

Reform and Practice of Application-Oriented Undergraduate Intelligent Accounting Curriculum System in the Age of “ABCD”

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Abstract:

With the rapid development of digital technology represented by "ABCD", the traditional accounting education can not keep up with the needs of The Times, accounting education in colleges and universities is facing transformation and upgrading. Taking Ningbo University of finance and economics accounting professional intelligent direction of accounting as an example, from the current problem of applied undergraduate accounting professional curriculum system analysis, introduced the school through the use of "One body, two wings and three steps" reform method, in talent target orientation, curriculum content, teaching method, practice environment to explore. Based on the experience and lessons of "intelligent accounting" talent training course system construction in the past five years, this paper puts forward some ideas and suggestions on the construction of intelligent accounting course system for applied undergraduate accounting major, hoping to play a reference role in the reform of other universities.

Keywords: ABCD, Application-oriented undergraduate, Intelligent accounting, Curriculum system

I. INTRODUCTION

With Artificial intelligence, Block chain, Cloud computing, Big Data, (referred to as "ABCD") [1]. The rapid development of digital technology represented by has had a great impact on the working environment and work content of the accounting industry, forcing accountants to upgrade and transform [2]. At the same time, it also puts forward new requirements for the training of accounting professionals in colleges and universities. In the era of "ABCD", the construction of accounting specialty should focus on the construction of modern governance system, aim at cultivating compound and innovative accounting talents integrating accounting, audit, management, law, risk, digital technology and other disciplines, and focus on the practice platform to promote the reform of Accounting Teaching mode.

At present, there are some problems in the training of applied undergraduate accounting professionals, such as the lack of top-level design, the neglect of the training of "informatization", the disconnection between the curriculum and the current technological development, the lack of accounting informatization

teachers and so on. Therefore, application-oriented undergraduate colleges and universities should keep up with the development of information technology, closely combined with industrial needs, industry education integration [3] and school enterprise cooperation, so as to keep up with the pace of industrial development. How to transform the industrial demand in the "digital economy" era into teaching content, build an adaptive curriculum system, and cultivate accounting talents in line with the needs of the new era is an urgent problem to be solved in front of all colleges and universities (especially applied undergraduate colleges and universities).

II. ANALYSIS ON THE CURRICULUM SYSTEM OF APPLIED UNDERGRADUATE ACCOUNTING SPECIALTY

2.1 The Orientation of Talent Training Goals and the Industry Demands are not High

With the emergence of digital technology represented by "ABCD", financial work is becoming more and more intelligent. Primary financial work mainly based on accounting can be completed by computers. In the future, the demand for traditional accounting and accounting financial talents will gradually decrease, and the demand for new financial personnel (such as financial sharing center personnel, business financial personnel, financial big data analysts, management accounting personnel, etc.) will gradually increase. In addition, considering the characteristics of application-oriented universities serving the local economy, their own positioning, students and other factors, they also emphasize the application of financial intelligence, and different universities will have different training emphases, as shown in Table I:

TABLE I. Personnel training target positioning

Types of colleges and universities	Keypoints of Personnel Training
Science and Technology	Focus on accounting information system analysis and design and program design training
Finance and Economics	Focus on cultivating students' ability to use information tools to solve practical accounting problems

Therefore, application-oriented universities should reposition themselves reasonably in personnel training based on their own situation and local industry needs.

2.2 The Faculty of Intelligent Accounting is Relatively Weak

The teaching of intelligent accounting requires that teachers not only master accounting knowledge, but also have computer technology, information system theory and other multidisciplinary knowledge, which requires that teachers engaged in the teaching of intelligent accounting should receive both accounting and

computer education, or graduate education in accounting informatization [4]. At present, many teachers have not been trained in this field due to the difficulty of learning comprehensive courses, the way of talent cultivation and the limited number of teachers. Most of them rely on a single accounting teacher or a single computer teacher, which will inevitably affect the final effect of teaching quality.

2.3 The Software and Hardware to Support Intelligent Accounting Teaching are Relatively Lacking

On the one hand, there are few specialized software for intelligent accounting teaching in colleges and universities and it lags behind the industry reality. For example, at present, enterprises have adopted the mode of financial sharing center for accounting for many years, but few colleges and universities have relevant software and open relevant courses. In addition, most of the software used in teaching is the demo version of commercial software of financial software companies, which is not designed for the needs and characteristics of teaching, and also has certain restrictions on data processing and other operations.

On the other hand, the hardware resources used to support intelligent accounting teaching are insufficient. At present, many colleges and universities do not pay enough attention to the laboratory construction of accounting and other liberal arts majors. The construction of accounting laboratory is relatively backward, which limits the improvement of intelligent accounting teaching level to a certain extent. At the same time, the current course practice of students in intelligent accounting only stays on the computer in class, restricted by the number of machines, computer time and other factors, the lack of "cloud computer room" that can be used for computer practice anytime and anywhere.

The above problems are difficult to be solved by the school's own strength. Therefore, school-enterprise cooperation, industry-education integration and joint education are needed to better cultivate compound accounting talents needed by the new era and new liberal arts.

2.4 The Curriculum System does not Meet the Demand for Compound Talents in the "ABCD" Era

Li Aihong (2018) [5] investigated the curriculum system of accounting major in 56 domestic universities and found the following problems: first, there were too many professional courses (more than 20); Second, the curriculum boundary is not clear, the content is repeated or omitted; Third, the professional courses overemphasize the technology, emphasize the regularity of accounting, ignore the professional judgment and decision-making consequences of accounting; Fourth, accounting course is equal to accounting entries. In addition, there is a lack of courses that integrate emerging technologies into accounting teaching. For example, the current industry emphasizes the integration of industry and finance, data analysis and financial sharing, but such contents are rarely involved in accounting courses in colleges and universities.

III. REFORM AND PRACTICE OF INDUSTRY-TEACHING INTEGRATION CURRICULUM SYSTEM FOR ACCOUNTING MAJOR IN NINGBO UNIVERSITY OF FINANCE AND ECONOMICS

Ningbo University of Finance & Economics, as an application-oriented undergraduate university and a local finance and economics university, takes serving the needs of regional economic society and the development of new industries and new forms of business as its own responsibility. It has been paying close attention to the latest developments of local and industry, and is determined to become the first choice for the development of small and medium-sized enterprises. Since 2016, our school has set the direction of "Internet + Accounting" for the accounting major of grade 16, actively exploring the training of accounting informatization talents and improving the training quality of accounting talents of our school. After five years of reform and time, gradually positioning "intelligent accounting" in this direction, the formation of talent needs in line with the regional economic development and with the characteristics of our school curriculum system, we will review our entire reform and practice process.

3.1 Reform Target Setting

Based on the OBE [6] education concept, combined with the needs of the "ABCD" era for the cultivation of compound talents, relying on the school-enterprise cooperation platform for the integration of production and education, with "curriculum system construction" as the main body, with "theoretical curriculum" and "practical curriculum" as the two wings, according to the three steps of "training objectives → ability framework → curriculum system" reform. According to the method of "one body, two wings and three steps", we should reform the curriculum system of accounting major in applied universities, integrate the curriculum content, reform the teaching methods, construct the teaching staff and improve the practice environment, so as to cultivate the compound and applied accounting talents in line with the needs of the new era.

3.2 Reform Design and Concrete Practice

Ningbo University of Finance & Economics since 2016, five years in fusion mode to carry out the education of accounting undergraduate direction of "smart" accounting course system construction, professional construction, etc. On the basis of the experience and lessons, around the personnel training target, curriculum content, teaching staff, teaching methods, practice environment [7] in five aspects, such as reform, The construction of application-oriented undergraduate accounting curriculum system in line with the needs of the new era, so as to cultivate interdisciplinary accounting talents who understand accounting, management and information technology. See Figure 1.

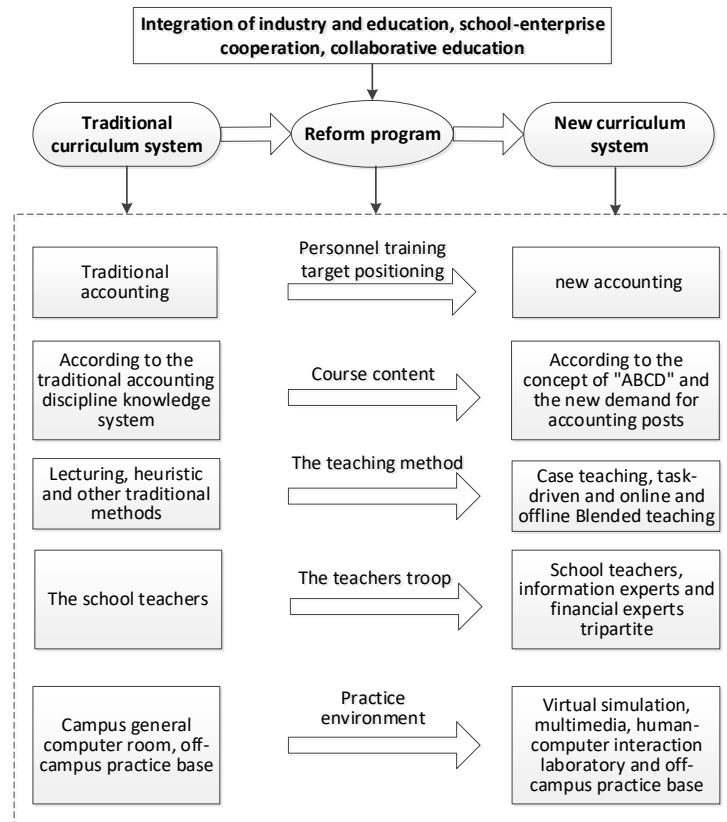


Fig 1: General thoughts on the reform of accounting specialty curriculum system integrating industry and education

3.2.1 Reorientation of talent training target in intelligent accounting direction

Under the background of "ABCD", new economy, new forms of business and new business models are constantly emerging, giving birth to many new accounting positions (such as financial BP, financial BA, financial sharing center and other related positions) and corresponding post capacity requirements. In view of the new era of accounting job ability put forward new requirements, we put the accounting undergraduate talents training target, from the previous focus on cultivation type accounting accounting talent to focus on the management accounting talents, training to adapt to the small and medium-sized enterprises need to understand accounting and management knowledge, also understand the information of accounting talents.

3.2.2 Construction of core competency matrix of intelligent accounting talents

Represented by "ABCD", with the rapid development of digital technology to the traditional accounting education to bring the huge impact, the impact and advocated by the new arts "and science and technology more cross-border integration and cross" again, we are in talent cultivating the core competence of the talents, build and OBE is commonly used in reference to engineering education concept to carry out reform.

OBE is Outcomes-based Education, which first appeared in the basic Education reform of the United States and Australia. In an OBE education system, educators must have a clear vision of the competencies and levels students are expected to achieve upon graduation, and then seek to design appropriate educational structures to ensure that students achieve these desired goals.

Based on OBE results oriented concept, combined with the new arts and "moving cloud" wisdom, age, and industry demands for accounting professionals in new, first of all, we through literature review and archival research (mainly for the applied undergraduate colleges accounting professional training scheme), preliminary build the applied undergraduate accounting professional core ability level indicators and secondary indicators; Secondly, we use Python web crawler technology to capture the job requirements of the recruitment and accounting positions of enterprises in Zhejiang province from the current domestic recruitment websites (51job.com and Zhaopin), and classify and sort them according to the first-level and second-level indicators previously set and combined with the actual situation of our school. Finally, we constructed the basic framework of core competence of application-oriented undergraduate accounting talents in line with the actual situation of our university (see Table II for details).

TABLE II. Intelligent accounting direction talent core competence matrix

First-level indicators	Second-level indicators	Third-level indicators
Knowledge	Professional knowledge	Knowledge of financial accounting, management accounting, financial management, auditing, taxation, etc
	Information technology knowledge	Business related information technology knowledge, basic knowledge of common software tools
	Interdisciplinary knowledge	Knowledge of big data thinking and decision-making, engineering fundamentals, project management and lean management, etc
Ability	Professional ability	Tax-related affairs processing ability, financial management ability, accounting ability, capital management and accounting ability, financial analysis ability, tax planning ability, audit ability, budget management ability
	Information capability	Data processing ability, data analysis ability, information processing ability, financial sharing center business processing ability, etc

	Management related ability	Internal management and control ability, organizational management ability, strategic ability, business execution ability, operation management ability, risk control ability, etc
Quality	Team accomplishment	Team work and communication skills
	Personal accomplishment	Problem-solving and critical thinking ability, ICT literacy, innovation ability, ability to adapt to social life, lifelong learning ability

3.2.3 Construction of intelligent accounting course system

(1) Re-examine the existing curriculum system to find problems

In the course system construction for the direction of intelligent accounting, we draw a table of the corresponding relationship between the professional core competence requirements of the direction of intelligent accounting and the course system on the basis of the aforementioned talent training objectives and capability matrix reform. Table III is the table of the corresponding relationship between the professional core competence requirements of the direction of intelligent accounting and the course system. Based on the OBE concept, the corresponding relationship of this table is used to re-examine whether the existing curriculum system meets the graduation ability requirements set by the talent cultivation goal, find out the existing problems, which courses do not meet the graduation ability requirements set by the talent cultivation goal, and adjust the original curriculum system.

TABLE III. Table of correspondence between core competence requirements of intelligent accounting major and course system

Core Competence		Knowledge			Ability			Quality	
		Professional knowledge	Information technology knowledge	Interdisciplinary knowledge	Professional ability	Information capability	Management related ability	Team accomplishment	Personal accomplishment
curriculum	Professional Introduction Courseware	✓			✓				✓
	The Development Frontier of financial information	✓	✓		✓	✓			✓
	Fundamental Accounting	✓			✓				✓

Management		✓			✓		✓	✓	✓
Intermediate Accounting	Financial	✓			✓				✓
Tax		✓			✓				✓
Advanced Accounting		✓			✓				✓
Accounting System	Information	✓	✓		✓	✓			✓
Financial Management		✓			✓				✓
Cost Accounting		✓			✓				✓
Management Accounting		✓			✓				✓
Auditing		✓			✓				✓
Financial Analysis		✓			✓				✓
ERP and table simulation		✓			✓		✓	✓	✓
Excel Financial Applications		✓	✓		✓	✓			✓
Fundamentals of Python data analysis			✓	✓		✓			✓
ERP+			✓			✓			✓
RPA			✓						✓
Financial big data analysis		✓	✓		✓	✓			✓
Finance Shared Service		✓	✓		✓	✓		✓	✓
Implementation of financial Information program		✓	✓		✓	✓	✓	✓	✓
Fundamentals of Engineering Technology				✓					✓
Big data thinking and decision making				✓		✓			✓
Project management and lean management				✓			✓	✓	✓

(2) The curriculum system should be reformed according to the method of "one body, two wings and three steps"

In accordance with the overall talent training goal of "cultivating compound accounting talents who understand accounting, management and informatization", we also focus on the setting of "two wings", namely theoretical courses and practical courses (see Figure 2 for details).

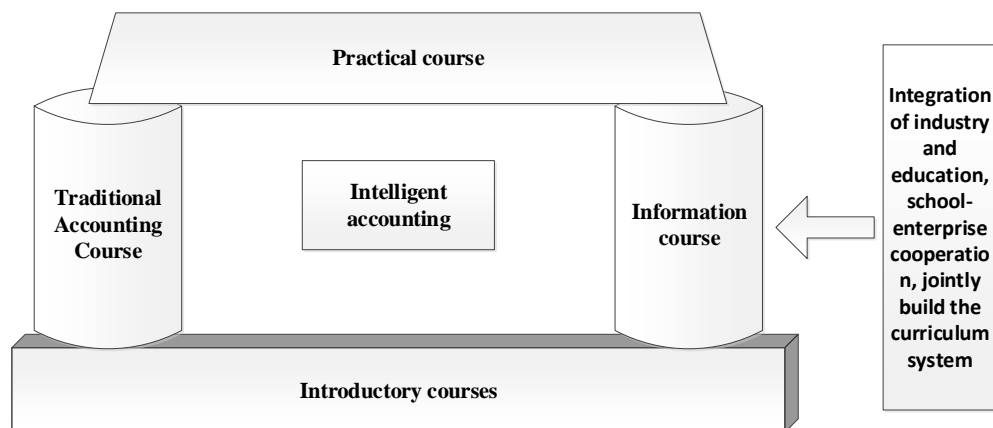


Fig 2: Framework diagram of course system for intelligent accounting direction

As shown in the figure, the introductory course is at the bottom of the curriculum system and plays the role of "laying the foundation". The traditional accounting course and the intelligent accounting course are located on the two sides respectively, which are the main "pillars" in the curriculum system and play a supporting role. And the practical course is located at the top, as the "capstone" of the whole structure, which is a kind of centralized embodiment of the ability to be cultivated in the course opening process. Thus, through this structure, a four-module curriculum system is formed which supports each other and organically links each curriculum category. In addition, through the integration of industry and education to transform the existing experimental and practical training conditions, school-enterprise cooperation to build the curriculum system, the industrial needs into teaching content, so as to improve the quality of application-oriented intelligent accounting personnel training in our school. After 5 years of reform and practice, the core curriculum system of intelligent accounting direction has been constructed, and the specific framework is shown in Figure 3.

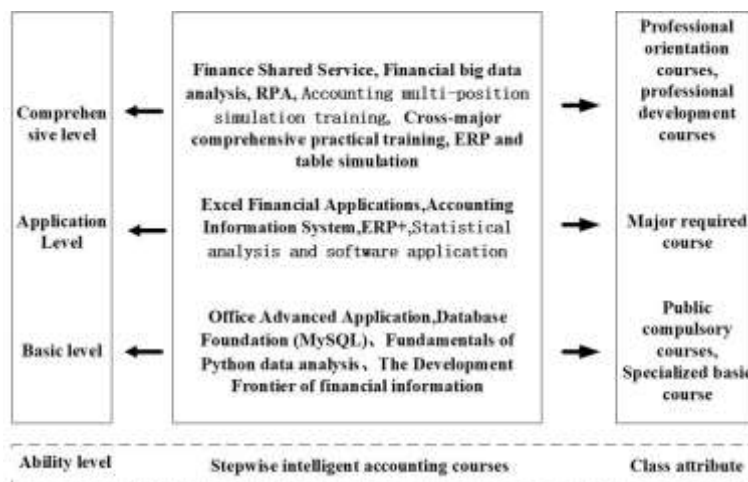


Fig 3: Core course system of intelligent accounting direction

3.2.4 The reform and integration of intelligent accounting course content

Facing the era of "ABCD", after accounting is replaced by artificial intelligence, how many traditional accounting courses should be opened and how deep they should be discussed needs further study. The general idea is to compress professional courses, strengthen general education and thinking training, to cope with technological innovation with ability and thinking training. Specifically from the following aspects:

- (1) We should streamline specialized courses and increase general courses

In terms of professional courses, for example, financial Accounting is divided into two courses, Financial Accounting I and Financial Accounting II in two semesters in the original talent training plan,

which are now merged into one course and offered in one semester. For example, "cost accounting" in the material cost collection and variety method, can be included in the "financial accounting"; Cost analysis and control is an important content of Management Accounting, which can be combined to open cost Management Accounting. In addition, finance and tax are never separated, "tax Accounting" should be infiltrated into "financial Accounting" courses. Therefore, traditional accounting courses can form 6-7 courses with financial accounting, cost management accounting, accounting information system, financial management and auditing as the core, and tax planning, finance and finance as elective courses.

In terms of general education courses, management strategy courses such as economics and management should be added, data analysis courses such as statistics should be added, and general ability courses such as law, art, copywriting and computer network should be added, so as to cultivate interdisciplinary talents with broad foundation, specialization and integration.

(2) Integrate the teaching content of traditional accounting courses

The accounting teaching content is extended from the "spindle type" that emphasized accounting and technology in the past to both ends of professional judgment and data analysis, forming a flat hourglass type (Li Aihong, 2018), as shown in Figure 2.

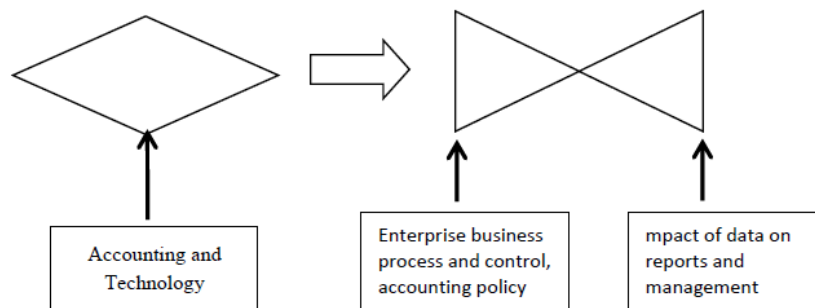


Fig 4: Reform of teaching content of traditional accounting course

As shown in the figure above, the middle of the hourglass, which is replaced by ARTIFICIAL intelligence, can be automatically completed by the program, while the optimization and control of the front-end enterprise business process, the selection of accounting policies, and the impact of the back-end data on statements and management should become the focus of teaching. In the future, accounting teaching should be carried out in accordance with "business description → internal control node → capital movement → accounting information", so as to reflect the synchronization of business flow, capital flow and information flow, and infiltrate the thought and content of management, namely the so-called "industry, finance and tax" integration.

(3) Add cross-border integrated courses of service management

Accounting education should emphasize the integration of industry and finance, strengthen management functions and integrate management thoughts. Based on this, we can consider adding interdisciplinary courses of service management, such as management and communication, production operation management, data modeling, data analysis, accounting data analysis and so on.

3.2.5 The reform of teaching methods

Due to the change of personnel training objectives and curriculum content, curriculum education model will also change greatly. Classroom teaching will no longer be lecturing with full knowledge, but a combination of online and offline teaching, that is, online MOOCs resources will be used to make students preview before class and consolidate after class. In class, offline flipped classroom will be used to improve the proportion of students' discussion and practice with students as the main body. In addition, relying on school-enterprise cooperation and integration of production and education, extracurricular teaching activities and enterprise practice activities will be greatly increased.

3.2.6 The improvement of the teaching staff

In curriculum construction and teaching activities, teachers are both the premise and the key, which directly determine the quality of curriculum development and teaching. In terms of construction of teachers team, in the current "wisdom, moving cloud" era, intelligent accounting applied undergraduate course teaching teachers to rely solely on campus teaching is difficult to meet the new requirements for accounting talents industry, so in addition to the school teachers, should have more information unit of industry experts and customers involved in applied accounting talents training, That is, the teaching team of applied undergraduate accounting course should be composed of university teachers, information experts and financial experts. By identifying industry distinguished professors (associate professors), our school employs front-line experts of enterprises to undertake the teaching of relevant courses, so as to improve the proportion of information experts and financial experts. Meanwhile, these front-line experts also objectively bring real cases of enterprises into the classroom teaching of our school.

3.2.7 Reform the practice teaching system

In terms of practical conditions, in order to adapt to the new requirements of "digital economy" development for intelligent accounting talents, relying on school-enterprise cooperation projects [8], our school has introduced advanced hardware and software facilities from leading enterprises in the industry (Yonyou, Kingdee), and co-built laboratories and off-campus training bases by school-enterprise. At present, we have established two professional laboratories: financial sharing laboratory and cross-professional comprehensive training laboratory. At the same time, using the partner's own resources

and customer resources to establish the Ningbo University of Finance and Economics Mathematics finance off-campus practice base, the base was rated as university-level demonstration base. In addition, the college set up its own "Yongqin Accounting company" on campus, which takes the real account, so that students have an "immersive" experience. Our school takes the above professional laboratories and practice bases as the platform to build a four-level progressive practice teaching platform combining the virtual and the real (See Figure 5 for details). It innovates the multi-dimensional practice teaching system that combines in-class and extra-curricular training, practice and practice, single enterprise and multi-enterprise and multi-position practice teaching and so on. It improves students' ability to adapt to jobs, solve problems and compete for jobs, and truly realizes the "zero distance" docking with enterprises. It also improves the experimental and practical training conditions of accounting major in our school.

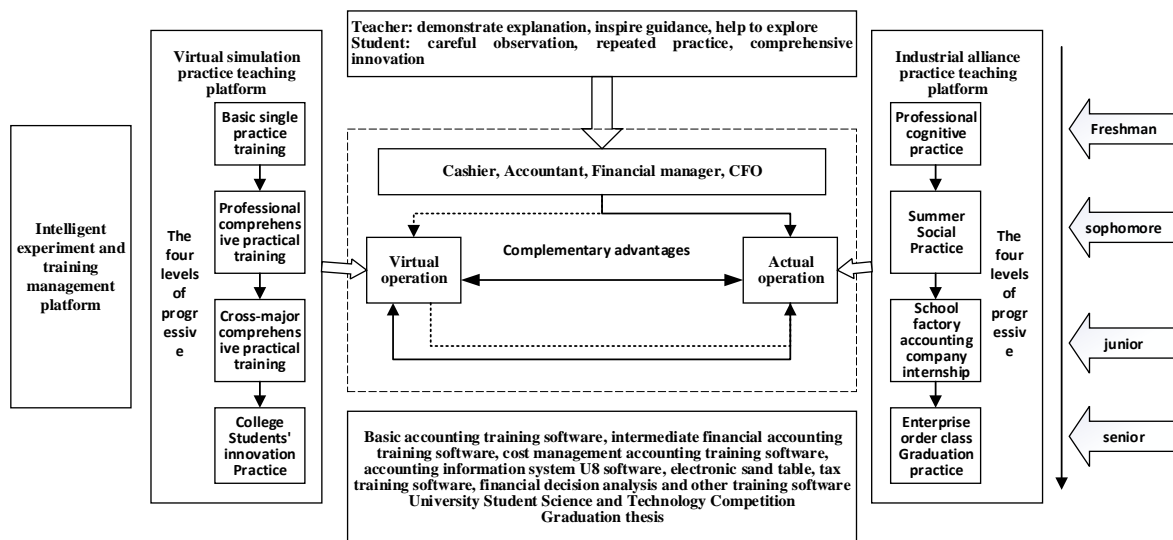


Fig 5: Four levels of progressive practice teaching system

IV. REFORM EFFECT

At present, after 5 years of cross-compound talent training exploration and practice, "intelligent accounting" talent training differentiated characteristic school-running mode has been highly recognized by the government [9], industry associations and peer experts and widely praised by the society and employers, and has won two municipal teaching achievement awards. The achievements have enhanced the school's contribution to regional economic and social development, enhanced the school's ability to serve regional economic and social development, and realized the "simultaneous resonance" between the reform of application-oriented personnel training and the development of new business forms. It is highly suitable for accounting talents of small and medium-sized enterprises.

4.1 Mainly Solve the Teaching Problems

4.1.1 Solve the accounting personnel training localization generalization and fuzzy, oriented to small and medium-sized enterprises positioning accuracy problem

The traditional accounting talent training mode is generalized, which has a low fit for regional economy, ADAPTS to the development of smart finance, and is short of talents with management characteristics for small and medium-sized enterprises.

4.1.2 To solve the accounting personnel training curriculum system is homogeneous and lagging, service SMES development needs to meet the problem

The traditional personnel training system is not perfect, the curriculum system and teaching content lag behind. The integration of industry and finance is insufficient, the ability of number and intelligence is insufficient, and the professional training of applied talents cannot meet the requirements of transformation and upgrading and innovation development of regional SMES.

4.1.3 Solve the accounting students practice ability is insufficient and single, adapt to the small and medium-sized enterprises new accounting post ability demand problem

The integration and innovation of the new generation of information technology has deepened the integration of industry and finance and put forward new requirements on the quality and ability structure of accounting talents. The single cultivation makes the current accounting talents have a big gap with the talent needs of small and medium-sized enterprises.

4.2 Results Achieved

4.2.1 Aiming at the training of intelligent accounting talents in small and medium-sized enterprises, a three-party linkage training mechanism of industry-education cooperation is designed

To serve the development of small and medium-sized enterprises in the region, build a tripartite linkage training mechanism of "school + digital leading enterprises + authoritative training institutions", and form "school full-time teachers + information experts + financial experts" to jointly train intelligent accounting talents. In order to meet the needs of small and medium-sized enterprises for intelligent financial talents, the department of intelligent accounting has been added. This direction takes "digital economy" as the premise, "industry and finance integration" as the foundation, and "financial sharing" as the platform to form accounting informatization talents to meet the needs of economic management data analysis and decision-making assistance information.

4.2.2 To adapt to the needs of regional talents as the focus, the construction of competency-based three-dimensional reconstruction of characteristic curriculum system

Goods through several intelligence can assign, industry integration and application of digital technology of three dimensional reconstruction accounting professional knowledge structure, the curriculum "+ financial industry business management", "big data + financial", "technology + financial", improve accounting personnel training goal and curriculum setting and talent demand is fit for small and medium-sized enterprises.

Flipped classroom and hybrid teaching reform were implemented to improve students' learning ability and classroom teaching effectiveness. Teachers developed 9 online courses with the help of Wisdom Tree, Ningbo MooC and provincial high-quality online course platform, and carried out task-based flipped classroom teaching exploration and practice. More than 4,000 students have participated in the reform, which has significantly improved their learning momentum and class participation and satisfaction.

V. CONCLUSION

5.1 Innovation of Talent Training Mode: Tripartite Linkage Training of Intelligent Accounting Talents in Small and Medium-Sized Enterprises

To adapt to the development of smart finance, aiming at the special needs of intelligent accounting talents for small and medium-sized enterprises and transformation and upgrading in Zhejiang, the school has cooperated with leading digital enterprises and authoritative training institutions to train intelligent accounting talents needed by small and medium-sized enterprises through financial informatization, data intelligence empowerment and business finance integration. Ningbo set up the first "intelligent accounting" specialty direction. In talent training objectives and specifications, curriculum system construction, textbook construction and other aspects into the industry standards, enterprise needs. It solves the problem of the homogenization of accounting professional talent training mode, which is disjointed with the development of digital economy and the development of intelligent accounting.

5.2 Innovation of Talent Training Scheme: Reconstruction of Curriculum System of Characteristic Person Training from Four Dimensions

According to the small and medium-sized enterprises accounting post ability "a hillock pluripotent" appeal, on the premise of "digital economy", "" industry wealth confluence is a foundation," financial sharing "as the platform," artificial intelligence "as the support, four dimensions to build" industry and finance ", "big data + financial", "technology + financial" characteristic talents training course system. At present, it has formed a set of cross-compound and distinctive talent training programs that meet the requirements of regional economic development and are highly compatible with the professional capacity.

It provides a beneficial attempt for the practice of accounting talents training reform in application-oriented universities.

5.3 Practical Teaching Platform Innovation: Four Layers of Progressive Construction of Practical Teaching Platform

According to the practice teaching concept of "combination of virtual and real, complementary, comprehensive application and emphasis on innovation", the virtual simulation practice teaching platform is built with the help of multimedia and cloud technology, and the four-layer progressive design experiment → comprehensive professional practice → cross-major multi-post practice → innovative practice is carried out. The school practice has been continuous for four years. With the help of "Ningbo Professional Managers Association School-enterprise Cooperation Alliance" to create an industrial alliance internship platform, the implementation of four layers of progressive professional cognition internship → summer professional internship → self-run company real account real practice → graduation post internship (enterprise order class), enterprise internship for four years continuous line. Through the double-platform four-level progressive practice teaching mode, talents training is closely connected with regional industries, teaching bases are jointly built and application-oriented teachers are shared, and the frequency resonance between school education and enterprise training is promoted.

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