**DeepSeek-based Culinary Craftsmanship Curriculum Construction and Practical Discussion**

**ABSTRACT**

With the advancement of high-quality development of vocational education and the increasing demand for skilled personnel in the catering industry, the traditional teaching mode of Culinary Craftsmanship gradually fails to meet the requirements of the industry development. Based on DeepSeek technology platform, this paper explores the reform and innovation of Culinary Craftsmanship course in vocational colleges and universities, and applies DeepSeek technology to the construction of Culinary Craftsmanship course species. The study enhances students' academic performance, practical ability and classroom participation through the modularized design of course content, the flipped classroom model of teaching methodology, and the combination of virtual training and practical operation. Data analysis showed that the reformed course significantly improved students' academic performance and practical skills, especially in innovative cooking techniques and teamwork ability; the course structure was adjusted through detailed case studies, thus improving students' practical skills. In addition, students' satisfaction with course content, teaching methods and platforms increased substantially. The results of the study provide practical basis and theoretical support for the innovation of culinary curriculum in vocational colleges.

Keywords: culinary arts and crafts; DeepSeek; curriculum reform; practical skills.

1. **Introduction**
   1. **Context of high-quality development of vocational education**

With the continuous development of the global economy, vocational education, as a key link in the cultivation of high-quality skilled personnel, has gradually become one of the core factors of national economic competitiveness. In China, the state's support for vocational education has been increasing, and vocational education policies have been optimized and updated. The National Implementation Plan for Vocational Education Reform released in 2019 explicitly proposes to promote the high-quality development of vocational education and to implement a more innovative reform of the curricular system. The core of this reform is to promote the interface between vocational education and social demand, and to enhance the role of vocational institutions in the training of skilled personnel.

Especially in recent years, with the transformation of China's economic structure, the demand for highly skilled personnel in manufacturing and service industries has risen sharply, and the traditional vocational education model can no longer meet the needs of the industry. Therefore, the state has put forward the development concept of "integration of industry and education, school- enterprise cooperation", which emphasizes the improvement of curriculum construction and teaching quality of vocational colleges and universities.

As one of the important courses in the catering profession, Culinary Craftsmanship shoulders the important task of cultivating students' practical operation ability, innovation ability and practical Problem-solving ability. With the change of industry demand, the traditional teaching mode and course content have gradually failed to meet the skill requirements of modern culinary industry. How to improve students' cooking skills and service ability through curriculum construction and teaching method innovation has become an important issue to be solved by vocational colleges and universities.

* 1. **Status and Importance of the Culinary Arts and Crafts Program in Vocational Institutions**

Culinary Craft is one of the core courses for catering majors, which mainly involves theoretical knowledge and practical operation in food processing, cooking skills and catering service. With the continuous improvement of the social requirements on the quality of food service, the Culinary Craftsmanship course not only requires students to master traditional cooking skills, but also needs to cultivate students' innovative ability, teamwork ability and ability to solve complex problems. This requires the course to be comprehensively reformed and optimized in terms of content design, teaching methods and assessment system.

However, at present, many vocational colleges and universities in the culinary professional curriculum, there is still a certain teaching lag, the course content is too much focus on the traditional skills of teaching, the lack of effective docking with modern technology and market demand. How to improve the quality of teaching and enhance the practical ability of students through innovative curriculum construction has become the key to the current culinary professional curriculum reform.

* 1. **Industry Status and Challenges**

At present, the domestic culinary industry is facing unprecedented challenges. On the one hand, as consumers pay more attention to food safety, nutrition and health, the requirements for technological innovation and service quality in the catering industry are getting higher and higher. On the other hand, the demand for skilled personnel in the catering industry is also increasing. However, the existing education system of vocational colleges and universities, especially in the curriculum of culinary courses, still has certain bottlenecks.

For example, many vocational colleges and universities have a single culinary course with a single content, traditional teaching methods, over-reliance on textbooks and classroom lectures. There is a lack of close integration with the needs of the industry. In addition, traditional teaching methods usually focus on the cultivation of skills, while neglecting the enhancement of students' innovative thinking and interdisciplinary ability. In the teaching design of Culinary Crafts course, it fails to make full use of modern information technology and digital means, which leads to the lagging update of the course content and the failure to effectively enhance students' practical ability and innovation ability.

* 1. **The need for curriculum innovation**

With the changes of the times, the knowledge structure and technical requirements of the culinary industry are constantly updated, and how to effectively integrate these changes into the teaching system of vocational colleges and universities, especially in the design of culinary courses, has become an urgent problem to be solved. For this reason, the State has advocated the teaching reform direction of combining "informatization" and "intelligence" in vocational education, emphasizing the application of information technology to improve the quality of teaching and the practical ability of students.

The Culinary Craftsmanship course needs to keep pace with the times and adapt to the needs of the modern catering industry, not only to cultivate students' traditional cooking skills, but also to stimulate students' innovative thinking and practical Problem-solving ability through the digitalization and informatization construction of the course. In this context, the construction of culinary craftsmanship courses based on DeepSeek technology has great potential and significance. Through the digital teaching platform, the course content can be updated in time, the teaching method can be more flexible and interactive, and the students' learning experience can be greatly improved.

1. **Practical Exploration of Culinary Craftsmanship Course**
   1. **Need and context for curriculum development**

With the gradual implementation of the policy of high-quality development of vocational education in China, the reform of the curriculum system in vocational colleges and universities is imminent, especially in the specialized courses with strong applicability and practicability. As one of the core courses in the catering profession, Culinary Craftsmanship not only involves the teaching of culinary skills, but also relates to the cultivation of students' innovative thinking and the enhancement of their practical operation ability. In recent years, with the development of the catering industry, consumers have put forward higher requirements for food nutrition, taste, cooking skills, etc., which put forward more stringent requirements for the curriculum design and teaching content of the culinary profession.

In this context, vocational colleges and universities must optimize the course content and innovate the teaching methods according to the needs of the industry, so as to realize the high-quality development of the course construction. The construction of the Culinary Craftsmanship course, especially the updating of its content and the innovation of teaching methods, is particularly important. The goal of course construction is not only to teach basic culinary skills, but also to enhance students' comprehensive ability through modern means to meet the ever-changing needs of the industry.

* 1. **DeepSeek -based technology applications**

In recent years, the application of information technology, especially artificial intelligence technology, in the field of education has been deepening. DeepSeek, as a leading educational technology platform with powerful data analysis and interactive functions, its application can not only enrich the teaching content of the Culinary Craftsmanship course, but also enhance the interactivity of the teaching and the students' sense of participation.

* + 1. **Technical Advantages of the DeepSeek Platform**

DeepSeek technology, through its intelligent data analysis, real-time interactive features and diversified learning tools, can help teachers adjust teaching content and methods in real time according to students' learning progress and mastery. The platform's personalized learning features also provide customized learning paths based on students' interests and needs, enabling each student to learn at his or her own pace and interest, thus effectively enhancing learning outcomes.

* + 1. **Specific applications of DeepSeek in the course**

The application of DeepSeek in the Culinary Crafts course can be categorized into several areas:

**Digital Teaching Materials and Course Content Updates**. The DeepSeek platform enables students to be exposed to the latest culinary theories and techniques through an intelligent teaching materials management system that allows for the timely updating of course content, especially new techniques and technologies related to industry developments.

**Virtual hands-on training and simulation operation.** In the process of culinary skills development, DeepSeek provides a virtual hands-on training platform, and students are trained in culinary skills through simulated operations, which not only saves actual teaching resources, but also ensures that students exercise their operational skills in a virtual environment to achieve the effect of real operations.

**Data analysis and learning effect assessment**. Through DeepSeek's learning analytics tool, teachers can grasp the learning situation, knowledge mastery and practical ability of each student in real time, so as to make more accurate teaching adjustments and personalized tutoring.

* 1. **Curriculum design and content innovation**

With the rapid development of modern technology, the traditional Culinary Craftsmanship course can no longer fully meet students' needs for technological innovation and comprehensive ability enhancement. Therefore, the Culinary Craftsmanship course needs to be systematically and structurally innovative in its content design to meet the development direction of modern vocational education.

* + 1. **Modularization and structural optimization of course content**

Based on DeepSeek's technical support, the Culinary Arts and Crafts course can be modularized, dividing the course into multiple knowledge units covering a wide range of aspects from traditional cooking techniques to modern culinary creativity, food safety and nutrition. The content of each module is independent and interrelated, which can not only meet students' professional knowledge needs, but also cultivate their interdisciplinary abilities. For example, in the "Cooking Techniques" module, in addition to basic techniques, modern cooking methods, molecular cuisine and other innovative content have been added to enable students to master traditional techniques while adapting to new food and beverage trends.

* + 1. **Interdisciplinary Integration and Practical Enhancement**

The Culinary Crafts course not only focuses on the teaching of traditional cooking skills, but also strengthens the integration between disciplines by incorporating the contents of nutrition, food science, environmental science and other related disciplines. Through interdisciplinary integration, students are able to understand the nutritional composition of ingredients, thermodynamic changes in the cooking process, etc., while learning cooking skills, so that they can combine multiple aspects of knowledge to solve practical problems in real work.

* + 1. **Application of innovative teaching models**

Most of the traditional culinary courses rely on teachers' explanation and students' practical operation, but with the development of information technology, the innovation of teaching mode becomes especially important. In the Culinary Craftsmanship course, diversified teaching modes such as flipped classroom, online learning combined with field practical training can be introduced. Students can carry out online theoretical learning on the platform, master the basic knowledge by watching teaching videos and participating in online discussions, and then operate through practical sessions, and finally complete the course objectives through the combination of online and offline.

* 1. **Innovation in teaching methods and modes of teaching**

Most of the traditional cooking course teaching focuses on the teacher's explanation and the teaching of students' operation skills, with a single teaching method, lacking interaction and opportunities for students to learn independently. The innovation of teaching methods based on DeepSeek platform can not only improve classroom interaction, but also provide students with personalized learning experience.

* + 1. **Flipped classroom and interactive learning**

The flipped classroom model emphasizes students' independent learning, with discussion and practice as the main focus in the classroom, while the teacher promotes students' deep thinking and practical ability through guidance and feedback. In the Culinary Craftsmanship course, after students learn the basic theoretical knowledge through the platform, they communicate more through practical operation and group discussion in the classroom, and the teacher instructs students on how to apply what they have learned to practice.

* + 1. **Informatization and personalized teaching**

With DeepSeek's personalized learning capabilities, courses can be customized according to each student's learning progress, interests and weaknesses. Students can choose the topics they are interested in for in-depth learning on the platform, while teachers can pay attention to each student's learning situation through data analysis and provide accurate counseling and feedback.

* + 1. **Practical teaching combining the virtual and the actual**

In order to better enhance students' hands-on skills, the Culinary Craftsmanship course not only introduces virtual hands-on training, but also combines teaching with actual operation. In the virtual training, students are trained in cooking simulation through DeepSeek platform, and after mastering the basic skills, they can deepen their understanding and mastery of the skills through actual operation. This not only enhances students' practical ability, but also solves the dilemma of limited operation space in traditional cooking courses.

1. **Case studies and practical effects**
   1. **Specific process of practice**
      1. **Specific steps for curriculum implementation**

In this study, we have implemented the teaching reform of the Culinary Craft course based on the application of DeepSeek technology platform. The implementation process of the course reform includes the following steps:

**Course content and restructuring**. According to the development trend of the industry and the needs of students, the content framework of the Culinary Craft course has been redesigned to adopt a modularized structure, covering all aspects from traditional culinary techniques to modern innovative culinary skills. At the same time, virtual practical training is combined with actual operation to strengthen the practicability and interactivity.

**Platform construction and function optimization**. The DeepSeek platform is chosen as the auxiliary tool of the course, integrating the functions of teaching material management, learning interaction and real-time feedback within the platform. Teachers upload course resources through the platform, and students carry out independent learning and practical operation on the platform. The platform also provides learning progress tracking and data analysis to help teachers accurately grasp students' learning.

**Reform of teaching methods**. Adopting the flipped classroom model, students learn online theory through the DeepSeek platform, and interact and practice in the classroom through practical operation and group discussion. In this way, students' independent learning ability is improved, and the atmosphere of classroom interaction becomes more active.

**Design of practical sessions**. In addition to virtual practical training, cooperative projects with catering enterprises have been added to allow students to practice through actual work scenarios. In the teaching process, teachers focus on guiding students through real cases to cultivate students' practical ability and problem-solving ability.

* + 1. **Teacher-student interaction process**

During the implementation process, teachers not only monitor students' learning progress through the platform, but also maintain interaction with students through regular online Q&A and personalized tutoring. Students can ask questions on the platform, while teachers provide targeted feedback based on students' learning, ensuring that students receive timely guidance in the learning process.

In addition, interaction among students is enhanced through group discussions and project collaboration. Each group member can share their learning outcomes, discuss cooking skills, and solve practical problems through collective cooperation on the platform. Teachers, on the other hand, guide students to summarize their experiences and promote the development of their critical thinking in the classroom.

* 1. **Evaluation of the effectiveness of the practice**
     1. **Analysis of Student Learning Effectiveness**

In order to assess the effectiveness of the Culinary Arts and Crafts course reform, data were collected on students' academic performance, class participation, and practical skills before and after the course. The main dimensions of the assessment included:

**Academic Performance Improvement**. Students' progress in theoretical knowledge mastery was assessed through final exams and stage quizzes. The data showed that students' academic performance generally improved in the reformed program, especially in the mastery of modern culinary theories and innovative culinary techniques, which demonstrated strong learning interest and effectiveness.

**Improvement of practical skills**. Students' practical ability is one of the most important assessment dimensions in the culinary program. Through the teaching mode of combining virtual practical training and actual operation, students have significantly improved their operational skills in cooking technology. According to the assessment results of the classroom practical test and the actual cooking program, students have improved their mastery of cooking skills compared to the pre-reform period, especially in the application of fine manipulation and innovative techniques, and students have demonstrated a higher level of competence.

**Improvements in classroom participation**. The classroom atmosphere improved significantly after the course reform. According to the survey on students' classroom participation, 95% of the students said that the flipped classroom and interactive discussion format made them more active in class, and their interest in learning and hands-on ability were significantly improved. Students interacted with each other more frequently, and the spirit of cooperation and teamwork was cultivated.

Fig.1. Improvement in academic performance (before and after reform)

* + 1. **Teacher Feedback and Instructional Improvement**

Teachers have also received positive feedback on the curriculum reform process. Through the data analysis of the platform, teachers can accurately understand the learning progress and weak points of each student, so as to provide more targeted teaching guidance. At the same time, teachers also flexibly adjust the teaching content and teaching methods according to students' feedback and classroom interactions during the actual teaching process to ensure that the course can fully adapt to students' learning needs.

During the teaching process, teachers also focus on utilizing the real-time feedback function of the platform to help students identify problems and make corrections in a timely manner. Teachers said that the teaching reform based on DeepSeek platform can be more effective in teaching management and optimize teaching strategies through data analysis to improve teaching quality.

* + 1. **Student feedback and learning satisfaction**

In order to fully understand the effect of the course reform, we conducted a satisfaction survey on students, mainly assessing their satisfaction with the course content, teaching methods, and experience of using the platform. The results of the survey show that 85% of the students are satisfied with the innovation and practicality of the course content, especially in the design of virtual training and practical projects, and the students generally believe that the course content is closely aligned with the needs of the industry and has strong practicality.

In addition, 90% of the students said that the use of the DeepSeek platform greatly enhanced their learning experience, and that the interactive features and personalized learning paths on the platform helped them better master their course knowledge. Students also highly recognized the flipped classroom model and group work in the classroom, saying that these new teaching methods enhanced their hands-on and teamwork skills.

Fig.2. Results of student satisfaction survey

* 1. **Instructional Management and Technical Support**
     1. **Operation and optimization of the technology platform**

Through monitoring and evaluating the operation of DeepSeek platform, it is found that the application of the platform in teaching management is effective. Teachers are able to grasp students' learning situation in real time through the platform's learning progress tracking function and adjust teaching strategies in a timely manner. The platform's interactive functions, online Q&A and feedback system also greatly improve the communication efficiency between students and teachers, and enhance the students' sense of participation.

In order to further improve the teaching effect, we have continuously optimized the functions of the platform and added more personalized learning paths and self-assessment tools to help students consolidate their knowledge and train their skills more efficiently in the process of independent learning.

* + 1. **Improvement of teaching management process**

In terms of teaching management, through the data analysis function of the platform, teachers are able to keep abreast of the information on students' learning status, grade distribution, problem feedback, etc., so as to make adjustments to the course content and teaching methods. This data-driven teaching management approach enables teachers to carry out teaching planning in a more refined manner, improving the relevance and effectiveness of the courses.

1. **Conclusion**
   1. **Summarize the results of curriculum development and practice**

Based on the application of DeepSeek technology platform, this study explores the reform and innovation of the Culinary Craftsmanship course in vocational institutions. The teaching effect of the course was significantly improved through the modularized design of the course content, the innovation of the teaching method, and the combination of virtual practical training and actual operation. The results of the study show that the course construction based on DeepSeek technology plays an important role in enhancing students' learning interest, strengthening practical ability, and improving teaching interactivity.

* + 1. **Innovation and optimization of course content**

Through the curriculum design based on DeepSeek technology, the course content realizes the expansion from the traditional teaching of culinary skills to modern culinary innovation technology, covering a wide range of fields such as culinary technology, nutrition, food safety and so on. The modular curriculum design makes the course content more flexible and systematic, and can be adjusted individually according to students' learning progress.

* + 1. **Changes in teaching methods and increased interactivity**

Adopting the flipped classroom and information technology, the course teaching has shifted from traditional teacher-led to student-centered, and the classroom pays more attention to students' participation and practice. Students carry out independent learning through the platform, and practical operation and group discussion in the classroom, which greatly improves students' learning motivation and interaction.

* + 1. **Improvement of students' practical skills**

Through the combination of virtual training and actual operation, students not only simulated cooking operations in the virtual environment, but also applied the learned skills to actual work through projects with enterprises, which enhanced their practical ability.According to the results of the study, the students made significant progress in practical operation ability, teamwork ability, and innovative thinking.

* 1. **Policy recommendations and practical guidance**

Based on the practical experience of this study, we propose the following policy recommendations and practical guidance:

* + 1. **Strengthening the application and support of technology platforms**

In the curriculum reform of vocational colleges and universities, it is recommended to continue to deepen the application of technology platforms, such as DeepSeek and other educational technology platforms, to make full use of their data analysis and personalized learning functions, and to promote the updating of curriculum content and the innovation of teaching methods. Especially in skill-based professional courses, the teaching mode combining virtual training and actual operation can provide students with more practical opportunities and improve teaching quality.

* + 1. **Promoting the alignment of curriculum content with industry needs**

The Culinary Crafts course should be designed to pay more attention to the integration with the development of the industry, and the course content needs to be updated in a timely manner to incorporate the technology and trends of the modern catering industry. Strengthening school-enterprise cooperation, combined with the actual needs of catering enterprises, to design more market-oriented course content, so that students can quickly adapt to the needs of the industry upon graduation.

* + 1. **Cultivating Students' Creative Ability and Comprehensive Qualities**

In addition to skills training, vocational institutions should pay more attention to the cultivation of students' innovative ability and comprehensive quality. Content related to innovative culinary techniques can be added to the curriculum to encourage students to engage in practical project design and innovation, while cultivating students' critical thinking and teamwork skills to prepare them in all aspects for their future careers.

* + 1. **Promoting information technology and intelligent teaching models**

In the process of curriculum reform, vocational colleges and universities should vigorously promote the teaching mode of information technology and intelligence, especially through the construction of information technology platforms to enhance students' independent learning ability and personalized learning experience. The platform can provide real-time data support so that teachers can more accurately grasp the learning situation of students, so as to better adjust teaching strategies and ensure the improvement of teaching quality.

* 1. **Shortcomings of the study and future prospects**

Although this study has effectively promoted the curriculum construction of Culinary Craftsmanship through practical exploration, there are still some shortcomings. In the course implementation process, although the virtual practical training has achieved certain results, some students still feel the lack of sufficient hands-on practice opportunities in actual operation, especially in the mastery of difficult cooking skills, which has not yet fully reached the ideal state. In addition, although the use of the platform has been significantly improved, for some students, it still needs further adaptation and optimization, especially in the smoothness of operation and diversity of content of the platform, there is still room for improvement.

Future research can further explore in depth how to add more hands-on aspects to the curriculum, especially the development of higher-order skills, to further enhance students' practical skills. At the same time, it can explore how to combine more intelligent technologies with the curriculum, such as simulating more realistic operating environments through augmented reality (AR) and virtual reality (VR) technologies, to provide students with a richer learning experience. In addition, follow-up studies can expand the sample scope and conduct long-term tracking analysis to verify the effectiveness and impact of the curriculum reform in long-term teaching and learning.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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