Research on the Synergistic Construction Strategy of AI Curriculum System and Chief Engineer Educating Culture in the Context of New Engineering

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Abstract: This study examines AI curriculum in engineering education, emphasizing the Chief Engineer Educating Culture. A survey of 50 projects reveals a curriculum split. Shanghai Jiao Tong University dedicates 60% to theory, Zhejiang University's medical image recognition project allocates over 40% to practicals, and Tsinghua University combines 50% theory with 50% practicals. Challenges include a lack of unified standards and insufficient interdisciplinary integration, impacting student development and job market prospects. Insights are provided for optimizing AI curriculum to effectively implement the Chief Engineer Educating Culture, taking into account industry trends and practical applications.
***Keywords*:** new engineering, AI curriculum, theoretical teaching, practical courses, curriculum standards

1. Introduction

Tech progress drives new engineering projects for industry needs. In engineering ed, AI boosts engineers' innovation, technical, and problem-solving skills. [1]Chief engineers are crucial for team - leading and decision - making. In AI projects, they need to consider ethical and social impacts for sustainability. Their educational culture matters in new - era engineering education. [2]

2. Theoretical foundation

2.1 Requirements of new engineering for AI integration

In the"Dual Carbon" era, materials engineering needs high-efficiency energy storage. Nanomaterials boost performance. AI algorithms simulate the nanomaterial-device link, optimizing design. This shows interdisciplinary integration and AI courses are vital for new-era engineers. [3]

2.2 Connotations and key elements of the chief engineer educating culture

Materials engineering chief engineers need a profound understanding of nanomaterials' energy storage impact. In the"Dual Carbon"era, they choose proper nanomaterials, lead teams to create efficient, green energy storage solutions, and set low-carbon strategies. [4]

During new battery R & D, they balance nanomaterials' performance and cost for innovation. When nanomaterial agglomeration occurs, they apply advanced AI-assisted methods. They also factor in environmental impacts in R & D and application to reach sustainable development and the "Dual Carbon" goal. [5]

2.3 The synergy theory between curriculum and culture

The AI course system should integrate with educational culture in design, implementation, and evaluation. It must align with the educational framework and institutional values. This synergy enriches student learning, cultivates key skills, and shapes engineers with both technical and cultural competencies. [6]

3. Analysis of the current situation of AI curriculum and chief engineer educating culture

3.1 Current situation of AI Courses in new engineering

A survey of 50 new engineering projects shows that some top universities, like Shanghai Jiao Tong, Tsinghua, and Harbin Institute of Technology, lean towards theory, while Zhejiang and Shenzhen Universities focus on practice. [7]In terms of practical course allocation, 10% of courses have less than 20% practical teaching, 30% have 20-40%, and 60% have over 40%.

3.2 Implementation of the chief engineer educating culture in engineering education

The implementation of the Chief Engineer Educating Culture varies among universities. Although there are measures such as mentorship programs and engineering project-based competitions, the integration of this culture into daily teaching is limited, and there is a lack of effective evaluation mechanisms. [8]

4. Synergistic construction strategies

4.1 Curriculum Design:Incorporating chief engineer elements into AI courses

AI curriculum should integrate Chief Engineer culture. In AI-project courses, students do teamwork, solve real-world problems, and consider ethics. The weightage formula for evaluating students in such a course could be: FinalScore=α×TechnicalPerformance+β×LeadershipandTeamwork+γ×Problem−Solving+δ×EthicalConsiderations, where α+β+γ+δ=1, and the coefficients α, β, γ, δ can be adjusted according to the course's focus.

4.2 Teaching method innovation:Fostering a cultural-oriented learning environment

By adopting project-based teaching methods, case-study teaching methods, and the flipped classroom model, students can design AI-driven transportation systems in artificial intelligence projects, master AI technologies, cultivate leadership skills, enhance problem-solving abilities, and strengthen moral awareness. [9]

4.3 Evaluation system reform:Comprehensive assessment of students' cultural and technical competencies

Create a multi-D student eval system for tech knowledge, leadership, problem-solving, ethics. Besides tech tests, assess leadership in group projects&problem-solving via case-based analysis.

5. Case analysis of synergistic construction in Shanghai Jiao Tong University

Shanghai Jiao Tong Univ integrates AI and Chief Engineer culture. It inter-disciplinarily optimizes AI courses. In"AI-Enhanced Eng Design", students use AI for design, getting solutions. The mentorship program with senior chief engineers trains students in tech, leadership, and problem-solving via real-world simulations.

These efforts have significant results. Real-world project participation rose from 30% to 65%, high-level problem-solving scores from 25% to 45%, and leadership-role interest from 15% to 35%. [10]

This case sets an example for other unis. The synergy is key for well-rounded engineers. In new engineering, the integrated curriculum helps students master AI, apply it, and develop leadership. Other unis should follow suit for students' future engineering.

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