

Research on the Design and Innovative Approach of Ideological and Political Education in Software Practical Training Courses under the Context of New Engineering Education

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Abstract: Research on teaching philosophy design and innovation paths for software training courses under the emerging engineering background has become a key issue in higher education. This research aims to explore how to organically combine ideological education with technical practice to cultivate students' comprehensive qualities and sense of social responsibility. Firstly, through analyzing the current teaching status of software training courses, we find differences and problems among different universities in aspects like curriculum settings and teaching methods. Secondly, we thoroughly study the theoretical foundations of software engineering education under the emerging engineering background, and discuss ideological education concepts and practices under the new context. Next, principles for curriculum teaching philosophy design are proposed, emphasizing integrating ideological education into training processes, guiding students to correctly handle the relationship between technology development and social responsibility, and establish proper values and social commitment. On this basis, a teaching philosophy effectiveness evaluation indicator system is constructed to comprehensively assess the ideological education and training effectiveness of software training courses, so as to fully understand the actual teaching effects and provide scientific basis for continuous optimization of teaching. Optimization paths and continuous improvement strategies cover aspects like teacher team building, resource integration, continuous feedback mechanisms, etc., to ensure teaching philosophy design and innovation paths of software training courses can meet the development requirements under the emerging engineering background and continuously improve teaching quality. The goal of this research is to provide beneficial references for the teaching philosophy design and innovation paths of software training courses, promote the continuous development of software engineering education under the emerging engineering background, and cultivate high-quality software engineering talents meeting the requirements of the times, contributing more outstanding talents to the innovation and development of China's IT industry. Through continuous exploration and improvement, we believe software training courses under the emerging engineering background will continue to innovate, cultivating more software engineering talents with social responsibility, innovation abilities and teamwork spirits, and contribute to promoting the sustainable development of the IT industry.

1. Introduction

With the continuous development of information technology and the growing demand for excellent software engineering talents, research on teaching philosophy design and innovation paths in software training courses under the emerging engineering background has received increasing attention [1]. Under the emerging engineering background, software training courses, as an important part of cultivating students' comprehensive qualities and improving innovation abilities, need to focus not only on technical practice, but also integrate ideological education into training organically, guiding students to establish correct values, social responsibility and innovative awareness [2]. This research aims to explore the teaching philosophy design and innovation paths in software training courses under the emerging engineering background, with the goal of cultivating

outstanding software engineering talents that meet the requirements of the times. Firstly, we will analyze the current teaching status of software training courses under the emerging engineering background, explore the differences in curriculum setting, teaching content and methods among different universities, and discover existing problems and room for improvement. At the same time, we will thoroughly study the theoretical basis of teaching philosophy in software training courses, explore the concepts and practices of ideological education under the emerging engineering background, and how to integrate ideological education with technical practice. Secondly, we will propose principles for curriculum teaching philosophy design, emphasizing people-oriented approaches, problem-oriented guidance, and focus on practice and application. By integrating ideological education into the training process, students can be guided to correctly handle the relationship between technology development and social responsibility, and establish correct values and social commitment. Furthermore, we will construct a teaching philosophy effectiveness evaluation indicator system to comprehensively assess the ideological education and training effectiveness of software training courses. This will help understand the actual teaching effects, provide scientific basis for continuous optimization of teaching, and enable software training courses to better exert ideological education functions under the emerging engineering background. Regarding optimization paths and continuous improvement strategies, we will focus on aspects like teacher team building, resource integration, continuous feedback mechanisms, etc., to ensure the teaching philosophy design and innovation paths of software training courses can meet the development requirements under the emerging engineering background, continuously improve teaching quality, and cultivate more outstanding and all-round developed software engineering talents.

The goal of this research is to provide beneficial references for the teaching philosophy design and innovation paths of software training courses, promote the continuous development of software engineering education under the emerging engineering background, cultivate high-quality software engineering talents that meet the requirements of the times, and contribute more outstanding talents to the innovation and development of China's information technology industry.

2. Overview and Analysis of Software Practical Training Courses in the Context of New Engineering Education

2.1. Software Engineering Education in the Context of New Engineering Education

Software engineering education under the background of emerging engineering plays a crucial role in higher education. With the constant advancement of science and technology and the advent of the information age, software engineering education is facing new challenges and opportunities [3]. Under the guidance of the concept of emerging engineering, software engineering education emphasizes interdisciplinary integration, combining computer science with engineering technology, management and other disciplines to cultivate students' comprehensive abilities and innovative spirit [4]. In addition, software engineering education under the background of emerging engineering also stresses practical teaching. Through software training courses, students are trained with the ability to solve practical problems. Meanwhile, integration of ideological and political education is highlighted to shape students' sense of social responsibility and values, facilitating the growth of software engineering talents into comprehensively developed talents with technical proficiency and firm ideals [5].

2.2. Analysis of the Current Status of Software Practical Training Courses

Software training courses have received extensive attention under the background of emerging engineering, and their teaching status presents diversified characteristics. Different colleges and universities have differences in curriculum settings, teaching content and methods [6]. Some schools focus on technical practice and emphasize the cultivation of software development skills, but may neglect the integration of ideological and political education. Others explore ideological and political education in software training, but the technical content may be relatively simple [7].

At the same time, teaching resources and faculty strength also affect the quality of software training courses [8]. To meet the needs of the new era, it is imperative to closely combine ideological and political education with software training, promote the improvement of students' comprehensive quality, strengthen the cultivation of innovative ability, and better cultivate outstanding software engineering talents in line with the requirements of emerging engineering.

2.3. The Ideological and Political Value of Software Practical Training Courses

The value of teaching philosophy in software training courses is particularly important under the background of emerging engineering. By incorporating ideological and political education into the training process, students' sense of social responsibility and values can be nurtured to guide them to establish a correct outlook on life, values and world [9]. Meanwhile, software training courses also provide a platform for cultivating innovative spirit and teamwork awareness, encouraging students to explore actively and innovate boldly, and provide effective technical support to solve social problems [10]. Under the guidance of teaching philosophy, software training courses enable students to improve themselves continuously through technical practice, and become comprehensive talents with both technical proficiency and moral integrity, contributing more excellent strength to the innovation and development of China's software engineering.

3. Software Practical Training Course: Design and Innovative Approach of Ideological and Political Education

3.1. The Theoretical Foundation of Ideological and Political Education in the Software Practical Training Course

The theoretical basis of teaching philosophy is an important support for software training curriculum education under the background of emerging engineering. This basis includes the guidance of the concept of emerging engineering, emphasizing the cultivation of comprehensive development, interdisciplinary integration, and innovation and entrepreneurship abilities. Meanwhile, inheriting the socialist core values is also an important part of teaching philosophy, guiding students to establish a correct world outlook, outlook on life and values. In curriculum design, give full play to the guiding role of ideological and political education, focus on cultivating students' sense of social responsibility, teamwork awareness, and attention and reflection on social issues. Under the guidance of these theoretical bases, software training courses can better exert the function of ideological and political education and cultivate high-quality software engineering talents meeting the requirements of emerging engineering.

3.2. Principles of Ideological and Political Education in Course Design

The principles of ideological and political education in course design are essential guidelines to ensure the success of the software practical training course under the context of new engineering education. These principles include:

- People-oriented approach: Focusing on students' comprehensive development, fostering their innovative thinking and practical abilities.
- Problem-oriented instruction: Guiding students to explore ways to solve practical problems, cultivating critical thinking and problem-solving skills.
- Emphasis on practice and application: Integrating theory with practice, stimulating students' enthusiasm for learning and hands-on capabilities.

Furthermore, the design of ideological and political education should embody the socialist core values, guiding students to establish correct life views and values, and cultivating their sense of social responsibility and entrepreneurial spirit, making them outstanding software engineering talents.

3.3. Implementation Path and Strategies

The implementation path and strategies are crucial for promoting the design and innovative approach of ideological and political education in the software practical training course. Firstly,

establishing interdisciplinary teams by bringing together experts in education, psychology, and other fields to jointly research course design and the integration of ideological and political education. Secondly, combining the context of new engineering education, carefully designing teaching content and cases to integrate technical practice with ideological and political education, enhancing students' comprehensive qualities. Moreover, innovating teaching methods and approaches, introducing interactive teaching and project-driven approaches, stimulating students' innovative capabilities and interest in learning. At the same time, actively cooperating with social enterprises, conducting off-campus practices and internships to broaden students' horizons. Finally, establishing a scientific evaluation mechanism, regularly assessing teaching effectiveness and ideological achievements, continuously optimizing teaching strategies, ensuring continuous improvement and innovation of the software practical training course under the context of new engineering education, As shown in Figure 1.

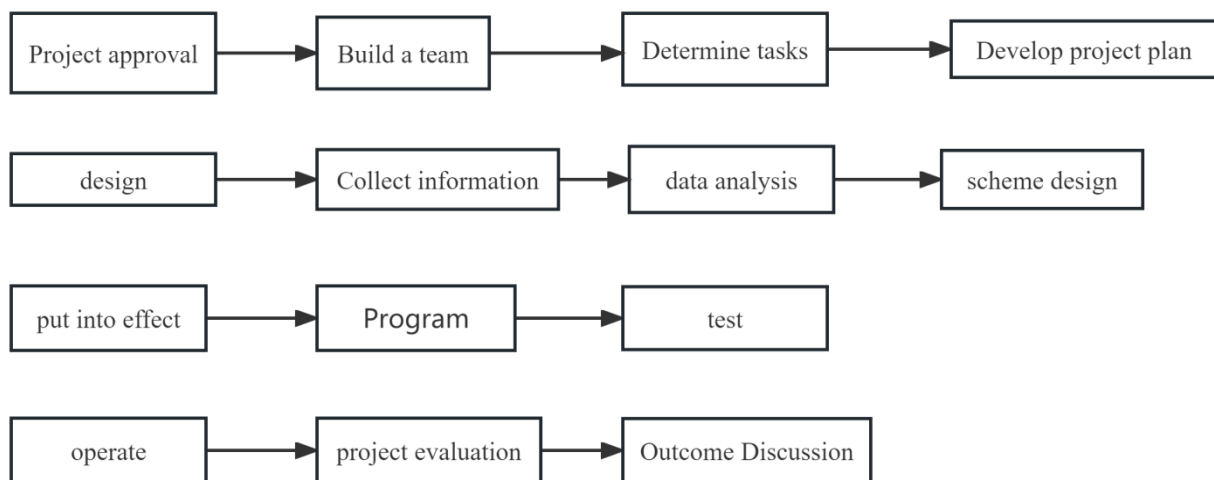


Figure 1 Course Design Process

4. Evaluation and Continuous Optimization of Teaching Philosophy Effectiveness in Software Training Courses

4.1. Construction of Evaluation Indicator System for Teaching Philosophy Effectiveness

The construction of an evaluation indicator system for teaching philosophy effectiveness is crucial for the research on teaching philosophy design and innovation paths in software training courses under the background of emerging engineering. This system should comprehensively consider the evaluation indicators in two aspects: students' ideological and political education and software training teaching effectiveness.

1) Student ideological and political education effectiveness evaluation indicators:

- Ideological and Political Performance: The acceptance and grasp of students towards socialist core values, reflected in their values and behaviors.
- Sense of Social Responsibility: Whether students are concerned about societal hot issues, actively engaged in public welfare activities, and focused on social fairness and justice.
- Value Transformation: Observe whether students undergo value adjustments during the practical training process, forming correct

2) Software Practical Training Course Evaluation Indicators:

- Improvement in Technical Abilities: Assess the extent to which students' programming, software development, and other technical skills have improved during the practical training process.
- Innovative Achievements: Evaluate whether students have produced innovative projects during the practical training, including software products, solutions, etc.
- Team Collaboration: Observe students' performance in team collaboration, including

communication, coordination, and division of work.

3) Lifelong Learning Abilities and Career Planning:

- Autonomous Learning Abilities: Evaluate whether students possess the initiative for self-learning, self-study skills, and awareness of continuous learning.

- Career Planning: Understand students' plans and goals for future career development and whether they have a deep understanding of the software engineering profession.

This indicator system should adopt various evaluation methods, including questionnaires, student grades, project evaluations and student self-evaluations, etc., to ensure a comprehensive and objective assessment of the teaching philosophy effectiveness in software training courses, As shown in Figure 2. The evaluation results will provide scientific basis for optimizing teaching design, strengthening ideological and political education, and improving software training teaching quality, in order to cultivate more outstanding and all-round emerging engineering software engineering talents.

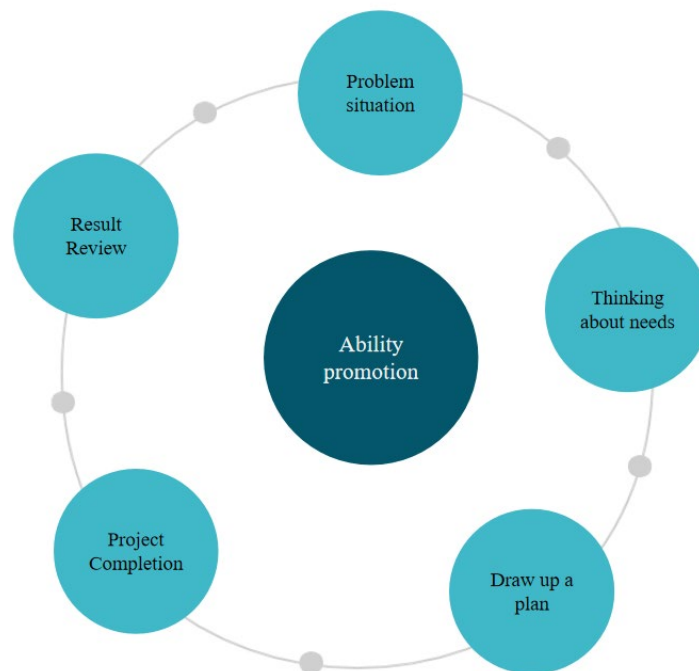


Figure 2 "6-link" Practical Training Method

4.2. Evaluation Methods and Data Collection for Teaching Effectiveness

To ensure effective implementation of teaching philosophy design and innovation paths in software training courses under the emerging engineering background, adopting proper evaluation methods and data collection means is crucial. Here are the methods and data collection strategies for teaching effectiveness evaluation:

- 1) Questionnaire survey: Design quantitative questionnaires, including student and teacher feedback. The student questionnaire focuses on the effectiveness of ideological and political education, the cognition and acceptance of core values, and the satisfaction with training teaching. The teacher questionnaire mainly collects teachers' self-evaluation on the teaching design and integration of ideological education.

- 2) Interviews and Focus Group Discussions: Conduct interviews with students and teachers to gain in-depth insights into issues encountered during the practical training, the effectiveness of teaching strategies, and suggestions for course improvements. Focus group discussions can further explore details and highlights and explore more targeted solutions.

- 3) Student Grades and Work Evaluation: Evaluate students' actual work and grades to reflect their improvement in technical skills and innovative achievements during the practical training, including software products, project solutions, etc.

4) Evaluation Based on Social Feedback: Collaborate with enterprises or organizations that use students' innovative work and collect their feedback to understand the real-world impact of students' work.

5) Student self-evaluation and narration: Encourage students to write learning notes, internship experiences and career planning to reflect on the impact of ideological education and their growth in the training process through self-evaluation.

By comprehensively analyzing the above data, the implementation effectiveness of teaching philosophy design and innovation paths in software training courses can be fully understood. Such evaluation methods and data collection strategies will help better adjust and optimize teaching content, teaching methods as well as the integration of ideological education, promoting continuous innovation and progress of software training courses under the emerging engineering background.

4.3. Optimization Pathways and Continuous Improvement Strategies

The optimization paths and continuous improvement strategies are crucial for the successful implementation of teaching philosophy design and innovation paths in software training courses under the emerging engineering background. Here are some key aspects of the optimization paths and continuous improvement strategies:

1) Constantly Enhance Teaching Design: Continuously optimize teaching design by integrating ideological and political education with technical practice in a more organic manner, ensuring the achievement of teaching objectives. Introduce new teaching methods and approaches such as project-based learning, virtual experiments, etc., to enhance students' interest and engagement in learning.

2) Strengthen teacher team building: Improve teachers' ideological education level and teaching abilities to better guide students and lead them to correctly handle the relationship between technology development and social responsibility. Establish teacher training plans to promote teachers' professional growth and update of ideological education concepts.

3) Promote Integration of Internal and External Resources: Strengthen collaboration among different disciplines within the university to achieve interdisciplinary synergy in the software practical training course, enriching course content and formats. Simultaneously, actively collaborate with enterprises, introduce real projects, and provide a training environment that aligns with practical demands.

4) Set up continuous feedback mechanism: Establish regular evaluation and student feedback mechanisms to collect students' and teachers' opinions and suggestions on the teaching philosophy effectiveness of the courses. Timely adjust teaching strategies, optimize curriculum content and teaching methods based on the feedback.

5) Promote successful cases and experiences: Summarize and share successful teaching cases and experiences to form good benchmarks for teaching improvements, and promote other schools to benefit from the teaching philosophy design and innovation paths in software training courses under the emerging engineering background.

By continuously optimizing pathways and employing continuous improvement strategies, the ideological and political education design and innovative approach in the software practical training course will continuously meet the demands of the new engineering education, cultivating more outstanding software engineering talents and driving innovation and development in our country's information technology industry.

5. Conclusions

Under the emerging engineering background, the research on teaching philosophy design and innovation paths in software training courses is of great significance. Combining ideological education and technical practice, we can cultivate software engineering talents with stronger social responsibility, innovation ability and teamwork spirit. Under the guidance of teaching philosophy design principles, we put student development first and focus on their overall development; emphasize problem-oriented approaches to develop students' critical thinking abilities; stress the

integration of practice and application to promote students' innovation abilities. The constructed teaching philosophy effectiveness evaluation indicator system comprehensively assesses the teaching outcomes and provides scientific basis for curriculum optimization through continuous improvement strategies. The optimization paths include improvements in teacher team building, resource integration, etc. Through continuous efforts, the teaching philosophy design and innovation paths in software training courses will play an important role in cultivating outstanding software engineering talents under the emerging engineering background, and promote the development of software engineering education.

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References

- [1] Liu Yuzhen. Research on Teaching Innovation of Mechanical Design Curriculum Design under the Background of New Engineering Construction [J]. China Science and Technology Journal Database Research, 2022, 23(9): 4.
- [2] Xie Li. Research on the Teaching Path of Industrial Design Innovation and Entrepreneurship Practice in the Context of New Engineering [J]. Contemporary Education Practice and Teaching Research, 2020, 26(08): 171-172.
- [3] Yan Zhenrong. Research and Practice on Ideological and Political Teaching of "C Program Design" Course in the Context of New Engineering [J]. Computer Age, 2020, 6(12): 4.
- [4] Wang Wenle, Jiang Changgen, Gui Xiaolin, Dai Liping. Ideological and Political Reform and Practice of Software Professional Courses Integrating Ideological and Political Elements - Taking "Object Oriented Design and Analysis" as an Example [J]. Industry and Technology Forum, 2022, 21 (1): 110-111.
- [5] Zheng Wenqi. Exploration and Practice of "Curriculum Ideology and Politics" in Science and Engineering Courses: Taking "Software Engineering" as an Example [J]. Education Progress, 2021, 11(5): 8.
- [6] Jiang Guihong. Construction of a Teaching Model for Software Engineering Graduation Design Guided by New Engineering [J]. Science and Technology Information, 2019, 17(3): 2.
- [7] Zhou Jingping, Qin Jun, Zeng Guangping. Research on the Curriculum Design of Software Engineering in the Context of New Engineering [J]. Modern Computer (Professional Edition), 2018, 000 (032): 53-56.
- [8] Sun Liqin, Lin Jian, Jiang Aili, Xing Ronglian. Exploration of the implementation path of ideological and political education in practical teaching courses for science and engineering students in the context of new engineering [J]. Journal of Higher Education, 2021, 7(34): 171-174179.
- [9] Gao Huanchao. Exploration of Ideological and Political Education in the Course of "Fundamentals of Program Design" in the Context of New Engineering [J]. Software, 2021,23(7):16.
- [10] Ma Lin. Design and Practice of Ideological and Political Education in Materials Science Basic Curriculum under the Background of New Engineering [J]. Education Modernization, 2019, 13(95):56.