

Embedding and Integration of Undergraduate Accounting Teaching Reform in the Context of Digitization and Intellectualization

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Abstract

Great changes in the information environment accelerate the penetration of data and intelligence technology into the accounting industry. The professional boundary and connotation, the innovation and reengineering of work mode and process require rapid response and profound changes in higher education. Starting with the embeddedness theory, this paper interprets the trend of accounting undergraduate teaching reform in the context of Digitization and Intellectualization in China. Then it explores the way of transformation and upgrading of accounting undergraduate teaching according to the ideas of discipline goal reconstruction, embedding and integration of teaching resources, optimization and adjustment of teaching modes and methods, strengthening teacher construction and deepening cooperation among industry, university, and research institutes. To explore the direction for the deep integration of digital intelligence education and enable the high-quality development of accounting higher education, this paper attempts to put forward the scheme and specific measures of embedding digital intelligence technology into discipline construction and realizing integration.

Keywords

Digital and Intelligence Technology; Talent Training Objectives; Teaching Reform.

1. Introduction

The explosive development of data and intelligence has swept all aspects of social life. Facing the scientific penetration of 'Big Data, Artificial Intelligence, Mobile Technology, Cloud, Block-Chain, and IOT', the discipline context has changed, also the boundary, connotation and application scenario of accounting has changed rapidly [1]. Compared with the characteristics of labor-intensive, one-dimensional value information feedback and lagging analysis of historical information in traditional accounting work, digital intelligent financial work driven by innovation reflects the characteristics of people-oriented and cross-border integration in a massive dynamic real-time information environment [2]. In 2018, the Ministry of Education put forward strategic requirements for 'deep integration of artificial intelligence and education' in the 'Action Plan for Artificial Intelligence Innovation in Colleges and Universities'. At the end of 2021, the Ministry of Finance pointed out in the general objective of the 'Outline of the 14th-Five Year Plan for Accounting Reform and Development' that the accounting function should be continuously upgraded, the support of 'Digitization' should be strengthened, and the digital transformation of accounting audit should be effectively accelerated. It can be seen that the development of accounting discipline and professional construction are facing upgrading and adjustment, and it is urgent to reshape from professional model to technical content, also from teaching means to teaching objects [3].

Technological innovation has given the accounting profession new challenges and tasks [4]. In recent years, the research on 'AI + Education' at home and abroad mainly focuses on the theoretical discussion and application scenario development of big data technology, machine learning, in-depth learning, intelligent teaching, etc. Undergraduate education in the context of digital intelligence began to pay attention to the cultivation of students' dual abilities of knowledge creation and knowledge destruction [5]. In contrast, the core curriculum of Accounting Undergraduate Specialty in China has tended to be stable for a long time and failed to form the discipline competitive advantage under the new situation. The disconnection between teaching and practice has caused criticism from employers and students [6, 7]. The accelerated development of new industries, new formats, and new business models has forced the integration and reconstruction of specialty and curriculum systems. In addition, the teaching scheme of 'no suspension of classes and no suspension of schools' under the epidemic has pushed intelligent teaching to the front line of the practical test. The wide-ranging passive transformation of teaching forms has exposed various problems in teachers, technology, platform, resources, and effect [8].

The whole process and systematic 'digital intelligence embedding' of education and teaching originates from technological change and is guided by industrial demand. Higher education leads industrial innovation with the transcendental cycle of 'Technology → Practice → Teaching → Practice → Technology' driven by the spiral driving force, which is manifested in the in-depth integration of 'industry, university, and research'. As an organization, colleges and universities are not only the supporting platform of technical communication but also the main actors and constructors of technology output. 'Embeddedness Theory' originates from economics (Polanyi, 1944). It is divided into four embeddedness types: politics, structure, cognition, and culture [9]. 'Embeddedness' reflects the network connection between human economic activities and multi-factor complexity at different levels. The difficulties and challenges of the teaching reform of embedded talent training need to be solved by the overall force. Only reasonable and efficient integration can provide continuous endogenous power.

Starting with clarifying the demand for compound accounting talents in the digital intelligence era, this paper combs the current problems and deficiencies in the embedded development of digital intelligence in the teaching process of colleges and universities. Furthermore, guided by the reconstruction of the training objectives of accounting undergraduate talents in China, it puts forward corresponding reform and integration suggestions around the subject setting, teaching mode, teaching methods, cooperative school running which may help implement the strategy of strengthening the country with talents in the context of transformation and upgrading.

2. Accounting Undergraduate Training Objectives in the Context of Digitization and Intellectualization

In 2019, the Chinese Ministry of Education clearly put forward that 'the focus of running a university should return to talent training'. Undergraduate education is the backbone link of transporting talents for the industry. 'Deepening education and teaching reform and improving talent training quality' is the key task of a current college education. Over the years, the undergraduate education of accounting major in China has focused on cultivating applied talents with solid theoretical knowledge of economy, management, and law, meanwhile high level of a practical operation who able to adapt to accounting and management work in different jobs, which obviously cannot meet the current talent demand standard [10].

'Digital intelligence + Accounting' is not the intergenerational upgrading of 'financial accounting informatization' in the traditional context, nor is it a simple superposition of adding 'digital intelligence' courses to the original training program of 'accounting'. 'Big Data, Artificial

Intelligence, Mobile Technology, Cloud, Block-Chain, and IOT' is subverting the existing industry ecology, constructing a new business form, and reshaping the financial unit module [11, 12]. Financial accounting work shows the general trend that traditional accounting is replaced by RPA technology, basic departments are compatible with sharing centers, and basic personnel is gradually reduced. Accountants in the new context will be more distributed in front-end technology, middle-end business, and back-end decision-making (Figure 1). On the one hand, rather than mastering the 'use technology' of digital intelligence, employees should have the conditions and requirements that can meet the R & D and programming technology of financial accounting and management software and hardware as much as possible. On the other hand, accountants will make more 'evaluation, judgment, communication, suggestion, decision-making, and even the design of artificial intelligence accounting system' based on the needs of 'Industry-Finance integration' [13].

It can be seen that the undergraduate talent training objectives will focus on the two levels of 'technology R & D and management talents' and 'decision support and strategic leading talents', so as to cultivate accounting talents into 'business experts in finance and financial experts in business'.

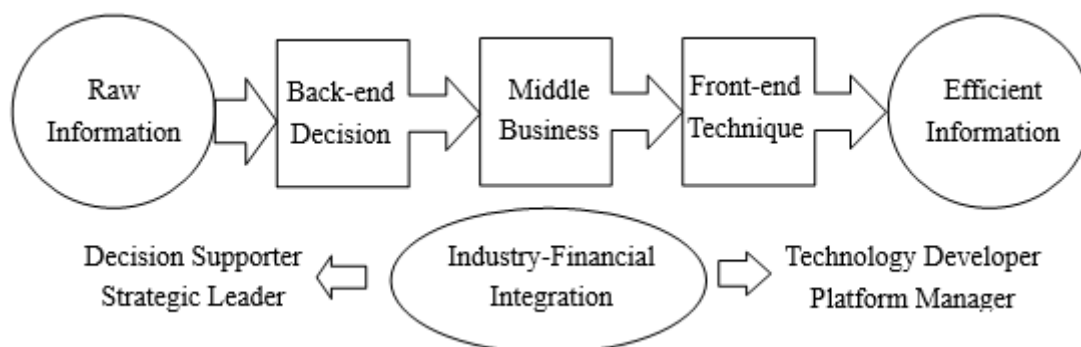


Figure 1. Talent training objectives in the new context

3. Development Status of Digital Intelligence Embedding in Accounting Higher Education

3.1. Specialty Embedded Distribution

According to the statistics of new filing and approval of ordinary colleges and universities of the Ministry of Education, as of July 2021, China has successfully applied for 345 ordinary colleges and universities majoring in artificial intelligence, including 130 in 2021, 180 in 2020, and 35 in 2019. In addition, in 2021, 194 colleges and universities specialized in intelligent science and technology and 301 specializing in robot engineering will be opened. Another 558 vocational colleges have set up artificial intelligence technology service majors.

While more and more colleges and universities have set up artificial intelligence, big data colleges, and other related majors, many financial colleges and universities have also begun to cultivate talents in the direction of 'Intelligent Accounting' and are at the forefront of the pilot teaching reform of striving for 'first-class disciplines' [14]. For example, Southwest University of Finance and Economics is the first school in China to set up an experimental class of accounting major (Big Data Accounting direction). Subsequently, Renmin University of China, Nanjing Audit University, and Shandong University of Finance and Economics also successively set up an experimental class of accounting majors (Intelligent Accounting and Intelligent Finance direction) at the undergraduate stage, and Shanghai University of Finance and Economics set up a major of financial management (Intelligent direction). At the same time, the master of accounting (MPAcc), which aims to cultivate high-level applied talents, also promotes

teaching reform at the same time. At present, 19 colleges and universities in China recruit and train accounting postgraduates in digital or intelligent direction (Table 1).

Table 1. MPAcc colleges and universities with the direction of digital intelligence accounting in China

NO.	University Name	Major	NO.	University Name	Major
1	Renmin University of China	Intelligent Accounting	10	Guangdong University of Finance and Economics	Big Data Accounting
2	Central University of Finance and Economics	Intelligent Finance	11	Chongqing Industrial and Commercial University	Intelligent Accounting
3	Shanghai National Accounting College	Big Data and Accounting	12	Chongqing University of Technology	Big Data and Artificial Intelligence Finance
4	Shanghai University of Finance and Economics	Accounting and Intellectualization	13	Jiangnan University	Audit and Big Data
5	Southeast University	Artificial Intelligence and Big Data Financial Analysis	14	Communication University of China	Big Data and Accounting
6	Nanjing University of Technology	Accounting and Data Analysis	15	Shanghai Normal University	Integration of Management Accounting and Big data, AI, Mobile, Cloud Technology
7	Nanjing University of Posts and Telecommunications	Data Analysis and Financial Decision	16	Shaoxing College of Arts and Sciences	Digital Management Accounting
8	Southwest University of Finance and Economics	①Data Analysis and Financial Decision ②CFO and Big Data Decision	17	Northwest Normal University	Big data + Accounting
9	Jiangxi University of Finance and Economics	Big data Application and Management Accounting	18	Xihua University	Management Accounting and Big Data Analysis

Note: Statistics by December 2021

3.2. Professional Embedding Mode

Throughout the current professional construction mode of digital intelligence embedding in the accounting discipline in Chinese colleges and universities, it mainly reflects the characteristics of 'one body, two sides, and three stages'.

One body. It means the basic teaching institutions. For example, Shanghai University of Finance and Economics set up an Intelligent Accounting Teaching Reform Center to complete the development of big data and artificial intelligence technology in basic teaching organizations. It focuses on the professional reform exploration of accounting and financial talent training, scientific research and innovation, social consultation and even teaching product research and development in an intelligent environment.

Two sides. Firstly, at the level of specialty, it could set up professional intelligent courses under Accounting and Financial Management, formulate corresponding talent training plans, embed a series of courses such as big data and intelligent financial decision-making, intelligent financial sharing, financial data collection and analysis, big data financial risk management and big data audit in the systematic plan, then optimize and integrate the curriculum system of 'Digital Intelligence + Accounting'. Form a knowledge structure to connect with each other. Secondly, at the level of teaching members, teaching experimental classes are usually selected from students with scientific backgrounds, excellent learning achievement points and willingness. Teachers are equipped with interdisciplinary and multi-college teachers to participate in collective lesson preparation, and appropriately introduce off-campus tutors with enterprise practice backgrounds for teaching.

Three stages. It refers to the speed of embedding 'Digital Intelligence' into teaching reform of accounting majors in colleges and universities across the country. Colleges and universities in the first echelon of educational reform have successfully realized the embedding and integration of 'Digital Intelligence' in undergraduate and master education, formed the main teaching unit in the form of experimental class, and output the most professional digital intelligence accounting talents. Meanwhile, colleges and universities at the second stage uniformly revised the traditional talent training scheme for accounting and auditing, added some professional courses of 'Digital Intelligence + Accounting', and output compound digital intelligence accounting talents with a medium professional degree. In the third stage, the schools have updated and selected some teaching materials of 'Digital Intelligence + Accounting' to output accounting talents with digital intelligence knowledge.

Although the current experimental teaching reform of digital intelligence education in China has made some gratifying achievements, it is undeniable that the rapid technological progress and relatively slow educational application have led to the widening gap between technical preparation and educational practice. This gap urgently needs to be narrowed to encourage the embedding and integration of educational technology.

4. Suggestions on Embedding and Integration of Undergraduate Teaching in the New Context

4.1. Adjust and Upgrade the Curriculum

4.1.1. Integration of Curriculum Resources at School Level

In the context of the new business format of 'Digital Intelligence + Accounting', the teaching reform activity of embedding cutting-edge technology into traditional teaching and realizing effective integration is an important starting point of the innovation system of higher education. It marks the innovation level of colleges and universities in promoting the systematic reform of cutting-edge fields such as educational concept, research paradigm, and education mode. It is the linkage reform of scientific research mechanisms, talent evaluation indicators, and other key elements. Therefore, the embedding and integration of 'intelligence' is a reform of interdisciplinary interaction and integration of computer, artificial intelligence, and accounting majors in the whole process of professional education.

The school should sort out all access points of the new talent training program when setting up the curriculum, then upgrade, integrate and adjust the teaching resources within the whole school[15]. Specifically include: (1) Upgrade the old computer application technology, enterprise management information system experimental platform, financial accounting training platform, financial accounting, cost management accounting, and other courses; incorporate the knowledge of new standards, new systems, new business models, and new business forms. (2) Integrate some courses and set up an interdisciplinary multi-level cross course system focusing on artificial intelligence accounting, big data financial risk management,

financial data mining and management, industry-finance integration and corporate strategy. (3) Supporting evaluation mechanisms such as teaching evaluation and scientific research identification, and fully mobilizing the incentive mechanism to guide teaching reform.

4.1.2. Improving Curriculum Quality at the Department Level

Accounting colleges and departments are the executors who directly promote the construction of professional courses. In the implementation of the links, they mainly work together to improve the quality level from three aspects: the number of courses, the content of courses, the integration and cooperation, and strive to create a professional 'golden course' suitable for the new context. A digital intelligence teaching reform center or teaching and research office is added in the department to build a team and form standardized and normalized organization management.

On the one hand, it aims at updating the teaching content in a timely manner to reflect the new business operation and business form mode, and embody the idea and current situation of 'AI, BigData and Internet+'. So that the students can have a global view of the business characteristics in the new environment, such as financial shared service system and intelligent financial development trend. On the other hand, pay attention to the introduction of theory, practice and cases in the course, combined with the changes and needs of the market, strengthen students' learning of theoretical knowledge, and further improve their practical ability by integrating accounting application cases.

4.2. Developing Experiential Teaching Mode

Experiential teaching mode is a significant means to ensure the smooth progress of professional teaching reform and improve teaching quality. It is essential for students' learning effect and achievements to grasp the new business form and the experience of 'comparative learning'. The original teaching model lacks in-depth analysis of the theory, students' interaction is not strong, and the understanding of the application in diversified business forms is not deep enough. The important feature of 'Digital Intelligence Accounting' is the integration of new technology and business. In order to improve students' comprehensive ability, it must rely on a large number of practical cases and experience feedback.

The core of teaching mode reform is how to effectively introduce new business scenarios into classroom teaching. We can consider classifying the companies according to the new business forms and subdividing the business modules of each company. It is also can use a digital information platform for simulation operation. During the operation, through real-time job simulation, students can switch different job roles according to business requirements, so as to complete the experiential learning of the whole business form of business analysis, budgeting, operation management, cost analysis, accounting treatment, accounting audit, tax declaration, financial statement analysis, and so on in each company from the establishment to operation. Such operation is much better than the traditional teaching model of curriculum division and fragmentation. In addition to improving the effectiveness of students' interactive simulation experience, it is also easier to compare and grasp the practical characteristics of different business forms.

4.3. Introducing Intelligent Teaching Methods

With the rapid development of internet information technology, modern education and teaching methods have the opportunity to make significant changes. Teachers benefit from targeted educational products. Teaching reform can use intelligent new technologies to help teachings, such as creating a 'Smart Classroom' and virtual scene teaching.

The Smart Classroom can not only connect different professional courses but also break the walls between classes, disciplines and schools. As an innovative teaching method to breakthrough single teaching, it uses information technology means such as big data, cloud

computing, IOTs, and mobile internet, to provide students with a large number of learning materials through the interactive use of computers, mobile phones, and tablets terminals. While digitizing and online teaching content, it also provides students with a large amount of learning materials through resource sharing. The teaching concept of 'learning before teaching, learning-based teaching' lays the foundation for differentiated teaching. On this basis, teachers can realize flipped classroom, MOOC teaching and micro class teaching. In addition, it can easily realize the timeliness of teaching evaluation feedback, real-time teaching supervision, digitization of teaching decision-making, and accuracy of resource push. There are more diversified interactions between teachers and students, so the objectives of personalized learning and precision education can be realized, and the teaching efficiency and quality can be improved and consolidated. The multi-mode accounting audit virtual education environment (VR, AR) also has high potential prospects.

4.4. Optimizing the Structure of Teaching Staff

Teachers' teaching level is directly related to the improvement of students' skill levels. One of the difficulties in the slow development of teaching reform in the new context is the gap between teachers' knowledge reserve and the forefront of practice. Practical problems such as teachers' lack of interdisciplinary knowledge and being far away from front-line practice hinder professional construction and development. Therefore, in addition to formulating talent training programs aimed at students, the school also needs to add the teacher training and growth plan into the construction objectives, and vigorously improve the stability and enthusiasm of the teaching staff.

First of all, when recruiting new teachers, we should consider teachers with interdisciplinary background and practical experience, introduce experts from the off-campus practice base into the undergraduate classroom, and even carry out teacher training for other teachers. Secondly, divide the existing teachers into different interdisciplinary groups according to the student training program, and then conduct teacher training in groups and batches, update the knowledge reserve through continuing education, and further improve the professional practice level of the curriculum group. Finally, carry out customized teacher training, select and fund excellent graduate students to study for doctoral degrees in universities at home and abroad, and return to the school to undertake teaching work after completing their studies. Integrate cutting-edge research results, innovative theory-driven courses and emerging technologies into teaching.

4.5. Deepening Cooperation with Enterprises

Companies, enterprises, social institutions and accounting firms have the most say in the application status of artificial intelligence accounting. When choosing them to establish accounting training bases and school-enterprise cooperation, schools should pay special attention to those industry leaders in the application of 'Big Data, Artificial Intelligence, Mobile Technology, Cloud, Block-Chain, and IOT', and focus on selecting these units as teaching partners. The school should make use of the information resources provided by these units, invite the experts to provide the list of professional needs, participate in the formulation of accounting talent training plan, and then formulate the curriculum system and practical training system.

Deepening school-enterprise cooperation can also be carried out from the following aspects: (1) Through experts entering the school and experts entering the classroom, teachers and students can be exposed to first-hand business information and the practical concept of 'industry-finance integration', promote alliance training and data sharing. (2) In the joint construction of school and enterprise teachers, these enterprises are invited to carry out training and qualification certification for college teachers, so as to realize the qualification certification of double qualified teaching. High-quality teacher training assists teachers to enhance professional skills

from front-line practical interaction and quickly connecting the technological gap between human learning and digital intelligence knowledge. (3) Schools and enterprises jointly build an intelligent training center to conduct business operation simulation teaching by introducing the company's mature professional platform and software equipment, such as ZTE Financial Cloud Laboratory in universities. (4) Carry out order type talent training for enterprises, and realize the training goal of jointly cultivating talents between schools and enterprises through close integration of production and education.

5. Conclusion

Digital intelligence transformation is the only way for enterprise development. Accounting professional practice puts forward new requirements for talent literacy. The goal of undergraduate teaching reform is not achieved overnight, but the process of facing the needs and challenges, embedding in time, eliminating conflicts, realizing the integration and integration with existing courses and resources, exploring the path according to levels, and completing the reconstruction. In this process, on the one hand, it is necessary to grasp the practical frontier in time, adjust the training plan, enhance the foresight of the teaching content, gradually improve and enhance the discipline status. On the other hand, it is vital to improving teachers' professional ability and professional skills, let them have interdisciplinary knowledge reserve. Through the embedded and integrated teaching reform, students can finally acquire cutting-edge ideas in the professional field in time, update the knowledge system at the same time, broaden their horizons and improve their comprehensive competitiveness.

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