The exploration of the information mixed teaching mode of ideological and political education in the basic course of mechanical design

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Abstract. This paper aims to explore the ideological and political teaching design of basic course of mechanical design based on information mixed teaching mode. Under the background of today's digital age, we skillfully integrate ideological and political elements into every link of curriculum teaching through in-depth analysis of curriculum characteristics and ideological and political education objectives. With the help of advanced information technology means, such as online course platform, virtual reality technology, we use the combination of online and offline teaching methods to break the time and space restrictions of traditional teaching. This information-based teaching mode not only improves students' learning enthusiasm and initiative, but also greatly cultivates students' innovative spirit and practical ability. At the same time, through the accurate guidance of information technology, we have realized the organic unity of knowledge imparting and value guidance, so that students can master professional knowledge and improve their ideological and political literacy in a relaxed and pleasant learning atmosphere.

Keywords: information-based mixed teaching mode, ideological and political elements, political literacy, innovative spirit, practical ability

1 Introduction

Fundamentals of Mechanical design, as a core basic course for mechanical majors, not only has a profound theoretical foundation, but also requires students to have strong practical operation ability. With the support of modern information education technology, curriculum teaching is no longer limited to traditional classroom teaching. Through the introduction of information tools and platforms, such as online learning management system, simulation software, etc., we can not only teach students the basic theory and method of mechanical design, but also effectively cultivate students' engineering consciousness, innovative spirit and practical ability.

At the same time, with the deepening of the ideological and political ideas of the curriculum, the seamless integration of ideological and political education content into

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the teaching of professional courses has become a key part of the ideological and political work of colleges and universities in the new era. The application of information technology makes this integration process more efficient and accurate. Through the information platform, teachers can more conveniently track students' learning progress and ideological dynamics, adjust teaching strategies in time, and ensure the organic unity of knowledge transmission and value guidance. Therefore, using information technology to deepen the ideological and political teaching of the basic course of mechanical design is not only the focus of the current college education and teaching reform, but also an effective way to improve the comprehensive quality of students.[1]

2 Information Mixed Teaching Mode and Traditional Teaching Mode

2.1 Teaching Methods and Strategies

(1) Information-based Mixed Teaching Mode.

Combining online and offline teaching resources, various teaching methods are adopted, such as video explanation, online discussion, virtual experiment, etc.

Students' independent learning and cooperative learning are emphasized, and students are encouraged to consolidate and apply knowledge through online platforms outside of class.

(2) Traditional Teaching Mode.

It mainly relies on teachers' classroom teaching, supplemented by textbooks and blackboard writing.

Students passively receive knowledge, and classroom interaction and participation are relatively low.

2.2 Evaluation of Teaching Effect

(1) Information-based Mixed Teaching Mode.

Students' learning results are evaluated through online tests, homework submissions, and discussion forums.

It can track students' learning progress and grade changes in real time, and provide personalized learning advice.

(2) Traditional Teaching Mode.

Students' learning is evaluated mainly through mid-term and final exams and daily assignments.

The assessment method is relatively simple, and it is difficult to fully reflect the learning situation and progress of students. Ideological and political education objectives.

2.3 Student Participation and Interaction

(1) Information-based Mixed Teaching Mode.

Students can ask questions and discuss at any time through the online platform, which enhances teacher-student interaction and student interaction.

Rich teaching resources and interactive forms enhance students' interest and participation in learning.

(2) Traditional Teaching Mode.

The interaction between teachers and students mainly occurs in the classroom, and the frequency and depth of interaction are limited.

Students have fewer learning activities outside of class and lack of continuous learning motivation and participation.

3 The Empirical Research of Information Mixed Teaching Mode

3.1 Sample Selection

Random selection: Two or more classes are randomly selected to adopt the information mixed teaching mode and the traditional teaching mode respectively[2].

Ensure that the sample is representative: students' backgrounds, learning abilities, and professional distribution are considered to ensure the generality and applicability of the findings.

3.2 Data Collection

Academic performance: Students' academic performance is collected to assess the impact of different teaching modes on students' academic performance.

Classroom engagement: Students' engagement is assessed by observing and recording their participation in class, such as questions, discussions, etc.

Assignment Completion: Students' assignment completion is collected to assess student engagement and mastery.

Questionnaire survey: Through questionnaire survey to understand students' satisfaction and feedback on different teaching modes, collect qualitative and 3.3 quantitative data.

3.3 Data Analysis Method

Statistical analysis: Statistical software is used to analyze the collected data and compare the differences between the two teaching modes in terms of students' learning effect, participation and satisfaction[3].

Hot word analysis: Carry out hot word analysis of online discussion content to identify the hot and difficult points of students' discussion.

Social relationship analysis: To understand the social relationships and network structure among students by analyzing their interactions in discussion boards.

Quantitative analysis and qualitative analysis: Combining quantitative and qualitative analysis methods to ensure the comprehensiveness and accuracy of research conclusions.

Interactive discussion: Initiate a topic discussion in the course forum, invite students to share their opinions and feelings on China's ancient mechanical inventions, and further stimulate their patriotic feelings and national pride.

4 Ideological and Political Teaching Content Design

4.1 Teaching Content Design

(1) Trace the History of Machinery and Ignite Patriotic Enthusiasm.

Combining historical figures and events: Inspire students' patriotic enthusiasm and national pride by telling the life stories of famous Chinese mechanical design, manufacturing and inventors, such as Zhang Heng and Ma Jun.

Emphasizing the connection between national development and mechanical design: Introducing the research and development process of China's high-speed rail bearings localization, emphasizing that the improvement of the development level of high-end bearings is a systematic project[4], which requires systematic global consideration from structural design, material preparation, simulation analysis, processing and manufacturing, precision assembly and other aspects, so as to cultivate students' global awareness and the spirit of craftsmanship of excellence.

(2) Focus on Innovative Ideas and Cultivate Pioneers in Practice.

School-enterprise cooperation: Combine school-enterprise resources to provide practical teaching opportunities and enhance students' practical ability and engineering awareness.

Ideological and political curriculum: Integrate patriotic education elements, stimulate students' patriotic enthusiasm and national pride, and cultivate engineers with social responsibility.

Multimedia teaching resources: Develop and use online courses, virtual simulation experiment system and other teaching resources to provide students with rich learning materials and practical opportunities.

(3) Introducing Engineering Ethics and Shaping Professional Models.

Case study: Through the analysis of real engineering cases, students explore the ethical issues in engineering decision-making, such as safety, environmental protection, responsibility, etc.

Role play: Let students play the role of engineers, simulate the ethical dilemmas in the design process, and cultivate their ethical judgment and decision-making ability.

Discussion and reflection: Organize classroom discussions, encourage students to share their views and feelings, and guide them to reflect on ethical responsibilities in engineering practice.

4.2 Design of Teaching Methods

(1) Online Teaching.

Use the online course platform to publish teaching resources such as course teaching videos, courseware, exercises, etc., so that students can learn independently.

Through online discussion, Q&A and other interactive links, timely solve students' problems in learning, improve students' learning enthusiasm and initiative.[5]

(2)Teach Offline.

Using classroom teaching, experiment, course design and other teaching methods, so that students can deeply grasp the basic theory and method of mechanical design.

Cultivate students' teamwork spirit and communication ability through teaching activities such as group discussion and case analysis.

4.3 Teaching Evaluation Design

(1) Teaching Effect Evaluation Methods.

Test score analysis: By comparing the test scores of the experimental group and the control group, we understand the influence of blended teaching mode on students' academic performance.

Questionnaire survey: Students in the experimental group were surveyed to find out their recognition and satisfaction of blended teaching mode.

Classroom Engagement observation: Students' engagement is assessed by observing their participation in class, such as questions, discussions, etc.

Homework completion analysis: Collect students' homework completion to assess students' learning engagement and mastery.

Practical project performance assessment: For learning combined with practical projects, the student's performance in the project is assessed, including problem-solving skills, teamwork skills, etc.

(2) Teaching Effect Evaluation Strategies.

Diversified evaluation: Adopt diversified evaluation methods, pay attention to students' knowledge application ability and innovative thinking, and promote students' all-round development.

Formative assessment combined with summative assessment: focusing on student performance and progress during the learning process, as well as overall performance and learning outcomes at the end of the learning process.[6]

Student feedback: Collect feedback from students through questionnaires, after-class discussions, etc., to understand their views on the course content and teaching methods, as well as the difficulties and challenges they encounter in the learning process.

Teacher self-reflection: Teachers should reflect on their own teaching process, evaluate the effectiveness of teaching methods and strategies, and how to improve in future teaching.

5 Conclusions

The ideological and political teaching design of basic course of mechanical design based on mixed teaching mode shows a more vivid and efficient teaching pattern after deeply integrating information elements. Through the combination of online and offline teaching methods, the ideological and political education is cleverly integrated into all aspects of the curriculum, which not only enhances students' learning enthusiasm and initiative, but also subtly cultivates students' innovative spirit and practical ability, and realizes the organic unity of knowledge and value. With the help of information technology, teaching design pays more attention to students' personalized needs and learning experience, online platforms provide rich resources, and offline classes emphasize practical operation and case analysis. In the future, we will continue to explore innovative curriculum ideological and political teaching methods, tap the application potential of information technology, use big data and artificial intelligence to accurately analyze students' learning situation, adjust teaching strategies, and strengthen cooperation with enterprises, introduce practical engineering cases and practical projects, in order to cultivate all-round socialist builders and successors, and jointly meet the challenges of the information age. Open up the future!

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