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STEM concept and optimization of teaching design for accounting majors: the case of“Management Accounting Practice”course

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Abstract

As an educational concept based on project-based learning and interdisciplinary learning, STEM is highly compatible with the needs of the current curriculum reform in colleges and universities. Due to the many deficiencies in the current teaching of accounting courses in colleges and universities, this article explores the optimization of teaching design based on the STEM educational concept, taking "Management Accounting Practice" as an example. On the one hand, it analyzes the connotations of various ability elements of STEM and studies how they can be integrated into and optimize the teaching content of management accounting practice respectively. On the other hand, it uses the project teaching method to construct a "small project & large project" teaching model of management accounting, stimulating students' interdisciplinary comprehensive abilities through sufficient practical exercises and improving teaching quality.

Keywords

Stem Education; Management Accounting Practice; Curriculum Reform

1. Introduction

On March 2, 2021, the Ministry of Education of China issued the "Notice of the General Office of the Ministry of Education on Recommending New Liberal Arts Research and Reform Practice Projects", requiring that the construction of new liberal arts be comprehensively promoted through interdisciplinary and professional cross-cutting, to meet the needs of new technologies, new formats, new models, and new industries. At present, with the rapid development of artificial intelligence and big data technology, a large number of accounting positions with repetitive and standardized work content are being eliminated, and information-based and intelligent work scenarios are gradually becoming the main environment for accounting

work[1]. In addition to accounting professional skills, accounting workers are increasingly required to have a diversified background in areas such as business management, computer programming, and statistical analysis, which also puts higher demands on the teaching of "management accounting" courses in universities. The STEM education concept emphasizes the use of interdisciplinary integration to cultivate students' practical, innovative, and critical abilities, which is in line with the direction and goals of new liberal arts talent cultivation, as well as the future talent cultivation needs of accounting professionals[2]. Therefore, integrating the concept of STEM education into accounting teaching and optimizing the "Management Accounting Practice" course will help improve the teaching level of management accounting and cultivate interdisciplinary accounting talents that are adaptable to future development trends.

In order to improve the quality of accounting education and training, and cultivate interdisciplinary, applied, and innovative professionals, this article takes the "Management Accounting Practice" course in the accounting major at Foshan University as an example. Relying on the educational characteristics and resource advantages of the science and engineering colleges at Foshan University, and based on the STEM education concept, this article explores new teaching models and implementation paths for the management accounting practice course.

2. Theoretical Basis

Stem was first proposed by the United States in the 1980s. It is an interdisciplinary education concept that integrates science (s), technology (T), engineering (E) and Mathematics (m)[3]. It encourages students to comprehensively improve their scientific literacy, technical literacy, engineering literacy and mathematical literacy in professional learning, and emphasizes that students should be the main body of teaching and practice project-oriented to improve their comprehensive literacy and practical problem-solving ability. Research shows that the integration of stem education concept into teaching design can significantly improve students' Curriculum Participation, academic performance and curriculum inclusiveness[4]; Mohammad namazi further studied that stem education based on big data can significantly improve the achievement of accounting students compared with the traditional education mode[5].

The project-based teaching method (PLB) is a teaching method that is very consistent with the stem education concept. It takes the actual professional project as the teaching content carrier, guided by teachers and led by students, and completes the whole process of the project step by step, so as to obtain professional knowledge and practical experience. Starting from the project-based teaching method, according to the four elements of stem and the knowledge system of disciplines, the construction of corresponding teaching projects has become the actual path of integrating stem education concept into professional teaching.

3. Problems in the teaching of management accounting practice

3.1. The teaching content is difficult to meet the needs of reality

The teaching content of the course is still out of touch with reality. In the era of digital intelligence, the teaching of management accounting should focus on the direction of financial strategic management and big data analysis, rather than traditional accounting skills such as report writing and financial accounting. With the development of economy and the progress of science and technology, enterprises are facing many new challenges and opportunities. Management accounting needs to constantly expand its field to provide more comprehensive decision support for enterprises. However, at present, the teaching content of management accounting course is relatively fixed, and teaching materials such as teaching materials are relatively backward, resulting in insufficient attention to emerging frontier fields, which is difficult to meet the needs of practical work. For example, there is a lack of introduction on how to use digital tools in management accounting, how to carry out management accounting practice under the background of industry finance integration, and how to carry out accounting business related to enterprise strategic management.

In addition, in the future, management accounting positions will increasingly require employees to master the software and hardware skills of a variety of composite disciplines, such as mastering the use of digital office software, financial management software, big data analysis software and even financial sharing center system or digital systems. Due to the wide range of knowledge involved, the learning of these skills is difficult to achieve in the traditional teaching process. It is necessary to innovate the teaching methods, integrate the learning of practical skills into the teaching process, and effectively advance the students' problem-solving ability.

3.2. Insufficient application of professional knowledge and practical training

This is mainly reflected in the disconnection between theoretical teaching and practical training, and the low proportion of students' practical training hours, which is difficult to improve students' ability to solve practical management accounting problems. Management accounting is a practical subject closely related to the practice of enterprise management, which requires students to have the comprehensive ability of project processing. However, the teaching process of the course is usually based on theoretical teaching, and the practice of specific project scenarios is less. For example, based on the real case scenario of enterprise management, students are encouraged to comprehensively use multidisciplinary tools and methods to explore and carry out accounting businesses such as budget management, cost management, risk management, etc.

3.3. The teaching method and mode are relatively simple

The existing management accounting teaching mainly focuses on the theoretical knowledge explanation led by teachers, supplemented by small case explanation based on specific small knowledge points. On the one hand, the single theory teaching is boring, it is difficult to give full play to students' learning enthusiasm, it is difficult to transform theoretical learning into practical problem-solving ability, and students often forget after the exam, which is not conducive to the sustainable development of students; On the other hand, small cases based on specific small knowledge points can only play the role of reviewing and consolidating knowledge points, and it is difficult to systematically cover the knowledge of each chapter, and it is also difficult to exercise students' ability to use their own comprehensive ability and explore the ability to use a variety of tools and methods to comprehensively solve systematic problems, which has little effect on improving students' practical ability and problem-solving ability.

4. Construction of teaching content of "management accounting practice" course based on stem education

According to the content of China's "basic guidelines for management accounting", based on the stem education concept, taking the improvement of students' actual ability as the core, the teaching content of management accounting is designed from the whole process of management accounting.

① Scientific literacy (S)

Science in stem education means an interdisciplinary knowledge system, which is a scientific ability and literacy including facts judgment, concepts, principles, ideas and so on. In the course of management accounting, the improvement of basic scientific literacy should be mainly based on the introduction of basic accounting theories, supplemented by the teaching of relevant interdisciplinary theoretical knowledge. For example, it describes the basic principles of statistics, the construction of mathematical models, enterprise strategic management and other interdisciplinary basic theories to build an interdisciplinary knowledge system of management accounting in series.

② Technical competence (T)

The technology in stem education mainly includes the knowledge of some software programs and specific technical tools, mainly including the steps, procedures, tools and skills to solve problems. In the course of management accounting, technical ability is collectively referred to as management accounting tools and methods, which should be introduced through the whole process described in the chapter, and focus on cultivating students' practical skills in the course. For example, the introduction of accounting information systems, data analysis software and other technical tools enables students to master how to use information technology to collect, sort, analyze and report financial data. Through the learning of financial software, automatic accounting processing and cost accounting can be realized, and

the learning of data visualization tools can be used to display the results of project financial analysis and improve the efficiency and accuracy of management accounting.

③ Engineering competence (E)

Engineering in stem education means integrating engineering thinking into the teaching process, mainly studying how to apply scientific knowledge to solve practical problems, and promoting the scale, industrialization and process of scientific knowledge. In the course of management accounting, we should use engineering thinking and systematic thinking to plan the teaching process, teach students to solve the whole process of management accounting projects including budget management, cost management, operation management, investment and financing management and performance management by identifying and analyzing complex problems, collecting and sorting data, formulating solutions, evaluating and implementing solutions, and improving students' ability to solve systematic problems.

④ Mathematical ability thinking (M)

Mathematics in stem education means to consciously use mathematical thinking and methods when analyzing and solving complex problems in the process of education. In the course of management accounting, the cultivation of mathematical thinking ability can be improved by setting specific projects to explore mathematical models and data algorithm processing and analysis to solve business problems. For example, the investment and financing management chapter emphasizes the teaching of calculation methods such as discounted cash flow method and capital cost analysis, while the performance management chapter emphasizes the teaching of key indicator method, economic value added, balanced scorecard and other tool methods. Through mathematical thinking and mathematical methods throughout the teaching process, students' mathematical acuity in solving management accounting problems is cultivated.

5. Practice path based on PLB project teaching method and stem

Explore the teaching mode of "small project & large project". According to the five major parts of "budget management, cost management, operation management, investment and financing management, and performance management", the course sets up simulation projects based on real cases for students to learn and do at the same time. Projects are divided into large projects and small projects. Small projects are based on the knowledge points of each part. It usually takes 1-2 weeks to solve the project business of the corresponding part in the teaching process of each part; In the final examination week, students are required to complete a large project connecting all teaching contents from the beginning in the form of group cooperation. The mode of "small project & large project" can ensure that students have sufficient opportunities for practical practice. While consolidating the knowledge they have learned, it is conducive to improving students' ability to comprehensively use

stem in all aspects to solve system problems.

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Public Disclaimer

The authors declare no conflict of interest.

References

[1] XU, J.(2019) The impact of AI and big data on the development of accounting. China University teaching, 9, 39-44.

[2] WEI, X.,YU, B.,YU, H. (2017) STEAM Education in America: Framework, Characteristic and Implication. Journal of East China Normal University(Educational Sciences), 35(04), 40-46+134-135

[3] ZHU, X.H.,XIONG, Z.F.,ZHENG, T.Y. (2021) Case-based learning combined with science,technology,engineering and math(STEM)education concept to improve clinical thinking of undergraduate nursing students:a randomized experiment. Nursing Open, 8(1), 415-422.

[4] Adebiyi, O.O.,Olabanji, O.S.,Olaniyi, O.O. (2023) Promoting Inclusive Accounting Education through the Integration of Stem Principles for a Diverse Classroom. Asian Journal of Education and Social Studies, 49(4), 152-171.

[5] Namazi, M.,Raiessi, Z. (2025) Stem accounting: Effects of traditional and big data education, learning and intelligence on the accounting student's achievement. The International Journal of Management Education, 23(2), 101069-101069.