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Reform of Teaching Methods for Big Data and Accounting Programs in Higher Vocational Colleges Driven by New Quality Productivity

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Abstract: To align with the transformative trends of the digital and intelligent era and effectively meet the escalating demands of new-quality productivity development, teaching methodologies in big data and accounting programs at higher vocational colleges require urgent and comprehensive reform. This paper begins by systematically examining the fundamental restructuring of professional competencies driven by the emergence of new-quality productivity. It provides a detailed, multidimensional analysis of the updated competency requirements across three critical domains: advanced data governance and intelligent analysis, seamless industry-finance integration and process reengineering, as well as rigorous technological ethics and risk compliance. Furthermore, the study comprehensively identifies and evaluates the structural challenges inherent in current pedagogical approaches, including outdated curriculum frameworks, inadequate practical training design, ineffective evaluation mechanisms, and superficial industry-academia collaboration. Building upon this robust analytical foundation, the paper proposes an integrated, forward-looking reform strategy. This strategic framework encompasses the complete restructuring of curriculum models, the development of a dynamic practical training ecosystem, the implementation of innovative and multifaceted evaluation paradigms, and the deepening of industry-academia symbiosis to foster sustainable educational partnerships. Ultimately, this research aims to offer highly practical and actionable references for higher vocational colleges, guiding them in establishing resilient teaching models for big data and accounting that perfectly align with the core developmental principles of new-quality productivity and future workforce requirements.

Keywords: new quality productivity; accounting education; big data; teaching reform; professional competence

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1. Introduction

The report emphasizes that education, science and technology, and talent are fundamental and strategic pillars for building a modern socialist country. Higher education institutions are critical in fostering innovation, which serves as the core driver of new-quality productive forces [1]. Innovation is essential for advancing industrial development and requires the implementation of strategies that prioritize innovation-driven growth. This involves enhancing workforce competence and integrating cutting-edge technologies into various sectors. Higher vocational colleges, as key institutions for cultivating skilled professionals, must adapt their teaching methodologies to align with these developmental trends. By doing so, they can effectively contribute to the creation of a highly skilled workforce capable of meeting the demands of modern industries. Furthermore, these colleges should focus on developing practical skills and fostering creativity among students to ensure their readiness for the evolving job market. The integration of advanced technologies into educational practices will empower students to

become innovators and leaders in their respective fields, thereby driving sustainable economic and social progress.

2. New Requirements of Quality-Enhanced Productivity for Professional Competencies in Big Data and Accounting

2.1. Data Governance and Intelligent Analytics Capabilities

In the evolving landscape of quality-enhanced productivity, the role of accountants has significantly broadened beyond the preparation of standardized financial documents. Modern accounting now requires the integration and analysis of diverse, multi-source datasets, such as transaction logs, user behavior patterns, and supply chain dynamics [2, 3]. To meet these demands, accountants must develop a robust governance framework that includes critical processes like assessing data quality, formulating data cleansing rules, designing efficient storage architectures, and managing access permissions to ensure data security and integrity. Moreover, the adoption of advanced technologies, such as Robotic Process Automation (RPA), is essential for automating repetitive tasks, thereby improving efficiency and reducing human error. Business Intelligence (BI) platforms further empower professionals to construct multidimensional analytical models, enabling the extraction of predictive insights from historical data. Additionally, the ability to process large volumes of information necessitates expertise in selecting appropriate algorithms, optimizing models, and interpreting results. These competencies ensure that analyses are not only accurate and reliable but also actionable and aligned with organizational objectives. By mastering these advanced skills, accountants can effectively contribute to data-driven decision-making processes, thereby enhancing the strategic value of their role in modern enterprises.

2.2. Capability in Business-Finance Integration and Process Reengineering

The fundamental requirement of new quality productivity is that accounting professionals develop cross-domain systematic thinking capabilities. Modern financial practitioners must transcend traditional bookkeeping roles to gain a comprehensive understanding of the operational logic behind enterprise value creation. This involves identifying critical financial control points and potential risk areas throughout the entire value chain. By leveraging this business insight, professionals can utilize advanced digital tools to diagnose and analyze existing processes, pinpoint efficiency bottlenecks, and address cost inefficiencies. This diagnostic approach enables the design of more agile and adaptive financial solutions tailored to the dynamic needs of businesses. Process reengineering, in this context, extends beyond technical system integration. It requires corresponding adjustments to organizational structures, job responsibilities, and incentive mechanisms to ensure alignment with the redefined financial objectives. Ultimately, this transformation shifts the role of financial management from being a traditional cost center to becoming a strategic value-creation function, fostering innovation and sustainable growth within the organization [4].

2.3. Technical Ethics and Risk Compliance Awareness

The integration of artificial intelligence algorithms and blockchain technology within the financial sector has introduced a range of technical and ethical challenges that demand heightened professional vigilance [5, 6]. Accountants and financial professionals are now tasked with responsibilities that surpass traditional operational roles, requiring them to critically assess the outputs of intelligent systems and take accountability for their implications. For example, algorithmic black boxes can obscure decision-making processes, potentially leading to biases that must be identified and addressed. Similarly, automated processes may encounter anomalies that require prompt and effective handling, while the cross-border transmission of sensitive data necessitates robust safeguards to ensure compliance with international standards. Additionally, the dynamic nature of regulatory frameworks calls for continuous monitoring and adaptation to evolving laws, particularly those related to data protection, privacy security, and

algorithmic transparency. Modern accountants must develop a nuanced understanding of technological limitations, leveraging digital tools to enhance efficiency while maintaining strict adherence to ethical and legal standards [5, 7]. This dual focus on innovation and compliance underscores the importance of cultivating a proactive approach to risk management and ethical decision-making in the era of advanced financial technologies.

3. Current Practical Challenges Faced by Teaching Methods in the Big Data and Accounting Program at Higher Vocational Colleges

3.1. The Update of Teaching Content Lags Behind the Iteration of Industrial Technologies

The curriculum design in vocational colleges often relies on relatively stable professional standards, which can hinder the ability to promptly address the evolving demands of industry technologies. For instance, while enterprises increasingly utilize intelligent financial robots to automate processes such as voucher verification and expense reimbursement, many institutions continue to emphasize traditional manual bookkeeping and basic software operations in their specialized courses. This disconnect creates a significant time lag between the knowledge imparted in classrooms and the cutting-edge practices adopted by industries. Consequently, students often graduate with outdated knowledge structures that fail to meet employers' urgent requirements for proficiency in applying advanced technologies. Furthermore, the rigid nature of curriculum adjustments exacerbates this issue, as institutional frameworks are often slow to adapt to technological advancements. This rigidity leaves professional education ill-equipped to prepare students for the rapidly evolving technological landscape. Addressing this challenge requires a more dynamic approach to curriculum development, ensuring that educational content aligns closely with industry trends and equips students with the skills necessary to thrive in modern workplaces. Institutions must prioritize flexibility and innovation in their teaching methods to bridge the gap between academic training and practical industry needs.

3.2. The Practical Training Component Is Disconnected from Complex Business Scenarios

Current practical training models predominantly emphasize isolated skill development for specific positions, such as cashier, accountant, and auditor, where students engage in standardized operational drills within controlled simulated environments. These exercises often lack the integration necessary to reflect the interconnected workflows of modern enterprises. In actual corporate settings, financial staff must collaborate extensively with departments like sales, procurement, and production to address multifaceted tasks, including cross-system data integration, anomaly detection, and risk analysis. Simulation platforms, however, tend to oversimplify these processes, failing to replicate the dynamic and unpredictable nature of real-world business scenarios. As a result, students are deprived of opportunities to develop critical professional competencies such as cross-departmental collaboration, emergency response capabilities, and systematic thinking [5, 8]. Furthermore, the rigid procedural design of training projects encourages a mechanical approach to problem-solving, leaving students ill-equipped to tackle non-standardized challenges that demand innovative solutions. This disconnect between training methodologies and real-world complexities undermines the development of adaptive decision-making skills, which are essential for navigating the uncertainties inherent in contemporary business environments. By addressing these shortcomings, training programs could better prepare students for the demands of integrated and dynamic professional roles.

3.3. Teaching Evaluation Emphasizes Knowledge Memorization Rather Than Competency Development

Traditional assessment methods in accounting education predominantly focus on theoretical knowledge tests and the preparation of accounting journal entries. These evaluations emphasize foundational skills such as memorizing concepts, applying

formulas, and adhering to standardized operational procedures. However, this approach fails to align with the evolving competency requirements of interdisciplinary talents demanded by modern productive forces. Higher-order cognitive abilities, such as data mining and analysis, business insight judgment, and ethical decision-making in technology, are inadequately assessed within the current framework. Students often become accustomed to standardized examination formats, which limit their opportunities for independent thinking and critical analysis [9, 10]. This singular focus on test scores fosters a utilitarian approach to learning objectives, prioritizing rote memorization over the development of practical problem-solving capabilities. Furthermore, the absence of formative assessments and project-based evaluations restricts the ability to comprehensively measure students' overall competencies, including teamwork, communication, and innovative thinking. A more holistic evaluation system that incorporates diverse assessment methods, such as case studies, collaborative projects, and real-world simulations, is essential to cultivate well-rounded professionals equipped to meet the challenges of a dynamic and interdisciplinary business environment.

3.4. The Industry-Education Collaboration Mechanism Lacks Both Visibility and Sustainability

Currently, the majority of collaborations between educational institutions and enterprises remain superficial, often limited to basic activities such as company visits, internships, specialized lectures, and short-term job placements. These initiatives, while beneficial in providing some exposure, fail to deeply integrate the high-quality resources and expertise that enterprises possess into the core aspects of professional curriculum design or the daily teaching process. Enterprises that participate in such collaborations are frequently motivated by social responsibility or brand promotion objectives, rather than by clear financial incentives or strategic long-term goals. This lack of alignment often results in minimal engagement and limited contributions to the educational ecosystem [11]. For instance, expert lectures delivered by enterprise professionals are infrequent and tend to focus on theoretical knowledge, rather than offering a structured framework for practical skill development. Educational institutions, on the other hand, often adopt a reactive stance in these partnerships, lacking proactive mechanisms to align their programs with evolving industrial demands or to effectively utilize corporate resources. Furthermore, the absence of unified planning in the design and execution of collaborative projects leads to fragmented efforts that fail to generate meaningful, synergistic educational outcomes. Compounding these challenges are factors such as rapid technological advancements and frequent personnel turnover, which undermine the stability and predictability of these partnerships. Consequently, the development of sustainable and effective industry-education collaboration models remains a significant challenge.

4. Reform Paths of Teaching Methods for Big Data and Accounting Programs in Higher Vocational Colleges Driven by New Quality Productivity

4.1. Reconstruct the Curriculum System and Integrate Intelligent Technology Modules

The restructuring of the curriculum system driven by new productive forces necessitates the establishment of a comprehensive framework that integrates "core professional competencies + intelligent technology application + vocational literacy cultivation." In designing professional courses, the emphasis should transition from solely imparting accounting theories to fostering a holistic set of technology-empowered competencies. This can be achieved by strategically embedding advanced technologies such as artificial intelligence, machine learning, and data mining into core modules like financial accounting, management accounting, and auditing. The organization of course content should evolve from a linear sequence of knowledge points to a project-driven, spiral progression approach. This method enables students to acquire both professional knowledge and technical tools while addressing real-world business challenges. Teaching units should enhance the interconnections between courses by developing cross-disciplinary knowledge maps and competency matrices, thereby promoting a systematic

understanding of professional concepts. The integration of intelligent technologies must go beyond the mere addition of computer courses; it should permeate all teaching components, making technology an essential tool for analyzing and resolving accounting issues. For example, in the "Intelligent Financial Analysis" course, instructors can guide students to use Python or R for cleaning and preprocessing historical financial data, constructing financial risk early-warning models using machine learning algorithms, and providing professional interpretations and decision-making recommendations based on accounting standards and business logic. Through this process, students not only acquire data analysis techniques but also develop interdisciplinary thinking skills that combine technological tools with professional judgment. Furthermore, the course evaluation mechanism requires significant adjustments, shifting its focus from knowledge reproduction to competency demonstration. This approach encourages students to submit comprehensive projects that include data processing code, analytical reports, and decision-making recommendations, transforming the evaluation process into a robust platform for showcasing learning outcomes. Additionally, the curriculum system should incorporate a dynamic update mechanism, regularly inviting industry experts to review and refine course content. This ensures that the teaching material remains aligned with the latest industry developments, providing students with a forward-looking and industry-relevant learning experience. Such a dynamic and integrated approach not only enhances the technical and professional capabilities of students but also prepares them to adapt to the rapidly evolving demands of the accounting and big data industries.

4.2. Establish a Hybrid Training Ecosystem Integrating Virtual and Physical Environments for Cross-Position, End-To-End Practical Training

To create a blended virtual and physical training environment, it is essential to simulate real corporate organizational structures and business processes, enabling students to experience the entire workflow—from transaction initiation to financial decision-making—through role rotation. The integration of virtual simulation technology with physical operational platforms provides students with a secure and controllable trial-and-error environment that replicates authentic workplace scenarios. This approach allows students to engage in realistic problem-solving while minimizing risks associated with real-world errors. Training projects should incorporate dynamically evolving market conditions and unexpected business events to cultivate students' ability to handle uncertainties and adapt quickly through experiential learning. Accounting students should collaborate with peers from marketing, logistics management, and e-commerce disciplines to form virtual enterprise teams that jointly address complex business challenges. This interdisciplinary collaboration fosters a deeper understanding of interconnected business functions and enhances students' ability to work effectively in diverse teams [12, 13]. Data-driven decision-making training should permeate the entire training process. Students must utilize big data analytics tools to extract business insights from vast datasets and translate these findings into actionable financial management recommendations. For instance, in "Supply Chain Financial Management" instruction, instructors can design a simulated enterprise environment encompassing procurement, production, and sales processes. Within this environment, students assume diverse roles, such as procurement specialists, production planners, sales representatives, and financial analysts. When confronting real-world challenges such as raw material price fluctuations, order demand variations, and liquidity management, students must coordinate multiple systems, including ERP platforms, business intelligence tools, and risk management solutions. Through tasks involving cross-departmental communication, data integration and analysis, and cost optimization, students develop comprehensive professional competencies. The practical training evaluation model should emphasize process-based assessment and the outcomes of teamwork, encompassing multi-dimensional indicators such as technical proficiency, depth of business understanding, communication and coordination skills, and innovative thinking. This comprehensive practical training ecosystem not only enhances students' professional competencies but also cultivates their

systematic thinking abilities and cross-domain collaboration skills. By engaging in such immersive and interdisciplinary training, students are better prepared to meet the demands of evolving roles in the era of new-quality productivity, ensuring they possess the adaptability and innovation required in modern professional environments.

4.3. Innovating Evaluation Paradigms: Emphasizing Dynamic Competencies and Ethical Judgment

Under the framework of new quality productivity, evaluation systems should integrate diverse approaches such as formative assessment, project-based evaluations, and peer reviews. The focus of evaluation should shift from traditional knowledge memorization to a comprehensive assessment of competencies, particularly high-order cognitive abilities like data insight, critical thinking, and ethical judgment. Teachers should design open-ended evaluation tasks that enable students to demonstrate their integrated problem-solving capabilities in real or simulated professional contexts. Evaluation criteria must reflect industry trends and professional standards, with particular emphasis on students' decision-making quality when confronting uncertainties and complexities [14]. Additionally, involving corporate mentors and industry experts in the evaluation process ensures alignment between assessment outcomes and actual professional competencies. For instance, in the "Corporate Internal Control Risk Assessment" course, instructors can design a comprehensive case involving multiple business departments and data security or moral risk issues. Students are required to employ big data technologies to identify potential risks, develop control measures, and address ethical concerns such as data usage boundaries and conflicts of interest. Evaluation should not only assess students' mastery of risk identification techniques but, more crucially, their judgment and accountability when handling complex scenarios involving data acquisition compliance, analytical transparency, and timely risk disclosure. Students must complete risk assessment reports within specified deadlines and present their findings publicly, subject to peer questioning and expert feedback. This evaluation method effectively assesses students' technical application skills, teamwork capabilities, communication proficiency, and professional ethics. By incorporating these multidimensional evaluation strategies, educators can ensure that students are better prepared to meet the demands of modern professional environments, where adaptability, ethical awareness, and collaborative problem-solving are critical. Such an approach fosters a deeper understanding of professional responsibilities and equips students with the skills necessary to navigate complex, real-world challenges with confidence and integrity.

4.4. Deepening Industry-Education Synergy to Establish a Sustainable Collaborative Education Mechanism

Universities should prioritize the establishment of strategic partnerships with leading industry enterprises to collaboratively develop talent cultivation standards and curriculum frameworks [10]. This approach enables enterprises to actively engage in decision-making throughout the professional development process, ensuring that academic programs align closely with industry needs. A two-way personnel mobility mechanism is essential, allowing exceptional faculty members to undertake practical assignments at partner enterprises. This hands-on experience enables them to address real-world project development and technical challenges, while corporate technical experts can be invited to serve as adjunct instructors. These experts can contribute to core curriculum design and provide practical training guidance, ensuring that students gain exposure to industry-relevant skills and knowledge. Establishing industry-academia integration innovation bases can further enhance this synergy by offering authentic project development platforms. These platforms allow students to refine their professional competencies and foster innovative thinking by solving real-world corporate challenges. A collaborative mechanism that balances shared benefits and risks should be implemented. Universities can provide technical services and a steady talent supply, while enterprises contribute practical training resources and employment opportunities,

creating a mutually beneficial cycle. For instance, in the "Digital Tax Planning" course, instructors can collaborate with corporate finance departments to design real-world tax optimization projects. Students can leverage big data analytics tools to identify critical risk points in corporate tax structures, develop compliant tax planning solutions, and create feasibility assessments and implementation roadmaps under the guidance of corporate mentors. This process deepens their understanding of tax policies, data analytics, and financial strategies through practical decision-making. Additionally, a dynamic evaluation and continuous improvement mechanism should be established to regularly assess the outcomes of these partnerships. This mechanism ensures that collaboration content and training objectives are adjusted in response to industry evolution and technological advancements, maintaining the relevance and quality of talent development initiatives.

5. Conclusion

The teaching reform in the Big Data and Accounting program at vocational colleges is currently undergoing a pivotal and transformative phase, reflecting the broader shifts in educational paradigms necessitated by the rapid evolution of new-quality productive forces. This restructuring emphasizes the cultivation of professional competencies that align with the demands of a digitalized economy, ensuring that graduates are equipped with the skills required to thrive in an increasingly specialized and technology-driven accounting industry. To achieve this, institutions must prioritize the development of innovative teaching models that integrate adaptive and forward-looking curricula, fostering a seamless blend of theoretical knowledge and practical application. Furthermore, the integration of advanced technological tools and methodologies into the learning process is essential to enhance students' problem-solving capabilities and innovation potential. Establishing sustainable mechanisms for industry-education collaboration will also play a critical role in bridging the gap between academic training and real-world professional requirements. These reforms are expected to significantly enhance the precision and effectiveness of talent cultivation, ultimately contributing to the supply of high-caliber skilled professionals who can support the growth and sophistication of China's digital economy. In the long term, this transformation will not only elevate the accounting profession to new levels of specialization but also serve as a model for other disciplines navigating the challenges of adapting to new-quality productive forces.

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