

Curriculum Reform of Higher Vocational Mathematics Under the Background of Digital Transformation

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Abstract: Under the background of digital transformation, the reform of the higher vocational mathematics curriculum faces urgent challenges and opportunities. This article explores the impact of digital transformation on the reform of higher vocational mathematics curriculum and emphasizes the importance of improving teaching methods centered on learners. The article proposes specific reform methods and discusses the practical application of digital technology in the reform process. By combining digital technology with specific reform methods, further conducting innovative practice research, and continuously exploring the path of reform, we can effectively improve the quality of higher vocational mathematics classroom teaching and provide strong support for the cultivation of comprehensive qualities and employment abilities.

Keywords: Digital transformation; Learner-centered; Higher vocational mathematics; Personalized development

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1. Introduction

The 20th National Congress of the Communist Party of China included “digitalization of education” in its report for the first time. Accelerating the implementation of digital education plays a strategic and crucial role in improving the quality of the people and enhancing talent innovation. With the advancement of digitalization in education, the digital transformation of higher vocational mathematics curriculum reform is inevitable. However, the current exploration of the digital transformation of education is still in its infancy and faces many challenges in top-level design, implementation paths, and other aspects^[1]. Against this background, the teaching paradigm of higher vocational mathematics courses has gradually shifted from being centered on teachers’ “teaching” to being centered on students’ “learning.” Therefore, integrating the “learner-centered” teaching method into digital teaching is an inevitable choice to promote the improvement of the connotation of higher vocational mathematics courses. It not only meets the basic requirements of “two degrees and one level” in vocational education but also promotes the personalized development of learners^[2]. This article aims to explore the importance of learner-centered teaching methods in the reform of higher vocational mathematics courses

and propose specific reform methods combined with digital technology to promote the improvement of the quality of classroom teaching in higher vocational mathematics.

2. Impact of digital transformation on the reform of higher vocational mathematics curriculum

2.1. Trends and development of digital transformation

With the rapid development of technology and continuous innovation in intelligent technology, digital transformation has become a hot topic in various industries. The core of digital transformation is to reconstruct and upgrade traditional businesses by utilizing information technology, thereby improving efficiency and creating more value. In the field of education, the trend of digital transformation has also become increasingly evident. Digitalization of teaching integrates digital technology into all aspects and links of teaching, innovating various teaching elements and their interrelationships^[3].

As an important component of vocational education, higher vocational education also needs to actively respond to the development trend of digital transformation. Establishing an adaptable, open, integrated, and continuously developing vocational education ecosystem to cultivate high-quality technical talents who meet the development needs of the digital era has become an important task for current vocational education.

2.2. Impact and challenges of digital transformation on higher vocational education

Digital transformation has brought many opportunities and challenges to higher vocational education. Students can obtain abundant learning resources and educational content through digital technology, which enhances their learning abilities and employment competitiveness.

However, digital transformation also faces a series of challenges, such as varying acceptance levels of digital education among teachers and students, insufficient digital teaching skills and experience, and more. Therefore, it is necessary to improve teachers' digital teaching skills, including continuously fostering awareness of using digital technology and exploring sustainable development^[4]. Teachers also need to possess the ability to develop multiple courses, including the development of digital courses and the compilation of textbooks^[5].

Furthermore, digital education faces issues related to security and privacy. Promoting digital transformation requires continuously strengthening network security management and building a modern network security protection system^[6].

3. Current situation of higher vocational mathematics classroom teaching

The traditional teaching paradigm usually centers on the teacher, who passes on mathematical knowledge through lectures and problem-solving demonstrations. However, this teaching model has certain limitations. In the traditional teaching model, teachers often use explanation and demonstration excessively, leading to less student participation and practical opportunities, making it difficult to cultivate students' hands-on abilities and problem-solving skills.

Additionally, modern students have high demands for learning time and space, preferring to learn according to their own schedules and progress, which traditional fixed class hours and curricula often cannot satisfy^[7].

4. Practice of curriculum reform in higher vocational mathematics under the background of digital transformation

4.1. Innovation in course design and teaching mode based on online learning platforms

With the development of internet technology, online learning platforms can be adopted as important tools in the reform of mathematics courses in vocational colleges to promote innovation in course design and teaching mode. The use of online learning platforms allows teachers and students to learn and communicate anytime and anywhere, breaking the limitations of time and space, and providing richer learning resources and support. Through online learning platforms, we have the opportunity to change teaching methods and course content, promote innovative teaching models such as blended and flipped classrooms, and build learner-centered personalized teaching models, thereby enhancing students' participation in learning and improving their sense of achievement and satisfaction^[8].

In the digital transformation of education, teachers can innovate teaching paradigms, broaden students' learning scope, and provide personalized learning methods based on online learning platforms. Online learning platforms offer diverse learning resources such as online courses, textbooks, and learning tools, providing students with rich and diverse learning content and methods. At the same time, new technologies such as artificial intelligence teaching assistants and knowledge graphs can be used to support teaching applications and realize personalized teaching and learning path recommendations. By collecting and analyzing students' learning data, teachers can better understand students' learning situations and needs, provide targeted guidance and support, and improve teaching effectiveness. The use of online learning platforms can also support the management and decision-making processes of vocational education administrative departments, providing scientific reference through the analysis and comprehensive evaluation of learning data.

4.2. Practice of higher vocational mathematics curriculum reform integrating practice and theory

The practice of higher vocational mathematics curriculum reform also needs to enhance the level of co-construction and sharing between schools and enterprises. Through cooperation with enterprises, it can provide rich content support for the transformation of vocational education. School-enterprise cooperation can combine the actual work of enterprises to design and develop digital educational resources and platforms suitable for vocational education, enhancing students' practical application and professional skills.

The application of digital technologies is also an important direction of mathematics curriculum reform. The introduction of digital technologies such as three-dimensional models, virtual reality, mixed reality, and augmented reality can successfully construct learning scenarios that integrate virtual and reality^[9]. These technologies can provide more intuitive, rich, and practical learning experiences, encouraging students to actively participate in practice and enhancing their practical operation and application skills.

4.3. Practice of curriculum reform introducing intelligent evaluation and feedback mechanisms

Under the background of digital transformation, data-enabled educational evaluation reform has also become a trend. By formulating optimized combinations of data evaluation methods, closely integrating evaluation with the learning process, and creating new methods, a more scientific educational evaluation system can be formed. This will effectively improve the accuracy and fairness of evaluation, providing students with better development opportunities.

Evaluation also brings automation to scoring and analysis. With the use of advanced technology, the evaluation process becomes more efficient, saving time and resources. Automated scoring and analysis improve

the efficiency of evaluation, reduce the burden on teachers, and allow teachers to focus more on teaching.

5. Challenges and coping strategies in the reform of higher vocational mathematics curriculum in digital transformation

5.1. Technical support and teacher team construction

When cultivating the digital literacy of teachers in vocational colleges, it is necessary to empower them with technology, including cultivating their digital craftsmanship abilities, conducting multimodal teaching, managing and evaluating classroom digitization, and applying and developing digital resources ^[10]. Teachers need to possess digital craftsmanship abilities, be able to proficiently use various digital tools and software, and design and develop digital resources suitable for teaching. Multimodal teaching requires teachers to flexibly use different teaching media and tools to meet the diverse learning needs of students. Classroom digital management and evaluation can help teachers better track students' learning progress and provide personalized evaluation and feedback. Digital resource application and development encourage teachers to use digital resources to provide rich and diverse learning resources and promote students' learning interests and initiative.

By providing necessary training and support and focusing on the cultivation of digital literacy of teachers in vocational colleges, the digital technological capabilities of teachers can be improved, and the digital transformation of teachers' teaching abilities can be emphasized ^[11].

5.2. Learners' adaptability and adjustment of learning habits

The digital transformation of education aims to meet the growing educational needs of students, teachers, and schools, creating an interconnected learning environment that enables collaborative, interactive, and personalized learning experiences, bridging the digital divide ^[12]. This requires us to focus on the value and capabilities of human beings, rather than merely focusing on technological disruption. In the process of technology-enabled learning, we should fully utilize digital technologies to provide students with broader learning paths and enable them to gain rich learning experiences. For example, students can learn anytime and anywhere according to their needs, and interact with other learners in real-time to explore and share learning experiences.

To adapt to digital transformation, learners also need to possess the ability to acquire and process information. With the advent of the era of information explosion, students need to learn to discern the authenticity of information and quickly obtain the knowledge they need from massive amounts of information. In the process of cultivating digital literacy, students can improve their information acquisition and processing abilities by taking information literacy courses and participating in practical activities such as information mining.

5.3. Innovation in evaluation and certification mechanisms

Traditional evaluation and certification methods may not be able to adapt to the complexity and difficulty of digital teaching. To better measure students' learning outcomes and abilities, we need to explore innovative evaluation and certification mechanisms.

One innovative evaluation mechanism is the application of intelligent evaluation tools. By using these tools, educators can effectively collect and analyze students' learning data, including classroom performance, homework completion, and online learning progress. Another innovative evaluation mechanism involves the application of artificial intelligence (AI). AI can analyze students' behavioral data and learning patterns to provide personalized evaluation and guidance based on their characteristics and needs. For example, through

techniques such as machine learning and natural language processing, AI can assist in evaluating students' application skills, logical thinking, and other aspects, and provide corresponding suggestions and improvement measures.

Digital evaluation also features immediacy, timeliness, and promptness^[13]. Traditional evaluation methods often require a considerable amount of time, and students may have to wait for a long time to receive their evaluation results. However, digital evaluation can achieve instant evaluation and feedback through online platforms, allowing students to quickly understand their learning status and adjust their learning strategies accordingly.

6. Conclusion

In the digital transformation-driven reform of higher vocational mathematics courses, learner-centered teaching methods have become crucial. The traditional teacher-centered approach no longer meets the needs of students' individualized development. The application of digital technologies provides specific reform methods for higher vocational mathematics courses. By actively exploring reform paths and conducting innovative practical research, we can effectively improve the teaching quality of higher vocational mathematics courses and meet the needs of students' individualized development. In the initial stage of the current educational digital transformation, educators need to work together to address challenges such as top-level design and implementation paths, and promote the digital transformation of higher vocational mathematics courses to meet the requirements of talent cultivation in the digital era.

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