



# The Optimization of Higher Vocational Accounting Curriculum System Under the Background of Intelligentization: A Web Crawler Based Method

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**Abstract.** Based on the OBE education concept, this paper adopts Python web crawler technology to conduct big data collection and analysis of accounting job recruitment information, sort out market demand for accounting talents' knowledge, ability, and quality, and pays attention to the knowledge structure, post ability and professional quality that students should have in the real work situation, makes clear accounting talent cultivation objectives in the era of intelligence, reverse design and reconstruct the higher vocational accounting curriculum system, which is conducive to enhance the accounting graduates' job adaptability and market competitiveness, and ultimately deepen the reform of talent cultivation mode, effectively improve the actual effect of talent cultivation.

**Keywords:** OBE education concept · Web crawler technology · Curriculum system · Talent cultivation

## 1 OBE Education Concept

OBE, also known as outcome-based education, which emphasizes that educators should start from the actual demand of the society for talents, reversely design the ability indicators that students are expected to achieve, and set the teaching objectives, teaching contents, teaching methods and teaching evaluation according to these ability indicators, so as to maximize the consistency of educational objectives and results, therefore to improve the quality of talent cultivation.

The core concepts of OBE education mainly include the following three aspects: (1) Student centered. Focusing on what students “learn” rather than what teachers “teach”, curriculum development returns to what students “acquire” and “what they can do”; (2)

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Outcome-based philosophy. In accordance with the reverse design principles as “the needs of education stakeholders → objectives of the talent cultivation → graduation requirements → curriculum system”, emphasis on students’ learning output as the starting point to launch cultivation program design, teaching resources allocation and teaching implementation; (3) Continuous improvement concept. It emphasizes the importance of establishing effective quality supervision and continuous improvement mechanism, which can continuously track the teaching situation, correct students’ learning curriculum system, teachers and teaching activities, so as to make the cultivation objectives meet the needs of the society, and finally continuously promote the improvement of professional talent cultivation quality.

## **2 Problems Existing in Cultivating Accounting Professionals in Higher Vocational Colleges**

At present, there is an increasingly obvious gap between the skill structure of accounting graduates and the demands of employers. The main reason is that the traditional accounting education in colleges and universities carries out the subject-oriented talent cultivation mode, pays attention to the breadth and depth of knowledge in teaching, lacks the demand analysis of industries and professions, and does not pay attention to the cultivation of students’ post ability and professional quality. As a result, the structural imbalance between the supply and demand of accounting talents becomes increasingly prominent. The Implementation Plan for The Reform of National Vocational Education issued by The State Council (2019) clearly states that: It should take the initiative to align with the trend of scientific and technological development and market demand, cultivate high-quality technical and skilled personnel for regional development, and alleviate the structural employment contradiction. As the cradle of talent cultivation and under the development and reform of information technology such as big data, Internet+ and artificial intelligence, universities have to rethink: the goal of training students to become the traditional data processors can no longer meet the needs of current economic development. In order to bring education up to date, what courses can be set to promote the training of accounting talents required by the era of intelligence, so that we cultivate talents in line with the market demand, conform to the trend of time.

### **2.1 Market Demand Positioning is Not Accurate**

The cultivation and curriculum setting of accounting professionals in higher vocational colleges should closely follow the development of enterprises and technological changes, adhere to the outcome-based education concept, and cultivate students’ knowledge ability and accomplishment according to the specific needs of accounting jobs in enterprise. However, the definition of the current demand of talent market is mostly adopts the methods of questionnaire survey, field research in enterprises or inviting experts to school for in-depth interviews and son on. These research methods all need to spend a lot of time, manpower and material resources while the obtained information has problems such as low efficiency, small sample size and one-sided judgment, which leads to incomplete and inaccurate information acquisition of accounting talent market demand in higher vocational colleges, and the market demand positioning is inaccurate.

## **2.2 Talent Cultivation Target Positioning is Not Clear**

College is the cradle of talent cultivation. What kind of talent should accounting major cultivate? What kind of knowledge, ability and quality can represent the value orientation of education? Due to the lack of the support of big data samples, the universities lack a clear goal orientation for talent cultivation, the homogenization of talent cultivation goals among universities is serious, and the positioning of talent cultivation is vague.

## **2.3 The Setting of Professional Curriculum is Out of Date**

Currently, the accounting curriculum of higher vocational colleges in China is still based on traditional courses, one-sided pursuit of the passing rate of the certificate of examination. Curriculum and content are mostly set around the accounting qualification certificate examination, and the awareness of general education is insufficient. At the same time, there is also a lack of courses related to financial strategy, intelligence and financial sharing. The curriculum system in this mode ignores the cultivation of accounting talents' post ability and professional quality, which cannot meet the current market demand for accounting talents.

# **3 The Market Demand of Accounting Talents' Knowledge, Ability and Accomplishment**

Under the OBE education concept, the education side should fully define the knowledge ability and accomplishment level that students should achieve when they graduate, and then construct the corresponding curriculum system to ensure that students achieve these expected goals. In order to ensure that the accounting talents knowledge, ability and quality of the comprehensiveness and accuracy of market demand information, under the background of the era of big data, this paper uses the Python language web crawler technology, from the post requirement information of recruitment website, in 51 job recruitment website, for low, medium and high levels of financial assistant, financial personnel, financial director and chief financial officer position information data capture, collected and screened thousands of useful original recruitment data. Through the collection and analysis of large sample data, the specific market demand for accounting talents' knowledge structure, post ability and professional quality can be obtained.

## **3.1 Accounting Personnel Knowledge Structure Demand Data and Analysis**

Through word frequency analysis (as shown in Table 1), this paper summarizes the knowledge structure that accounting personnel should master. There are eight contents in descending order: financial management, financial accounting, information technology, financial analysis, cost accounting and management, laws and regulations, tax, internal control and audit (as shown in Fig. 1).

**Table 1.** Demand for knowledge structure of accounting talents at different levels

Index post		Financial assistant	Financial personnel	Financial executive	Chief financial officer	Total	
Knowledge structure	Financial Accounting	Accounting treatment	2625	1359	5628	3670	13282
		Financial audit	3549	2439	6234	5025	17247
		Assets management	1902	1617	3301	3495	10315
	Financial analysis	Financial analysis	3229	3984	9850	10956	28019
		Statement analysis	917	1241	3681	3271	9110
	Cost accounting and manage	Cost plan	100	1066	806	5314	7286
		Cost accounting	460	1526	1682	3464	7132
		Cost analysis	342	1366	2018	4418	8144
		Cost control	188	1740	2998	4092	9018
	Financial management	Financial management	5666	6461	12444	15086	39657
		Financial budget	253	646	1134	1728	3761
		Capital operation	59	104	208	510	881
	Tax	Tax law	1010	1045	2353	2201	6609
		Tax declaration	1431	736	1650	767	4584
		Tax planning	467	748	3165	5076	9456
	Internal control	Financial regulations	560	664	2851	4242	8317
		Financial monitoring	145	236	721	1567	2669
	Audit	Organize internal audit; Cooperate with external audit	451	1716	2249	4174	8590
	Laws and regulations	Laws and regulations	1178	2529	4039	4969	12715
		Accounting standard	976	1080	2941	2954	7951
	Information technology	OFFICE	2945	1644	2455	1709	8753
Financial software		6708	3288	7658	5106	22760	
ERP		1288	1395	2249	1893	6825	

According to the analysis in Table 1, with the increase of post level, the importance of financial management, financial analysis, cost accounting and management, laws and regulations, taxation, internal control and audit increased significantly, among which the importance of cost accounting and management rose sharply. Among the demands

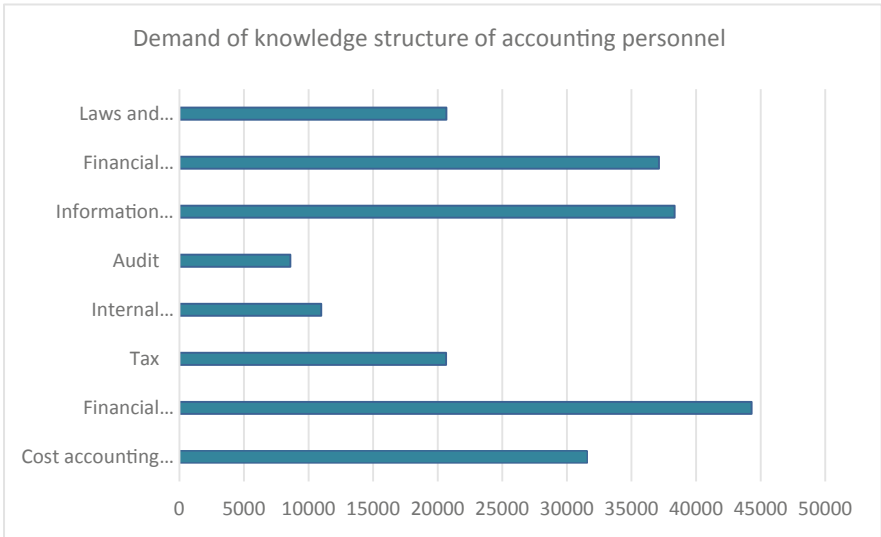


Fig. 1. Demand analysis of knowledge structure of accounting personnel

of knowledge structure, tax declaration and information technology decline with the increase of post level.

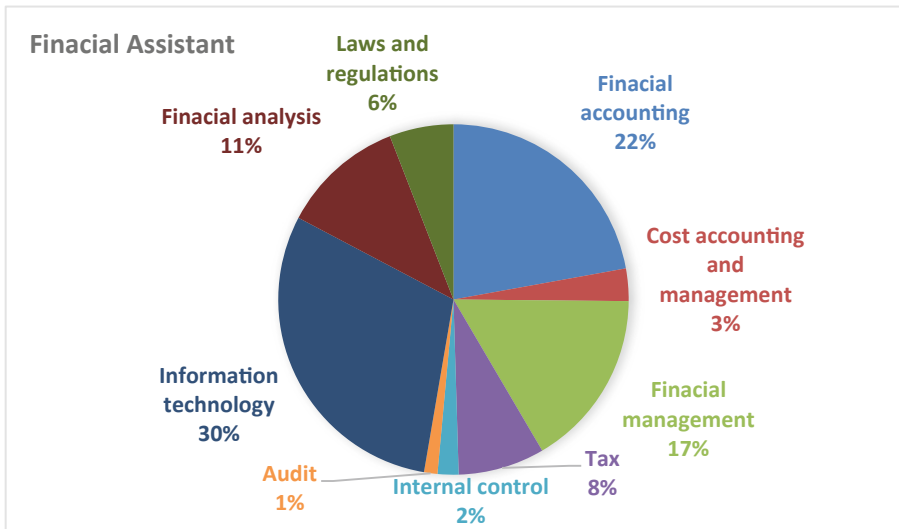
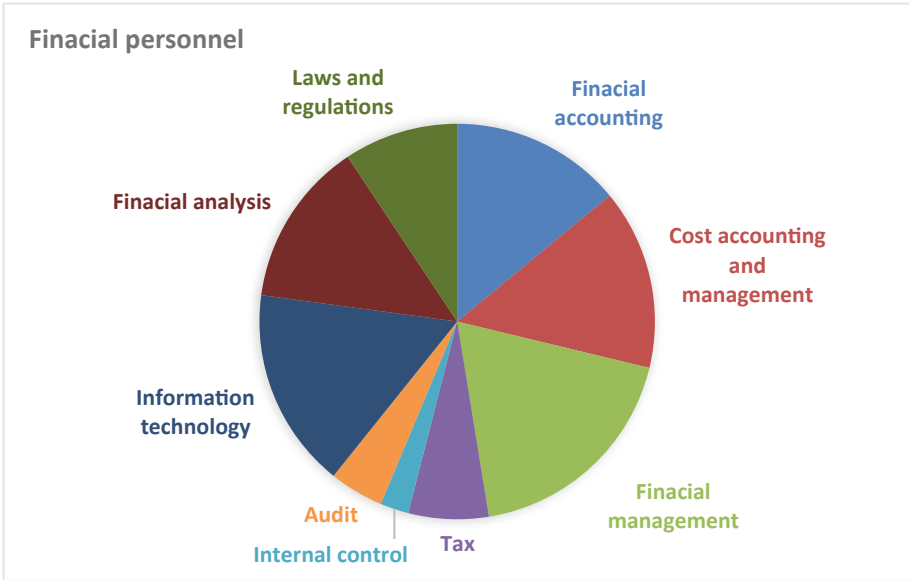
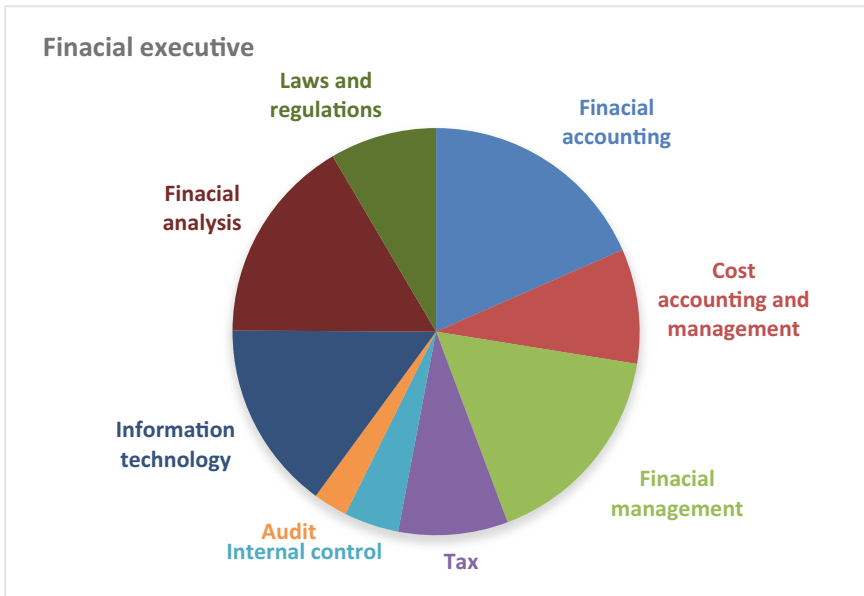


Fig. 2. Knowledge structure analysis of financial assistants

As can be seen from Fig. 2, the financial assistant position has the highest requirements for information technology and financial accounting knowledge, followed by financial management and financial analysis. From Fig. 3, it can be seen that financial



**Fig. 3.** Knowledge structure analysis of financial personnel



**Fig. 4.** Knowledge structure analysis of financial executives

personnels have balanced requirements on financial accounting, financial management, cost accounting and management, while information technology, tax, internal control

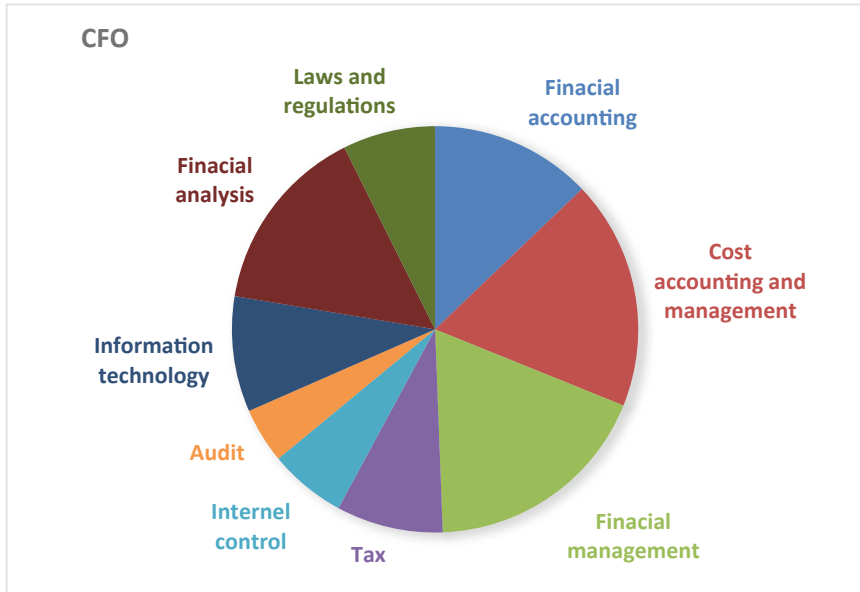


Fig. 5. Knowledge structure analysis of CFO

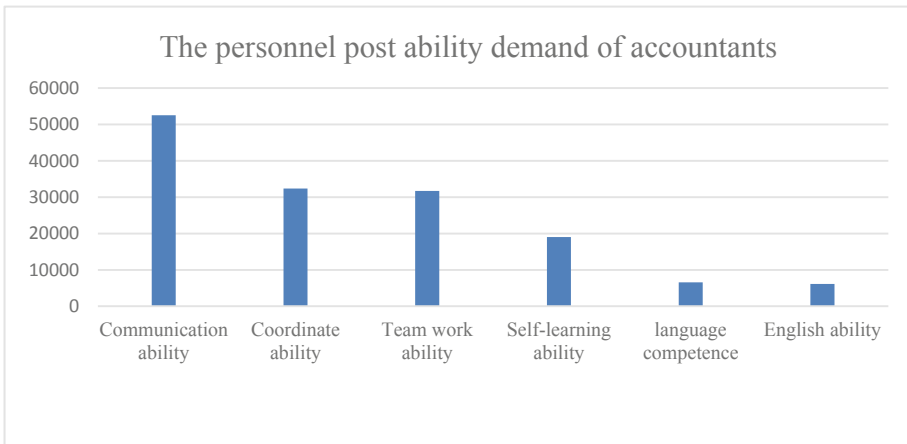
and audit are less important. Figure 4 shows that the requirements of financial director position on the knowledge structure of accounting talents are basically similar to those of financial personnels. As can be seen from Fig. 5, the position of CFO strengthens the requirements on financial management, cost accounting and management knowledge, and weakens the requirements on information technology.

### 3.2 Accounting Personnel Post Ability Demand Data and Analysis

By Table 2 Different levels of accounting personnel post ability demand and Fig. 6. Analysis of accounting personnel post ability demand, it can be seen that employers pay particular attention to accounting personnel's interpersonal skills, including communication, coordination and teamwork skills. In addition, they have high requirements on learning ability, language expression ability and English ability. With the upgrade of accounting job, the importance of interpersonal skills, among which the importance of coordination has skyrocketed. Although the employment positions of accounting graduates in higher vocational colleges are mostly basic accounting positions, but while focusing on knowledge learning in personnel cultivation and curriculum setting, more attention should be paid to the cultivation and improvement of students' interpersonal skills, learning skills and language skills, so as to lay a good foundation for the development of their future career.

**Table 2.** Different levels of accounting personnel post ability demand

Index post			Financial assistant	Financial personnel	Financial executive	Chief financial officer	Total
Post ability	Interpersonal skill	Communication	12832	9339	15378	14975	52524
		Coordinate	4366	5413	9827	12785	32391
		Team work	7236	5644	8583	10241	31704
	Self-learning ability		7193	3847	4760	3232	19032
	language competence		1486	1352	1684	2062	6584
	English ability		1861	1427	1333	1519	6140



**Fig. 6.** Analysis of accounting personnel post ability demand

**3.3 Accounting Personnel’s Professional Literacy Demand Data and Analysis**

As can be seen from Fig. 1 and Fig. 1, employers attach particular importance to accounting personnel’s sense of responsibility and professional ethics, as well as stress resistance. They hope that accounting personnel should be meticulous, rigorous, practical and have hard-working craftsman spirit. With the upgrade of accounting positions, they have higher and higher requirements for stress resistance. In addition, the employer also has a requirement to the health of accountant personnel and disposition, just the requirement is not outstanding (Table 3 and Fig. 7).

**Table 3.** Demand for professional quality of accountants at different levels

Index Post		Financial assistant	Financial personnel	Financial executive	Chief financial officer	Total
Professional accomplishment	Conscientiousness	8731	4644	8265	6380	28020
	Professional ethics	5432	3279	6020	6030	20761
	Compressive resistance	2747	2493	4448	4707	14395
	Meticulous and rigorous	6012	2872	4845	4327	18056
	Practical	2275	1128	1482	977	5862
	Hard work and enduring hardship	1765	726	1213	741	4445
	Healthy body	541	602	509	580	2232
	Open personality	1113	493	682	540	2828

**Fig. 7.** Analysis on the demand of accountant's professional quality

#### 4 Establishment of Cultivation Objectives for Higher Vocational Accounting Professionals in the Era of Intelligence

Different talent cultivation objectives determine how to cultivate the corresponding professional talents for a major. Based on the collation and analysis of large sample data, this paper defines the knowledge structure, post ability and professional quality of accounting talents in line with market demand. On this basis, the cultivation objectives of higher

vocational accounting talents in the intelligent era are set as follows: Cultivating innovative, developmental and compound technical accounting talents with all-round development of morality, intelligence, body, beauty and labor who are oriented to the construction of socialism with Chinese characteristics, adapt to technological change and enterprise development, who master national financial laws and regulations and economic policies, have strong accounting processing ability and certain cost management, tax planning, financial data analysis and decision-making ability; who are good at accounting management and decision-making; who are proficient in using Internet tools and common office software for data retrieval and analysis and daily business processing, familiar with the analysis and processing of commercial data, with the ability to solve problems with big data analytical thinking; who are with strong interpersonal skills and lifelong learning ability, pragmatic cooperation spirit and good professional ethics and accomplishment.

## **5 Construction of Curriculum System of Higher Vocational Accounting in Intelligent Era**

- (1) Meet the demands of the accounting industry, reconstruct the traditional professional courses.

As most graduates of accounting major in higher vocational colleges are engaged in basic accounting positions, the construction of accounting major course system mainly relies on the requirements of financial assistant positions, while considering future career development. Specifically, financial management, financial accounting (including basic accounting), financial analysis, cost accounting and management accounting computerization tax calculation and declaration and the application of Excel in accounting should be set as the core courses of accounting major; and Internal control, audit, tax planning, ERP and financial budget can be selected as professional courses.

In addition, in addition to Excel, Word and PPT are also required by employers for the operation of Office software for accountants. During the implementation of each course, students can choose the electronic version of homework submission, so as to improve the operation level of Office software in the process of learning.

- (2) Change the traditional education idea, design the integrated curriculum of general education and professional education.

One-sided pursuit of professional education and neglect of general education is not conducive to the cultivation of students' professional quality, as well as the shaping of their outlook on life and values, while, students often lack interest and enthusiasm in learning for the specialized integrated curriculum of general education and professional education. General education and professional education are not exclusive, and they can be coordinated and integrated with each other. Therefore, it is possible to change the traditional educational concept and design the integrated curriculum based on general education and centered on accounting courses. On the one hand, by the form of case teaching and task-driven, professional ethics and financial laws and regulations should be integrated into the teaching of professional courses (such as basic accounting, financial accounting, tax calculation

and declaration, etc.) in a planned and targeted way. On the other hand, setting up a series of professional elective courses in the form of special lectures combined with the characteristics of accounting major to strengthen students' psychological quality education such as sense of responsibility and resistance to pressure.

At the same time, the student-centered education idea should be highlighted in the teaching process. On the one hand, various teaching methods and teaching modes should be flexibly used in the classroom teaching process to strengthen students' communication and coordination ability, teamwork ability and independent learning ability. On the other hand, combined with the teaching design, more opportunities to exercise and display should be given to students to cultivate their language expression ability.

- (3) Keep up with the development of information technology and increase intelligent accounting courses

With the constant change and development of information technology and financial intelligence, the cultivation of accounting talents in colleges and universities should be forward-looking. Based on the characteristics of the talent cultivating target in higher vocational colleges, combined with the current market demand, students do not need to master computer language and programming related to intelligent accounting, and there is no need to set up a large number of intelligent accounting courses in the course. But on the basis of traditional curriculum system, it can increase big data technology applications (such as Python language introductory course), business data analysis, intelligent accounting courses, such as business financial integration and financial sharing courses to make students familiar with the development direction of future accounting, train students' big data and intelligent thinking, and strengthen the ability of big data analysis to solve practical problems.

## 6 Conclusion

The main conclusions of this paper are as follows: First, make clear the demand of accounting talent market. Through the analysis of large sample data, define the specific market demand for accounting talents from three aspects: knowledge structure, post ability and professional accomplishment. Second, establish accounting personnel cultivation objectives. Based on the market demand, combined with the background of the current intelligent era, formulating the cultivation objectives of higher vocational accounting talents. It should emphasize the cultivation of accounting talent management and decision-making ability, strengthen the education consciousness of post ability and professional quality, and pay attention to the formation of big data analysis thinking. Third, reconstruct accounting curriculum system. Based on the data analysis and cultivation objectives, the core and elective courses of the major are readjust, the integrated courses of general and specialized are designed, and the intelligent accounting course is added, so as to cultivate accounting talents that meet the market demand in the background of the intelligent era.

## References

1. Li, Z.: Outcome based instructional design. *China Univ. Teach.* (03), 32–39 (2015)
2. Li, L., Meng, Y.: Imbalance between supply and demand of accounting talent skill structure in China: present situation and countermeasures. *China Account. Rev.* (03), 117–132 (2015)
3. Yan, D.: An approach to instructional design based on outcome-based. *J. Zhengzhou Univ. Aeronaut.* (06), 132–128 (2018)
4. Cao, Z., Cao, Y., Hao, C., Wang, J., Qu, Q.: Discussion on student cultivation system of mineral processing engineering under the background of engineering education certification -- a case study of Inner Mongolia University of Science and Technology. *Univ. Educ.* (02), 39–41 (2019)
5. Zhou, S., Tang, D.: Transformation and development of accounting education in intelligent era. *Account. Res.* (12), 92–94 (2019)
6. Chang, F., Li, Z., Wen, J., Chang, F.: Design and implementation of recruitment data crawler based on Python. *Softw. Guide* (12), 130–133 (2019)