

Research on RPA Development and Application Curriculum Construction under the Reform of Intelligent Accounting in China's Universities

Yan Zhao^{1, *}, Qijun Yao²

¹School of Accounting, Anhui University of Finance and Economics; Anhui, China

²Students' Affairs Division, Anhui Vocational College of Electronics and Information Technology, Bengbu Anhui, 233030, China

*Corresponding author email: zhaoy_ah@sohu.com

Abstract: Intelligent manufacturing has become the development direction of China's modern advanced manufacturing industry, and talents are the first element for the development of intelligent manufacturing. Under the guidance of the national strategy of enabling digital technology to build a powerful country, China's colleges and universities are promoting the teaching reform of Intelligent Accounting undergraduate majors at full speed. Introducing and improving the course construction of Financial RPA Development and Application has important practical significance for the transportation of compound professional and technical talents, and the implementation of guarantee strategy. After analyzing the current situation and implementation difficulties of the opening and embedding of this course, this paper discusses the suggestions of course optimization from four perspectives: teaching objectives, teaching resources, teaching design implementation, and teaching feedback & evaluation. Try to provide a reference for the construction of first-class disciplines and first-class majors of accounting under the national digital strategy, and provide research support for talent training and development in the intelligent era.

Keywords: Accounting intelligence, Robot process automation, Higher education reform, Curriculum construction.

1. Introduction

The great leap forward development of digital technology has accelerated the Digital Transformation, which changes the organization from the cultural, social and technical levels. Also, the rapid integration of enterprise ecosystem and information technology (ITS) promotes the transformation from traditional manufacturing to intelligent manufacturing. On the one hand, different from the traditional manufacturing of large-scale, mechanization or automation, intelligent manufacturing can meet the personalized needs of customers through very small batch or even one-time products to achieve efficient mass customization [1]. On the other hand, the company's core processes and management operations minimize human intervention with the help of intelligent simulation [2], and use dynamic, real-time, comprehensive, and high-precision information resources to assist the management in rapid response and deploy the optimal decision-making scheme. According to the survey and statistics of the China Academy of Information and Communications in 2021, excellent digital transformation enterprises have accounted for 16.4%, but many enterprises still 'dare not turn' and the transformation effect 'value is difficult to show'. The reason is that it is difficult to integrate technology and management. The digital transformation of enterprises has brought subversive innovation to the standards of talent quality and ability, management paradigm and system [3]. To break through the dilemma, China's State Council emphasized in 'The 14th Five-year Plan for the Development of Digital Economy' issued at the beginning of 2022 that enterprises should pay more attention to Digital Thinking, start with employees' digital skills, strengthen data operation and management, and systematically promote digital transformation.

Intelligent manufacturing is an ecosystem of 'Personal-Information-Physical System', in which manufacturing is the main body, intelligence is the leading, and individual is dominant. The digital intelligence professional and technical literacy that breaks through the discipline boundary and blends knowledge is the core driving force to break through the bottleneck of transformation and strengthen competition. Colleges and universities are the main channels for the delivery of new talents and shoulder the cutting-edge task of technology demonstration and innovative R&D [3]. Under the background of 'Industry4.0', developed countries around the world have successively launched actions in the field of engineering education, such as the 'T-Type Talent Training Program' of the United States, the 'Digital Apprenticeship Program' of the European Union, the 'Industry 4.0 Apprenticeship Training Program' of Germany, and the 'Strategy of Data Science, Technology, Research and Application' of India. Based on the industrial and educational foundation of digital transformation, different types of educational subjects such as research universities, engineering colleges and private colleges in developed countries design the professional construction of data science, the hierarchical and classified training system of digital talents according to their basic system and work together with multiple subjects such as scientific research institutes, industry associations and enterprises to think and analyze different levels, types of talent needs, systematically integrate knowledge and skills in management, statistics, computers, and other fields, give priority to the development of demographic dividends in transformation software and information service industry, and then drive the development of digital talents in manufacturing, education, telecommunications and other fields [5]. In contrast, although China has the scale advantage of intelligent manufacturing talents, the quality of innovative talents still faces severe

challenges.

As the center of enterprise management, financial organizations also meet the digital challenge. In 2021, the outline of ‘The 14th Five-year Plan for Accounting Reform and Development’ of the Ministry of Finance put forward objective requirements for the digital upgrading and transformation of accounting functions. In 2022, the arrangements will be made for data standardization and digitization of financial statements. Technological innovation has given the accounting profession new challenges and tasks. However, it is worth reflecting on that the development and application of digital intelligence technology in manufacturing enterprises or government institutions have been far ahead of undergraduate accounting teaching content and talent training plan in colleges and universities. Accounting education in colleges and universities urgently needs adjustment and transformation [6] [7]. In the context of the construction of new liberal arts, domestic undergraduate colleges and universities began to actively explore the integration of intelligence, digitization with accounting education, and piloted several new talent training modes such as ‘Intelligence + Accounting’ or ‘Intelligence + Finance’[8]. Under the dual opportunities of the high-frequency release of the national strategic policy, the rapid promotion of the talent training direction of ‘Intelligent Accounting’ in financial colleges and universities and the pilot of teaching reform, it is of far-reaching practical significance to explore the embedding and construction of the course of Financial RPA Development and Application.

This paper starts with the reform and construction of intelligent accounting majors in Chinese colleges and universities, then considers the specific ideas of curriculum upgrading and layout, facing the application and development status of RPA technology in the field of financial and accounting practice and the needs of professionals. Combined with the difficulties of the course construction of Financial RPA Development and Application, this paper provides theoretical support for the course construction and teaching reform from four levels: teaching objectives, teaching resources, teaching design implementation, and teaching feedback evaluation, for implement the strategy of strengthening the country with talents under the background of transformation and upgrading.

2. Business Application of RPA

With the continuous increase of information in the process of enterprise operation, the interference of information redundancy makes enterprise decision-making and financial management face unprecedented challenges. With the extensive application of data mining, data sorting and robot process automation, which are based on the technologies of artificial intelligence and machine in-depth learning, enterprises show high work accuracy and efficiency when dealing with the processing of massive financial data and information [9]. Chinese RPA product developers appeared in 2011. The earliest commercial application was in the scenes of shopkeeper operation and after-sales service automation of Alibaba Group. With more and more AI manufacturers and Fintech companies transforming into the RPA field, RPA products and developers with independent intellectual property rights are gradually becoming large-scale, and technology maturity and industry application scenarios are favored by enterprises. Over the years, financial robots have been developed and appeared in practical work. They are configured to use algorithms in the field of machine learning and artificial intelligence to complete traditional mechanical and repetitive financial work, such as accounting processing robot, DuPont analysis robot, stock investment analysis robot, etc.

The core of financial robots is robot process automation (RPA), which was proposed by The Blue Prism plc.in 2012. It means to assist or even replace manual work with ‘fixed rules, high repeatability and low-added-value’ by preset rules in digital equipment. RPA can reduce errors in task processing, shorten the completion time of executing tasks, improve team productivity, create a more positive work experience for employees, give them more time to focus on creative, cognitive and customer service tasks, and give enterprises full transformation space and potential. RPA technology has flexible configuration, process visualization, strong data interaction ability and can be used in a wide range of scenarios, such as information extraction, filling, tracking and approval in the process of public affairs; in financial work, the account management system fills in and generates reports, and the data analysis and prediction of cost management accounting; automatic clearing of the financial system; automatic writing of disclosure reports of the listed companies [10].

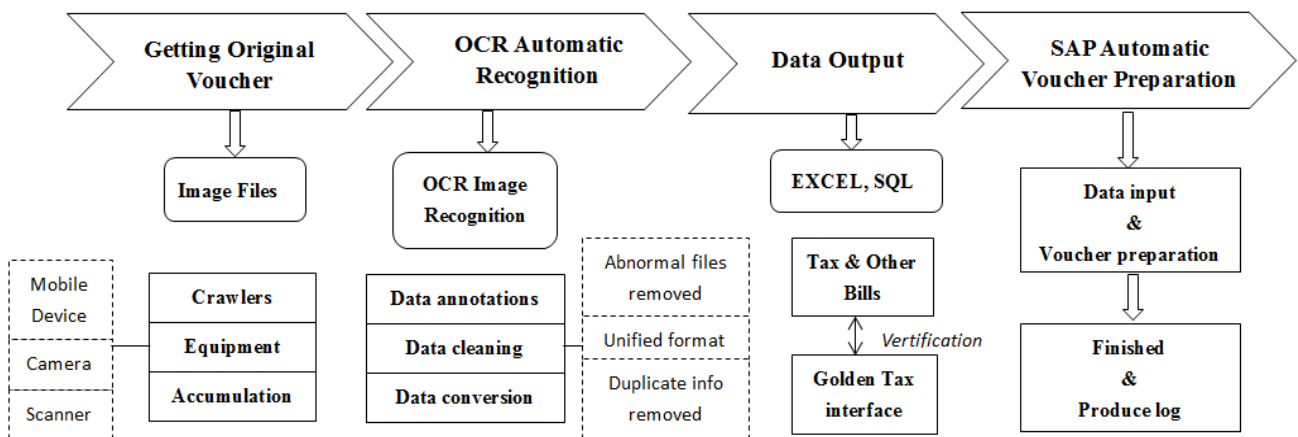


Figure 1. Financial Bill Robot Processing

The most typical scenario of financial RPA is Financial Bill Robot. In the face of the rapid increase of financial bills (such

as vouchers and invoices), the traditional manual invoice reimbursement and financial accounting system bring more

and more burden to financial accountants and consume too much manpower. By introducing the financial bill intelligent identification system (FTIRS) with automatic iterative optimization mechanism, and through the financial bill rapid detection network (FTFDNet) and intelligent financial bill data warehouse [11], enterprises can accurately identify multiple types of bills, summarize bill information and automatically generate financial vouchers, improve the efficiency and performance of financial accounting and reduce the labor cost of accountants.

3. Intelligent Accounting Reform and RPA Course Difficulties

3.1. Reform of Intelligent Accounting in Universities

Under the background of ‘realizing educational modernization and entering the ranks of educational powers’ in China’s Educational Modernization 2035, the educational field has widely discussed and deeply practiced the educational reform in the digital intelligence era, and actively promoted the implementation of the concept through the establishment of ‘Intelligent Education Demonstration Zone’ and other national actions [12]. The construction of intelligent specialty in domestic colleges and universities is first carried out in the field of engineering and has gradually expanded to new liberal arts and other majors in recent years. According to the statistics of the Ministry of Education, in the past two years, more than 100 colleges and universities have successfully applied for the undergraduate majors of artificial intelligence every year. By the end of 2021, there are 194 colleges and universities offering intelligent science and technology and 301 robotics engineering majors in China; another 558 vocational colleges have set up artificial intelligence technology service majors.

At the same time, as June, 2020, among the 942 colleges and universities offering undergraduate accounting majors in China, 95 colleges and universities [6] have carried out information-based curriculum reform related to accounting majors. Financial colleges and universities focus on building ‘First-class disciplines’ around the direction of ‘Intelligent Accounting’. For example, Southwest University of Finance and Economics is the first school in China to set up an experimental class in the direction of big data accounting. Except for the addition of many colleges and universities in the undergraduate stage, a total of 19 colleges and universities across the country are also simultaneously promoting teaching reform and recruiting masters of accounting (MPAcc) in similar directions such as artificial intelligence and big data accounting.

3.2. Difficulties in RPA Course Construction

With the opening of experimental classes in the direction of ‘Digital Intelligence Accounting’, the course of financial RPA Development and Application has entered the classroom. The basic goal of this course is to master the working principle, data rules, and implementation application of the financial robot through the study of the application management platform of the financial robot, the robot development software, be familiar with the demand analysis and design method of the financial robot, and realize tax declaration, capital settlement, expense reimbursement with the help of RPA, OCR and other process automation and visual programming technologies Automatic and cross-

platform operation processing of report preparation, purchase, sale, inventory and other businesses.

In less than two years since the curriculum was embedded, we found that with the strong promotion of the Ministry of Education, the professional transformation of ‘Big Data and Accounting’ in higher vocational education and the matching of information technology courses are faster, the introduction scope of courses is wider, and the practice pace of professional teaching reform is greater. Only in the autumn semester of 2020, 18 undergraduate universities and vocational and technical colleges have offered this course. In 2021, more schools will start with teacher training and platform deployment to fully promote the launch of courses. However, due to the late introduction of the course, it is still in the pilot stage, and the corresponding teaching resources and teaching experience are slightly insufficient [13].

The Development and Application of Financial RPA is an operational and applied course, which is highly complex and practical. In addition to the intercommunication within the discipline of finance, accounting and audit, it also intersects with the knowledge system of other disciplines. The lack of interdisciplinary knowledge reserve of teachers will affect the speed of curriculum construction and teaching reform. Financial accounting focuses on the ability to analyze and solve practical problems. Despite the revised and upgraded three-dimensional teaching materials, newly built laboratories, and software platforms, the simulation explanation is far less vivid and intuitive than the solution of real cases.

4. Course Introduction and Optimization

4.1. Adjust Teaching Objectives

Within the enterprise, the chief digital officer and chief information officer have become the new standard configuration. The training scheme of accounting undergraduate talents in the new liberal arts era should match the practical needs, expand and upgrade from professional routine to data intelligence, and improve the level of compound and applied accounting talents in multiple directions [14]. The Development and Application of Financial RPA is an important part of the teaching reform system. To timely meet the needs of social practice circles for digital professionals, curriculum design needs to be rooted in professional accumulation, closely follow the technical trends, and effectively connect the employment needs of the market; teaching objectives should be designed and improved around knowledge reserve, ability application, ideological and political cultivation.

The overall goal of the course is to enable students to master the working principle and operation process of the financial robot, be familiar with the application scenarios of the financial robot, and improve their comprehensive professional skills. At the same time, cultivate digital ethics awareness, risk and financial law awareness in the new technology environment, abide by accounting professional ethics, and improve exploratory and critical thinking ability in business training. The specific objectives of the teaching include five units: basic theory and data rules of the financial robot, modular operation application, process design and component development, sand table experiment, and case analysis.

4.2. Improve Teaching Resources

Teaching platforms and teaching resources are important guarantees for the orderly development of teaching. Curriculum construction is not achieved overnight, and digital technology is also changing rapidly. Only through long-term teaching practice and continuous accumulation and optimization, can we dynamically update teaching resources in real-time. Promote the implementation of teaching quality reform with the help of resource platform, from the pilot of 'Experimental Class' to mature and popular 'Regular Class', and realize the construction goal of 'First-class Discipline' and 'First-class Specialty' to build 'New Course' into 'Golden Course'[15].

On the one hand, at the beginning of the curriculum, the college completed sufficient advanced research and demonstration to build the curriculum level scientifically. As the courses of artificial intelligence accounting, big data financial risk management, financial data mining and management, industry finance integration, and corporate strategy have the characteristics of interdisciplinary, interdisciplinary, and multi-level intersection, the course of financial RPA Development and Application has a certain penetration and correlation. Therefore, curriculum positioning, textbook selection, and software matching are not only for one course, but also for the whole curriculum system. At the same time, the knowledge of new standards, new systems, new business models and new business forms should be incorporated, and the three-dimensional construction of intelligent situations should be completed simultaneously in the courses of conventional financial accounting and cost management accounting. On the other hand, upgrade, integrate and adjust teaching resources from the school level: upgrade the old computer application technology, enterprise management information system experimental platform, financial accounting training platform, etc.; supporting interdisciplinary, interdisciplinary, university and research teachers. With the focus of theoretical research and practical application, we will make a forward-looking layout and extend the construction of intelligent professional resources from undergraduate education to masters and doctoral education.

4.3. Update Teaching Design

In traditional accounting courses, the interaction between teachers and students is not strong. After teachers complete the theoretical explanation in the classroom, students' practical skills rely on accounting computerization and comprehensive accounting experiment as a supplement. The long-term single teaching method, the failure to update the platform software in time, and the absence of digital intelligence technology all reflect the backwardness of educational concept and poor implementation effect.

It is gratifying that in the past two years, more and more colleges and universities have cooperated with software companies (UFIDA, Xindao, ZTE, Netinnet, RongzhiGuochuang, etc.) to complete the construction of financial sharing laboratory, realized the embedding of the course of financial RPA Development and Application, and made the teaching design and Implementation more smooth. The teacher will offer this course after completing the pre-course 'Intermediate Financial Accounting', 'Financial Management', 'Auditing' and 'Management Information System'[16]. In addition to traditional multimedia teaching methods, MOOC resources and VR visual teaching

equipment are introduced to strengthen the teaching effect by combining single-person operation and group expansion. In the course implementation, teachers can also strengthen practical research, develop supporting practical cases and optimize classroom teaching. Through industry and financial analysis, process planning, and technical traction in project organization, students' ability to enhance their professional position and grasp business knowledge from the macro perspective of overall view has been strengthened.

4.4. Optimize Teaching Evaluation Mechanism

Getting teaching feedback and evaluation in time is an important means to improve teaching quality. The evaluation of teaching effect can be carried out from three aspects: knowledge, skills and quality assessment. Through teacher collection, student exchange, professional discussion and interaction, the teaching team can learn the teaching feedback of the financial robot course. Firstly, in the teaching process, teachers conduct real-time quantitative control over students' daily learning through smart teaching software such as classroom interaction, after-school homework and learning pass, to fully grasp students' mastery of knowledge within the course cycle. Secondly, according to the students' questions and exchanges, combined with different task situations, conduct multivariate analysis on each student, formulate learning tasks in line with the characteristics of each type of student, teach students according to their aptitude, and tap students' potential to the greatest extent. Finally, take advantage of the opportunity for the course group to prepare lessons regularly and participate in digital intelligence seminars to reflect on the problems existing in the current teaching and improve it according to the feedback suggestions.

In addition, the reform of digital intelligence teaching is a linkage reform affecting key elements such as scientific research mechanism and talent evaluation index. Schools and colleges should improve the evaluation mechanisms such as teaching evaluation and scientific research identification of teachers and teaching reform teams by benchmarking the construction objectives of 'New liberal arts' and 'Double first-class', and fully mobilize the incentive mechanism to guide teaching reform.

5. Conclusion

As data has become the core technology resource for the rapid transition of enabling industries, the continuous progress of artificial intelligence solutions has created more opportunities for enterprises to improve production efficiency, simplify operation and management, reduce cost and increase efficiency. Digital accounting talent training is an important starting point to improve the core competitiveness of enterprises and help the high-quality development of the industry. However, at present, the contradiction between the development speed mismatch between the practical application of digital intelligence in financial accounting and undergraduate professional teaching has become prominent. Under this background, the full speed of undergraduate accounting reform has entered the key period.

The Development and Application of Financial RPA focuses on the digital skill training in the undergraduate teaching curriculum system of intelligent accounting. It requires educators to face the demand direction of digital intelligence talents, reform the traditional teaching ideas and ideas, and do a good job in the introduction and supporting of the curriculum as soon as possible. The optimization and

construction of courses need to re specify the professional training objectives, reconstruct the connotation and extension of professional teaching, and innovate the teaching characteristics according to the cutting-edge trends of practical development, so as to better deliver compound accounting talents for professional posts, serve the enterprise strategy and help the transformation of enterprises.

Acknowledgment

This work is supported by the provincial quality engineering teaching research project of Anhui Provincial Department of Education in 2019, 'Research on the teaching reform direction and path of intelligent accounting specialty in the context of artificial intelligence' (2019jyxm0196); the humanities and social sciences key research project of Anhui Provincial Department of Education (SK2019A0472); the independent project for cultivating outstanding top-notch talents in Colleges and Universities in Anhui Province (gxyq2019025).

Authors

Yan Zhao (1984 -), female, doctor, associate professor, School of accounting, Anhui University of Finance and Economics, with research interests in corporate finance and governance, artificial intelligence, and financial accounting.

Qijun Yao (1984 -), female, undergraduate, deputy director of Students' Affairs Division of Anhui electronic information vocational and technical college, majoring in talent training and vocational education.

References

- [1] Ying, W., Pee, L. G., & Jia, S.. Social informatics of intelligent manufacturing ecosystems: A case study of KuteSmart. *International Journal of Information Management*, 2018(42): 102–105.
- [2] Ying, S., & Liu, H.. The Application of Big Data in Enterprise Information Intelligent Decision-Making. *IEEE Access*, 2021(9):120274–120284.
- [3] Frynas J G, Mol M J, Mellahi K.. Management innovation made in China: Haier's Rendanheyi[J]. *California Management Review*, 2018, 61(1): 71-93.
- [4] Song Xuguang, Zuo Ma Huaqing. What kind of skilled talents are needed in the era of intelligent manufacturing? [J]. *Journal of Northeast University (SOCIAL SCIENCE EDITION)*, 2022,24 (01): 16-24.
- [5] Shi Jincheng, Kong Hanbing, Wu Jingshan, Wang Yujie. Data empowerment Engineering Education Transformation: analysis of European digital strategy report [J] *Research on higher engineering education*, 2021 (01): 17-23.
- [6] Shu Wei, Cao Jian, Wang Hua, Zhao Shuowen. Current situation, challenges and Countermeasures of undergraduate accounting talent training in China [J] *Accounting Research*, 2021 (08): 177-189.
- [7] Xu Yude, Liu Di, fan Kexin. Accounting education transformation and career development planning in the era of digital economy [J] *Financial Science*, 2021, (12): 27-36.
- [8] KuangYushu, Liu Yongze. Reform and innovation of higher accounting education in the era of artificial intelligence [J] *Research on Financial issues*, 2019 (07): 96-103.
- [9] Yao, L.. Financial accounting intelligence management of internet of things enterprises based on data mining algorithm. *Journal of Intelligent & Fuzzy Systems*, 2019,37(5), 5915–5923.
- [10] Bai Dan. Research on data technology and intelligent financial management innovation [J] *Economic Research Guide*, 2021 (26): 130-132.
- [11] Zhang, H., Zheng, Q., Dong, B., & Feng, B.. A financial ticket image intelligent recognition system based on deep learning. *Knowledge-Based Systems*, 2021(222), 106955.
- [12] Lu Xing, Huang Ronghuai. Educational reform in the era of intelligence: the evolution of educational social experiment and its value response [J] *Educational Research of Tsinghua University*, 2022,43 (01): 42-54.
- [13] Tang Dapeng, Wang Bolun, Liu Yichen. Reconstruction of accounting education in the era of 'Digital Intelligence': contradiction between supply and demand and factor innovation [J] *Accounting Research*, 2020, (12): 180-182.
- [14] Zhang Min, Wang Yinping, Li Ang. Training program of intelligent accounting (Finance): a framework construction -- from the perspective of AACSB certification [J] *China University Teaching*, 2021, (06): 25-33.
- [15] JinQinglu, Zhu Kai, Zeng Qingsheng. Exploration and practice of 'Shanghai University of Financial and Economics' model about accounting talent training in the digital intelligence era [J] *China University Teaching*, 2021, (11): 28-34 + 45.
- [16] Fu Yuanlue. Intelligent accounting: financial robot and Accounting Reform [J] *Journal of Liaoning University (Philosophy and Social Sciences Edition)* 2019,47 (01): 68-78.