

Research on a New Teaching Model Combining "Project Oriented" with Curriculum Ideological and Political Education

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Abstract: In recent years, the demand for skilled, applied, and compound talents in enterprises has not been met, and the "internal competition" of undergraduate students has become increasingly serious, resulting in a contradiction between the shortage of talents in enterprises and the difficulty of employment for college students. In order to solve this contradiction, under the guidance of the country, China's higher education is undergoing a profound transformation with the theme of adjusting the education structure, and the new type of applied undergraduate education has become the main force of this reform. The programming course adopts a traditional cramming method, which makes students prone to problems such as "listening too much", "practicing too little", and "having high expectations but low abilities", which is not conducive to the cultivation of students' programming and innovation abilities. It is of great significance to carry out teaching reform on "Python Programming" in response to this issue. In addition, based on the characteristics of applied undergraduate universities and the actual situation of the school and students, we explore the methods of "interest guidance+project task driven+project orientation+ideological and political elements" in teaching practice, to stimulate students' interest and enhance teaching effectiveness. In the context of information technology teaching, learn to use modern educational methods such as multimedia to create a relaxed, vivid, and vivid classroom environment. Through entertaining teaching, lead students into the ocean of knowledge, learn relevant knowledge points, improve their logical analysis ability, self-learning ability, and hands-on ability, and enable them to apply what they have learned in practice. In addition, we also focus on exploring ways to integrate ideological and political elements into the curriculum, striving to enable students to improve their patriotism, establish correct core values and dedication while learning knowledge.

1. Introduction

At present, our education reform is constantly emerging, and relevant education departments and technical personnel are sparing no effort in finding various learning methods that are relatively easy for students and ultimately achieve the best results. We are committed to reducing the pressure on students and teachers, striving to cultivate students with high quality and professional abilities, and improving the overall level and strength of education in China. In addition, the resolution of the

contradictions and contradictions between scale, structure, quality, and efficiency that arise in the process of advancing higher education is the internal driving force behind the development of higher education. In recent years, the demand for skilled, applied, and compound talents in enterprises has not been met, and the "internal competition" of undergraduate students has become increasingly serious, resulting in a contradiction between the shortage of talents in enterprises and the difficulty of employment for college students. In order to solve this contradiction, under the guidance of the country, China's higher education is undergoing a profound transformation with the theme of adjusting the education structure, and the new type of applied undergraduate education has become the main force of this reform. The programming course adopts a traditional cramming method, which makes students prone to problems such as "listening too much", "practicing too little", and "having high expectations but low abilities", which is not conducive to the cultivation of students' programming and innovation abilities [1]. It is of great significance to carry out teaching reform on "Python Programming" in response to this issue.

According to the goal of talent cultivation in software engineering, the purpose and task of the course "Python Programming" is to enable students to master the basic methods of Python programming through the learning of this course. Our goal is not only to cultivate high-level professional talents, but also to cultivate patriotic young people with national spirit. We need to combine the characteristics of application-oriented undergraduate universities and explore the methods of "interest guidance+project task driven+project orientation+ideological and political elements" in teaching practice based on the actual situation of the school and students, in order to stimulate students' interest and enhance teaching effectiveness [2]. In the context of information technology teaching, learn to use modern educational methods such as multimedia to create a relaxed, vivid, and vivid classroom environment. Through entertaining teaching, lead students into the ocean of knowledge, learn relevant knowledge points, improve their logical analysis ability, self-learning ability, and hands-on ability, and enable them to apply what they have learned in practice. In addition, we also focus on exploring ways to integrate ideological and political elements into the curriculum, striving to enable students to improve their patriotism, establish correct core values and dedication while learning knowledge. By effectively integrating ideological and political education into the curriculum, we enhance moral awareness, prioritize ethics in software development, respect rules, strictly abide by ethical norms, respect intellectual property rights, and respect innovation. Emphasizing "patriotism, dedication, integrity, and friendliness", cultivating students' core values of serving society, scientific social responsibility, and responsibility, as well as patriotism.

2. Research Status

Python Programming is a group elective course for software undergraduate majors. Through the study of this course, students can understand the programming mode of Python, especially the Functional programming mode. They can skillfully use Python Intrinsic function and basic data types such as operators, lists, tuples, dictionaries, sets, and related List comprehension, slicing and other grammars to solve practical problems [3], and master Python branch structure, cycle structure Function design and class design and use will enable students to master Python extension modules in different fields and be able to solve practical problems in file operation, big data processing and other fields. At the same time, students should also develop code optimization and security programming awareness.

According to the goal of talent cultivation in software engineering, the purpose and task of the course are to enable students to master the basic methods of Python programming through the study of this course. Our goal is not only to cultivate high-level professional talents, but also to cultivate patriotic young people with national spirit.

However, the traditional teaching of "Python Programming" focuses on basic knowledge such as grammar and algorithm theory, and the cultivation of hands-on practical skills is weak, resulting in insufficient practical teaching hours. Students can proficiently master programming by conducting extensive hands-on training outside of class. In current teaching, even if teachers adopt the teaching method of practicing while speaking in the classroom, due to the many steps involved in the operation, many students will master it in the classroom, and forget some parts after class, resulting in experimental failure, making it difficult to reproduce and review the classroom content, seriously affecting the learning effect. In addition, when taking the course "Python Programming", in order to make up for the leading knowledge, the usual approach is for the teacher to briefly review or teach 10 minutes before class. This method is too short in time, and students cannot smoothly review and digest, with little effect. Alternatively, the teacher may assign tasks for students to preview before class, but this approach lacks supervision for students and the teacher cannot accurately determine whether there is a preview, resulting in poor effectiveness [4]. The lack of mastery of leading knowledge has resulted in the inability to effectively connect and carry out this course. In addition, procedural courses are rarely integrated into ideological and political education, resulting in many talented young people who, although they have acquired knowledge, do not establish a correct outlook on life, values, and patriotism. This has led to some outstanding young people being unable to withstand various temptations after entering society and ultimately leading them astray. Therefore, simple classroom teaching cannot meet students' learning needs, and it is necessary to use the latest teaching models to improve the teaching of programming courses [5].

3. Specific Measures for a New Teaching Model Combining Project Orientation with Curriculum Ideological and Political Education

3.1 Specific reform content

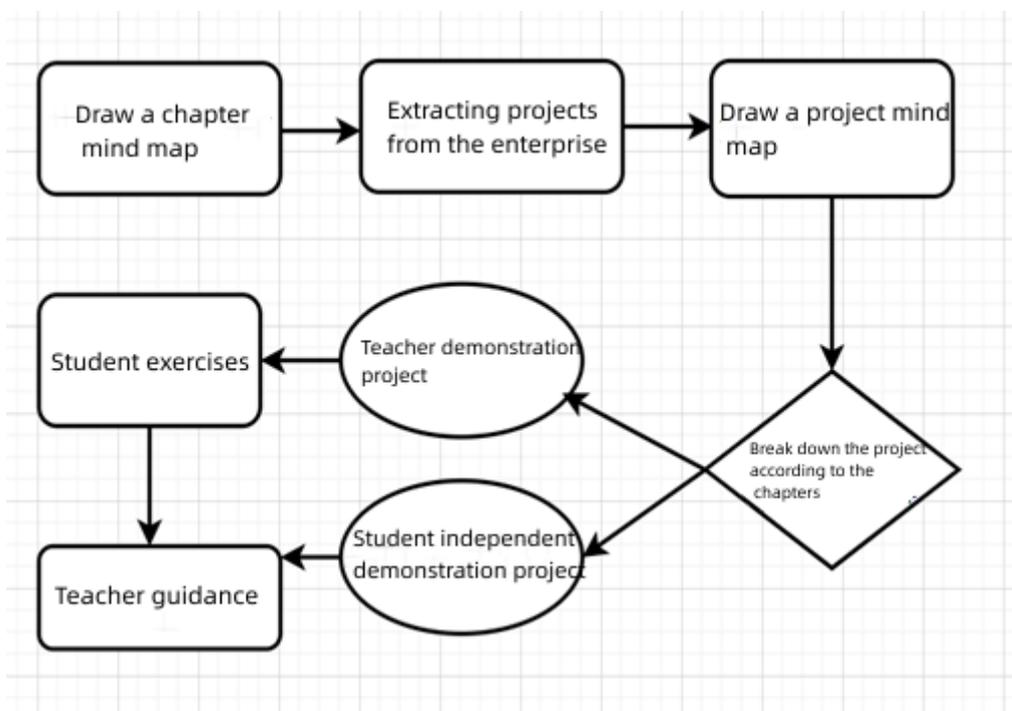


Figure 1: Course teaching mode

The course "Python Programming" will adopt a teaching mode that combines "task driven, project

oriented" and course ideological and political education, and will be completed in conjunction with mind mapping. The project-based approach in teaching is a student-centered teaching method that emphasizes the importance of active participation and exploration by students in achieving learning goals. It is a new teaching method that focuses on analyzing student communication situations and optimizing the learning process. With the goal of cultivating students' professional skills in software development, the teaching content is arranged in a modular manner. By selecting selected cases and decomposing real project tasks for enterprises [6], it is gradually improved from shallow to deep. Following the guiding ideology of "learning by doing, learning by doing", the teaching highlights the student's main position, strengthens project training, and improves students' actual programming ability. The project-based approach is referenced in Python programming teaching, which organically combines students' learning process, skill improvement, and professional activities, emphasizing "learning through project implementation". Teachers should design practical links based on the characteristics of software engineering, guided by experimental projects, to enhance students' interest in learning and teamwork spirit. The specific mode is shown in Figure 1:

Course ideological and political design mainly involves exploring the ideological and political elements in professional courses and integrating them into the teaching process of the course. Through the design of course ideological and political content and teaching methods, the specific design is shown in Figure 2. By effectively integrating ideological and political education into the curriculum, we enhance moral awareness, prioritize ethics in software development, respect rules, strictly abide by ethical norms, respect intellectual property rights, and respect innovation. Emphasizing "patriotism, dedication, integrity, and friendliness", cultivating students' core values of serving society[7], scientific social responsibility, and responsibility, as well as patriotism. Strive to enable students to improve their patriotism, establish correct core values and dedication while learning knowledge.

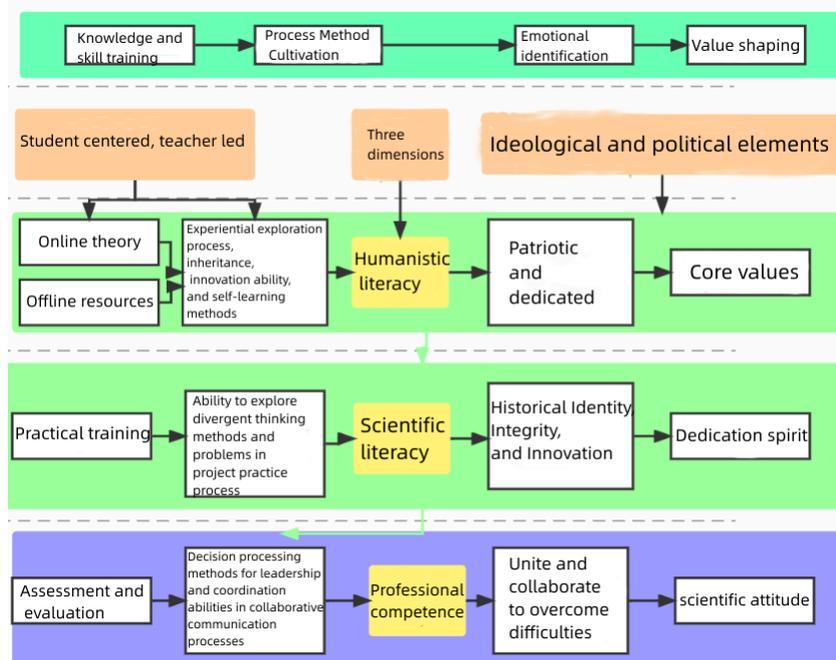


Figure 2: Integrating ideological and political education into the curriculum

3.2 Course teaching methods

1) Developing situational teaching methods. The practical stage of professional courses will adopt the method of situational teaching, with "situational examples as the main thread, teachers as guidance, and students as the main body" to complete. Select appropriate scenario cases, update cases in a timely

manner, build a high-quality case library, and enrich teaching resources.

2) Carry out participatory teaching methods, discussion based teaching methods, and heuristic teaching methods, gradually reducing the time teachers spend teaching knowledge points in the classroom, using more classroom time for communication and discussion, and cultivating a sense of self innovation.

3) By combining various teaching methods such as mind mapping, task driven, group discussion, summary and induction, process assessment and evaluation, and teacher-student interactive discussion, we aim to enhance students' participation and stimulate their enthusiasm to master this course well.

4) Establish an online teaching platform. Establish a unified professional online teaching platform to admit elective students into the virtual space of the course through the method of "student application teacher authorization". By utilizing the online learning system, online testing, and online Q&A provided by the Super Star Learning Platform, students can read, download, and test online, as well as achieve teacher-student interaction, allowing for the exchange of opinions and suggestions between teachers and students anytime and anywhere. Transform the learning context into a place that transcends one-way information transmission, forming a platform for sharing knowledge, experience, wisdom, and happiness.

5) Conduct overall design before, during, and after class. Before class: Self preview through platforms such as MOOCH; In class (BOPPPS): Adopting the teaching mode of BOPPPS, it is divided into six stages: introduction, bridge in, importing the current course content, determining learning objectives, pre assessment, participatory learning, post assessment, and summary; After class: Consolidate knowledge points through homework exercises.

Teach students according to their aptitude, flexibly use various appropriate teaching methods, effectively stimulate students' interest in learning[8-9], promote students' active thinking and practice, achieve teacher-student interaction, and truly change the situation of one-way information transmission and one-way control by teachers in the classroom.

6) In the teaching process, combining current affairs and politics, integrating ideological and political elements, and integrating ideological and political elements into specific project cases, strive to help students shape correct life and values while learning knowledge, and cultivate patriotism.

3.3 Course teaching evaluation methods

This course follows the "learning centered" teaching evaluation system and constructs a complete evaluation system that combines and influences process evaluation and summative evaluation, forming a comprehensive evaluation of students' learning status. Introducing a process based evaluation system, the final evaluation score will be composed of three parts and each part of the assessment content will be weighted. Among them, the overall evaluation score=process assessment 30%+project experimental practice 30%+final score (40%). Process assessment 30%: including classroom attendance 5%, E-learning 5%, homework 10%, classroom performance 10%, experimental practice 30%: including experimental report 10%, experimental defense 20%.

Experimental assessment: 'Python Programming' is a highly practical course[10], and practical training content is particularly important. The close combination of practice and theory adopts an integrated teaching approach of "teaching learning doing". The experiment is arranged after each theoretical class, and the experimental content is set based on the knowledge taught in the theoretical class. The experiment requires both mandatory and multiple-choice questions, among which multiple-choice questions are provided for students who have spare energy to complete. Students complete the experiment on the computer and write the experimental report in a standardized format. The teacher evaluates the scores of each experiment by conducting on-site acceptance (students

running the program for defense) and correcting the experimental report.

Regular grades: composed of assignments, classroom interactions, check-in, video learning, chapter quizzes, group tasks, chapter learning, discussions, and exams.

Final examination: The Final examination is conducted in the form of big homework. Firstly, develop an exam plan and determine the scope of the exam. After being reviewed by the leader, the paper will be produced and divided into A and B papers. Then, the Academic Affairs Office will randomly select one of the papers as the main exam paper and the other as a supplementary exam paper, as shown in Table 1.

Table 1: Assessment Details for Programming Courses

COURSE ASSESSMENT		Assessment process	Proportion (%)	Assessment Rules
Daily performance	Process assessment	Classroom attendance	5%	Attendance status of each class assigned in class
		E-learning	5%	Record of learning situation of Super Star Learning Pass
		Homework after class	10%	Weekly video learning and units on the classroom dispatch platform; Completion status of test questions and assigned assignments
		Classroom performance	10%	Flipped classroom participates in questions, competitive answers and discussions; Comprehensive score with explanation
	Project Experimental Practice	Experimental report	10%	Check the experimental report status
		Experimental defense	20%	Explanation of the project and answering of questions during the student defense process
Final grade		Offline centralized Final examination	40%	Final examination score

3.4 Reform Objectives

(1) Exploring the theoretical foundation of teaching mode education that integrates "project driven" and curriculum ideological and political education.

(2) Based on the characteristics of applied undergraduate universities and the actual situation of the school and students. To achieve an efficient combination of "teaching" and "learning" in the teaching process, emphasizing the reasonable optimization of the leading roles of teachers and students in the classroom. The main purpose is to encourage students to participate more actively in learning. Interest guidance is an effective method that can stimulate students' enthusiasm for learning. It is important to explain the knowledge points clearly in simple, vivid, and vivid language, while also emphasizing the cultivation of students' logical analysis and hands-on abilities, striving to make every student gain and improve.

(3) Explore the methods of "interest guidance+project task driven+ideological and political elements" in teaching practice, stimulate students' interest, and enhance teaching effectiveness. In the context of information technology teaching, learn to use modern educational methods such as multimedia to create a relaxed, vivid, and vivid classroom environment. Through entertaining teaching, lead students into the ocean of knowledge, learn relevant knowledge points, improve their

logical analysis ability, self-learning ability, and hands-on ability, and enable them to apply what they have learned in practice.

(4) Exploring methods for integrating ideological and political elements, striving to enable students to improve their patriotism, establish correct core values and dedication while learning knowledge. By effectively integrating ideological and political education into the curriculum, we enhance moral awareness, prioritize ethics in software development, respect rules, strictly abide by ethical norms, respect intellectual property rights, and respect innovation. Emphasizing "patriotism, dedication, integrity, and friendliness", cultivating students' core values of serving society, scientific social responsibility, and responsibility, as well as patriotism.

3.5 Key Issues to be Resolved

1) The structure of the teaching staff needs to be continuously optimized. Teachers with high professional titles, high educational qualifications, and high-level skills are not yet able to adapt to the current development needs.

2) Search for school enterprise cooperation enterprises and establish a long-term mechanism for deep integration between both parties. Hiring technical personnel to give lectures to students and discussing course teaching experimental cases together is crucial for improving teaching quality.

3) To find a suitable enterprise project for this course, it is necessary to delve deeper into the enterprise and divide the enterprise project reasonably according to the course chapters.

4) The "Five Modernizations" standardized teaching management system with project-based content, process-based processes, standardized quality, standardized operation, and integrated school enterprise integration still needs further improvement.

5) Exploration of methods for integrating ideological and political education into curriculum. How to organically combine current politics with project cases, and how to stimulate students' interest in learning through current politics. How to effectively integrate ideological and political education into the curriculum, enhance moral awareness, prioritize ethics in software development, respect rules, strictly abide by ethical norms, respect intellectual property rights, and respect innovation.

6) Course resource construction. How to take the construction of a series of high-quality courses as the main line, and construct professional core courses and characteristic courses according to the provincial standard of high-quality courses.

4. Implementation Plan for a New Teaching Model Combining Project Orientation with Curriculum Ideological and Political Education

4.1 Implementation content

Divide the entire teaching process into: pre class: independent preview through platforms such as MOOCO; In class (BOPPPS): Adopting the teaching mode of BOPPPS, it is divided into six stages: introduction, bridge in, importing the current course content, determining learning objectives, pre assessment, participatory learning, post assessment, and summary; After class: Consolidate knowledge points through homework exercises.

Teach students according to their aptitude, flexibly use various appropriate teaching methods, effectively stimulate students' interest in learning, promote students' active thinking and practice, achieve teacher-student interaction, and truly change the situation of one-way information transmission and one-way control by teachers in the classroom. When designing teaching, pay attention to the following three aspects:

(1) Transform learning methods. Encourage students to actively participate in the classroom and become the main body of classroom teaching. With the help of modern educational methods, students

can participate in learning through various means (such as mobile terminals).

(2) Integrating scenarios with knowledge points. Set up a scene that integrates with knowledge points, allowing students to delve deeper into it, and then throw out learning tasks related to knowledge points, allowing students to enter a learning state naturally in the scene.

(3) Wake up students' awareness of autonomous learning. Timely acknowledge students' efforts and achievements, allowing them to experience the joy of success and inspiring them to actively learn.

In the teaching curriculum, the curriculum adopts a "task driven, project oriented" approach combined with a mind map, integrating the teaching mode of ideological and political education into the curriculum. The goal is to cultivate students' professional skills in software development, and the teaching content is arranged in a modular manner. By selecting selected cases and decomposing real project tasks of enterprises, the teaching is gradually improved from shallow to deep. Following the guiding ideology of "learning by doing, learning by doing", the teaching highlights the student's main position and strengthens project training, Improve students' practical programming skills.

The project-based approach is referenced in Python programming teaching, which organically combines students' learning process, skill improvement, and professional activities, emphasizing "learning through project implementation". Teachers should design practical links based on the characteristics of software engineering, guided by experimental projects, to enhance students' interest in learning and teamwork spirit, as follows:

Team organization form: A group consists of a team leader and 6 members. Each group is responsible for a chapter and a project. By drawing a chapter mind map, they independently analyze the key and difficult points of this chapter and form an analysis report. Finally, based on the project results, they are evaluated through defense and acceptance. Finally, the teacher summarizes and evaluates the results.

Course ideological and political design mainly involves exploring the ideological and political elements in professional courses and integrating them into the teaching process of the course. By effectively integrating ideological and political education into the curriculum, we enhance moral awareness, prioritize ethics in software development, respect rules, strictly abide by ethical norms, respect intellectual property rights, and respect innovation. Emphasizing "patriotism, dedication, integrity, and friendliness", cultivating students to serve society, scientific social responsibility, and the core value of responsibility

4.2 Implementation methods

1) Literature research method is used to collect relevant literature reviews, discussions, and practical cases of teaching models for program design courses in universities. Based on this, relevant concepts are analyzed and defined, and theories and methods to promote application are mastered.

2) The questionnaire survey method uses methods such as questionnaires, interviews, and field investigations to select a course major in a typical university in this province as a practice site. A face-to-face survey is conducted on students, teachers, and school leaders in this major to understand the current situation and needs of case teaching.

3) Case analysis method, based on a questionnaire survey, conducts further research on some representative survey objects, and combines the situation of other objects in the survey to summarize and summarize the characteristics of program design courses in universities in this province.

4) The enterprise visit method involves delving into the enterprise, entering the project team, understanding the implementation process of the project, and striving for suitable projects as teaching cases.

4.3 Specific implementation plan (including annual progress)

The specific implementation plan is as follows:

1) Phase 1, 2022.9-2022.12: Project inception phase

① Conduct research and analysis on the demand and current situation of professional talents in the new engineering era, optimize the program design professional talent training plan and curriculum quality standard system;

② Literature collection and preparation stage. Improve the project plan, determine the hardware and software support required for the project research, purchase relevant equipment, search for school enterprise cooperation enterprises, and cooperate with them to provide platform, network, and technical support for the project. Simultaneously carry out training for members of the research group, including online platform usage training and offline teaching test box training.

2) Phase 2, 2023.1-2023.5: Project Implementation Phase

① Constructing a teaching platform for the course "Python Programming"

② Improve the curriculum system, teaching methods, and assessment standards;

③ Construction of teaching resources such as high-quality courses and case libraries;

④ Members of the research group listen to and evaluate each other's lessons, provide face-to-face guidance, and especially provide comprehensive guidance to the main lecturer. Summarize the necessary conditions for preparing online teaching resources, adapting to the technical platform of our school's students, student self-learning task sheets, pre test exercises, post test exercises, basic experiments, innovative experiments, comprehensive experiments, assessment and evaluation methods, etc.

3) Phase 3, 2023.6-2023.9: Summary and Acceptance Phase

4.4 Feasibility analysis

1) The research idea is clear. Using the relevant principles of software engineering, pedagogy, management and Big data, and drawing on relevant experience at home and abroad, we will deeply analyze the historical circumstances, practical difficulties and multidimensional causes of the teaching model of the program design curriculum specialty in colleges and universities, and scientifically build a realistic path and innovation mechanism.

2) The literature is rich. Scholars at home and abroad have made relatively in-depth research on teaching mode and teaching reform. The literature is extensive and the theoretical foundation is solid. Through Document retrieval, we can quickly grasp the relevant research trends, and on this basis, we can better carry out the further investigation and statistical research required by this topic.

3) The research object and objectives are clear. In recent years, our school has attached great importance to and supported collective and individual teaching and research. From the establishment of various participation and reward systems such as listening and speaking, to the establishment of multiple research and innovation teams and academic committees led by doctoral students, these are all incentives and assistance for our school teachers, actively guiding them to fully devote themselves to teaching and research.

5. Summary

This project combines the characteristics of the course to explore project cases closely related to actual projects in enterprises, and cultivate students' ability to apply what they have learned and connect theory with practice. The traditional teaching paradigm is a fragmented code of knowledge points, or it may no longer keep up with the needs of the times. Such examples are not ideal in

stimulating students' desire for learning and are not conducive to cultivating their ability to analyze and solve practical problems. In the process of learning case studies, students can continuously accumulate practical experience in industrial projects such as requirement analysis, system design, and system implementation, and improve their problem-solving abilities. Students can also develop professional qualities such as dedication, good communication skills, fearlessness of difficulties, and proactive progress. Utilize diverse teaching methods to stimulate students' enthusiasm for learning and cultivate their ability to actively learn. This course adopts diversified teaching methods for different teaching contents, including situational teaching method, participatory teaching method, case teaching method, discussion teaching method, heuristic teaching method, etc. It combines multiple teaching methods such as mind mapping, task driven, group discussion, summary and induction, process assessment and evaluation, and teacher-student interaction discussion to improve students' participation and mobilize their enthusiasm to master this course well.

Combining competition to promote learning. In traditional teaching, teachers often focus on students' ability to replicate textbook knowledge, without paying attention to their ability to innovate and apply it. The characteristic of this project is that during the learning process, teachers can continuously motivate students to participate in competitions, propose project ideas for various competitions, and cultivate students' divergent and innovative thinking. After completing the course, students have the foundation to participate in project competitions. Under the guidance of the teacher, they can combine life and utilize the knowledge of various subjects in various competitions for innovation. Build various online resources. The traditional offline teaching method completely relies on teachers' classroom teaching. Even some online teaching resources for courses still provide explanations of traditional textbook cases, without combining them with actual industrial projects or demonstrating students' technical abilities. Integrating ideological and political elements to cultivate students' correct outlook on life, values, and patriotism while learning knowledge and skills.

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