify data sources, identify unreasonable inferences, and explain revision basis. Professional rules shape the boundary conditions of technology use, technology expands the means of realizing professional judgment, and craftsmanship criteria require users to be responsible for the process and results.

3.3 Principal Capability Requirements

At the level of talent development, students first require a solid professional foundation in finance and accounting so that they can understand the substance of business activities and make appropriate treatments under accounting, taxation, financial management, auditing, and

internal-control rules. In digital work environments, this professional competence extends to data acquisition and governance, selection of digital tools, verification of system outputs, and understanding of integrated business–finance processes. Digital tools are therefore not add-on skills external to disciplinary knowledge; they need to be embedded in the identification, analysis, and solution of finance and accounting problems.

As finance and accounting roles increasingly contribute to operational analysis and management support, practitioners must also be able to translate specialist information into explanations and recommendations that managers and other departments can understand and use. Students therefore need to understand both data and the business processes that produce them, and to communicate financial information through discussion, reports, and visualisation. At the same time, the regulated nature of finance and accounting means that technology use is always constrained by quality, risk, and professional responsibility. Students must be able to identify anomalies in data and processes, maintain necessary prudence in important judgements, and revise methods and workflows when problems are discovered.

These requirements overlap substantially. Professional judgement depends on business processes and data sources; digital tools must be used within the constraints of professional rules and risk control; communication creates managerial value only when it rests on reliable data and sufficient evidence; and continuous improvement presupposes reflection on the quality of existing work. The central task of cultivating digital craft professionals is therefore not to assign each capability to a separate course, but to create tasks in which students must mobilise relevant knowledge, technologies, and occupational standards simultaneously. These principal capability requirements and their typical manifestations are summarised in Table 1.

Table 1. Principal Capability Requirements for Digital Craft Professionals in Finance and Accounting

Capability requirement	Occupational meaning	Typical manifestations
Professional execution and judgement	Understand the substance of transactions and relevant finance and accounting rules and make appropriate professional treatments	Accounting treatment; tax judgement; budget analysis; audit assistance; judgement in exceptional cases
Digital technology use and output verification	Select digital tools according to task requirements and professionally verify system- or AI-generated outputs	ERP; data analytics; visualisation; RPA; AI-assisted analysis and output verification
Business–finance processes and data handling	Understand the relationships among business operations, data, information systems, and finance and accounting outcomes	Data acquisition and cleaning; definition management; process linkage; business–finance data analysis
Quality control, risk, and compliance	Take responsibility for the accuracy, completeness, compliance, and traceability of work results	Data verification; risk identification; professional prudence; access control and data security
Collaborative communication and value articulation	Translate finance and accounting information into forms that different stakeholders can understand and use	Cross-departmental communication; report writing; data storytelling; management recommendations
Continuous learning and work improvement	Use problems and feedback to improve processes and update knowledge and tools	Process optimisation; reflective improvement; learning new technologies; professional responsibility and innovation

3.4 From Curriculum Knowledge to Occupational Capability: Authentic Task Participation as a Key Condition

Occupational capability does not emerge automatically from the accumulation of course knowledge. Baartman and de Bruijn emphasise that knowledge, skills, and attitudes must be integrated in complex professional tasks [22]. For digital craft professionals in finance and accounting, course-based requirements become occupational action only when students face professional rules, data processing, technology selection, business communication, and quality responsibility within the same task. Completing separate courses in financial accounting, Python,

and professional development is not in itself evidence that a student has developed the capabilities required of a digital craft professional.

Workplace learning research further demonstrates the importance of authentic task participation. Billett shows that what tasks are made available to learners, what guidance they receive, and how much responsibility they are allowed to assume directly influence learning outcomes [11,12]. For higher vocational students in finance and accounting, the educational value of enterprise practice does not depend on whether every number comes from an identifiable real company. What matters is whether the task preserves authentic business relationships, regulatory constraints, data problems, and judgement difficulties. De-identified enterprise cases can therefore provide high-quality learning resources when these relationships are retained.

Schools and enterprises also organise knowledge differently. Guile and Griffiths and Tynjälä both show the importance of connecting school knowledge with work experience [13,14]. Akkerman and Bakker's research on boundary crossing further suggests that learners may reinterpret existing knowledge when they recognise differences between practices, coordinate action across them, and reflect on those differences [23]. For the cultivation of digital craft professionals in finance and accounting, enterprise tasks therefore cannot simply be transplanted into the classroom, nor can simulated software fully substitute for occupational contexts. What matters is repeated movement between school-based learning and industrial practice, so that students use theory to explain real problems and use real problems to test and revise their understanding of theory.

4. How Industry–Education Integration Supports the Cultivation of Digital Craft Professionals in Finance and Accounting

4.1 Identifying Cultivation Requirements from Changes in Workplace Tasks

Industry–education integration first allows colleges to maintain sustained contact with changes occurring inside finance and accounting jobs. Conventional labour-market surveys often focus on job titles, employment numbers, and general capabilities, whereas digital transformation often changes the internal content of jobs before job titles change. Even if the position is still called accountant or financial specialist, after the introduction of shared service centers, RPA and intelligent auditing, work such as voucher entry and manual reconciliation will decrease, while work such as exception handling, data maintenance, rule configuration and business interpretation will increase. Therefore, the analysis of digital craftsman demand should shift from job titles to the basic analysis unit of typical work tasks.

Task analysis does not mean copying all software currently used by enterprises into the curriculum. Digital tools and work processes iterate rapidly, and colleges need to identify the more stable professional requirements behind technologies and processes. Taking automated electronic invoice review as an example, its educational significance lies not only in platform operation, but also in understanding voucher data sources, review rules, exception document handling and related risk responsibilities. Similarly, when data platforms automatically generate financial indicators, what students need is not only the ability to read charts, but also the ability to select appropriate indicators, explain the causes of abnormalities, and make business judgments. Through industry-education integration, colleges can effectively distinguish lasting professional competence from transient technical tools.

4.2 Converting Enterprise Tasks into Curriculum Tasks Appropriate for Student Learning

Enterprise work tasks are authentic, but they are not inherently educational tasks. Enterprises prioritize operational efficiency and results, while colleges must consider students' knowledge base, learning stages and development sequences. If mature enterprise work methods are directly copied, students may only mechanically imitate processes, or rely on automation tools without mastering underlying knowledge. Therefore, enterprise tasks must undergo educational transformation before entering the curriculum.

This transformation should not only retain the complete business background and core quality requirements, but also adjust task difficulty, disassemble overly complex work into activities adapted to different learning stages, while retaining necessary exceptions, conflicts and uncertainties. Taking monthly business

performance analysis as an example, students can successively complete links such as understanding original materials, data cleaning, indicator selection, abnormality identification, cause interpretation, digital tool-assisted analysis, professional result verification, and achievement presentation. As a result, enterprise tasks are no longer just sources of classroom cases, but become learning carriers connecting finance and accounting knowledge, digital technology and craftsmanship criteria.

4.3 Developing Professional Judgement and Craftsmanship-Oriented Standards through Authentic Task Participation

The professional judgment required by finance and accounting digital craftsmen is difficult to form only through theoretical teaching. Textbooks can explain the principles of internal control, but cannot exhaust all risk scenarios in enterprise processes. Classrooms can teach financial ratios, but standardized data sets are difficult to train students to interpret the business drivers behind abnormal fluctuations. Real or high-fidelity tasks require students to make judgments under conditions of incomplete information and non-unique solutions, and mobilize professional knowledge and digital tools in the process.

Real tasks also provide specific carriers for craftsmanship criteria. In the finance and accounting field, rigor, responsibility and pursuit of quality are not generalized personality traits divorced from work, but are reflected in: whether to verify data sources, whether to trace the causes of abnormalities, whether to maintain prudence when evidence is insufficient, whether to verify system and artificial intelligence outputs, and whether to revise existing judgments or processes when problems are found. Only by repeatedly being exposed to such professional situations can craftsmanship be internalized from external requirements into the internal quality standard of finance and accounting work.

4.4 Bringing Industry Quality Standards into Assessment and Continuous Curriculum Renewal

Industry–education integration can also bring enterprise standards of work quality into student assessment. School-based assessment tends to emphasise knowledge mastery and procedural correctness, whereas enterprises are more concerned with whether outputs are usable, evidence is sufficient, procedures are appropriate, and risk is controlled. The Vocational Education Law explicitly calls for industry organisations and enterprises to participate in vocational education quality evaluation. The educational significance of enterprise mentors' involvement lies not simply in increasing the number of raters, but in subjecting student work to occupational standards.

Table 2. Main Links through Which Industry Requirements Enter the Cultivation of Digital Craft Professionals in Finance and Accounting

Main link	Problem to be addressed	Educational significance
Identify changes in workplace tasks	Which tasks are being automated, added, or strengthened in finance and accounting jobs?	Ground training objectives in actual changes in work
Extract cultivation requirements	Which relatively stable professional, digital, and quality requirements can be identified behind changing tools and workflows?	Avoid equating every new technology with a new course
Convert requirements into curriculum tasks	How should enterprise tasks be decomposed and reorganised for students at different stages of learning?	Reconcile enterprise production logic with the logic of student learning
Organise authentic task learning	How can students use knowledge and technology in complete or highly realistic tasks?	Integrate professional judgement, digital capability, and craftsmanship-oriented work standards
Introduce joint school-enterprise assessment	How can industry quality standards be used to examine task outcomes and the reasoning process?	Bring work quality and professional responsibility into student assessment
Use feedback for continuous renewal	How can curriculum and tasks be adjusted in response to industrial change, graduate performance, and learning difficulties?	Maintain continuing alignment with digital finance and accounting practice

Assessment becomes educationally meaningful only when feedback informs subsequent learning. Students need to use feedback from teachers and enterprise mentors to re-examine their data handling, choice of technology, and professional judgement. Colleges likewise need to adjust content and task design in response to recurrent student difficulties, graduate performance in the

workplace, and enterprise feedback on new technologies and tasks. The process linking identification of task change, extraction of cultivation requirements, design of curriculum tasks, authentic task learning, joint school–enterprise assessment, and curricular renewal ensures that industrial change can enter talent development in a stable way and that training outcomes, in turn, can inform programme development. Table 2 summarises the main links through which industry requirements are incorporated into the cultivation process.

5. Current Problems in the Cultivation of Digital Craft Professionals in Finance and Accounting

5.1 Training Objectives Are Prone to Digital Labelling

A common response to digital transformation is to add terms such as big data, artificial intelligence, and digitalisation to existing programme objectives. The problem is that training objectives for digital craft professionals need to specify not merely what technologies students know, but in what finance and accounting tasks they can use those technologies appropriately and what standards of professional quality they can meet. If objectives are expressed mainly as mastering financial software, being familiar with big-data technologies, or understanding AI, digital tools remain add-on skills and are unlikely to enter core activities such as accounting judgement, tax treatment, financial analysis, and risk management.

5.2 Finance and Accounting Knowledge and Digital Technologies Remain Separated in the Curriculum

Finance and accounting curricula are usually organised around domains such as accounting, financial management, taxation, and auditing, while digital courses are offered separately in Excel, Python, big-data analytics, RPA, or artificial intelligence. The difficulty is not an insufficient number of courses, but the absence of common occupational tasks connecting them. International accounting education research has long argued that technological capability should be embedded across the accounting curriculum rather than confined to a small number of information-systems courses [16,18]. If students use Python to analyse non-financial data in one course and then return entirely to traditional cases in financial accounting, digital technology is unlikely to become part of the professional action expected of digital craft professionals.

5.3 Practical Training Is Highly Simulated but Insufficiently Occupational

Because enterprise financial data are highly confidential, it is more difficult for authentic business materials to enter finance and accounting classrooms than in some manufacturing fields. This has encouraged widespread use of simulated account sets, virtual enterprises, and standardised training projects. Such simulation is necessary for basic skills development, but if every task contains complete data, a fixed process, and a single correct answer, students are still mainly learning to follow procedures. Real finance and accounting work often involves missing data, differences in business interpretation, inconsistent information across departments, exceptional cases, and judgement about rule applicability. The professional judgement and responsibility for quality expected of digital craft professionals need to be developed precisely in such situations of incomplete information and non-standard problems.

5.4 Teacher Capability Structures Do Not Fully Match Cross-Disciplinary Task Teaching

Cultivating digital craftsmen requires teaching to connect finance and accounting business, enterprise processes and digital technology. Finance and accounting teachers usually have solid professional knowledge, but face the pressure of continuously keeping up with new enterprise platforms and new artificial intelligence applications. Information technology teachers understand technical methods, but may have insufficient interpretation of accounting standards, tax rules and financial management logic. The solution should not be to require every teacher to be an all-round talent, but to adjust the teaching arrangement organized by single discipline and single course, and build an interdisciplinary collaboration mechanism around complex finance and accounting tasks.

5.5 Enterprise Participation Often Remains at the Level of Resource Provision

Enterprises usually participate in the form of providing internship positions, software

platforms, lectures and case materials, but the stable participation mechanism in links such as training objective formulation, task design, learning process guidance and achievement evaluation is still not sound. If enterprises only act as resource providers, and curriculum content, teaching methods and evaluation standards are still unilaterally determined by colleges, changes in workplace tasks and industry quality requirements will hardly enter the core process of digital craftsman cultivation. Therefore, to measure the depth of industry-education integration, we should not look at the volume of resource exchange, but at the extent to which enterprise work knowledge and professional standards are integrated into curriculum and learning.

5.6 Assessment Emphasises Operational Outputs and Provides Limited Evidence of Craftsmanship-Oriented Practice

Traditional training evaluation is often based on "whether the accounts are balanced", "whether the report is generated" and "whether the software operation is completed". These indicators are suitable for standardized tasks, but it is difficult to reflect whether students can make evidence-based professional judgments, whether they have data quality and risk awareness, and whether they can continuously improve their work. Generative artificial intelligence can quickly generate texts and analysis results with standardized formats. Judging students' ability only by final products is more likely to cause misjudgment of ability. Therefore, evaluation needs to extend to the learning process: pay attention to the selection basis of processing methods, the reliability of data sources, the verification process of technology outputs, and the investigation and revision paths of abnormal problems.

6. Pathways for Cultivating Digital Craft Professionals in Finance and Accounting

6.1 Calibrating Training Objectives against Changes in Digital Finance and Accounting Tasks

Training objectives should be calibrated through analysis of changes in workplace tasks. Colleges can rely on industry-education integration communities, industrial colleges, cooperative enterprises and graduate tracking channels to observe the internal evolution of typical finance and accounting positions: Which routine tasks are handed over to systems by shared service centers? Which exceptions still require manual judgment? After enterprises introduce artificial intelligence to assist financial analysis, which links do manual reviews focus on? What process knowledge requirements do industry-finance integration platforms put forward for entry-level personnel? This task-centered analysis can provide a more direct basis for setting training objectives than generally asking enterprises "what abilities are needed".

Professional training objectives should also shift from "understanding technology" to "being able to correctly use technology in finance and accounting tasks and ensure work quality". Software platforms and business systems vary by region and enterprise, but understanding the substance of transactions, processing data, judging exceptions, verifying outputs, and taking professional responsibility have more lasting professional value. Taking these requirements as the core of training objectives can reduce the tendency of "adding or removing a course for every technological hotspot" without changing the underlying competence structure.

6.2 Integrating Finance and Accounting Knowledge with Digital Technology across the Curriculum

The curriculum system should not expand infinitely around popular software, but should strike a balance between relatively stable professional foundations and ever-changing technology applications. Accounting, taxation, cost management, financial management, internal control and auditing are still the core knowledge foundation of professional judgment, and data analysis, RPA, business intelligence and artificial intelligence should be gradually embedded in these professional tasks. When students learn digital technology, they should focus on finance and accounting problems; when learning professional knowledge, they should gradually use data and digital tools to solve real problems.

Curriculum organization can follow the progressive path of "basic business tasks — integrated business tasks — complex comprehensive tasks": lower grades focus on understanding rules and performing operations accurately; middle grades connect finance and accounting knowledge with digital technology through cross-curricular tasks; upper grades

introduce comprehensive projects including exceptions, information conflicts and uncertainties. This progression does not require repackaging all content into new courses, but changes the way students apply knowledge through task design.

6.3 Using Authentic Finance and Accounting Tasks to Develop Professional Judgement and Craftsmanship-Oriented Work Standards

The value of project-based learning does not lie in renaming chapter exercises as projects, but in allowing students to experience a relatively complete finance and accounting work process. In a monthly business-performance analysis, for example, students can begin with understanding source materials and cleaning data, move through indicator construction, budget comparison, and anomaly identification, interpret causes with reference to business facts, use digital tools or AI to support analysis, and then complete professional verification, visual communication, presentation, questioning, and revision. Throughout the process, students not only complete a task but repeatedly judge whether the data, rules, and conclusions are reliable.

Authentic enterprise tasks can enter the classroom after de-identification and educational transformation. Colleges do not need to preserve every original amount or the identity of the enterprise. More important is preserving real relationships among transactions, genuine risk points, data problems, and judgement conditions. Where risks are low and boundaries are clear, small-scale real projects can also be introduced, allowing students under teacher and enterprise-mentor guidance to undertake activities such as cost-accounting improvement, business-data visualisation, or diagnosis of finance processes. The closer task participation comes to authentic professional judgement, the more concretely craftsmanship-oriented work standards can be developed through professional action.

6.4 Incorporating Artificial Intelligence into the Development of Professional Judgement

As generative AI enters finance and accounting education, neither complete prohibition nor instruction limited to prompt-writing is sufficient. A more appropriate approach is to place AI within a complete process of professional judgement. Students should first clarify the problem and the boundaries of the data, then select an appropriate tool, obtain an output, and verify the facts, logic, and conclusions against professional rules, ultimately assuming responsibility for the final result.

Courses such as financial analysis, tax consulting simulation, audit data analysis and management accounting can all design the task mode of artificial intelligence generating preliminary results — students verifying data and rules — identifying errors — professionally revising analysis — explaining revision basis. In this design, artificial intelligence is not just a speed-up tool, but also a carrier to test whether students truly understand finance and accounting problems. Studies by Ballantine et al. and Blondeel et al. also show that the use of artificial intelligence in accounting education must always place accuracy, professional judgment and responsibility at the core [20,21].

6.5 Expanding Occupational Learning through Joint School–Enterprise Development

Enterprise resources should be transformed from general internship resources into task resources that can be used for learning. Historical transactions, exceptional cases, and process problems that enterprises have already resolved can be de-identified and then reconstructed by colleges into cases of different levels of difficulty. Low-risk, well-bounded activities can also be introduced as small-scale real projects. Colleges and partner enterprises can jointly develop continuously updated teaching datasets so that students work with data containing authentic business relationships, appropriate levels of noise, and realistic anomalies rather than relying indefinitely on fixed, standardized account sets.

The role of enterprise mentors should likewise extend beyond guest lectures and internship supervision. Their greater educational value lies in participating in task design, process guidance, and outcome assessment and in bringing enterprise standards of work quality into student learning. College teachers, in turn, remain responsible for educational transformation and for ensuring that enterprise tasks are appropriate to students' current knowledge. Only when school and enterprise actors jointly organize learning around concrete finance and accounting tasks can industry–education integration move from resource cooperation into the formation of

the capabilities required of digital craft professionals.

6.6 Using Work-Quality Assessment to Internalizing Occupational Standards

Assessment of digital craft professionals should attend both to task outcomes and to the process of judgement. Student work products, analytical reports, operation logs, records of AI use and revision, enterprise-mentor feedback, and project presentations can together provide evidence of occupational capability. Students should not only produce a result, but also explain the basis for their judgement; they should not only show what tools they used, but also explain why the tools were appropriate and how the outputs were verified.

This approach makes craftsmanship-oriented standards visible through concrete occupational behaviour. Whether students proactively verify data, continue investigating anomalies, qualify claims when evidence is insufficient, and revise previous treatments in response to feedback are closer to the realities of finance and accounting work than a separate attitude scale labeled craftsmanship. Assessment criteria can thereby become an important means through which students understand and internalize occupational standards of quality.

7. Support Mechanisms for Cultivating Digital Craft Professionals in Finance and Accounting

7.1 Establishing Collaborative Governance Centred on the Cultivation of Digital Craft Professionals

The long-term educational effect of industry-education integration depends on whether schools and enterprises establish a stable division of responsibilities around the cultivation of finance and accounting digital craftsmen. Industry-wide industry-education integration communities, industrial colleges, professional construction steering committees, etc., can serve as institutional platforms for colleges, industry organizations, representative enterprises and technology service providers to carry out continuous professional consultations. Their work should gradually expand from activity organization and resource docking to deep-seated fields such as analysis of workplace task changes, identification of core professional tasks, adjustment of curricula and training programs, and evaluation of talent cultivation quality.

This collaborative governance must translate digital craftsman cultivation into specific finance and accounting tasks and quality standards, rather than staying at the level of general cooperation agreements. Enterprises continuously provide information on workplace changes, digitalized processes and professional standards, and colleges transform them into educational content. Both parties participate in achievement evaluation together. Only through this continuous division of responsibilities can digital craftsman cultivation always align with industrial practice.

7.2 Creating Sustainable Incentives and Benefit-Sharing Arrangements for Enterprise Participation

In-depth enterprise participation in finance and accounting education requires real costs, including professional personnel time, data processing costs, and protection costs for commercially sensitive information. Relying only on social responsibility or the enthusiasm of individual employees, it is difficult to maintain long-term in-depth participation. Several Opinions on Deepening Industry-Education Integration and the Vocational Education Law have provided policy and legal support for enterprise participation. At the college level, enterprise participation should be combined with enterprises' own needs such as talent delivery, employee training, process consulting, data analysis and applied research: enterprises provide professional scenarios and workplace knowledge, and colleges provide talents, training and technical services, and reasonably share cases, curriculum resources and project results.

For finance and accounting majors, sustainability also depends on the protection of data and trade secrets. Clarifying rules on data use scope, desensitization rules and achievement ownership can reduce enterprises' concerns about opening up real tasks and cases, and promote the transition from short-term project cooperation to long-term joint development.

7.3 Building Dual-Qualified Teams that Connect Finance and Accounting, Digital Technology, and Enterprise Practice

Teacher development should focus less on the number of certificates held and more on whether teachers remain connected to authentic professional practice and can transform that

practice into teaching resources. Colleges can shift enterprise practice for teachers from time-based management to task- and outcome-based management by requiring teachers to conduct workflow studies, collect typical tasks, convert enterprise cases for teaching, or participate in technical services, and by recognising these outputs in teaching and performance evaluation. The 2025 vocational education teaching standards further strengthen requirements for teacher practical capability and digital teaching and thus provide an institutional basis for this approach.

At the same time, it is neither necessary nor realistic to expect every finance and accounting teacher to become equally proficient in accounting, programming, AI, and enterprise digitalisation. A more feasible approach is to form teams in which finance and accounting teachers, information-technology teachers, and enterprise practitioners collaborate around complex tasks. The practical capability of the teaching team should ultimately be judged by whether it can design high-quality finance and accounting tasks and guide students in professional judgement, rather than by the number of digital tools mastered by individual teachers.

7.4 Strengthening Authentic Data, Digital Resources, and Governance of AI Use

Digital technologies change more quickly than traditional textbooks can be revised. The cultivation of digital craft professionals therefore requires a resource structure in which textbooks, cases, data, and projects complement one another. Colleges can develop dynamic resources such as de-identified enterprise datasets, typical enterprise workflows, cases of artificial intelligence error, RPA process cases, business-analysis projects, and compliance and ethics cases, updating them as partner enterprises' technologies and practices change. Textbooks should provide relatively stable concepts and rules; digital resources should reflect industrial change; authentic projects should support capability integration. None can fully substitute for the others.

Finance and accounting programmes also deal with highly sensitive data. The deeper industry–education integration becomes, the greater the need for robust data governance. Colleges should establish rules for de-identification, access rights, permitted uses, retention periods, and publication of outcomes, as well as clear requirements concerning what enterprise information may not be uploaded to public generative-AI platforms, how AI-generated content should be disclosed, how important finance and accounting conclusions should be manually reviewed, and what process records students should retain. Data security and AI governance are themselves part of the professional responsibility expected of digital craft professionals.

7.5 Establishing Continuous Quality Feedback Oriented towards Occupational Development

The quality of talent cultivation should not be evaluated only at the time of graduation. Colleges need to connect the achievement of core tasks during school, the adaptation and career development of graduates after employment, and the continuous response ability of majors to industrial changes. Enterprise feedback should also shift from "overall satisfaction" to more specific dimensions: which tasks can graduates complete independently? Which require a longer adaptation period? Which abilities do enterprises still need to retrain? This information should feed back to task analysis, curriculum adjustment and resource updating. Digitalized finance and accounting work changes rapidly. Professional construction cannot rely only on major revisions every few years, but requires continuous small-scale updates to ensure the adaptability of cultivation content. Quality feedback is not only used to evaluate results, but also a mechanism for continuous revision and improvement of the cultivation process.

8. Discussion and Contributions

This paper first shows that digital technology and finance and accounting professional knowledge are not in a simple substitution relationship. When systems undertake part of the calculation, entry and rule matching work, finance and accounting personnel need to have a deeper understanding of "why the process is effective, under what conditions it is effective, and when manual intervention is needed". The digital dimension of the digital craft professional does not weaken disciplinary expertise; it changes how that expertise is used in digital work environments. Accounting, taxation, auditing, financial management, and internal

control continue to define the boundaries within which technology can be used and determine whether practitioners can make evidence-based judgements about system- and AI-generated outputs.

Craftsmanship likewise needs to be understood through the concrete quality requirements of digital finance and accounting work. Commitment to quality is expressed in prudence towards data, evidence, rules, and conclusions; appropriate verification of system- or AI-generated outputs; and willingness to revise processes and methods when problems are discovered. Technology can perform some operations, but it cannot replace practitioners' professional responsibility for work outcomes. An important distinction between digital craft professionals and other digitally skilled finance and accounting personnel therefore lies not in the number of digital tools they know, but in their capacity to use those tools within professional rules and standards of quality.

The meaning of industry–education integration also needs to be brought from the level of organisational cooperation into the talent-development process. Enterprises can provide authentic tasks, business constraints, digital workflows, and industry quality standards that colleges cannot easily generate on their own. Colleges, however, remain responsible for selecting, abstracting, and educationally transforming this practical experience into learning tasks appropriate to student development. The relationship is a continuing process in which industrial practice enters the curriculum and student learning outcomes feed back into programme development. For the cultivation of digital craft professionals in finance and accounting, the depth of industry–education integration is ultimately reflected in how far enterprise work knowledge and quality standards enter student learning.

The study makes three main contributions. First, it advances a sector-specific interpretation of the digital craft professional by incorporating the professional regulation, digital work practices, and quality responsibilities of finance and accounting into the concept and clarifying its distinction from generic digital talent and other digitally skilled finance and accounting personnel. Second, it moves discussion of cultivation beyond parallel lists of knowledge, skills, and qualities and towards capability integration within concrete occupational tasks, arguing that professional judgement, digital technology, understanding of data and processes, risk control, communication, and continuous improvement become stable occupational capabilities only when they are mobilized together. Third, it explains the role of industry–education integration through the process of talent development: how industrial tasks are identified and educationally transformed, how students develop capabilities through authentic tasks and joint school–enterprise assessment, and how training outcomes subsequently inform curriculum renewal. This alignment means that cultivation pathways and support mechanisms are tied to the development of digital craft professionals rather than presented as generic policy recommendations.

This study relies primarily on literature review, policy-text analysis, and normative analysis. Its propositions concerning capability requirements and the cultivation process therefore require further empirical examination. Future research can combine workplace task analysis, interviews with teachers and enterprise practitioners, student project-performance data, and graduate career-development data to investigate how capability requirements vary across finance and accounting specialisations and levels of enterprise digitalisation. It may also be useful to develop performance-based assessment tools using authentic finance and accounting tasks in order to examine relationships among professional judgement, digital technology use, and work quality.

9. Conclusion

Digital transformation is changing the task content, information base, and boundaries of responsibility in finance and accounting work. If higher vocational education continues to organize training mainly as a combination of conventional professional courses and a number of additional digital-technology courses, students may gain more experience with tools without necessarily integrating professional knowledge, digital technology, and craftsmanship-oriented standards in complex finance and accounting tasks. The value of the concept of the digital craft professional is therefore not simply that it provides another label for higher vocational finance and accounting talent. It helps clarify the professional foundation, technological capability, and responsibility for quality required of high-level practice under digital conditions.

Finance and accounting digital craftsmen are first and foremost finance and accounting professionals: their digital ability must serve professional tasks and be constrained by professional standards; their craftsmanship is specifically reflected in the emphasis on data, rules, evidence and results, the necessary verification of information systems and artificial intelligence, and continuous improvement when problems are found. The role of higher vocational education is to lay a professional foundation, provide digital task experience, transmit professional quality standards, and cultivate continuous learning ability, rather than claiming that graduates are fully mature craftsmen upon graduation.

The special value of industry-education integration lies in that enterprises can provide real finance and accounting tasks, digitalized work processes and industry quality standards that are difficult for colleges to independently create, and colleges can transform these resources into educational curricula and learning activities. Higher vocational colleges should calibrate training objectives in alignment with changes in workplace tasks, promote integrated teaching of professional knowledge and digital technology, cultivate professional judgment and craftsmanship with real tasks, integrate artificial intelligence into the professional verification process, and support the internalization of professional standards with work quality evaluation. Collaborative governance, in-depth enterprise participation, improvement of teachers' practical ability, supply of real data resources and continuous quality feedback provide institutional guarantees for the above reforms.

The key to cultivating digital craft professionals in finance and accounting under industry–education integration is therefore not the number of digital technologies appearing in the curriculum or the number of school–enterprise projects. It is whether students, through sustained engagement with authentic finance and accounting tasks, learn to use technology within professional rules, make sound judgements, control risk, and take responsibility for the quality of their work. Only when industrial practice becomes a substantive part of student learning can the cultivation of digital craft professionals move from conceptual advocacy to a stable educational process.

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