Exploration of Teaching Mode Innovation and Practice Path of Engineering Drawing Courses of Application-Oriented Universities under Digital Transformation Based on Wuzhou University

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Abstract: Under the background of artificial intelligence (AI) technology reshaping higher education, this paper takes the engineering drawing courses at Wuzhou University as an example to explore the teaching mode innovation and practice path under the digital transformation in application-oriented universities. A systematic teaching reform plan is proposed to address the problems of outdated teaching content, single methods, and weak practical links in traditional teaching. Practical teaching is strengthened by optimizing the course content and introducing modern technologies such as virtual and augmented reality. A phased implementation plan is developed, and off-campus internship bases are established by integrating school-enterprise resources. Teacher training to improve teachers' professional abilities is carried out, and diversified teaching resource bases are built. The reform has significantly improved students' practical abilities, learning interests, and innovation consciousness. It has verified the empowerment effect of digital transformation on the teaching of engineering drawing courses. In the future, it is necessary to deepen technology integration, expand school-enterprise cooperation, and continuously improve the teaching system to cultivate high-quality engineering and technical talent to meet the industry's needs.

1. Introduction

AI technology is reshaping higher education ecology at an unprecedented speed. From classroom teaching to scientific research innovation and management decision-making to teacher-student interaction, AI penetration has broken the single tool attribute and gradually evolved into the core driving force of promoting education paradigm reform. Higher education institutions show a pattern of multi-dimensional exploration and practice at the AI application level, and the development characteristics can be summarized in the following directions.

The adaptive teaching system based on deep learning breaks traditional classrooms' time and space

limitations. Through natural language processing and knowledge graph technology, the intelligent teaching platforms can analyze students' learning trajectory in real time and dynamically adjust teaching content's difficulty and presentation. For example, some platforms have realized the personalized exercise push of "thousands of people and thousands of faces." The systems construct the heat map of personal knowledge weakness according to the data, such as the correct rate of students' answers and their thinking length, and automatically generates a targeted intensive training program. In experimental teaching, the virtual simulation system enables students in medicine, engineering, and other disciplines to complete high-risk or high-cost operation training in an immersive environment with the help of computer vision and physical engine technology. More noteworthy is that generative AI is changing how knowledge is transferred. Some teachers begin to use AI tools to automatically generate teaching cases, design classroom interactive games, and even create virtual teaching assistants to answer common questions [1-3].

AI technology is reshaping every aspect of the education management process. In the enrollment system, machine learning algorithms can perform semantic analysis and feature extraction on massive amounts of application materials and assist in identifying students' potential characteristics and development possibilities. Regarding teaching quality management, some institutions introduce emotional computing technology and construct a dynamic evaluation model of teaching effect by analyzing unstructured data such as micro-expressions, voice, and intonation in classroom videos. It is worth noting that predictive analysis technology plays an important role in students' early academic warning. By integrating multi-dimensional data such as attendance records, homework completion, and library borrowing, the system can predict the risk of academic crisis in advance with high accuracy.

The integration of AI and higher education is at a critical turning point. Technology applications have moved from fragmented pilot to systematic integration, and educational innovation has upgraded from tool to model level. However, the real challenge lies in building a new educational ecology of human-machine collaboration. AI empowerment advantages are fully utilized, and the humanistic core of education is upheld. Efficiency improvement is pursued, and fairness and justice are guaranteed. Technological change is embraced, and systemic risks are prevented. It requires educators, technology developers, and policy makers to establish an in-depth dialogue mechanism to jointly explore the sustainable development path of higher education in the intelligent era [4-6].

2. Practical ability improvement

Improving practical ability is one of the core objectives of the teaching reform of engineering drawing courses. To achieve this goal, teachers must start from many aspects, including setting up practical operation projects, inviting enterprise experts to teach lessons, and establishing a complete practical ability evaluation system.

Setting up practical operation projects and cases related to practical engineering applications is crucial. These projects and cases should be closely combined with engineering practice, which is challenging and practical. Students can experience the whole process and method of engineering drawing by completing practical operation projects and cases, helping them understand and master the relevant knowledge more deeply [7-8].

Inviting enterprise experts to teach lessons or give lectures is important to improve practical ability. Enterprise experts have rich practical experience and industry knowledge, and they can provide valuable practical experience and guidance for students. Through the exchange and learning with enterprise experts, students can better understand the industry's needs and standards and make complete preparations for their future career development.

Establishing a complete practical ability evaluation system is essential. Teachers must formulate

scientific evaluation criteria and methods to comprehensively and objectively evaluate students' practical abilities. Teachers can adjust teaching strategies and methods according to the evaluation results to ensure the pertinence and effectiveness of teaching reform. In this way, teachers can improve students' practical ability more effectively and lay a solid foundation for future career development [9-10].

3. Implementation plan of teaching reform

A careful implementation plan is essential in teaching reform. Teachers should comprehensively review the existing engineering drawing courses and deeply analyze the problems and deficiencies in teaching content, methods, and practical teaching links. This step requires in-depth communication and exchange with course teachers, students, and relevant industry experts to ensure the curriculum reform's needs and direction can be accurately grasped.

After analyzing the problems of the existing courses, teachers must combine the actual situation and teaching resources of Wuzhou University to formulate specific implementation steps and timetables. In this process, the school's teachers, teaching facilities, school-enterprise cooperation, and other factors should be addressed to ensure the feasibility and effectiveness of the reform plan. The risks and challenges in the reform process must be predicted, and corresponding coping strategies must be formulated.

To ensure the smooth progress of the implementation plan, the division of responsibility and task arrangements for each task need to be clarified. In this step, enthusiasm and creativity in all aspects need to be fully mobilized, and a good atmosphere for the whole school to participate in the curriculum reform needs to be formed. A clear responsibility division can ensure that the work is carried out in an orderly manner and that solutions can be found when problems arise.

4. Implementation steps of teaching reform

After formulating a thorough implementation plan, the teaching reform can be gradually promoted according to the plan. The teaching content and materials need to be updated. The original teaching content must be optimized and adjusted according to the industry's latest development and market demands. New teaching materials and resources must be introduced to ensure the timeliness and practicality of the course content.

Modern teaching technology and equipment need to be introduced. More modern teaching technology and equipment are applied to education with the continuous development of science and technology. In engineering drawing courses, teachers can use multimedia technology, virtual reality technology, and other modern teaching methods to improve the teaching effect and students' learning interests. By introducing advanced technologies and equipment, teachers can provide students with a more vivid and graphic learning experience.

Off-campus practice bases need to be actively established to improve students' practical ability. Students can receive more practical opportunities and employment channels by cooperating with enterprises to establish practice bases. In practice, students can deeply understand the enterprise's needs and workflow and better combine theoretical knowledge with practice. Enterprises can provide students with more vocational guidance and skills training to help them better adapt to future career development.

Teacher training needs to be conducted. Teachers are one of the key factors in teaching reform. Relevant teacher training activities must be organized regularly to improve teachers' teaching level and professional quality. Through training, teachers can keep abreast of the latest educational concepts and teaching methods and improve their teaching abilities and innovative consciousness. Industry experts and outstanding teachers can be invited for experience sharing and exchange

activities to provide teachers with more learning opportunities and growth space.

5. Importance and strategy of teacher training

Teacher training is key to improving teaching quality and teachers' professional growth in teaching reform. In the teaching reform of engineering drawing courses, Wuzhou University should fully realize the importance of teacher training and formulate corresponding training strategies. Through systematic training, teachers can update their educational concepts and teaching methods and improve their professional quality and practical abilities, helping them better adapt to the teaching reform needs.

The following strategies can be adopted to implement practical teacher training. Teachers can keep abreast of industry trends and educational concepts by organizing regular school or off-campus lectures and seminars, and inviting industry experts and educators to teach lessons. Teachers are encouraged to participate in various teaching skills competitions and academic exchange activities. Teachers' teaching level and innovation abilities are improved through practical training and peer exchanges. The complete teacher evaluation and incentive mechanism should be established. The teacher training results should be linked to their professional development and teaching performance evaluation to stimulate teachers' enthusiasm and initiative in participating in training.

6. The path and significance of teaching resource construction

The construction of teaching resources is an indispensable part of teaching reform. Rich and varied teaching resources can provide students with more learning choices and practical opportunities, which can improve their learning outcomes and satisfaction. Building high-quality teaching resources is significant for the engineering drawing courses at Wuzhou University

The following aspects can be conducted on the path of teaching resource construction. The advancement and practicality of teaching content can be ensured by actively introducing and updating excellent domestic and international textbooks and teaching materials. Combined with the school's situations and the industry's needs, targeted school-based teaching materials and resources are developed, which can meet students' individual learning needs. Employing modern information technology, such as establishing online course platforms and teaching resource libraries, the sharing and efficient utilization of teaching resources can be realized. Students can have more practical learning opportunities by strengthening cooperation with enterprises and industries and jointly developing practical teaching projects and case libraries.

By strengthening teacher training and resource construction, Wuzhou University can improve teaching quality and the effect of engineering drawing courses. It helps cultivate students' practical abilities and innovative spirit, and promotes the continuous deepening and development of the school's education and teaching reform. High-quality teaching resources and professional teachers will become an important part of the school's core competitiveness, laying a solid foundation for the school's long-term development.

7. Teaching reform's difficulties and countermeasures of engineering drawing courses at Wuzhou University

Implementing the teaching reform of engineering drawing courses at Wuzhou University may involve difficulties and challenges. These difficulties may arise from many aspects, such as teaching content, methods, teacher team, student acceptance, and teaching resources. Formulating corresponding countermeasures for these difficulties is necessary to ensure the smooth progress of teaching reform and achieve the desired results.

The optimization and updating of teaching content may face resistance. Engineering drawing is a developing field, and new technologies and methods emerge in an endless stream. It requires that the teaching content keep pace with the times. However, compiling and updating textbooks requires time and resources, and teachers need to constantly learn and master new knowledge to integrate it into teaching. In this regard, Wuzhou University can strengthen its links with industries and enterprises, keep abreast of the latest technologies and development trends, and encourage teachers to participate in professional training and academic exchanges to enhance their professional quality.

The innovation of teaching methods may face challenges. Traditional teaching methods focus on imparting knowledge and ignore ability cultivation. New teaching methods, such as case teaching and project-driven learning, focus more on students' practical abilities and innovative spirit. These new teaching methods require teachers to have higher teaching skills and organizational abilities, and students to have good learning habits and self-exploration abilities. Therefore, the college can organize teachers to train and discuss teaching methods, and strengthen the cultivation of students ' learning habits and independent inquiry ability. Therefore, Wuzhou University can organize teachers to train and discuss teaching methods and strengthen the cultivation of students' learning habits and independent inquiry abilities.

The strengthening of practical teaching may face some difficulties. Practical teaching requires sufficient experimental equipment, venues, enterprise cooperation, and internship opportunities. Many factors, including funding, time, and management, may limit access to and use of these resources. To solve this problem, Wuzhou University can increase practical teaching investment, improve experimental equipment and site conditions, and actively establish cooperative relations with enterprises, providing students with more practical opportunities.

Implementing teaching reform must overcome the difficulties of the teachers' team and students' acceptance. Teachers may have doubts or conflicts about the new teaching content and methods, and students may be unaccustomed to the new methods because they are accustomed to the traditional teaching methods. Therefore, Wuzhou University needs to strengthen the publicity and interpretation of teaching reform, so that teachers and students can understand the necessity and significance of teaching reform. Wuzhou University should actively listen to teachers' and students' opinions and suggestions and constantly improve the teaching reform program.

Because of the above difficulties, Wuzhou University can take a series of countermeasures to ensure the smooth implementation of teaching reform. For example, the teaching reform leading group is established to be responsible for developing and implementing the teaching reform program. Training and seminar activities are strengthened to improve teachers' teaching level and innovation abilities. Practical teaching bases are built by cooperating with enterprises to provide students with more practical opportunities. The cultivation of students' learning habits and independent inquiry abilities is strengthened. Through the implementation of these countermeasures, the difficulties and challenges in the teaching reform can be effectively overcome, and the teaching reform of engineering drawing courses at Wuzhou University can be promoted smoothly.

8. Conclusions

Taking Wuzhou University as an example, this study deeply discusses the teaching reform of engineering drawing courses in application-oriented universities. It conducts a comprehensive analysis of the current teaching situations. The key factors restricting teaching quality improvement are obsolete teaching content, single teaching methods, and weak practical teaching links. Based on this, targeted teaching reform programs are proposed, including teaching content optimization, teaching method innovation, and strengthening practical teaching.

Implementing teaching reform emphasizes teacher training and the construction of high-quality

teaching resources. It provides a strong guarantee for the reform's smooth progress. Establishing a scientific evaluation mechanism and actively collecting students' feedback uncovers problems and ensures continuous improvement. It ensures the effectiveness of teaching reform.

After a series of reform measures, students' learning interests and enthusiasm have been significantly improved, and their practical abilities and innovative spirit have been effectively developed. These positive changes fully prove the importance and necessity of teaching reform.

Although this study has achieved some results, teaching reform is continuous. In future work, the latest developments in engineering drawing will be considered, and the teaching content will be constantly updated, which ensures the close integration of teaching and industry development.

Teaching method innovation will be further explored, and more modern teaching technologies, such as virtual augmented reality, will be actively introduced. It will provide students with a more colorful learning experience. Cooperation with enterprises will be strengthened to expand the practical teaching platforms so students can receive more practical opportunities and career development resources.

Through continuous teaching reform and innovation, more high-quality engineering and technical talent with solid engineering drawing foundation, innovative spirit, and practical ability can be cultivated. It can make greater contributions to social development and progress.

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