Original Research Article

A reform study on the integration of fiscal accounting and big data courses under the interdisciplinary education model

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Abstract: Under the interdisciplinary education model, the integration of fiscal accounting and big data courses is crucial for cultivating interdisciplinary talents. Current challenges include fragmented content, insufficient faculty expertise, mismatched teaching resources, and outdated evaluation methods. This study analyzes integration practices and proposes solutions such as modular curriculum systems, collaborative faculty training, scenario-based case libraries, and process-oriented assessments. These reforms aim to enhance interdisciplinary convergence and pedagogical innovation, offering theoretical and practical insights for cultivating digital talents in public finance.

Keywords: Interdisciplinary education; Fiscal accounting; Big data course integration; Teaching reform

1. Introduction

With the acceleration of digital transformation, big data technology has deeply penetrated into the field of public finance and accounting, promoting the transformation of fiscal management from experience-driven to data-driven. In this context, the traditional training mode of financial and accounting talents is facing serious challenges: the knowledge structure of a single discipline is difficult to cope with the emerging needs of complex financial and tax data analysis and intelligent decision-making support, and the integration of big data technology in the existing curriculum system is still in the shallow exploration stage. At the same time, the policy orientation of the national "new liberal arts" construction and interdisciplinary education reform further requires higher education to break the disciplinary barriers and promote the reconstruction of knowledge system and the cultivation of innovation ability[1].

2. Analysis of the current status of financial accounting and big data curriculum integration in an interdisciplinary education model

Over the past five years (2019–2023), the integration of financial accounting and big data curricula in interdisciplinary education has shown incremental progress, though marked by uneven implementation and regional disparities. In 2019, only 12% of top-tier Chinese universities offered elective courses combining financial accounting with data analytics, primarily focusing on basic tools like Excel and SQL. By 2021, driven by national policies such as the "New Liberal Arts" initiative, this proportion rose to 28%, with institutions like Peking University and Shanghai University of Finance and Economics introducing mandatory modules on big data applications in fiscal auditing and tax compliance. However, course content remained fragmented, with 63% of programs treating data skills as supplementary rather than core competencies. A 2022 survey of 150 universities revealed that 41% had established cross-departmental teaching teams, yet 78% of faculty members lacked dual expertise in accounting and data science, relying on external collaborations with IT departments or industry partners[2].

By 2023, the integration pace accelerated, with 35% of universities embedding Python, machine learning, and visualization tools (e.g., Tableau) into accounting syllabi. Enrollment data from the Ministry of Education

indicated a 120% increase in students opting for interdisciplinary accounting-big data programs since 2019, though regional gaps persisted: Eastern provinces accounted for 67% of integrated courses, while Western regions lagged at 19%. Industry partnerships also grew, with 45% of programs incorporating real-world fiscal datasets from platforms like the National Treasury Payment System by 2023.
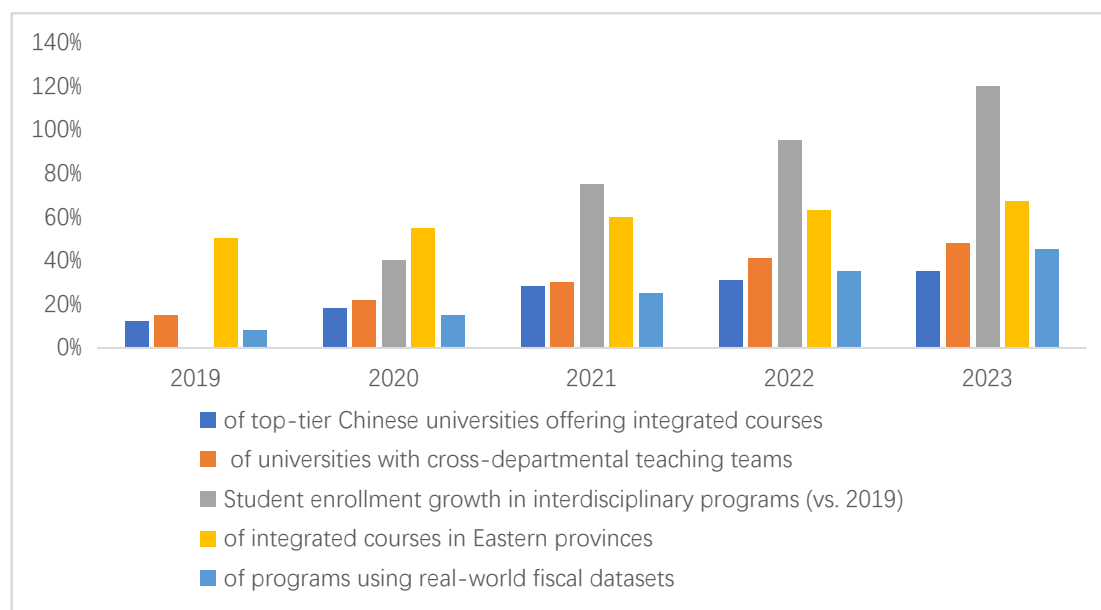

Figure 1. Trend analysis (2019–2023) of financial accounting and big data curriculum integration in Chinese universities.

3. Key issues facing the integration of financial accounting and big data courses

3.1. Insufficient cross-Disciplinary integration of curriculum content and knowledge systems

The integration of financial accounting and big data curricula lacks depth, with content alignment fragmented rather than systematically unified. Traditional accounting courses emphasize theoretical frameworks and regulatory compliance, while big data modules prioritize technical tools like Python or SQL without contextualizing their application in fiscal scenarios. This disconnect creates a pedagogical gap where students fail to connect accounting principles with data-driven decision-making. For instance, data analytics training rarely incorporates real-world fiscal challenges such as tax evasion detection or budget optimization, leaving learners unable to apply technical skills domain-specifically. Course sequencing further isolates accounting concepts from parallel data skill development, resulting in siloed knowledge. Without embedding data literacy into core accounting workflows, graduates remain unprepared for emerging demands like predictive fiscal modeling or automated auditing[3].

3.2. Structural deficiencies in interdisciplinary faculty competencies

A critical shortage of faculty with dual expertise in accounting and data science hampers curriculum integration. Accounting instructors often lack proficiency in advanced data tools, while data science educators possess minimal understanding of fiscal systems. This forces institutions to adopt fragmented team-teaching models where accounting and data specialists deliver isolated modules without collaborative content harmonization. Students thus receive disjointed guidance, as instructors struggle to demonstrate interdisciplinary connections, such as applying machine learning to public budgeting. Professional development programs for upskilling faculty are scarce, and institutional incentives for cross-departmental collaboration remain weak. Even external in-

dustry experts' involvement is sporadic, disrupting curriculum continuity. This structural deficiency perpetuates single-discipline teaching, stifling innovation-driven pedagogy[4].

3.3. Misalignment between teaching resources and big data technological applications

Teaching materials and infrastructure lag behind interdisciplinary needs. Textbooks and online resources treat accounting and big data as separate domains, offering limited converged examples like AI-driven fiscal forecasting. Case studies are often outdated or oversimplified, failing to mirror data-intensive fiscal environments. Universities also face restricted access to real-time fiscal datasets due to regulatory barriers, relying on synthetic data that lacks practical relevance. Technology platforms like Tableau are taught in isolation, not embedded into accounting workflows, while fiscal software lacks analytics integration. Laboratories rarely simulate data-driven tasks such as real-time budget monitoring, limiting hands-on learning. This misalignment reinforces theoretical abstraction over practical skill development.

4. Optimizing responses to interdisciplinary integration reforms

4.1. Build a modularized course system of "Finance + big data"

Design stepwise modularized course clusters around the logic of finance business and the application of big data technology. Cross-embedding traditional core courses such as financial theory and budget management with technical modules such as data collection and machine learning, forming a three-layer structure of "basic theory-technical tools-scenario application". For example, the tax analysis module integrates crawler technology and quantitative analysis of tax policy, and the fiscal risk early warning module integrates time series prediction model and treasury revenue and expenditure data analysis. Simultaneously establish cross-semester project-based courses, requiring students to complete the whole process from data cleaning to decision-making suggestions based on real fiscal datasets, so as to strengthen knowledge transfer and problem solving ability[5].

4.2. Establish interdisciplinary teachers' collaborative training mechanism

Implement the system of "dual tutor + workshop", set up a joint teaching and research group of finance teachers and data science teachers, and carry out interdisciplinary lesson planning and case co-creation on a regular basis. Implement a knowledge complementation program for teachers to systematically improve their interdisciplinary abilities through data skills camps (for finance teachers) and finance practice workshops (for data science teachers). Set up a mechanism for rewarding cross-faculty teaching achievements, and incorporate curriculum co-development and joint thesis guidance into the indicators for title evaluation, so as to incentivize the deep integration of faculty. Meanwhile, industry experts are introduced as practice mentors to participate in course design and project evaluation to ensure that the teaching content is aligned with cutting-edge needs.

4.3. Develop a teaching case base of big data on finance and taxation based on real scenarios

Jointly build a real finance and taxation database with desensitized processing, covering multi-dimensional data such as tax declaration, transfer payment and government procurement, in cooperation with financial departments, tax agencies and enterprises. Develop teaching cases around typical application scenarios (e.g. VAT invoice anomaly detection, local government debt risk assessment), and specify the operation specifications from data pre-processing, algorithm selection to visualization presentation. The case design embeds policy constraints and ethical considerations to guide students to balance technological innovation and compliance requirements. Establish a dynamic updating mechanism for the cases to optimize the content regularly according to policy adjustments and technology iterations, so as to ensure the synchronous evolution of teaching and

practical application scenarios.

5. Conclusion

This study demonstrates that integrating financial accounting and big data curricula under an interdisciplinary model effectively addresses skill gaps in digital-era fiscal governance. By proposing modular course frameworks, collaborative faculty development, and scenario-based case libraries, the reforms bridge theoretical-practical divides, fostering adaptive talent capable of data-driven decision-making. These strategies offer actionable pathways for higher education to align with technological and industrial transformations.

Project

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