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On the Teaching Reform and Effectiveness of Macroeconomics Curriculum of Practical Education in the Context of New Liberal Arts

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Abstract

The construction of new liberal arts has put forward higher requirements for the theoretical foundation course system of macroeconomics and the effect of practical education. This paper analyzes the existing problems in the teaching of macroeconomics, points out that the reform focuses on the systematic reconstruction of teaching content, the transformation of teaching mode and practical training, and the diversification of assessment and evaluation system, and constructs the framework of the trinity teaching reform system of "knowledge, quality and ability". Through the nurturing practice of this course in colleges and universities, it demonstrates the effectiveness of the mixed teaching mode of "online + offline + experimental platform", the classroom organization mode of "assessment, context, interaction", and the implementation of a diversified assessment and evaluation system. It provides a systematic theoretical framework and practical path for the teaching reform of macroeconomics courses, and promotes the innovative development of economics education under the background of new liberal arts.

Keywords

New Liberal Arts, Macroeconomics, Practical Education, Teaching Reform

1. Introduction

The Declaration on the New Liberal Arts Construction issued by the Ministry of Education in November 2020 systematically constructed a framework for the construction of new liberal arts with developmental, integration, innovation and stra-

tegic features. The framework emphasizes breaking down disciplinary barriers, integrating cross-disciplinary resources, and innovating information-based teaching paradigms through dynamic practical exploration, ultimately realizing the high-quality development of new liberal arts with Chinese characteristics. Going back to the 2019 Work Points of the Ministry of Education, it explicitly calls for the implementation of the "Excellence in Education and Training Program for Economic and Management Talents", aiming to cultivate new-era economic and management talents with both applied and composite characteristics. Therefore, the cultivation of economic and management talents needs to realize the integration of triple competencies: cross-domain integration of knowledge structure, digital synergy and integration, and systematic enhancement of comprehensive quality (Smith & Brown, 2020; Sun & Li, 2022). The teaching reform of macroeconomics, as a basic core course of economic management disciplines, has become a key practical subject to implement the construction goals of new liberal arts.

As an important branch of economics, the teaching reform of macroeconomics is of special importance. First of all, macroeconomics studies the overall economic operation law, which is wide-ranging and comprehensive, and is highly compatible with the concept of interdisciplinary integration advocated by the new liberal arts. Secondly, macroeconomic theory is closely related to real economic problems, and it is especially important to cultivate students' practical ability and innovative thinking (Wang & Zhang, 2021). However, there are still many problems in the current macroeconomics course teaching, such as teaching content favoring theory, single teaching method, low student participation, etc., which constrain the improvement of the teaching effect of the course (Li & Chen, 2020). In terms of digital synergy, the market needs talents to master data analysis tools and forecasting models to cope with the digital economic environment. In the course teaching reform, students carry out online experiments with the help of economic simulation systems such as EViews and Stata, and conduct practical projects such as GDP forecasting to enhance their data processing and economic forecasting abilities. Therefore, promoting the teaching reform of macroeconomics courses in the context of new liberal arts is not only an inevitable choice to adapt to the needs of talent cultivation in the new era, but also an important way to improve the quality of economics education.

Macroeconomics course is a professional foundation course for economics and management majors, which places great emphasis on the completeness and logic of the theoretical system, how to achieve the real flexibility of economic theory for solving and analyzing economic problems, and how to localize the macroeconomics theory for practice? In this paper, we will reform the traditional macroeconomics course from the perspective of practical education, reshape the teaching goal system of "knowledge, quality and ability" under the concept of OBE, and reconstruct the teaching content system, teaching mode and assessment method accordingly. The main focus is on the cultivation of economic thinking and ability training, and the use of economic analysis meth-

ods to explain and solve practical problems through case studies and group discussions. In the process of talent cultivation, output-oriented hierarchical training is carried out to improve the effect of practical training in the construction of Macroeconomics course.

2. Problems and Reform Priorities in the Teaching of Macroeconomics Courses

2.1. Problems in Teaching Macroeconomics Courses

1) Macroeconomics theory and practice disconnect

Macroeconomics theory is relatively complex, traditional teaching favors the derivation of theoretical models, and it is difficult for students to apply their knowledge to the analysis of actual economic phenomena (Sun & Li, 2022). Economics cases are lagging behind, and some textbooks and cases fail to reflect the characteristics of China's new normal economy, such as the "double-cycle" pattern and independent innovation in science and technology, as well as the lack of timely tracking of current economic hotspots (e.g., real estate deep adjustment, local debt problems).

2) Limitations of teaching resources and methods

Insufficient application of digital tools in the teaching process of macroeconomics courses, although online teaching tools are gradually popularized, some teachers are still unskilled in the use of artificial intelligence, AI software, simulation software, and economic model building platforms (Zhang & Liu, 2022). In the teaching process, the depth of teacher-student interaction is insufficient, the formalization of group discussion and flipped classroom is obvious, and students' critical thinking is not fully stimulated (Garcia & Martinez, 2022).

3) Shortcomings in students' ability development

Students' application ability is comparatively weak and the ability to analyze real economic problems needs to be further improved. There is a disconnect between theoretical knowledge and practical application, and although students have mastered basic economic principles and models, they often do not know how to apply them when facing real economic problems (Huang & Zhang, 2024). Students' policy analysis ability needs to be improved, and most students lack the ability to interpret and evaluate macroeconomic policies such as fiscal policy and monetary policy, making it difficult to accurately judge the possible effects and potential impacts of policy implementation. In addition, students are skillful in using data analysis tools and prediction models, and are weak in market prediction and analysis, resulting in a lack of scientific tools for judging and analyzing market trends.

4) Evaluation system and incentive mechanism to be improved

The existing assessment is still based on knowledge memorization, and there is a lack of effective indicators for the evaluation of innovative thinking, teamwork and other abilities. Restricted by faculty strength and resources, it is difficult to

carry out high-cost practical teaching (e.g., simulation labs, field research), and there is a certain gap between the effect of applied talent training and expectations.

2.2. Macroeconomics Course Teaching Reform Priorities

1) Reconstruction of teaching content systematization

The application object of macroeconomics teaching needs to focus on China's macroeconomic reality. Macroeconomics, as a theoretical system born in the 1930s during the Great Depression in the United States, is an academic mapping of Western economic practice. With the development of China's economy, there is an urgent need to incorporate the practical experience of China's economic development into teaching materials in the form of cases, to build a macroeconomics narrative system with Chinese characteristics, and to realize the dialectical unity between the "Western theoretical framework" and the "China's development practice" (Chen & Wang, 2023). Therefore, how to tell a good Chinese story and tell macroeconomics with Chinese characteristics in the light of China's actual situation is an important issue to be solved in the reform of macroeconomics teaching.

The organic connection within the economic discipline needs to further build in terms of teaching content. The current teaching content of macroeconomics is fragmented and lacks internal organic connection. Although the macroeconomics course is close to the academic frontier in content arrangement, the classification of "problem-model" chapters may lead to the fragmentation of classroom content, the lack of intrinsic connection between different modules, and the overall vein is not clear (e.g., through the "problem posing"—theoretical analysis—economic modeling). Theoretical analysis—economic modeling"). This fragmentation hinders students' deep understanding of the macroeconomic theory system, restricts the spread of their vision and thinking, and is not conducive to the cultivation of innovative talents.

2) Transformation of teaching mode for practical parenting

Since the macroeconomics theory is abstract and difficult to understand, which is difficult for students to learn; there are many models and formulas, which makes it easy to continue the traditional teaching mode of "blackboard economics", and the connection between theory and practice is not close enough. In the classroom, the teacher mainly lectures and the students mainly listen, which makes the interaction between teachers and students lack of certain interaction and communication. As Macroeconomics is a basic course for economics and management majors, which is usually taught in big class, the content is logical, students participate in the classroom learning, usually lacking enthusiasm, just a passive acceptance of knowledge points. Therefore, it is necessary to increase the application of teaching methods such as classroom discussion and case study teaching to exercise students' thinking in economics as well as their ability to think independently (Anderson & Taylor, 2023). Teachers need to tailor their teaching

to the students' learning progress.

Therefore, how to optimize the practical teaching mode of macroeconomics courses, adopt diversified teaching methods, combine the systematic theory of economics with explaining and responding to current economic realities, and at the same time improve students' interest in learning and learning effect, and cultivate students' innovation ability, which is the core issue of macroeconomics teaching reform.

3) Diversification of the assessment and evaluation system

The assessment form of macroeconomics is too single. Macroeconomics is a basic course in economics and management, and the assessment is mainly carried out in the way of usual grades and closed-book exams, which lacks the dimension of formative evaluation, and there are significant drawbacks in this single assessment mode, which will lead to students' behavioral pattern of "slacking off in normal times and raiding at the end of the semester". There is a gap between this assessment mechanism and the three-dimensional cultivation goal of "knowledge integration-capability transfer-value shaping" required by the new liberal arts, which is not conducive to the cultivation of new liberal arts talents. We should take advantage of the combination of online and offline, and establish an assessment method that can more comprehensively reflect students' learning and motivate them to take the initiative to learn through the interactive data of cloud classroom and cloud teaching materials, as well as the demonstration and participation in the offline classroom.

3. Framework for the Implementation of Teaching Reform of Macroeconomics Course

As a basic course of economics, macroeconomics puts great emphasis on the completeness and logic of the theoretical system. How to use economic theories flexibly to solve practical problems, localize macroeconomics theories into practice, use macroeconomics analysis methods to explain and solve practical problems in China's economic development, and scientifically evaluate the teaching results, is the focus of teaching reform.

Macroeconomics in Beijing Institute of Petrochemical Technology is a basic economics theoretical course that combines online cloud classroom and cloud teaching material platform with offline physical classroom, and is deeply integrated into the practical teaching of the course through rich teaching resources. The college has been exploring the teaching reform since 2020, and after five years of practice, the following framework for the implementation of the teaching reform of the Macroeconomics course has been formed:

3.1. Setting Teaching Objectives

Reshape the teaching objective system and teaching content of "knowledge, quality and ability" under the concept of OBE. Macroeconomics is a specialized basic

course for economics majors, and the orientation of the course is mainly based on the cultivation of thinking, supplemented by ability training. Therefore, the syllabus of Macroeconomics is reconstructed according to the concept of OBE, and the traditional knowledge-based teaching system is transformed into a hierarchical cultivation and output-oriented teaching goal system (Johnson & Lee, 2021).

Based on the macroeconomics knowledge system, the curriculum reform reshapes the teaching objective system of Macroeconomics under the OBE concept of "knowledge, quality and ability". Firstly, the online platform is used to continue to give full play to the advantages of the comprehensive coverage of traditional macroeconomics knowledge points, and the shallow learning objectives such as "memorization and comprehension" are assigned to the cloud textbook and the MOOC online platform, so as to realize "breadth as the basis" and liberate the class time occupied by the traditional lectures on knowledge points. Secondly, deep learning objectives such as "application, analysis, evaluation and creation" are assigned to offline classrooms to realize "depth as expansion", so that students' cultivation can change from low-order knowledge mastery to high-order thinking training and ability cultivation. Using the online-offline hybrid teaching mode (Li & Zhang, 2021), we comprehensively utilize question banks, case studies, experiments, videos and other means to turn scattered knowledge points into a progressive knowledge system, so that students can clearly understand the logical connection between chapters and knowledge points, and have a deeper understanding of the achievements of China's economic development.

The specific course objectives are set as follows:

1) Knowledge objective: to master and understand the basic knowledge of macroeconomics. Recognize and understand the general structure of macroeconomics, the basic principles and mechanisms of macroeconomic operation, master the theory of equilibrium national income determination and related issues, and know the basic framework structure and analytical logic of the discipline.

2) Quality objective: to master and apply the research methods of macroeconomics. Understand the theoretical system and analytical methods of macroeconomics, be able to use macroeconomic models and data to analyze and evaluate the implementation and effect of macroeconomic policies, and cultivate students' logical thinking ability in economics.

3) Ability objective: to obtain the ability of comprehensive analysis and preliminary solution of macroeconomic problems. Students are able to use macroeconomic knowledge and data analysis tools to analyze and explain macroeconomic problems such as unemployment, inflation, economic growth, etc., to judge the running state of the national economy, to establish correct economic values, to understand the impact of macroeconomic regulation on the economy and society, and to have the spirit of commitment to socialist economic construction (Table 1).

Table 1. Course objectives and supporting graduation requirements for specialization.

No.	Course Objectives	Supporting Graduation Requirements
1	Course Objective 1	To be able to apply basic knowledge and principles of economics to explain phenomena and problems in the field of specialization.
2	Course Objective 2 Course Objective 3	To be able to select appropriate research methods to analyze economic problems.
3	Course Objective 2 Course Objective 3	To be able to synthesize and analyze practical problems in economic activities and propose solutions.

3.2. Reconstruction of Teaching Content

Based on the matrix of "knowledge, quality and ability", the macroeconomics course content is reconstructed.

On the basis of retaining the basic framework structure of macroeconomics, i.e. income-expenditure model, IS-LM model, AD-AS model and other classical theoretical models, the practical application of the theories of the neoclassical school economic thought is added to the practical cases in China. Establishing the three-dimensional analysis framework of "government-market-society", and embedding the factors of institutional change in the traditional market equilibrium model. For example, when analyzing the aggregate supply curve, we explain the case of China's supply-side structural reform and construct a new type of production function that includes institutional costs, technological innovation and human capital (Kim & Park, 2023). Implant the "people-centered" development concept in economic growth theory, extend the Gini coefficient analysis to the assessment of the common wealth policy, and realize the integration of macroeconomics theory and Chinese practice.

Establishing a case base of China's economic practices. The hot issues of China's economic reform, such as "double-cycle pattern", "supply-side reform" and "common wealth", are integrated into macroeconomics case teaching to build a macroeconomics case library. For example, we select the cross-country input-output analysis of the Belt and Road Initiative to analyze the synergy mechanism of the domestic and international double-cycle; take the iron and steel industry as an example of production capacity reduction, and set up the econometric model of the fiscal policy, monetary policy tools, market response function and enterprise behavioral equations, so as to reveal the economic conduction mechanism of the supply-side reform; we design the research topic of "Changes in the structure of Beijing-Tianjin-Hebei Energy Consumption and its Influencing Factors", and use the panel data model to verify the influence of the Beijing-Tianjin-Hebei energy consumption structure and its influencing factors. The research project "Changes in the energy consumption structure of Beijing-Tianjin-Hebei and its influencing factors" is designed, and the panel data model is used to verify the factors influencing the energy consumption structure of Beijing-Tianjin-Hebei and its role in promoting the green and low-carbon development of the region.

3.3. Teaching Mode Innovation Path

1) "Online + offline + experimental platform" hybrid teaching mode

The course reform constructs the "online + offline + experimental platform" combining virtual simulation experiments, embedding economics experiments in the economics "online + offline" hybrid teaching mode (Liu & Zhao, 2021), expanding the "online + offline" teaching mode. The experimental part of this course is divided into two major sections: online experiment and offline experiment. Among them, the online experiment mainly uses economic simulation systems (e.g., EViews, Stata) to carry out practical projects, such as GDP forecasting, to deepen students' understanding of general equilibrium and comparative static analysis of economics models, and to analyze and reflect on theories by logging into the experimental platform for actual operation. And offline experiments are carried out in the way of participating in scientific research projects and supervising college students' projects of Moment Strict Training Program, through analyzing the real data of China's macroeconomic development, so that students can base on the practical development of data to complete the experiments by adopting the standardized econometric analysis methods, and further deepen the value shaping effect in case study. Students are encouraged and supported to participate in college students' scientific research training programs and disciplinary competitions, so that the macroeconomics knowledge mastered by students can be practically applied through scientific research programs and disciplinary competitions. Thus, we can realize the benign interaction of "online + offline" classroom, and guarantee the achievement of the teaching goal of "knowledge, quality and ability" of students in all aspects.

In detail, the experiment platform is a key part of the practical teaching of the course, which is divided into online and offline experiments in course practice. The online experiment relies on economic simulation systems, such as EViews and Stata, through which students carry out practical projects such as GDP forecasting. In the process of operation, students can deeply understand the general equilibrium and comparative static analysis of economic models, analyze and reflect on theories through actual operation, and combine theoretical knowledge with practice. Offline experiments mainly allow students to analyze the real data of China's macroeconomic development by participating in scientific research projects and college students' scientific research training programs (e.g., "Challenge Cup", etc.). For example, in the "Beijing-Tianjin-Hebei Energy Consumption Structure Changes and Its Influencing Factors" research project, students analyze the panel data model and complete the experiments based on real data to deepen their understanding of theoretical knowledge and strengthen the value shaping of case studies. Online experiments provide students with simulated practical scenarios to lay the foundation for theoretical application; offline experiments allow students to come into contact with real scientific research projects to enhance their ability to solve practical problems, and the two complement each other by integrating them into the teaching content of the course and helping stu-

dents to realize the teaching goal of "Knowledge, Quality, and Ability".

2) The classroom organization model of "assessment, context and interaction"

First of all, assess and analyze the students' learning situation before class. Make full use of online learning data front-end analysis, targeted adjustment of the offline course mode, online establishment of cloud class platform and release chapter learning tasks, complete the self-assessment questions, collect students' self-assessment data before class, analyze the error rate, in order to determine the mode of teaching, according to the difficulty of the teacher's explanations, student lectures and student assessment and thematic seminars.

Secondly, design the introductory contextual links were fully. Diversified teaching techniques and course topics are used to carry out context-induced and problem-driven macroeconomics, and build a vivid learning situation. Based on the case base of China's macroeconomic development, the practical teaching effect of the macroeconomics course is enhanced to realize the contextualization, problematization, multi-dimensionalization and tasking of economics learning.

Thirdly, interactive learning methods are used to guide students to participate in the analysis and solution of macroeconomics problems, so this course comprehensively adopts the forms of course groups, group discussions and cutting-edge inquiry to build an interactive communication space. Make full use of online platforms and other mobile communication platforms to share the learning method, guide and encourage students to break the time and space limitations of the physical classroom, online and offline at the same time to create a parallel equalized knowledge exchange platform. Specific forms include role-playing, project training, case discussion, communication and debate, economics experiments and so on.

In addition, curriculum reform utilizes a variety of tools and platforms. In terms of online teaching, with the help of the cloud classroom platform, teachers release chapter learning tasks in advance, students complete self-assessment questions, and teachers analyze the question-answer data to understand students' knowledge mastery and then adjust the mode of offline courses to achieve personalized teaching. For example, based on the correct rate of online practice, the offline classroom is divided into three difficulty modes: lecture-based, group discussion and seminar, so as to improve the relevance of teaching. At the same time, the MOOC online platform is used to cover the traditional macroeconomics knowledge points, so that students can learn the basic knowledge independently and save classroom time for higher-order thinking training. On the experimental platform, EViews, Stata and other economic simulation systems are used to carry out online experiments, such as allowing students to carry out GDP forecasting projects to deepen their understanding of economic models and improve their data analysis and practical skills. In offline experiments, through participation in scientific research projects and undergraduate research training programs, students apply standardized econometric analysis methods to deal with the actual data of China's

macroeconomic development, consolidate their theoretical knowledge in practice, and improve their ability to solve real-world problems.

3.4. Optimization and Reconstruction of Evaluation System

The diversified assessment system is designed to include "classroom contribution (10%)—course analysis report (10%)—course task expansion (10%)—course unit test (10%)—final assessment (60%)", in which the weight of practical ability assessment is raised to 50%.

Implementation of "process-oriented assessment" based on Macroeconomics. In order to ensure the completion of students' hierarchical teaching objectives, "process-oriented assessment" is implemented, and a dynamic evaluation mechanism is designed to provide timely feedback. First, the difficulty and mode of offline courses are adjusted by using online learning data. According to the correct rate of online exercises, the offline classroom mode is divided into three difficulty modes: lecture-based, group discussion and seminar. Secondly, we set up performance assessment standards according to process management to ensure the completion of OBE teaching goals and test the effectiveness of teaching implementation. Third, "online + offline" reflection and criticism are set up. Through cloud classes, cloud teaching materials, course clusters, class summaries and questionnaires, the transfer and application of knowledge and skills are trained.

3.5. Faculties' Training for the New Framework

Various measures have been taken to help teachers adapt to a more integrated and practical approach to teaching and learning. Teachers are organized to attend training and seminars on the construction of new liberal arts and the OBE concept, so that they can have a deeper understanding of the direction and concept of education and teaching reform, update their teaching concepts, and design their teaching activities in a result-oriented way. Carry out special training on teaching methods, invite experts to introduce and demonstrate case teaching, classroom discussion, blended teaching and other methods to enhance teachers' ability to utilize diversified teaching methods, enhance classroom interactivity and stimulate students' critical thinking. Teachers are encouraged to participate in teaching reform practice and research projects, such as participating in the project "Construction and Exploration of Practice Teaching System for Economics Courses Based on 'Stratification and Integration'", so as to accumulate experience in practice and improve teaching level. The university also supports teachers to participate in academic exchange activities, to understand the cutting-edge dynamics of the discipline and the trend of teaching reform, and to promote teachers' professional development.

4. Effectiveness of Teaching Reform

The teaching reform in Beijing Institute of Petrochemical Technology has fully

considered the characteristics and needs of different student groups. In terms of setting course objectives, we construct a hierarchical cultivation system of "knowledge, quality and ability" based on the OBE concept, and set learning objectives at different levels, such as placing lower-order objectives such as "memorization and comprehension" in online learning, and higher-order objectives such as "application, analysis, evaluation and creation" through offline classes, so as to meet the needs of students with different learning abilities. For example, low-order objectives such as "memorization and comprehension" are put in online learning, and high-order objectives such as "application, analysis, evaluation and creation" are realized in offline classrooms to meet the needs of students with different learning abilities. With the front-end analysis of online learning data, teachers can accurately grasp the learning situation of students and adjust the teaching mode for different students. For students with weak fundamentals, the offline courses mainly focus on lectures to consolidate the fundamentals; for students with better fundamentals, group discussions and seminars are used to stimulate their innovative thinking and teamwork skills. In the organization of teaching activities, diversified learning forms are provided, such as role-playing, project training, case discussion, etc., to meet the needs of students with different learning styles. Extraverted students can take advantage of classroom discussions and debates, and introverted students can demonstrate their abilities through online learning and individual projects.

The teaching reform of Macroeconomics course has been implemented by Beijing Institute of Petrochemical Technology since 2020, and the institute has tracked the results of the reform of Macroeconomics course and made a comparative analysis with that before the reform in 2019, and the results show that the practice of the teaching reform of Macroeconomics has been effective.

Macroeconomics, as a compulsory basic course in economics, is taken or required by all students in the college. Relevant majors in the College of Economics and Management include International Economics and Trade, Big Data Management and Application, E-commerce, Logistics Management, Accounting, and Marketing. The sample size of students in the 2019 session is 425, the sample size of the 2020 session is 412, the sample size of the 2021 session is 423, the sample size of the 2022 session is 455, the sample size of the 2023 session is 502, and the sample size of the 2024 session is The sample size of the 2024 class was 536 (see Table 2 for details).

We conducted a questionnaire survey on the students who took the Macroeconomics course in previous years to provide feedback on the effect of government, industry, academia and research practice in terms of the quality and satisfaction of talent cultivation, satisfaction, employment, and practical teaching sessions. Through the questionnaire survey of students in the sessions of 2019 - 2024, the results show that more than 97% of the students believe that their ability to apply research methods in macroeconomics and their ability to synthesize and analyze have been significantly improved.

Table 2. The data description of the survey.

Classification	Year	Male	Female	Total Number
Before teaching reform	2019	193	232	425
After teaching reform	2020	202	231	433
	2021	196	269	465
	2022	254	278	532
	2023	264	272	536
	2024	257	279	536

Data Source: Annual Survey on Students' Satisfaction (2019 - 2024)[1].

Since the implementation of the curriculum reform, the check-in data of Cloud Classroom Learning Pass shows that the check-in rate of the Macroeconomics course in 2024 is up to more than 99%, and the students' interest in learning the economics course has increased significantly. The macroeconomics scenario setting and case study analysis have aroused extensive discussion among students online and offline, the classroom atmosphere is active, and the average score of students' course evaluation is 97.91. After the teaching reform, the average grade of the course increased year by year, from 60.7 before the reform in 2019 to 82.8 in 2024, which is a significant increase (**Figure 1**).

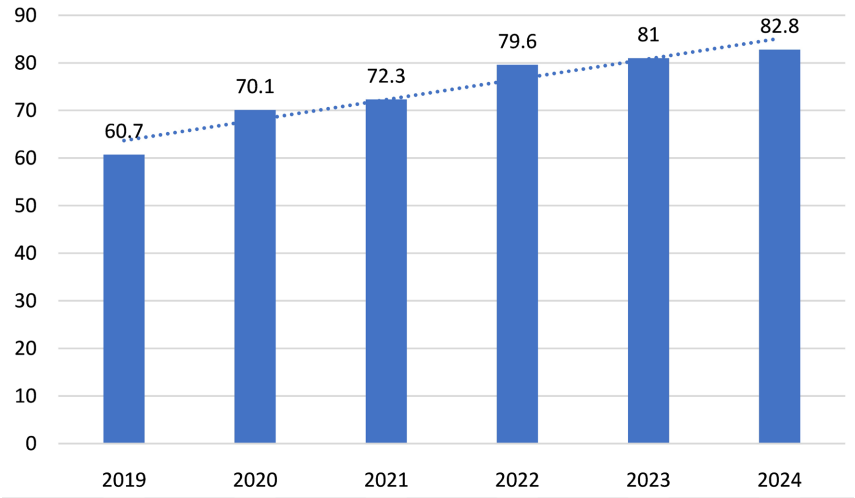

Figure 1. Change in the average overall grade for the Macroeconomics program (2019 - 2024).

The process-oriented assessment makes students attach great importance to the completion of large assignments and ordinary learning tasks, the quality of students' course papers improves yearly, and students' theoretical understanding of

[1]Beijing Institute of Petro-chemical technology will hold an annual survey on students' satisfaction for each course teaching.

macroeconomic issues, macroeconomics literacy, and independent thinking problem-solving ability are significantly improved (Figure 2). The unit test shows that the theoretical foundation of macroeconomics, research methodology and application have been greatly improved after the teaching reform, with the average test score increasing from 8.2 in 2020 to 9.1 in 2024; the course contextual tasks and extracurricular assignments have also been greatly improved, from 8.6 and 7.8 in 2020 to 9.2 and 9.1 in 2024, respectively, and the course paper has increased from an average of 7.5 in 2020 to 8.8 in 2024, indicating significant progress in the development of students' practical ability in macroeconomics.

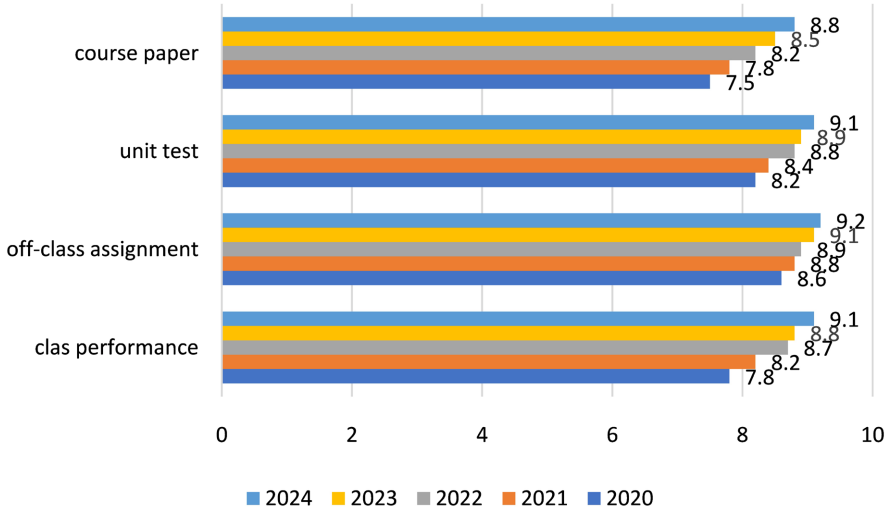

Figure 2. Changes in Average Usual grade in the Macroeconomics course (2019 - 2024).

In terms of practical teaching, students' ability to apply macroeconomics theory to analyze China's macroeconomic practice has been enhanced. Through the teaching mode of theory and practice, students' innovation ability and analytical ability have been significantly improved. Since the teaching reform of the course in 2020, a total of 145 provincial awards have been won by the Internet + College Students' Innovation and Entrepreneurship Competition, the "Challenge Cup" and other innovation awards, and 45 university-level projects, and more than 50 papers have been publicly published in provincial journals or above, with the topics focusing on economic growth, energy efficiency, low-carbon development and other hot issues of macroeconomics. The selected topics focus on economic growth, energy efficiency, low carbon development and other macroeconomic hot issues. He has led his students to participate in 24 national and Beijing-level undergraduate scientific research training programs (URT), including 8 outstanding URT projects. Students have also joined various research and practice activities as members of the project team, for example, participating in the research on the development of Beijing Daxing Airport Economic Zone and Yizhuang Economic Development Zone, and the survey on Beijing's rural old-age pension insurance, etc., which have greatly improved their comprehensive quality.

A three-dimensional macroeconomics course system has been created. Led by the characteristics of "online + offline + experiment", the Macroeconomics course has realized a new three-dimensional curriculum system based on cloud teaching materials, online/offline hybrid courses, Beijing's high-quality teaching materials and high-quality lesson plans. The "Construction and Exploration of Practice Teaching System of Economics Courses Based on 'Layering and Integration'" won the First Prize of Teaching Achievement Award of Beijing Institute of Petrochemical Technology in 2023, and the "Exploration and Practice of Reform of Teaching Paradigm Based on Students' Development, Learning and Effectiveness" won the First Prize of Teaching Achievement Award of Higher Education of Beijing Municipality in 2021.

5. Conclusion

In this paper, we have systematically sorted out the background, problems and implementation paths of the teaching reform of macroeconomics course, put forward the teaching reform system centered on the trinity of "knowledge, quality and ability", and verified the effectiveness of the reform through the practice of Beijing Institute of Petroleum and Chemical Industry (BIPC). The similarities with the teaching reform of macroeconomics in universities at home and abroad lie in the fact that they all focus on improving teaching quality and cultivating students' ability, pay attention to the combination of theory and practice, adopt case teaching, experimental teaching and other methods to enhance students' understanding of economic theories and their ability to apply them, and also emphasize the use of modern educational technology to assist teaching and improve teaching efficiency and students' interest in learning. The difference is that the teaching reform of this course is closely related to the actual development of China's economy, integrating the cases of China's economic practice e into the teaching content, and constructing a narrative system of macroeconomics with Chinese characteristics, such as integrating the cases of "double-cycle" and "supply-side reform" into the teaching, analyzing the problems of China's economy, and realizing the economic development of China. For example, cases such as "double cycle" and "supply-side reform" are integrated into the teaching to analyze China's economic problems, so as to realize the unification of the western theoretical framework and China's development practice. The reformed teaching mode significantly improves students' theoretical learning ability, practical application ability and innovative thinking ability, and provides a reference experience for cultivating economic management talents in the new era.

The teaching reform of macroeconomics course should keep up with the development of the times and social needs, and constantly explore innovative paths, so as to provide solid support for the cultivation of new era economic management talents with global vision, innovative ability and digital literacy. In the future, the macroeconomics course could, on the one hand, further integrate artificial intelligence and AI technology, for example, use machine learning algorithms to ana-

lyze macroeconomic data, build intelligent prediction models, or carry out simulation experiments of policy effects through AI simulation platforms, which not only enhances students' data analysis ability, but also cultivates their ability to use advanced technologies to solve complex economic problems; on the other hand, digital literacy and macroeconomics courses will be further deeply integrated. Digital literacy has become the core competitiveness of economic management talents, and the macroeconomics course teaching should strengthen the cultivation of students' ability to use digital tools, incorporate the operation skills of digital modeling software and data analysis platforms into macroeconomics research methods, and at the same time pay attention to the education of data ethics and digital security awareness. By integrating digital literacy into the practical nurturing aspects of macroeconomics courses, we can help students better adapt to the digital economic environment and enhance their comprehensive competitiveness.

Support Project

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