

International Education Forum

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International Education Forum

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Applications and Prospects of Virtual Reality-Based Artificial Intelligence Technology in Medical Laboratory Education

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Abstract: As a branch of computer science, artificial intelligence (AI) has been widely applied across various medical fields. Medical laboratory education faces challenges such as resource scarcity, and AI technology has brought innovative transformations to this domain, promoting the democratization of educational resources, standardization of teaching practices, and precision of personalized learning. However, challenges remain, including the “black box” problem of AI algorithms, ethical risks, teachers’ adaptation to technological integration, and the cultivation of students’ critical thinking. In the future, AI is expected to be deeply integrated into medical laboratory education, ushering in a new era of “human-machine symbiosis.” Achieving this vision, however, requires multi-dimensional collaborative efforts. This paper explores the innovative applications of AI in medical laboratory education and envisions future development directions to advance the field.

Keywords: Artificial intelligence; Medical laboratory; Smart education; Talent cultivation

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1. Introduction

Artificial intelligence (AI), based on computer science, encompasses various types such as symbolic reasoning, machine learning, deep learning, natural language processing, and visual robotics, and finds applications in multiple domains. The application of AI in the medical field primarily includes intelligent assistant diagnosis, treatment, and health management. In terms of intelligent assistant diagnosis, AI technology can enhance doctors’ diagnostic accuracy and efficiency by analyzing medical images, pathological slices, and other information^[1-2]. Deep learning techniques exhibit high accuracy in assisting the diagnosis of diseases like gliomas

and renal cell carcinomas^[3]. For intelligent treatment, AI can provide personalized therapeutic regimens for patients based on their genomic profiles and disease conditions^[4]. Additionally, AI plays a significant role in drug discovery, vaccine design, and other areas. In health management, AI is utilized for predicting disease risks, offering health advice, managing chronic diseases, and more, thereby improving people's health and quality of life.

Medical laboratory science, as a crucial means of medical diagnosis, serves as a key bridge connecting basic medicine and clinical diagnosis and treatment. Its teaching content spans multiple dimensions, including experimental operations, instrument usage, data analysis, and clinical diagnosis. However, traditional education often faces challenges such as scarce resources, inadequate teaching standardization, and the absence of personalized learning. To this end, the utilization of AI-based technologies provides an innovative pathway to address these challenges, pushing medical laboratory science education toward intelligent and precise transformation. This article aims to explore the innovative applications of AI technology in medical laboratory science teaching and discuss its future development directions.

2. Core applications of AI in medical laboratory science teaching

2.1. Teaching aids

Utilizing AI-driven visualization tools, complex concepts can be represented through graphics and animations, providing intuitive visual explanations that make abstract medical information more accessible and understandable. These tools also offer corresponding exercises and feedback. For instance, in clinical hematology laboratory courses, AI constructs a knowledge graph of blood cell generation and development, enabling students to clearly grasp the knowledge structure and internal connections, understand the relationships between different cells and diseases, and recognize various blood cell images to train their cell morphology identification skills. This teaching method not only helps students understand the application of AI in medical laboratory science but also allows them to grasp the working principles of AI in blood cell classification and morphology recognition^[5]. Furthermore, by analyzing students' learning data and performance, AI can identify their weaknesses and strengths, tailoring exclusive learning paths. For example, students who are weak in anemia-related knowledge may receive targeted learning content and practice questions on anemia classification and diagnostic key points, making it easier for them to understand and master the knowledge.

2.2. Virtual simulation experiment platform

Practice is an essential component of medical laboratory science teaching. Combining AI with virtual reality technology provides medical students with a safe, controlled, and highly simulated clinical operation environment that closely replicates real-world experimental settings, including instruments, equipment, experimental benches, and materials. Through AI virtual technology, students can perform experimental operations in a virtual environment, such as blood smear preparation and cell morphology observation. The system provides real-time feedback on operational accuracy, such as prompts on the appropriate angle and speed during smear preparation, instant feedback scores, and suggestions. This enhances their practical skills and manipulation techniques. AI-driven virtual laboratories (e.g., Labster, Beijing Oubeier platform) can simulate the entire process of medical tests like blood analysis and microorganism cultivation. Coupled with a real-time error correction and operation scoring system, they assist students in comprehending and memorizing

knowledge points and mastering standardized operational norms. This instant feedback significantly contributes to the rapid improvement of students' experimental skills and analytical abilities ^[6].

2.3. Case analysis and clinical decision training

In medical laboratory science teaching, students need to integrate knowledge from various disciplines, such as clinical laboratory microbiology, molecular biology, biochemistry, and more. They are required to combine laboratory test results with clinical practice, providing clinicians with recommendations and accurate diagnoses. However, students majoring in medical laboratory science often lack opportunities to enter clinical settings and connect with clinical practice, making the integration of laboratory and clinical practice a significant challenge and focal point in teaching.

AI technology provides possibilities to complement and improve this issue. A virtual case library based on generative AI (such as GPT-4, ERNIE Bot-4.0) can integrate a large amount of clinical laboratory case data, covering various disease types and symptom manifestations. This provides students with a rich and diverse array of real cases, which are helpful for training in the interpretation of test results and auxiliary diagnosis ^[7]. AI can analyze clinical test results, such as blood routine and biochemical indicators, identify abnormal values, and suggest possible disease tendencies. This aids students in understanding the correlation between test results and diseases. For example, machine learning algorithms can be used to establish risk assessment models for cardiovascular diseases, providing students with analytical insights and a reference basis ^[8]. AI can also automatically generate diversified clinical scenarios (such as infectious diseases, abnormal tumor markers, etc.). Students need to combine virtual patient test data (such as blood routine, PCR results) to propose auxiliary diagnoses. Real-time feedback on their analysis helps to point out errors and deficiencies, allowing students to make timely corrections. Additionally, after course learning, students can input key search terms such as disease names or test indicators to quickly retrieve and match relevant cases from the database for analysis and training on specific cases. AI can comprehensively evaluate learners' case analysis and decision-making abilities from multiple dimensions, assisting students in integrating their knowledge and enhancing their clinical decision-making skills.

2.4. Interactive learning

AI interactive teaching tools like MedPaLM can engage in real-time interaction with students through voice, text, and image modalities, providing personalized learning support and answering student questions instantly ^[9]. Furthermore, AI can tailor personalized learning plans for students based on their knowledge mastery and learning abilities, targeting weaknesses with specific reinforcement training. Compared to traditional learning methods, AI technology integrates, categorizes, and manages learning resources, thereby improving learning efficiency.

3. Teaching advantages of AI technology

3.1. Resource universalization

Through virtual simulation and cloud resource integration, AI significantly reduces teaching dependence on physical equipment and biological specimens. Labster and BioDigital can transform costly equipment like flow cytometers and mass spectrometers into infinitely reusable three-dimensional interactive models. Students can complete the entire training process, including specimen handling, instrument operation, data analysis, result interpretation, and diagnosis, through terminal devices. Additionally, AI-driven digital specimen libraries (such

as the Visible Body pathology slide database) address the issue of specimen depletion in traditional teaching. Students can observe rare cases from multiple angles, increasing resource reuse rates by over 80%^[10]. This “cloud resource pool + smart terminal” model provides universal access to educational resources for institutions in developing countries and remote areas.

3.2. Teaching standardization

AI algorithms unify operational evaluation criteria, reducing human bias. AI technology enables quantitative analysis and pattern recognition, constructing a standardized teaching framework. In microbiology laboratory teaching, the YOLO algorithm can analyze the trajectory density and angular deviation of inoculation loop streaking operations in real-time. It performs pixel-level comparisons with WHO standard operation videos, generating quantitative indicator reports. During the examination report review process, natural language processing models automatically detect logical contradictions and terminology errors, ensuring output compliance with industry standards. Compared to traditional teaching, AI’s standardized training can standardize student operational procedures, reduce error rates, and enhance the accuracy of clinical diagnostic decisions.

3.3. Precise learning

Through multi-dimensional learning data analysis, AI constructs a dynamic portrait of students’ abilities, enabling the precise implementation of teaching strategies. AI utilizes reinforcement learning algorithms to tailor learning paths for each student: pushing virtual simulation training for students with high operational error rates and strengthening case analysis for those weak in clinical reasoning. In more cutting-edge applications, emotional computing technology can capture signals of student anxiety, allowing AI mentors to dynamically adjust the pace of teaching^[11]. Ultimately, by collecting and analyzing students’ learning data, AI integrates various indicators to make more targeted teaching decisions.

4. Challenges and limitations

4.1. Technical challenges

AI algorithms rely on massive and high-quality data for training. In the field of medical laboratory science, data comes from a wide range of sources and is complex, including diverse data from different detection equipment and patient populations. The quality of these data varies, with issues such as missing data and incorrect labeling, limiting the accuracy and reliability of trained AI models. For example, in blood cell morphology analysis, if the blood cell images in the training data are mislabeled, the AI may give incorrect guidance to students during teaching, affecting their judgment. Additionally, teachers and students need to understand the principles behind AI decisions to better interpret test results. However, the current “black box” characteristic of AI models makes it difficult to present the basis for judgments visually, hindering effective knowledge transfer^[12].

4.2. Ethical and privacy risks

Clinical teaching involves a large amount of sensitive clinical data, which requires anonymization and compliance when used for teaching purposes. Clinical data contains a wealth of sensitive information about patients, from basic personal identification information to detailed disease diagnosis and treatment records. If privacy leaks occur during the use of these data for teaching, it can infringe on patients’ rights and may lead

to a series of legal disputes. Although various data anonymization techniques exist, such as de-identification and encryption, there are still many technical and legal challenges to ensure their complete effectiveness and compliance in clinical data applications. Therefore, how to ensure the security and usability of anonymized data while meeting teaching needs remains an urgent problem to be solved^[13].

4.3. Educational issues

AI technology is gradually integrating into the field of clinical education, bringing many changes to teaching and clinical practice. However, its over-reliance may cause new problems. The traditional teaching model is deeply ingrained, and teachers are accustomed to lecture-style teaching, with a low acceptance of AI integration into teaching. Some teachers lack AI-related knowledge and skills, making it difficult to effectively integrate AI tools with teaching content, resulting in poor teaching effects. Students may overly trust algorithms and neglect the cultivation of critical thinking. For example, in microbiological testing experiments, students may abandon traditional microscope observation and biochemical identification methods, relying solely on AI detection results. In the long run, students' basic testing skills and clinical thinking will not be fully exercised, making it difficult to adapt to future clinical laboratory work. Therefore, maintaining humanistic care and thinking training in AI-assisted teaching is a key direction that needs to be focused on in the future.

5. Future prospects

5.1. Deep integration into diagnostic work

In the future, AI technology is expected to achieve deeper integration with medical laboratory teaching, tightly embedding itself into clinical work and building a closed-loop ecology of "teaching-practice-feedback." On one hand, it is crucial to focus on developing seamless integration between AI-assisted diagnostic tools and teaching systems. Taking the fields of pathological image recognition and genetic data analysis as examples, advanced AI algorithms can precisely analyze pathological section images, quickly identify diseased cell characteristics, and efficiently process massive genetic data, providing a key basis for disease diagnosis. When these AI-assisted diagnostic tools are perfectly integrated with teaching systems, they can simulate a very realistic clinical diagnostic environment. Students can access case data and diagnostic processes similar to those encountered in actual clinical work, from image or data acquisition and analysis to the final diagnostic conclusion, comprehensively exercising clinical decision-making skills and greatly improving the effectiveness of teaching and students' practical abilities.

5.2. Innovative applications of generative AI

Generative AI has huge innovative potential in the field of medical laboratory teaching. Using diffusion models to generate high-fidelity virtual inspection scenes will greatly enhance students' immersion during learning. These virtual scenes can highly restore the real medical laboratory environment, including the appearance and operation of various inspection instruments, as well as the inspection process and reactions of different disease samples. Students can operate as if they were in a real laboratory, not only avoiding the risk of sample waste and instrument damage that may be caused by operational errors but also allowing them to practice repeatedly in a virtual environment and accumulate rich practical experience.

In addition, building AI virtual patients that support natural language interaction and dynamic disease evolution will further enrich teaching content and formats. AI virtual patients can simulate various real patient

symptoms, medical histories, and test results. Students can communicate with virtual patients in natural language to obtain disease information and make diagnoses. As communication deepens, the virtual patient's condition will dynamically evolve based on set rules and student decisions, just like a real patient's condition changes during treatment. This allows students to comprehensively exercise their clinical communication skills, diagnostic abilities, and ability to respond to changes in patient conditions in a safe and controlled environment, fully preparing them for future clinical work ^[14].

5.3. Reconstruction of the educational ecology

In the future, medical laboratory education will form a new ecology of “platform sharing + standardized certification.” Firstly, it is important to establish a global AI resource sharing platform for medical laboratory teaching. Through this platform, medical education institutions around the world can share high-quality AI teaching resources, including virtual experiment scenes, case databases, teaching courseware, etc. Teachers and students from different regions can interact and share teaching experiences and learning insights on the platform, achieving cross-institutional collaboration. This not only promotes the balanced distribution of educational resources, allowing more students to benefit from advanced AI teaching technology, but also accelerates knowledge innovation and dissemination in the field of medical laboratory teaching. Secondly, it is necessary to establish certification standards and ethical norms for AI teaching tools. Developing certification standards can rigorously evaluate the functionality, performance, accuracy, and other aspects of AI teaching tools, ensuring teaching effectiveness. Simultaneously, clear ethical norms can regulate the development, use, and data processing of AI teaching tools, protecting the rights, interests, and privacy of students and patients, preventing technology misuse, and providing solid support for the healthy development of AI technology in medical laboratory teaching.

6. Conclusion

The “13th Five-Year Plan” for National Education Development points out that “Internet + Education” has become the direction of future education reform and development ^[15]. Artificial intelligence technology, with its unique advantages, has brought unprecedented changes to medical laboratory teaching, upgrading it from the traditional “knowledge transmission” model to a “capability cultivation” model.

Through the organic combination of AI data-driven and intelligent interaction, a new, efficient, safe, and scalable medical laboratory education ecology is being built. However, there is still a long way to go to achieve deep integration between artificial intelligence and medical education. In the future, collaborative efforts will be needed in multiple key dimensions. Innovation in teaching models is also a crucial aspect of promoting the integration of AI and medical education. Teachers need to actively explore how to organically combine AI technology with traditional teaching methods. Schools and educational institutions should increase investment in AI teaching ability training for teachers, encourage teachers to conduct AI-based teaching research, and form a series of mature and effective AI-integrated teaching models to meet the development needs of medical laboratory teaching in the new era.

Looking ahead, medical laboratory education will move towards a new stage of “human-machine symbiosis”, where the role of teachers will transition from knowledge transmitters to learning experience designers, and AI systems will become “smart mirrors” providing precise feedback. This transformation is not

only about improving teaching efficiency but is also an important driver of globalization in medical education. Through cloud resource pools and low-code teaching tools, medical students in remote areas can gain access to training resources equivalent to those of top medical schools. When technological optimization, ethical governance, and educational innovation resonate, AI will truly become the core engine for reshaping the medical talent cultivation paradigm.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Wiljer D, Hakim Z, 2019, Developing an Artificial Intelligence-Enabled Health Care Practice: Rewiring Health Care Professions for Better Care. *Journal of Medical Imaging and Radiation Sciences*, 50(4 Suppl 2): 8–14.
- [2] Liu SC, Hu HY, Zhu NN, et al., 2023, Application Analysis of Artificial Intelligence-assisted Image Reading (AI) in Cervical Cytology. *Journal of Clinical Oncology*, 28(6): 541–544.
- [3] Unger M, Kather JN, 2024, Deep Learning in Cancer Genomics and Histopathology. *Genome Medicine*, 16(1): 44.
- [4] Bhat M, Rabindranath M, Chara BS, 2023, Artificial Intelligence, Machine Learning, and Deep Learning in Liver Transplantation. *Journal of Hepatology*, 78(6): 1216–1233.
- [5] Xue ZR, Xu T, Yao CY, 2023, Current Situation and Improvement Measures of Artificial Intelligence Teaching in Medical Laboratory Science. *International Journal of Laboratory Medicine*, 44(7): 890–893.
- [6] Tripepi M, 2022, Microbiology Laboratory Simulations: From a Last-Minute Resource during the Covid-19 Pandemic to a Valuable Learning Tool to Retain — A Semester Microbiology Laboratory Curriculum That Uses Labster as Prelaboratory Activity. *Journal of Microbiology & Biology Education*, 23(1): e00269–21.
- [7] Lu XQ, Jia W, Wu YX, et al., 2024, Evaluation of the Application Potential and Challenges of Large Language Models in the Field of Laboratory Medicine. *Journal of Clinical Laboratory Science*, 42(8): 619–623.
- [8] Zhu H, Qiao S, Zhao D, et al., 2024, Machine Learning Model for Cardiovascular Disease Prediction in Patients with Chronic Kidney Disease. *Frontiers in Endocrinology*, 2024(15): 1390729.
- [9] Singhal K, Azizi S, Tu T, et al., 2023, Large Language Models Encode Clinical Knowledge. *Nature*, 620(7972): 172–180.
- [10] Chen J, Xie JY, Li P, et al., 2023, Exploration of Practical Teaching Reform of “Kinematics” based on the Visible Body Virtual Dissection Platform. *Industrial and Technological Forums*, 22(3): 226–228.
- [11] Xiong L, 2024, Hidden Concerns, Optimization, and Future Trends of Emotional Computing Education Applications in the Era of Intelligent Technology. *Open Education Research*, 30(6): 66–71.
- [12] Quinn TP, Jacobs S, Senadeera M, et al., 2022, The Three Ghosts of Medical AI: Can the Black-box Present Deliver? *Artificial Intelligence in Medicine*, 2022(124): 102158.
- [13] Zhang JX, Li CF, Lv WF, 2024, Application Prospects and Challenges of Artificial Intelligence in Medical Education, Scientific Research, and Clinical Practice. *Chinese Journal of General Practice*, 22(7): 1085–1089.
- [14] Huang MF, Hou QH, Zhang W, 2025, Current Status and Future Trends of Generative Artificial Intelligence Applications in Medical Education. *Medicine and Society*, 38(1): 29–34 + 47.
- [15] Zhou J, 2018, Promoting Sustainable Development of Vocational Education with Quality as the Core —

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Research on the Development of Teachers' Teaching Ability under the Background of the New Era

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Abstract: This article focuses on the development of teachers' teaching abilities in the context of the new era. Public health emergencies have promoted the deep integration of "Internet plus education", brought new challenges to teachers' teaching, and triggered discussions on the improvement of teachers' teaching ability. Through literature review, this paper combs the research on teachers' teaching ability and the relevant achievements of teachers' teaching ability cultivation under the background of "Internet plus", and finds that the existing research provides a theoretical basis for the development of teachers' teaching ability, but still needs to further explore optimization strategies. The new era has put forward new requirements for teachers' teaching, including the modernization of educational concepts, comprehensive information literacy, and lean teaching levels. To enhance the teaching ability of teachers, strategies such as prioritizing the transformation of teacher roles, scientifically cultivating and comprehensively improving teacher quality, creating an environment to optimize technical support, relying on technology to build a network teaching and research system, and incentivizing and regulating the construction of a scientific evaluation mechanism should be adopted, aiming to help teachers adapt to the development needs of education in the new era and improve teaching quality.

Keywords: New era; Teacher's teaching ability; Internet plus education; Improvement of teaching ability

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1. Introduction

In recent years, sudden public health emergencies have had a huge impact on the education sector, with the pandemic being the most typical. At that time, to prevent the spread of the epidemic to schools, the State Council issued a notice to delay the start of the spring semester for primary, secondary, and tertiary schools in various regions. At the same time, the Ministry of Education has proposed the measure of "suspending classes

without stopping teaching, suspending classes without stopping learning”, which has brought significant development opportunities for online education. The deep integration of the Internet plus education has led to the reform of the education system. In this context, teachers, as key teaching roles, face the practical challenges of technology application. The construction of their new teaching literacy and the improvement of technology application and teaching ability have become important research topics.

2. Literature review

2.1. A review of research on teachers’ teaching abilities

The teaching ability of teachers is the most core and important ability in their professional development, which directly affects the quality of their teaching and the learning outcomes of their students. Through a relevant literature search, it can be summarized that current research on the current status of teachers’ teaching abilities mainly focuses on the following three aspects.

Firstly, research on the connotation of teachers’ teaching ability. For example, Wang Lei et al. constructed a teaching ability system based on teacher teaching tasks and practical work needs, including a first level, second level, and third level indicator system, and established a teaching ability level grading model ^[1]. Wang Guangming and others believe that the core competencies of teachers include educational and teaching abilities, learning and innovation abilities, and communication and cooperation abilities. These three abilities constitute the direction, motivation, and guarantee of teachers’ professional development. Based on the directness of influencing the teaching process, Wang Pei et al. proposed that teachers’ educational and teaching abilities consist of two main parts: core ability groups and exogenous ability groups ^[2-3].

Secondly, research on the current situation and problems of teachers’ teaching ability. Based on the 2019 China College Teaching and Learning Survey (CCTL) data, Zhang Jinghua analyzed the main problems in the undergraduate teaching ability of current university teachers: many teachers lack background teaching knowledge and insufficient understanding of students’ knowledge base; Failure to prepare lessons seriously and insufficient concern for students’ learning difficulties; Lack of emphasis on setting teaching objectives, receiving feedback from students, and assigning and providing feedback on course assignments ^[4]. Han Jizhen et al. conducted a questionnaire survey on 35 newly hired teachers and 100 students, describing the current situation of their teaching abilities from four aspects: teaching design ability, teaching implementation ability, teaching evaluation and reflection ability, and teaching research ability. They analyzed the reasons for the lack of teaching abilities among newly hired teachers ^[5].

Thirdly, research on the influencing factors of teachers’ teaching ability. This can be roughly divided into two directions: (1) focusing on the influencing factors of teachers’ teaching ability itself. Li Chao divided the teaching abilities of university teachers into basic teaching abilities and developmental teaching abilities, and believed that teachers themselves and school teaching conditions were important factors affecting the teaching abilities of university teachers ^[6]. Wei Xueyan et al. investigated the influencing factors and improvement measures of the teaching ability of young teachers in research-oriented universities and found that factors such as teaching research, teaching preparation, and teaching aspirations all have an impact on teaching ability ^[7]. (2) Focusing on the research of factors influencing a certain teaching ability. Li Wen et al. conducted a survey and research on the information technology teaching abilities of backbone teachers in primary and secondary schools in a region with weak information technology construction. The results showed that self-efficacy,

skill foundation, school system, training and training, and application atmosphere all had an impact on their abilities^[8]. Jia Jiyou et al. found through research that age, teaching experience, and whether they undertake the development and management of school electronic teaching resources are the three main factors affecting the information literacy of surveyed teachers^[9].

Fourthly, research on the development and cultivation of teachers' teaching abilities. Based on empirical research, Tang Yewei and others have proposed development strategies for precise training of information technology teaching abilities for primary and secondary school teachers based on the concept of human centered services^[10]. Chen Baohua believes that the development of teaching abilities for teachers in private undergraduate universities in the context of industry education integration should focus on cultivating teachers' practical abilities, applied research abilities, and practical teaching skills^[11]. Zhao Huichen et al. proposed research suggestions for improving the teaching ability of maker teachers from the perspectives of demand analysis, structural models, improvement strategies, and evaluation methods in response to the current situation and causes of maker teacher teaching ability^[12].

Overall, the teaching ability of teachers, as an extremely important component of their professional competence, has always received attention from the academic community. The previous basic theoretical research has further deepened people's understanding of the connotation and nature of teaching ability, and the subsequent exploration of influencing factors is conducive to promoting the development of teaching ability and improving the cultivation mechanism.

2.2. A summary of the cultivation of teachers' teaching ability in the context of "Internet plus"

The arrival of the "Internet plus" era has expedited a series of educational reforms, and the information-based teaching ability will also become the most important professional quality and core competitiveness of contemporary teachers. Through relevant literature search, it can be concluded that the current research on teachers' teaching ability in the context of "Internet plus" mainly focuses on the following three aspects:

Firstly, research on the integration of teachers' information technology teaching abilities. For example, Zhang Zhe et al. evaluated the information technology teaching ability of pre-service teachers in a certain university based on the TPACK theoretical model and found that the teachers' ability to integrate information technology teaching was relatively low^[13]. Huang Chunguo believes that using blended learning models can effectively improve teachers' information technology teaching abilities and promote their professional development^[14]. Wu et al. conducted empirical research on the information technology and curriculum integration ability of pre-service teachers in Shanghai's municipal universities, providing the relevant basis for improving the quality of pre-service teacher training and adjusting training programs^[15].

Secondly, research on the current situation and problems of teachers' information technology teaching ability. Based on the research conducted by Li Tianlong and others on the current situation of information technology teaching among young teachers in universities in Xi'an, the problems in the development of information technology teaching ability among young teachers in universities have been proposed, including the lack of policy support and guarantee mechanisms at the national level, biased performance evaluation systems and incentive measures in universities, widespread problems in the construction of information technology teaching resources and environment in universities, and insufficient development beliefs and internal motivation of young teachers^[16].

Thirdly, research on the influencing factors of teachers' information technology teaching ability. Zhao Chengling et al. constructed a model of personal influencing factors of vocational college teachers in information-based teaching, with vocational college teachers as the research object ^[17]. After investigation, Zhu Yan proposed that the main influencing factors on the development of information technology teaching ability of primary and secondary school teachers include government factors, school factors, teacher factors, and student factors ^[18]. Yang Ning et al. concluded through interviews with 149 exemplary interns from a normal university that five influencing factors, including teacher role models, disciplinary cultural constraints, adaptation to school culture, participation in teaching practice, and transfer of course learning, collectively contribute to the development of students' information technology teaching abilities ^[19].

Fourthly, research on teacher information technology education and training, as well as teacher professional development training. Zhang Lin et al. used three teacher education colleges in the Netherlands as a case study to investigate the model and effectiveness of integrating disciplines to cultivate teacher education students' information technology teaching abilities in the Netherlands ^[20]. Jiang Lin et al. proposed an analytical framework for the transfer of information technology teaching ability training for university teachers ^[21]. Wang Ru used the training of regional teachers' information technology teaching ability as an example to explore strategies for improving the effectiveness of teacher training and enhancing teachers' educational and teaching abilities ^[22].

Overall, educational reform in the context of the information age has had an impact on traditional teaching and has put forward higher requirements for teachers' teaching abilities. How to leverage existing advantages, eliminate the impact of unfavorable factors on teachers' teaching abilities, and propose improvement suggestions and optimization strategies remains a focus of attention in today's academic community.

3. New requirements for teachers teaching in the context of the new era

Under the impact of sudden public health emergencies, the normal teaching order of schools has been disrupted, and online teaching has become an important form of teaching. According to relevant research, teachers face many difficulties in conducting online teaching, such as limitations in network environment and hardware equipment and uneven online teaching abilities. Nowadays, in the context of normalized education, it is of great practical significance to consider the new requirements for teachers' teaching abilities in the new era.

3.1. Modernization of educational philosophy

In the context of the new era, teachers should possess advanced teaching concepts, eliminate old ideas, and embrace new changes. In the teaching process, modern teaching methods should be used as much as possible, information acquisition channels should be strengthened, new teaching aids should be added, and careful consideration should be given to how to combine new concepts with teaching practice to maximize technological advantages.

3.2. Comprehensive information literacy

The trend of online education has once again raised the requirements for teachers' information literacy. Teachers should have the ability to use basic equipment (such as computers), collect and process information, and identify and screen information. Strengthen teachers' information awareness, cultivate their information ethics,

enrich their information knowledge, and enhance their information abilities.

3.3. Lean teaching level

While improving teachers' information literacy, educators must not turn the cart before the horse and ignore the most basic teaching skills. In the context of the new era, teaching is no longer simply following the textbook but using technological equipment to improve the teaching level. Handle the relationship between teaching content, multimedia teaching environment, and students well, improve teaching level, and enhance teaching efficiency.

4. Strategies for enhancing teachers' teaching abilities in the new era

4.1. Putting ideas first, realizing the transformation of teachers' roles

The arrival of the new era not only breaks the original educational ecology but also challenges the traditional role of teachers. Teachers are no longer pure "knowledge transmitters", and "guides" are the path of teacher role transformation that conforms to the background of the times. Ideas influence practice, and role positioning influences role performance. Teachers should adjust their own state in a timely manner and actively accept emerging educational concepts. To make teachers fully aware of the important impact of technology on education and teaching, if they do not seize this historical opportunity, they will be eliminated by the times. At the same time, teachers should also experience the convenience that technology brings to education and teaching, fundamentally solving some teachers' fear and resistance to technology and facing challenges with a more positive attitude. Enable teachers to truly discover the application value of new educational technologies, actively master new technologies and knowledge, consciously and voluntarily apply educational technologies, and truly achieve role transformation.

4.2. Scientific cultivation and comprehensive improvement of teacher quality

Firstly, different colleges and universities should comprehensively consider and adopt group discussions based on their own teaching and teacher situations and scientifically and reasonably formulate teacher competency development plans while ensuring rationality. Secondly, attention should be paid to the individual differences of teachers, and a modular training system should be formed according to the needs of different levels. Teachers who encounter difficulties in use should receive on-demand training, emphasizing the combination of training and application to ensure the effectiveness of training, to ensure that teachers with different differences can better adapt to the new environment of technology education.

4.3. Create an environment and optimize technical conditions to support

To provide a suitable environment for teachers to enhance their abilities. On the one hand, starting from the physical environment, the architecture is conducive to creating a good environment for preschool teachers to improve work efficiency and quality. It selects and introduces more intelligent equipment systems and provides educational software resources that match them. On the other hand, creating a harmonious and harmonious communication atmosphere and emphasizing the cultivation of collaborative efforts among the teacher team. Regularly conducting teaching and research exchange activities, fully exchanging experiences and insights based on teaching practice, and promoting collaboration, sharing, dialogue, and reflection among team members can enhance the learning of relevant technologies and teaching experience through exchange. Practical and feasible improvement plans can be proposed for problems that arise, and collective wisdom can be leveraged.

4.4. Relying on technology to build a network teaching and research system

With the popularization of mobile Internet technology and intelligent terminal equipment, new research resources such as online open courses, micro courses, and live classes are emerging. During the epidemic, online learning has become the main form of curriculum teaching in schools of all levels and types. Although the current rapid situation of the epidemic has eased and normal teaching activities have gradually resumed, technology can still maximize its educational value. Frontline teachers can promptly record difficult problems and reflections in teaching through multimedia methods such as video and audio and upload them to the online space for guidance or sharing and communication. At the same time, educators should make good use of online learning space resources, organize frontline teachers to actively build and apply personal online learning spaces, and establish a diversified improvement system for online and offline integrated online teaching capabilities.

4.5. Encourage regulation and establish a scientific evaluation mechanism

Gilbert Sachs proposed that assessment can identify an individual's strengths and weaknesses to improve their behavior, among other things. Individuals can be arranged into the most suitable plan to increase their likelihood of success. Individuals can also be assigned tasks of different levels or categories^[23]. Therefore, the construction of a scientific and reasonable teacher ability evaluation mechanism, especially the evaluation mechanism for information-based teaching ability, is particularly important. The education department can learn from similar qualification certification examination processes, widely solicit opinions from well-known experts, scholars, frontline teachers, etc., develop a scientific evaluation system, and establish a reasonable evaluation mechanism. In addition, the application of information technology teaching ability can be moderately associated with awards and evaluations, motivating teachers to actively learn new teaching aids and truly apply them to teaching activities.

Disclosure statement

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References

- [1] Wang L, Wei YL, Hu JH, et al., 2018, Research on the Composition and Level Hierarchy Model of Teacher Teaching Ability System. *Teacher Education Research*, 30(6): 16–24.
- [2] Wang GM, Zhang YJ, Wu LB, 2018, The Connotation, Constituent Elements, and Cultivation of Teachers' Core Competencies. *Education Science*, 34 (4): 47–54.
- [3] Wang P, Guan WJ, Wang Y, 2010, The Connotation and Structure of Educational and Teaching Abilities of Primary and Secondary School Teachers. *Curriculum, Textbooks, and Teaching Methods*, 30(6): 92–96.
- [4] Zhang JH, 2020, Research on the Problems and Countermeasures of Undergraduate Teaching Ability of College Teachers. *China Higher Education Research*, 2020(5): 9–16.
- [5] Han JZ, Peng DM, Du WL, 2016, Research on the Current Situation and Countermeasures of Teaching Ability of Newly Employed Teachers in Ordinary High Schools. *Teaching and Management*, 2016(18): 69–71.
- [6] Li C, 2017, Research on the Composition and Influencing Factors of Teaching Ability of College Teachers. *Heilongjiang Higher Education Research*, 2017(1): 103–105.
- [7] Wei XY, Ji ZC, Zhou P, et al., 2011, Empirical Study on the Factors Influencing and Improvement Measures of Teaching Ability of Young College Teachers. *Modern Education Management*, 2011(7): 75–78.

- [8] Li W, Du J, Wang YN, 2018, Analysis of Factors Affecting the Information Technology Application Ability of Backbone Teachers in Primary and Secondary Schools in Areas with Weak Information Construction. *China Electronic Education*, 2018(3): 115–122.
- [9] Jia JY, Wang Q, Chen WC, 2008, Quantitative Analysis of the Impact of Teacher Information Literacy: A Case Study of the Information Literacy Survey of Information Technology Teachers in Primary and Secondary Schools in Beijing. *Research on Electronic Education*, 2008(8): 37–42.
- [10] Tang YW, Fan JR, Pang JW, et al., 2019, Research on Precise Training Strategies for Informationized Teaching Ability of Regional Primary and Secondary School Teachers under the Humanistic Service Concept. *China Electronic Education*, 2019(11): 113–119.
- [11] Chen BH, 2019, Research on the Development of Teaching Ability of Private Undergraduate College Teachers from the Perspective of Industry Education Integration. *Education Academic Monthly*, 2019(8): 97–102.
- [12] Zhao HC, Ma JW, Jiang C, et al., 2019, Reflection and Suggestions on the Improvement of Teaching Ability of Maker Teachers. *Modern Educational Technology*, 29(5): 119–125.
- [13] Zhang Z, Chen XH, Wang YN, 2017, Research on the Evaluation of Teacher's Informationized Teaching Ability Based on TPACK Model. *Modern Distance Education*, 2017(6): 66–73.
- [14] Huang CG, 2010, Research on Enhancing Teachers' Information Technology Teaching Ability through Blended Learning Mode. *Modern Educational Technology*, 20(7): 62–65.
- [15] Li TL, Ma Li, 2013, Research on the Development Status and Countermeasures of Informationized Teaching Ability of Young University Teachers: A Case Study of Universities in Xi'an. *Modern Educational Technology*, 23(6): 34–37.
- [16] Wu D, Hu YL, Gu XQ, 2016, Empirical Study on the Integration Ability of Information Technology and Curriculum for New College Teachers: Based on the Pre-service Training Program for Teachers in Shanghai Municipal Universities. *Modern Distance Education Research*, 2016(3): 77–83 + 103.
- [17] Zhao CL, Zhou L, Liang YZ, et al., 2017, Research on Personal Influencing Factors of Vocational College Teachers in Information Technology Teaching. *Modern Distance Education*, 2017(1): 57–62.
- [18] Zhu Y, 2016, Research on Strategies for Enhancing the Informationized Teaching Ability of Primary and Secondary School Teachers. *Education Review*, 2016(1): 116–119.
- [19] Yang N, Bao ZW, Dong YQ, 2014, Analysis of the Influencing Factors Model on the Development of Information Technology Teaching Ability of Normal University Students: Based on in-depth Interviews with Fourth Grade Normal University Interns. *Research on Electronic Education*, 35(5): 103–107.
- [20] Zhang L, 2019, York Vogt Cultivation of Information Technology Teaching Ability for Teacher Education Students Integrated into Disciplines: Experience from the Netherlands. *Education Development Research*, 39(4): 44–53.
- [21] Jiang L, Han XB, 2018, Analysis Framework for the Transfer of Information Technology Teaching Ability Training for College Teachers. *China Electronic Education*, 2018(4): 17–25.
- [22] Wang R, 2018, Research on Regional Teacher Training Strategies Based on Positive Feedback of Cloud Services. *Research on Electronic Education*, 39(12): 123–128.
- [23] Yang XZ, Zhang YJ, 2020, Analysis of Online Teaching and Training for Primary and Secondary School Teachers under Epidemic Prevention and Control. *Modern Educational Technology*, 30(3): 5–11.

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Exploration of the Path for Integrating the “Spirit of Craftsmanship” into Ideological and Political Teaching in Colleges and Universities

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Abstract: Drawing on the theoretical significance and practical importance of the craftsman spirit, this research investigates its incorporation into ideological and political education within higher education institutions. By identifying the components of the craftsman spirit embedded in the knowledge framework and embedding them into classroom instruction and hands-on activities, the aim is to enhance the professional competence and value systems of college students. The study emphasizes that educators should focus on steering students toward developing a constructive worldview and set of values while nurturing their investigative mindset and innovative awareness in specialized domains. Additionally, in alignment with the evolving trends of educational informatization in the modern era, instructors are encouraged to probe into reform pathways for ideological and political teaching, fostering a deep integration of the craftsman spirit with technological advancements to support students' holistic growth and the elevation of educational standards. Through an examination of the essence and attributes of the craftsman spirit, this paper substantiates the viability of integrating it into ideological and political teaching, proposing concrete strategies to serve as both a theoretical basis and practical roadmap for the transformation of ideological and political education in universities.

Keywords: Craftsman spirit; Colleges and universities; Ideological and political teaching; Feasibility analysis; Path exploration

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1. Introduction

As China's economy and society continue to develop rapidly and the industrial structure undergoes transformation and upgrading, cultivating high-quality applied talents has emerged as a crucial direction for higher education reform. One of the key characteristics of higher education is the concept of “all-round quality education”, which focuses on nurturing students' overall abilities and qualities through a variety of educational

activities^[1]. In this context, incorporating the cultivation of the craftsman spirit into the ideological and political education system of colleges and universities not only aligns with the demands of modern talent development but also represents a significant avenue for deepening higher education reform. Currently, the academic community has reached a general consensus regarding the essence of the craftsman spirit and its educational significance. Studies indicate that core components of the craftsman spirit, such as dedication, precision, focus, and innovation, are highly consistent with the ideological and political education objectives in higher education institutions. However, existing research predominantly centers on theoretical exploration, lacking systematic investigations into practical implementation pathways. In particular, effectively integrating the craftsman spirit with ideological and political education within the framework of curriculum-based ideology remains an urgent issue requiring further attention and resolution.

2. Elaboration on the connotation of the craftsman spirit

In a conventional sense, the spirit of craftsmanship pertains to the process where artisans utilize their skills to create value and wealth. The items crafted by these artisans are not only aesthetically pleasing and functional but also more cost-effective and widely accepted^[2-3]. In contemporary times, the concept of craftsmanship has expanded to encompass the professional dedication of individuals striving for excellence in their respective fields. This modern interpretation centers on achieving excellence, fostering continuous innovation, and demonstrating the courage to overcome challenges, symbolizing the essence of “pursuing perfection”^[4]. From this perspective, the genuine significance of the craftsman spirit involves effectively inheriting prior knowledge, refining it by retaining valuable aspects while discarding unnecessary elements, and leveraging traditional techniques and insights to drive reform and innovation. This is also a crucial component that universities and educators should incorporate into their ideological and political education systems. On a national scale, this spirit can strengthen China’s overall national power and contribute to the nation’s prosperity. From a societal standpoint, it can ensure social stability and harmony while encouraging environmental progress. At an individual level, embracing this spirit can enhance professional competence and boost personal competitiveness^[5].

3. The feasibility analysis of “craftsman spirit” into ideological and political teaching in colleges and universities

3.1. The feasibility of the integration of professionalism and ideological and political education in colleges and universities

According to recent research on the job market, the employment landscape is encountering significant challenges, with a notable prevalence of burnout in workplaces. The phrase “complaining about the very field one works in” highlights a deficiency in professional identity^[6]. Data indicates that there is considerable mobility and cross-sector employment among college graduates, which can hinder their long-term career growth. Consequently, from an educational intervention standpoint, it is essential to implement systematic career planning education, vocational skill training, and professional ethics instruction during the early stages of schooling. This approach aims to strengthen students’ social responsibility and professionalism, fostering the career ethos of “dedication and commitment to one’s work”^[7]. On a societal level, this educational framework can enhance employees’ professional competence, supply talent for enterprise development

and industrial transformation, and ultimately drive economic progress through positive feedback loops. In summary, integrating professionalism with ideological and political education in higher education institutions demonstrates substantial feasibility. By intertwining theoretical teaching with practical activities, the efficacy and reach of education can be significantly amplified.

3.2. The feasibility of the integration of innovation spirit and ideological and political education in colleges and universities

As the innovation-driven development strategy continues to deepen, the nation's demand for innovative talent is growing. However, surveys indicate that traditional educational concepts impose constraints that result in some students lacking innovation awareness and capability. Additionally, there is a disconnect between training objectives and the actual educational process. Consequently, incorporating the innovative aspects of the craftsman spirit into ideological and political education can address this contradiction. This approach can nurture more individuals who possess an innovative mindset and practical skills, thereby offering robust support for societal advancement. Specifically, by exploring the innovative essence of the craftsman spirit and embedding it within the ideological and political education practices at colleges and universities, it not only facilitates the profound integration of ideological and political education with the craftsman spirit but also provides a tangible pathway for educational reform and innovation. This model of integration holds significant theoretical value and practical implications, warranting further investigation and implementation.

4. Explore the path of integrating “craftsman spirit” into ideological and political teaching in colleges and universities

4.1. Carry out practical activities to cultivate students' ability

The concept of the craftsman spirit, as a central theme in ideological and political courses, exhibits significant practical characteristics. Educators can develop a variety of hands-on activities while integrating societal resources such as businesses and communities to establish a cooperative educational model that connects the campus with society^[8-9]. Specifically, students are encouraged to collaborate in groups to conduct surveys, subsequently utilizing collected data and materials to create presentations, including PPT displays and video interviews, thereby fostering a deeper understanding of the craftsman spirit and its ideological-political implications while enhancing their overall competence. For instance, in investigating professional ethics among medical students, universities and enterprises jointly supply necessary human and material resources, offering students a platform to explore and practice the craftsman spirit within ideological and political education activities. Whether it involves researching exemplary figures both inside and outside the school at the beginning of study projects or engaging in hospital internships later on—where they learn principles like prioritizing patients and upholding ethical standards—all these experiences contribute positively to nurturing professional ethics and the craftsman spirit in students. Moreover, medical students are urged to focus on details and strive for excellence in their daily studies, aligning perfectly with the core tenets of craftsmanship, which emphasize continuous improvement and excellence. The integration of these two aspects encourages students to engage in both study and practice, establishing a strong foundation for a successful career trajectory in the future. For instance, consider the investigative activities centered on professionalism and the craftsman spirit within mechanical roles. The talent development framework under school-enterprise collaboration leans toward a “mentor-apprentice” model, where experienced employees guide newcomers in understanding regulations

and job responsibilities. This allows students to apply what they have learned through teaching, assisting, and leading others ^[10]. Simultaneously, students can model themselves after the “master”, regulating their thoughts and actions, inheriting the craftsman ethos demonstrated by the “master” in daily tasks, and approaching the duties of front-line machine tool positions with seriousness. In doing so, they also gain proficiency in rules and regulations, focus on work details, and safeguard both personal safety and collective interests. There are numerous examples like this, underscoring the necessity of exploring the incorporation of the craftsman spirit into ideological and political education in higher education institutions.

4.2. Attach importance to the analysis of events and deeply understand the connotation

The skilled artisans of ancient times in the country have earned renown and admiration, with their legacy enduring through generations. Today’s craftsmen continue to uphold these esteemed traditions, serving as exemplary models for students to emulate and admire. This tradition also offers valuable material for integrating the craftsman spirit into ideological and political education. By examining the essence of significant historical events and figures, educators can further cultivate students’ appreciation for craftsmanship, innovation, and professionalism, thereby enhancing educational quality. Additionally, this approach aids students in deeply understanding the cultural and spiritual dimensions of these values, promoting the integration of knowledge and action, and establishing a strong foundation for their healthy development and holistic growth in the future. For instance, consider the legendary figure Lu Ban, known as “a thousand workers united, a thousand artists combined” ^[11]. Notably, he traveled from the State of Lu to the State of Chu to assist in weapon production and even devised ladders for attacking the State of Song. The hand tools utilized by woodworking experts, including drills, planers, shovels, rulers, and ink pots for drawing lines, were all creations of Lu Ban. Another example is the introduction of modern craftsmen like Hu Shuangqian, a crucial figure in China’s modern aviation industry. Hu maintains an absolute zero-tolerance policy regarding part production, ensuring no errors or issues arise in any component. He once remarked, “It would be ideal to continue working for another 10 or even 20 years, contributing further to China’s large aircraft development” ^[12]. In this context, educators can also incorporate specific events as case studies, enabling the case teaching method to yield positive results in ideological and political classrooms. This approach not only nurtures students’ minds but also fosters the spirit of craftsmanship, laying a solid foundation for them to potentially become “great craftsmen” in the future. Overall, integrating the essence of craftsmanship into ideological and political education at colleges and universities, encouraging students to comprehend its significance, and leveraging the craftsman spirit to guide educational advancement through case analysis with the remaining valuable area worthy of the continued exploration and practice.

4.3. Provide development advice and plan the direction of development

The practical implementation of ideological and political courses holds significant importance in students’ development journey. These courses assist students in identifying their personal growth paths, foster the sustainable advancement of modern education, and achieve a harmonious blend of theoretical knowledge and practical application. When the concept of craftsmanship is incorporated into ideological and political teaching, it reinforces the guiding influence of individual spiritual strength and developmental direction. Through engaging with such courses, students are subtly inspired by the essence of craftsmanship, gaining confidence in their future aspirations while progressively clarifying their roles during the process of skill enhancement. Additionally, students draw inspiration from those embodying the spirit of craftsmanship, cultivating self-

awareness, introspection, and confidence. This synergy, combined with professional mentorship from educators and personal decision-making, strengthens students' vocational aspirations and life objectives. In constructing the contemporary ideological and political education framework within higher education institutions, instructors should enhance teacher-student interactions, establish an open and welcoming communication atmosphere, encourage students to express themselves freely, promote mutual growth between teachers and students, and fully leverage the educational impact of these courses. Certainly, teachers ought to proactively grasp the ideological tendencies of students, promptly address any cognitive misconceptions, and enhance their capacity to discern right from wrong while fostering a sense of theoretical introspection. In practical terms, relaxed teaching methods such as forums and tea parties can be employed to guide students in sharing their confusions and challenges related to personal development and ideological growth. Through student interactions, teachers can focus on resolving common issues and provide positive reinforcement during the process to assist students in cultivating self-confidence and steadfast ideals. Furthermore, teachers may organize specialized communication sessions outside of class to motivate students to share their insights and perceptions regarding the course material. Peer-to-peer inspiration can establish an educational cycle of "learning-reflection-practice-enhancement." This approach not only identifies and fills gaps but also integrates ideological and political theories into students' ideals, beliefs, and value pursuits. Ultimately, by constructing a diversified platform for recognizing ideological and political thought, educators can achieve the sharing and elevation of educational outcomes, offering robust support for students' holistic development.

4.4. Improving educational evaluation and tracking the development process

To incorporate the craftsman spirit into the assessment of ideological and political education in higher education institutions, it is essential to develop a scientific and systematic evaluation framework. In this context, teachers, who serve as educational mentors, play a crucial role in assessing students' ideological qualities, cultural refinement, and embodiment of the craftsman spirit. Nevertheless, within the realm of modern education—particularly in ideological and political instruction that integrates the nurturing of the craftsman spirit—there is an urgent need to construct a comprehensive evaluation system. Such a system should not only evaluate teachers but also involve student self-assessment, administrative evaluations, and input from logistics service staff, thereby creating a multifaceted evaluation structure.

In particular, the assessment content should encompass various dimensions, including group activities, personal growth, classroom engagement, and ideological innovation initiatives. By conducting a multi-faceted and multidimensional evaluation, the results become more holistic and scientifically grounded, ensuring that students genuinely gain benefits from the educational assessment process ^[13–14]. In contrast to other subjects, ideological and political courses place greater emphasis on evaluating students' thought processes, beliefs, and ideological progression. Consequently, educators must thoroughly understand the current state of students' value systems and developmental requirements, implementing evaluations that consider both ideological perspectives and practical applications. When constructing the evaluation framework, it is essential to establish diverse assessment criteria aligned with the central objective of incorporating the craftsman spirit into ideological and political instruction. These criteria should be collaboratively designed by educational authorities, instructors, and students and continuously refined and adapted through practical implementation. Simultaneously, the methods of assessment should be varied to steer clear of a sole focus on performance-oriented evaluations. For instance, students' self-evaluations can be analyzed by comparing data from online learning platforms, such as

their learning progress, homework submission rates, involvement in contests, participation in social events, and volunteer service achievements. This approach helps to demonstrate the tangible outcomes of embodying the craftsman spirit ^[15]. Ultimately, by establishing a comprehensive teaching evaluation framework, it is possible to fully capture students' ideological qualities, cultural refinement, professional dispositions, and the application of the craftsman spirit, thereby offering a reliable foundation for the ongoing enhancement of educational standards. The refinement and advancement of this evaluation system will continue to require practical exploration and further development.

5. Conclusion

In conclusion, the varied approaches to incorporating the “craftsman spirit” into ideological and political education in higher education institutions offer valuable practical insights for educators on the front lines. Instructors should promote traditional culture, implement the unity of theory and practice, focus on student-centered teaching, and facilitate holistic student development through role modeling or by highlighting exemplary student representatives. From an educational management standpoint, teachers must establish a well-structured teaching framework, foster a positive environment for ideological and political education, and provide support for nurturing the craftsman spirit. Within theoretical course instruction, educators should broaden the scope of teaching materials, introduce innovative teaching methods, emphasize the central value of the craftsman spirit, and strengthen its influence within campus culture. By adopting these strategies, the integration of the craftsman spirit can effectively enhance students' professional competence and ethical standards, laying a solid foundation for their future careers. Future research could delve deeper into the mechanisms for integrating the craftsman spirit with curriculum and ideological education, develop a robust educational assessment system, and offer both theoretical and practical guidance for talent cultivation in higher education.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Zhou JJ, Han JW, Zhao J, 2024, Research on the Integration of Craftsman Spirit and Ideological and Political Education of College Students. *Journal of Huainan Vocational and Technical College*, 24(5): 28–30.
- [2] Jiang D, Li ZR, Wang J, 2024, Research on the Teaching of Ideological and Political Course Empowered by Craftsman Spirit — Taking Situation and Policy Course as an Example. *Reference for Middle School Political Teaching*, 2024(36): 53–57.
- [3] Wang GY, 2024, An Exploration of University Computer Experimental Practice Course Integrating Curriculum Ideology and Politics — Taking Android and Embedded System Design Course as an Example. *China Educational Technology Equipment*, 2024(1): 73–76.
- [4] Dong H, Shi YQ, 2023, Research on Talent Training Strategies for Innovative “Craftsman Spirit” in Colleges and Universities Based on Ideological and Political Courses in the New Era. *Proceedings of Ideological and Political Education Forum 2023*.
- [5] Li JX, 2023, Analysis of the Effective Combination of Craftsman Spirit Training and Ideological and Political

Education in Colleges and Universities. Hong Kong New Century Culture Press. Proceedings of the Third International Academic Conference on Innovative Talent Training and Sustainable Development in 2023.

- [6] Zhu LL, 2022, The Importance and Implementation Path Analysis of Integrating Artisan Spirit Cultivation into Curriculum Thinking and Politics for Chemical Engineering Majors in Colleges and Universities. *Chemical Engineering*, 50(12): 94–95.
- [7] Zheng X, Yu YW, Xu K, et al., 2020, Thinking on the Construction of Ideological and Political Integration in Professional Courses — A Case Study of Special Equipment Safety Course. *Journal of Higher Education*, 8(35): 181–184.
- [8] Hou L, Jiao M, 2022, Strengthen Ideological and Political Construction of College Curriculum and Help High-quality Development of Vocational Education — Taking stm32 and Wireless Sensor Network Technology as an Example. *Intelligence*, 2022(23): 77–80.
- [9] Zhai K, 2022, Research and Practice on the Effective Integration of “Craftsman Spirit” and “Curriculum Ideology and Politics” in Application-oriented Undergraduate Universities. *Modern Vocational Education*, 2022(28): 106–108.
- [10] Li YZ, Yang WF, Wang SJ, et al., 2020, Application of Curriculum Ideological and Political Elements in Surveying and Mapping Engineering Teaching. *Journal of Higher Education*, 8(11): 185–188.
- [11] Fan XH, 2020, Analysis on the Integration Path of Craftsman Spirit and Ideological and Political Education in Colleges and Universities — A Case Study of Mechatronics Professional Talent Training. *Paper Making Equipment and Materials*, 51(1): 241–243.
- [12] Er YY, 2021, Analysis on the Current Status and Countermeasures of “Craftsman Spirit” in College Students’ Daily Ideological and Political Education. *Public Relations World*, 2021(22): 131–132.
- [13] Feng AH, 2021, Research on the Path of Cultivating and Carrying forward the Craftsman Spirit of College Students in Science and Technology from the Perspective of Ideology and Politics. *Journal of Liaoning Economic Management Executive College*, 2021(5): 74–76.
- [14] Er YY, 2021, Under the Background of “Internet Plus”, the Ideological and Political Education of Private Colleges and Universities Integrates into the Path Innovation of “Craftsman Spirit”. *Computer Knowledge and Technology*, 17(21): 195–196.
- [15] Li YS, Li XD, Lang YC, et al., 2021, Exploration and Application of Curriculum Ideology and Politics in Practical Teaching of Geography Major — A Case Study of Geography Science in Tianjin University. *Journal of Higher Education*, 7(14): 162–165.

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Research on Application Scenarios of Big Data Analysis in the Field of Education

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Abstract: With the integration of AI and the improvement of computing power, big data analysis will further empower the intelligent society and become the core engine of digital transformation. This article mainly explores the use of AI in the field of education. From student management and personalized education, teaching optimization and curriculum design, administrative management and resource allocation, campus service and health management, and education research and policy formulation, in-depth discussion is carried out, aiming to provide a reference for the promotion of intelligent education.

Keywords: Big data analysis; Education; Application scenarios

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1. Overview

Big data analytics involves the structured processing and examination of large, varied, and rapidly generated datasets to identify concealed patterns, trends, and relationships. This supports optimizing decisions and uncovering valuable insights. In the education sector, big data analytics plays a crucial role, assisting schools in enhancing administrative efficiency, refining resource allocation, improving student experiences, and fostering innovation in educational practices^[1]. Initially, it is essential to gather and categorize relevant data. Regarding academic performance, key data points include exams (primarily final assessments), assignments, laboratory work, classroom participation, project submissions, competition outcomes, and more. In terms of subject scope, both general education and specialized courses are considered. From a temporal perspective, data can be grouped by semester, academic year, or learning phase. Additionally, it may incorporate elements such as student backgrounds, learning activities, and teacher evaluations, among others.

2. Application research of big data technology in the field of education

2.1. Student management and personalized education

2.1.1. Academic early warning and intervention

Academic early warning and intervention systems primarily rely on core index analysis, which encompasses four key dimensions: individual subject evaluation, interdisciplinary relationships, group comparisons, and predictive modeling. In the context of individual subject evaluation, the system assesses overall academic performance by analyzing statistical measures such as mean, median, standard deviation, and extreme scores (highest and lowest). Additionally, it evaluates learning consistency or improvement through time-series analyses, such as line graphs that track grade fluctuations over time. Regarding interdisciplinary relationships, the system employs tools like heatmaps or correlation matrices to explore connections between different subjects and perform correlation analyses. It also compares individual student grades against class or grade averages to identify students whose performance significantly deviates from expected norms, thereby pinpointing areas of weakness. For group comparisons, students can be categorized based on factors such as gender, learning clusters, or instructional methodologies. This allows for an examination of score variations across these groups, highlighting potential disparities in performance ^[2-3]. In terms of predictive modeling, the system leverages historical data and external variables to forecast future academic outcomes. It can identify students whose performance is consistently declining or falling below established thresholds, triggering intervention strategies and issuing risk alerts accordingly.

Data such as students' grades, homework completion rate, and class participation are analyzed, and predictive models are established to identify students at risk of dropping out or having academic difficulties, and timely counseling or psychological support can be provided. It is reported that by analyzing the frequency of students logging on to an online learning platform and their test scores, one university identified potentially problematic students in advance, and the graduation rate increased by 15% after the intervention. Generate student performance reports highlighting strengths, weaknesses, and recommendations. When various learning achievements are included in the analysis indicators, the data can be systematically analyzed from multiple dimensions to comprehensively evaluate learning outcomes, identify potential problems, and optimize teaching strategies.

2.1.2. Personalize the learning path

Customized learning resources or courses are recommended according to students' historical learning data, while some adaptive learning platforms can dynamically adjust the difficulty of exercises, and big data analysis can tap students' learning preferences and shortcomings in ability to promote the teaching model of "thousands of faces". For example, the Yantai High-tech Zone generates a comprehensive classroom evaluation report by recording the "AI classroom portrait" of teacher-student interaction data in real time, which recommends customized learning resources for students and provides a basis for teachers to improve teaching methods.

2.1.3. Behavioral analysis and mental health

By integrating data such as campus card usage, library visits, and social participation, it is possible to detect students who are isolated or experiencing emotional difficulties. This approach can also be expanded by incorporating additional campus card data to create a more detailed profile of student behavior, contributing to the development of smart campuses. For instance, a university in China identified students at risk of depression by analyzing irregular dining patterns in cafeterias and offered them psychological support. Currently, many

students face heavy academic pressures, leading to significant psychological stress. This stress often results in sleep disturbances, depression, and anxiety. The interconnected nature of mental and physical health means that prolonged anxiety or depression can cause insomnia, weakened immunity, and other physiological issues. Good mental health not only enhances resilience to stress but also aids individuals in effectively managing real-world challenges like academics and career planning. It serves as both a foundation for personal well-being and an indicator of societal progress ^[4]. To promote mental health, coordinated efforts in prevention, intervention, and support are essential to establish a comprehensive mental health framework spanning the entire life cycle. In the long term, college students with strong mental health will exhibit higher productivity, greater creativity, and reduced absenteeism or burnout due to psychological factors once they enter the workforce.

Faced with numerous psychological challenges, educators established academic counseling centers aimed at assisting students in refining their learning strategies ^[5]. Educators also organized career planning seminars to alleviate employment-related anxiety, motivated students to engage in clubs and athletic activities to combat monotony and enhance social competencies. By integrating psychological counseling services, course materials, and event updates, educators provide comprehensive mental health support, bridging informational gaps between departments. Additionally, we developed online psychological evaluation platforms and virtual counseling aids to broaden service accessibility and compensate for the scarcity of in-person resources. Leveraging the insights from big data analysis, educators refined course structures, such as incorporating a career planning segment to address college entrance stress and introducing emotional education classes to tackle relationship issues.

2.2. Teaching optimization and course design

2.2.1. Course effect evaluation

Examine the relationship between student engagement in classroom interactions and their academic performance, and refine instructional strategies accordingly. Modify the teaching emphasis as needed. Additionally, personalized learning plans can be developed for students based on analytical findings. Present an overview of class performance and compare teaching effectiveness. By analyzing classroom videos, a secondary school discovered that students seated in the back rows had low participation rates during group discussions. However, after rearranging the seating configuration, there was a notable improvement ^[6-7]. Recognize less effective aspects of instruction and adjust content design to enhance efficiency. Adapt the course difficulty dynamically to align with the distribution of students' abilities. Leveraging big data analysis, course evaluations have transitioned from traditional "subjective experience-based" approaches to "data-driven decision-making", offering a scientific foundation for enhancing educational quality.

2.2.2. Teacher effectiveness evaluation

The integration of teacher effectiveness evaluation with big data analysis allows for a comprehensive assessment of educators' instructional capabilities, classroom management skills, and innovation in education. This is achieved by quantifying teaching behaviors, student feedback, and outcome metrics, ultimately aiding in the optimization of teacher development programs and resource distribution. By incorporating holistic student evaluations, performance improvement rates, and research outcomes, a scientific appraisal of teacher performance can be conducted to support professional title assessments.

Teacher competency profiles can be established by analyzing instructional behavior data and research

achievements, creating professional growth records, and offering tailored training resources. Teaching efficacy can be gauged by linking student achievement gains with classroom interaction statistics. Through the examination of classroom discourse, it has been observed that when teachers wait less than three seconds for student responses during “silent pauses”, student engagement decreases by 50%. This insight underscores the importance of enhancing teachers’ “white space” communication techniques. Additionally, emphasis should be placed on long-term value, assessing not only short-term academic results but also the cultivation of core competencies over time.

2.2.3. Optimization of teaching materials and resources

Assessing the complexity of textbook sections and dynamically modifying the content based on students’ click-through rates and dwell times on the online learning platform. Redirect teaching resources and instructor focus toward groups with greater requirements. Consider the equilibrium of teachers’ workloads by utilizing teaching assessment data and course difficulty levels, allowing the system to automatically assign teaching responsibilities and prevent excessive workloads. Through the analysis of energy consumption in campus buildings, NYU Shanghai has devised energy conservation strategies, such as deactivating air conditioning and lighting systems during low-usage periods, achieving an annual energy savings of 15%. Aim to accomplish dynamic space management by integrating classroom usage statistics and course needs, enabling the system to propose the most efficient classroom arrangement solutions to minimize spatial inefficiencies.

2.3. Administrative management and resource allocation

2.3.1. Intelligent scheduling of campus resources

Campus resource management requires the integration of multi-faceted data, such as student activity records (e.g., attendance and course registration), infrastructure usage statistics, energy consumption metrics, and external environmental factors. By evaluating the usage patterns of classrooms, laboratories, and gymnasiums, it is possible to enhance course planning and resource allocation strategies. Regarding course arrangement and conflict resolution, dynamic adjustments were made to class timing and room capacities based on analyses of student course preferences and instructor teaching capabilities. The University of Jinan applied a customized DeepSeek model, achieving a 30% reduction in course scheduling conflicts ^[8]. Additionally, laboratory and equipment sharing can be facilitated through a data-driven reservation platform, minimizing idle resources and boosting efficiency. For instance, one university promoted interdisciplinary collaboration by examining equipment usage logs, resulting in a 25% increase in equipment utilization. Another institution employs IoT sensors to track classroom occupancy and makes study rooms available during off-peak hours.

2.3.2. Enrollment and employment strategies

Examine the enrollment statistics across different years to refine the promotional strategies; modify the program offerings based on the career paths of graduates. Big data technology can consolidate job recruitment information from companies, align it with students’ skill profiles, and provide smart employment recommendations. Additionally, it evaluates industry dynamics, assisting universities in revising their course structures, cultivating suitable talents, creating a graduate employment archive, monitoring long-term professional growth, and assessing the effectiveness of specialized training. Ranging from precise forecasting to automated pairing, skill enhancement to quality supervision, big data technology is redefining the landscape of

educational admissions and employment, establishing an integrated optimization cycle ^[9].

2.4. Campus service and health management

2.4.1. Health monitoring and early warning

Integrate the heart rate monitoring of physical education class and the food data of the canteen to provide personalized health suggestions. Through data analysis, students can carry out data analysis on what kinds of dishes they like to eat, understanding of consumption behaviors, and identifying students' dining habits, preferences, and financial status. It can also combine the height and weight information of students, as well as eating behavior, and give reasonable suggestions to avoid excessive obesity and other situations. In terms of student service improvement, it can also provide precise financial assistance, identify potential students with financial difficulties, and provide invisible financial assistance for low-consumption students. For some students who lose their cards, they can also monitor abnormalities, find risky behaviors, such as misuse, meal card loss, and find them in time.

2.4.2. Campus security prevention and control

Detect unusual activities, such as frequent visits by unfamiliar individuals to the laboratory, by analyzing data from cameras and access control systems, and integrate AI to issue alerts regarding potential security concerns ^[10]. A camera is placed at the library entrance, enabling real-time facial recognition analysis when images are sent to the backend system. To safeguard privacy and ensure data security, the information is only stored or utilized after authorized students grant permission; otherwise, it is immediately discarded. Authorization occurs via a WeChat mini-program, where users upload photos for facial verification and approval. This approach not only enhances student safety monitoring but also facilitates data collection, such as tracking when students enter the library and how long they spend studying there—information that can be documented ^[15].

Monitoring is installed at the dormitory gate, data processing is carried out in real time, facial features are extracted and compared with the data in the database, abnormal situation is warned and the situation report is pushed to the dormitory administrator, although the dormitory administrator also takes care of the dormitory, but it is difficult to remember all the students, and the form of monitoring and early warning through the camera greatly reduces its burden. This also improves security, especially in girls' dormitories, to prevent the illegal elements from outside from breaking into the dormitory, greatly improving the safety of girls' dormitories, to eliminate the occurrence of illegal incidents.

2.4.3. Canteen operation optimization

Analyze the sales of dishes and the amount of leftovers, adjust the menu, and reduce waste. A middle school found through the data that “there are many leftovers on Wednesdays” because of the intensive course schedule, it provided portable lunch boxes instead.

It can also optimize the operation of the canteen, analyze the sales of dishes and the amount of leftovers, adjust the menu, and reduce waste. On the other hand, in the canteen operation optimization, the hot window staff can be increased during peak hours to reduce queuing time. Set meals are designed according to the relevance of dishes. Student meal card consumption analysis is an important tool to connect data with campus management. Through refined analysis, schools can improve the quality of logistics services, optimize the allocation of resources, and provide more responsive support to students.

2.5. Educational research and policy formulation

2.5.1. Research on educational trends

Examine educational data from different regions and time periods to evaluate the influence of teaching approaches or policies. Educational institutions or districts can refine their evaluation criteria or curricula by leveraging big data analytics. Through the fusion of diverse data sources, including student behavioral patterns, course material usage, and regional educational development metrics, schools are able to forecast upcoming educational requirements^[11-12] and develop adaptive adjustment plans.

2.5.2. Scientific research management

Tracking academic papers and patent data, evaluating the development potential of disciplines, and assisting in the allocation of scientific research funds. Colleges and universities build a standardized scientific research management system covering project application, fund management, and achievement evaluation modules with the help of big data to solve the problem of data islands and promote the transparency of the scientific research process^[13-14]. There is a common problem of inconsistent data formats in the scientific research management of colleges and universities, and it is necessary to establish unified data standards and sharing platforms, for example, classifying and managing scientific research project data through tree diagrams.

3. Concluding remarks

Through systematic performance analysis, educators can more accurately understand the learning effect, promote data-driven teaching improvement, and ultimately improve the overall quality of education. Big data technology is pushing education trend research from “experience-oriented” to “data-driven.” Its core value lies in the dual improvement of educational equity and efficiency through accurate analysis. Through big data analysis, schools can shift from experience-driven to data-driven decision-making to achieve precision in education, but there needs to be a balance between technological innovation and humanistic care. But at the same time, there are many challenges and precautions, data privacy, desensitization of sensitive student information (such as mental health data), etc. need to comply with the Personal Information Protection Law, student information processing should be anonymized, and education data security regulations should be complied with. In terms of ethical risks, it is necessary to avoid labeling students due to data analysis (such as “low potential group”), which needs to be combined with human judgment, and to avoid over-reliance on statistical results due to teacher experience, which requires qualitative analysis.

Disclosure statement

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References

- [1] Zhao XN, 2023, The Application of Big Data and Cloud Computing Technology in Smart Campus. Information Recording Materials, 24(12): 186–188 + 191.
- [2] Liu H, 2023, Research on the Application of Computer Technology in the Construction of Intelligent Campus in Colleges and Universities. Information Recording Materials, 24(10): 157–159 + 162,

- [3] Liu SY, 2024, Application of Big Data Technology in Campus Education Management. *Electronic Technology*, 2024(53): 568.
- [4] You J, 2024, Application of Big Data Technology in Building Smart Campus. *Electronic Technology*, 2024(53): 571.
- [5] Ren LF, 2023, Application of Big Data and Cloud Computing Technology in Smart Campus. *Integrated Circuit Applications*, 40(9): 98–99.
- [6] Liu D, Zhou B, Ren HR, et al., 2023, Discussion on the Application of Cloud Computing Combined with Big Data Technology in Smart Campus. *Information Recording Materials*, 24(6): 188–190.
- [7] Lai YS, Yang CL, Li QY, et al., 2023, The Application of Internet of Things and Cloud Computing Technology in the Construction of College Smart Campus. *Modern Vocational Education*, 2023(13): 109–112.
- [8] Wang L, Tian MQ, Gu RL, 2021, Application of Big Data and Cloud Computing Technology in Smart Campus. *Yangtze River Information and Communication*, 34(12): 105–107.
- [9] Wang L, 2021, Research on Innovative Mode of Ideological and Political Education in Colleges and Universities under the Background of “Smart Campus” in the Era of Big Data. *Invention and Innovation (Vocational Education)*, 2021(2): 13–14.
- [10] Zhang Q, 2021, Overall Planning and Construction of Smart Campus Based on “Artificial Intelligence Big Data”. *Mobile Information*, 2021(5): 29–31.
- [11] Zhu SY, 2022, Research on Informatization Infrastructure Construction of University Library under the Background of Smart Campus. *Jiangsu Science and Technology Information*, 39(24): 35–38.
- [12] Li SY, 2021, Research on Accurate Management of College Students’ Work Based on Big Data Analysis — A Case Study of Jinling College of Nanjing University. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 4(3): 167–169.
- [13] Zhao QY, 2021, Research on Smart Campus Construction based on Big Data Platform. *Electronic Components and Information Technology*, 5(3): 34–35.
- [14] Shi LY, 2021, Analysis on the Application of Big Data Technology in the Construction of Smart Campus Platform. *Electronic Components and Information Technology*, 5(3): 147–148.
- [15] He WJ, 2021, Construction Framework and Path of College Smart Campus under Cloud Computing and Internet of Things Technology. *China Information Technology Education*, 2021(7): 109–112.

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Analysis of the Integrated Education of Innovation and Entrepreneurship Education and Ideological and Political Education in Colleges and Universities

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Abstract: This paper studies the path and strategy of the integrated education of innovation and entrepreneurship education and ideological and political education in colleges and universities. Given the problems such as lack of integration opportunity, lack of pertinency and imperfect system guarantee, this paper puts forward the integration strategy with professional accomplishment as the guide, mass creation projects as the carrier and system optimization as the starting point, builds the education model of “value leading — ability training — quality improvement”, and creates the practice platform of “project guidance — school-enterprise collaboration — teachers and students co-creation.” The research shows that this model can effectively improve students’ innovative spirit, practical ability, and social responsibility and provide theoretical and practical support for college education reform and high-quality personnel training.

Keywords: Innovation and entrepreneurship education; Ideological and political education; Integrated education; Double innovation project

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1. The significance of integrating education of innovation and entrepreneurship education with ideological and political education in colleges and universities

1.1. It is conducive to cultivating innovative talents with both morality and ability

The integration of innovation and entrepreneurship education with ideological and political education is an important practice for higher education in the new era to “foster virtue and cultivate talents.” Innovation and entrepreneurship education focuses on cultivating students’ innovative thinking, entrepreneurial ability, and practical skills. Based on the basic principles of Marxism and the theoretical system of socialism with

Chinese characteristics, ideological and political education focuses on shaping students' political attainment, moral quality, and social responsibility ^[1]. The organic combination of the two forms a three-in-one education model of knowledge imparting, ability training, and value shaping, which effectively promotes the all-around development of students ^[2].

1.2. Promoting the modernization and transformation of the higher education system

In the era of the Fourth Industrial Revolution and the swift advancement of the digital economy, higher education is encountering an immediate demand for paradigmatic change. The conventional educational framework typically emphasizes knowledge transmission while overlooking the development of students' innovative capabilities and ideological-political literacy, thereby restricting students' potential for holistic growth to some extent ^[3]. On one side, by incorporating ideological-political education into innovation and entrepreneurship training, students can develop a stronger sense of social responsibility and purpose, encouraging them to prioritize societal values and public welfare during their innovation and entrepreneurial endeavors. Conversely, the hands-on nature and inventive aspects of innovation and entrepreneurship education offer a fresh medium and stage for ideological-political education, rendering it more engaging, concrete, and readily embraced and assimilated by students ^[4]. This multi-faceted integration and innovation not only enhances educational efficacy but also drives the modernization and evolution of educational methodologies.

1.3. Serving national strategies and the needs of social development

The combination of innovation and entrepreneurship education with ideological and political education represents a crucial step in implementing the innovation-driven development strategy and the talent-strengthening strategy for China. As the primary platform for nurturing talent, universities play a vital role in cultivating innovative and versatile individuals for the nation ^[5]. The Implementation Outline of Patriotic Education in the New Era emphasizes that patriotic education should permeate all stages of education. This integrated approach significantly enhances students' overall capabilities, enabling them to better meet societal demands. In practical terms, this fusion manifests in several key areas. First, by incorporating ideological and political components, such as patriotism and social responsibility, into the project guidance of innovation and entrepreneurship platforms (e.g., makerspaces and incubators); second, by establishing a dedicated "Red Dream" track in competitions like "Internet Plus," encouraging students to focus on national strategies; and third, by leveraging university-enterprise collaboration to integrate major national strategic needs into innovation and entrepreneurship education, thereby strengthening students' comprehensive abilities and providing robust support for aligning with national objectives ^[6].

2. The practical dilemma of integrating education of innovation and entrepreneurship education with ideological and political education in colleges and universities

2.1. The integration of innovation and entrepreneurship education and ideological and political education lacks endogenous impetus

Currently, the integration of innovation and entrepreneurship education with ideological and political education in universities faces a contradiction characterized by "formal integration" but "substantive separation." From the perspective of systems theory, this challenge arises due to the absence of an effective coupling mechanism

between the two educational subsystems. At the value level, there is a failure to achieve an organic alignment of educational objectives, while at the practical level, there is a lack of effective integration platforms and operational mechanisms. The incorporation of ideological and political education into mass innovation education predominantly remains at the value level, insufficiently advancing the cultivation of entrepreneurial knowledge and skills ^[7]. According to the theory of educational ecology, the root cause of this dilemma lies in the fact that the two have not yet identified integration opportunities at the “core of education” level. Specific manifestations include: first, educational stakeholders exhibit cognitive biases, perceiving integration merely as curriculum overlap while neglecting the deeper fusion of underlying concepts. Second, the evaluation system demonstrates directional bias, overly emphasizing tangible outcomes of mass innovation education (e.g., the number of entrepreneurial projects, competition awards) while undervaluing the intangible contributions of ideological and political education (e.g., value formation, social responsibility development). This results in a utilitarian approach to educational practice, diminishing the intrinsic motivation for meaningful integration ^[8].

2.2. The lack of precision of ideological and political education in the integration of mass entrepreneurship education

In the process of integrating innovation and entrepreneurship education with ideological and political education in higher education institutions, a major challenge arises from the insufficient alignment of ideological and political education with mass innovation initiatives ^[9]. Firstly, there is a lack of targeted content delivery. Ideological and political education tends to remain at the macro level of value orientation, offering little specific guidance tailored to particular entrepreneurial contexts. Secondly, the employed methodologies are not sufficiently adaptable. Traditional theory-based indoctrination approaches struggle to align with the practical nature of mass entrepreneurship education. Lastly, there exists an imbalance in the skill sets of educators. Teachers specializing in innovation and entrepreneurship often lack expertise in ideological and political education, whereas those focused on ideological and political education find it challenging to grasp the specialized aspects of innovation and entrepreneurship. Consequently, the “one-size-fits-all” teaching approach fails to address the diverse needs of students effectively ^[10]. This dual deficiency in competencies hinders the overall effectiveness of integrated educational efforts.

2.3. The institutional guarantee system of integrated education has not yet been perfected

Currently, the integration of “ideology and politics + mass innovation” in higher education institutions faces challenges related to inadequate institutional support. Firstly, the absence of strategic planning and systematic implementation frameworks in most universities results in a lack of continuity in practical efforts and exploratory initiatives ^[11]. Secondly, inter-departmental coordination mechanisms remain underdeveloped, with instances of “silo governance”, hindering the formation of cohesive educational synergy. Thirdly, the evaluation framework is skewed, overemphasizing quantitative outcomes while neglecting process-oriented and value-added assessments of integrated education. This imbalance also manifests in insufficient motivational measures for faculty members. Lastly, the incentive structure is flawed, making it difficult to measure the contributions of ideological and political educators in mass innovation programs. Consequently, this leads to diminished teacher engagement and a prevailing inclination toward prioritizing research over teaching.

3. The practice path of integrating education of innovation and entrepreneurship education with ideological and political education in colleges and universities

3.1. Build a professional quality oriented integrated education model

Entrepreneurship, innovation courses, professional subjects, along with the spirit of industries and humanistic thinking within professions, serve as crucial resources for nurturing students' professional competence. Institutions of higher education should establish an integrated educational framework that combines "value guidance, capability development, and quality enhancement" to strengthen students' identification with and pride in their majors ^[12]. Firstly, regarding the restructuring of the curriculum system, a blended course module integrating "major studies + ideological and political education + mass innovation" should be developed. Ideological and political components, such as professional ethics, should be incorporated into both major-specific courses and mass innovation courses, thereby forming a modularized curriculum structure. For instance, engineering programs could offer a course titled "Engineering Ethics and Innovation Entrepreneurship", while science programs might provide a course called "Science, Humanities, and Innovative Practice." Simultaneously, it is essential to construct a mapping connection between ideological and political courses and mass innovation education. This involves defining the specific mapping points of ideological and political education tailored to each major. For instance, "Network Security and National Sovereignty" can be emphasized for computer science majors, while "Corporate Social Responsibility" can be highlighted for economics and management students. Furthermore, innovative teaching approaches should be implemented. Experiential teaching techniques, such as situational simulation and role-playing, can be utilized to design scenarios like "entrepreneurial decision-making simulations" and "innovative thinking training." These activities allow students to appreciate the significance of professional ethics and social responsibility through simulated experiences ^[13]. Additionally, problem-based learning practices should be integrated into the curriculum. Problem scenarios, such as "ethical challenges in technological innovation" and "legal risks during the entrepreneurial process", can be designed to encourage inquiry-based learning among students. Ultimately, the evaluation framework must be refined by establishing a comprehensive assessment system that encompasses knowledge acquisition, skill development, and value recognition. A value-added evaluation approach can be introduced to measure improvements in students' professional competence and innovation capabilities by comparing pre- and post-testing results. Moreover, a combined evaluation model incorporating process evaluation (60%, including classroom participation and project involvement) and outcome evaluation (40%, including final assessments and project outcomes) should be implemented.

3.2. Build a platform for practical education based on mass entrepreneurship and innovation projects

In the context of integrating innovation and entrepreneurship education with ideological and political education in higher education institutions, mass entrepreneurship initiatives serve as crucial platforms for enhancing students' practical skills and facilitating educational convergence. Grounded in the theory of communities of practice, a practical education framework — "project-led, school-enterprise cooperation, teacher-student co-creation" — is established. This approach seamlessly merges the value-oriented guidance of ideological and political education with the hands-on focus of mass innovation and entrepreneurship education. As a result, students deepen their comprehension of innovation and entrepreneurship through real-world experiences while developing social responsibility and professional integrity, ultimately achieving an all-around enhancement in knowledge, skills, and values.

3.2.1. Identify entrepreneurial projects and strengthen school-enterprise cooperation

The selection of entrepreneurial projects should align with students' interests, specialties, professional backgrounds, and market demands. Higher education institutions should proactively foster deep collaborations with businesses to offer students an authentic entrepreneurial environment and practical platform. By engaging in school-enterprise partnerships, students can gain a comprehensive understanding of business operation models, market regulations, and industry standards, enabling them to apply their knowledge effectively to entrepreneurial initiatives ^[14]. Universities can collaborate with leading companies in the industry to establish “innovation and entrepreneurship practice hubs”, integrating real-world enterprise projects into classroom settings. This allows students to enhance their comprehension of core socialist values while addressing practical challenges.

3.2.2. Strengthen the analysis of the learning situation and implement collective lesson preparation

Educators should thoroughly grasp students' interests, abilities, and requirements by conducting systematic evaluations of learning contexts, enabling them to design more focused instructional plans. Collaborative lesson preparation involves input from both ideological and political educators as well as instructors in mass innovation and entrepreneurship. Through detailed discussions and interactions, they can establish a cohesive educational objective and methodology. In this collaborative process, ideological and political educators contribute value orientation and relevant content, while dual-innovation teachers offer specific advice and hands-on experience for entrepreneurial initiatives. By engaging in collective lesson planning, educators can better identify teaching priorities and challenges, ensuring that the curriculum remains both scientifically grounded and practically applicable. Additionally, this collaborative approach facilitates resource sharing and knowledge exchange among teachers, thereby enhancing overall teaching quality. For instance, a teaching group combining “mass innovation and entrepreneurship + ideology and politics” could be formed to conduct routine teaching workshops, fostering a deeper integration between these two educator categories.

3.2.3. Optimize the teaching content and innovate the teaching mode

Upon selecting the entrepreneurial project, ideological and political teachers, along with dual-innovation instructors, should adopt project-based teaching as a foundation. They should restructure and redesign the teaching content to ensure that the teaching model, methodology, and system are closely aligned with the entrepreneurial project. At the level of ideological and political education, instructors should update the teaching material by focusing on the legal frameworks, entrepreneurial policies, value systems, and ethical considerations associated with entrepreneurial ventures, thereby enhancing the relevance and effectiveness of education. For instance, by linking specific entrepreneurial projects, teachers can elucidate laws such as the Company Law and Intellectual Property Law, guiding students to develop a proper understanding of the rule of law. Teachers can also assist students in comprehending policy support mechanisms by examining national innovation and entrepreneurship policies. Furthermore, by exploring entrepreneurial values, educators can foster students' appropriate value orientations and ethical standards. Additionally, the case study method could be incorporated to strengthen students' ability to make value judgments by analyzing ethical challenges and social responsibility issues within notable entrepreneurial scenarios.

3.3. Improving the collaborative education system guaranteed by institutional innovation

3.3.1. Optimize the top-level design and improve the institutional guarantee

Educational institutions should tailor the internal connection between innovation and entrepreneurship education and ideological and political education based on their developmental status, students' cognitive patterns, and economic requirements. More specifically, schools can incorporate the fundamental principles of ideological and political education into innovation and entrepreneurship curricula by restructuring courses. This allows students to gain a profound understanding of socialist core values and social responsibility while acquiring knowledge in innovation and entrepreneurship. Additionally, schools may introduce courses such as Innovation, Entrepreneurship, and Social Service to encourage students to focus on societal challenges during their innovative and entrepreneurial endeavors, actively engage in charitable activities, and foster a sense of social duty and purpose. Furthermore, an integrated educational strategy should be developed to define objectives and responsibilities, outline execution methods, and establish supportive measures, ensuring the regulation and institutionalization of this combined educational approach.

3.3.2. Build an incentive mechanism to stimulate teachers' enthusiasm

Developing a scientific and reasonable incentive mechanism serves as a crucial guarantee for promoting the deep integration of ideological and political education with innovation and entrepreneurship education. Educational institutions can establish dedicated funds to motivate ideological and political educators to conduct relevant research and identify effective approaches for integrated teaching. Furthermore, the outcomes of integrated education should be integrated into the teacher evaluation system, with preferential policies provided in areas such as excellence assessments and professional title advancements, thereby encouraging faculty members to actively engage in related activities. For instance, an "Award for Excellence in Integrated Education" could be established to recognize outstanding teams and individuals annually, offering them commendations and rewards. Additionally, schools should organize regular training sessions for teachers and invite experts in innovation and entrepreneurship to provide specialized training for ideological and political educators. This will assist them in staying updated on the latest trends in innovation and entrepreneurship and mastering advanced teaching techniques, thus enhancing their guidance capabilities.

3.3.3. Strengthen process management and improve the evaluation system

Educational institutions ought to develop a quality control framework covering the entire process, establish "Quality Standards for Integrated Education", and construct a three-tiered quality assurance structure encompassing "institution-department-specialization." By leveraging a dynamic adjustment mechanism, the implementation strategy should be refined in a timely manner based on annual assessment outcomes. Concurrently, the evaluation framework should be enhanced by creating a diversified index system that incorporates three key dimensions: student development, teacher advancement, and societal influence. Each dimension should include 5–7 specific metrics for comprehensive analysis. A categorized evaluation approach will be implemented, tailoring distinct criteria according to specialization attributes and project categories. For instance, a value-added evaluation model could be utilized for students, assessing the enhancement of their overall competencies through pre- and post-testing comparisons. Regarding educators, a combination of process-oriented and outcome-based evaluations can be employed to holistically gauge their teaching efficacy and educational contributions.

4. Conclusion

The combination of innovation and entrepreneurship education with ideological and political education plays a crucial role in nurturing morally competent and innovative talents, advancing the modernization and transformation of higher education, and supporting national strategies. Given challenges such as insufficient integration opportunities, lack of educational relevance, and incomplete systemic support, this study proposes an integrated educational approach guided by professional competence, utilizing mass innovation projects as a platform, and initiating system optimization as a starting point. This provides both theoretical and practical foundations for reforming higher education. Moving forward, it is essential to deepen theoretical research and practical exploration through multi-party collaboration, establish a comprehensive curriculum system, develop practice-oriented platforms, and improve institutional guarantee mechanisms. These efforts will facilitate the deeper integration of the two educational domains, offering robust support for cultivating high-quality talents in the new era and serving the nation's innovation-driven development strategy.

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References

- [1] Zheng JS, 2024, The Organic Integration of College Ideological and Political Education and College Students' Innovation and Entrepreneurship Education. *School Party Building and Ideological Education*, 2024(7): 88–90.
- [2] Chen LH, 2023, Research on the Integration of Ideological and Political Education and Innovation and Entrepreneurship Education for College Students. *Jilin Education*, 2023(23): 44–46.
- [3] Wang J, 2023, Research on the two-way Integration of Innovation and Entrepreneurship Education and Ideological and Political Education of College Students — A Case Study of Xi'an Translation University. *Chengcai*, 2023(3): 46–47.
- [4] Yu Y, 2022, Research on the Integration of College Students' Innovation and Entrepreneurship Education and College Ideological and Political Education. *Road to Success*, 2022(13): 49–51.
- [5] Guo XL, Zhang LP, 2022, Research on the Value and Path of Integrated Development of Ideological and Political Education and Employment and Entrepreneurship Education of College Students. *Journal of Mudanjiang College of Education*, 2022(1): 91–93.
- [6] Li CX, Yu ZS, 2021, On the Organic Integration of Ideological and Political Education and Innovation and Entrepreneurship Education of College Students. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 4(23): 84–86.
- [7] He X, 2021, Research on the Path of Integration of Ideological and Political Education and Innovation and Entrepreneurship Education for College Students. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 4(21): 103–105.
- [8] Yan CL, 2021, Feasibility of Integration of Ideological and Political Education and Innovation and Entrepreneurship Education of College Students. *Journal of Hubei Open Vocational College*, 34(13): 31–32.
- [9] Wang Y, 2021, On the Organic integration of College Ideological and Political Education and College Students' Innovation and Entrepreneurship Education. *Comparative Research on Cultural Innovation*, 5(8): 20–22.
- [10] Chen B, 2020, A Brief Analysis on the Feasibility of the Integration of Ideological and Political Education and

College Students' Innovation and Entrepreneurship Education. *Science and Education Literature Review* (Last ten-day issue), 2020(31): 40–41.

- [11] Feng W, 2022, Discussion on the Construction Plan of Multimedia Teaching Resource Library of Innovation and Entrepreneurship Courses in Colleges and Universities. *Television Technology*, 46(1): 11–14.
- [12] Li QY, 2023, Exploration of Mass Innovation and Entrepreneurship Education for College Students in the Context of General Education. *Educational Technology and Innovation*, 5(3): 110–114.
- [13] Liu B, Liu BH, 2021, Reflection and Model Construction of Innovation and Entrepreneurship Education in Undergraduate Universities. *Journal of Hubei Open Vocational College*, 34(23): 7–8.
- [14] Lu Y, 2021, Research on the Integration of Innovation Practice and Ideological and Political Education in Colleges and Universities from the Perspective of Sanquan Education. *Jilin Education*, 2021(20): 111–113.
- [15] Wang H, 2024, Research on the Path of Dual Innovation Integration of Ideology, Politics and Curriculum in Higher Vocational Courses. *Journal of Jiangnan Petroleum Workers University*, 37(2): 88–90.

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An Innovative Countermeasure for Teaching Architectural Interior Design Oriented by Aesthetic Education

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Abstract: In the education of vocational colleges and universities, the teaching of architectural interior design is an important part of it, through which the education can send a steady stream of high-quality talents for the development of the field of architectural interior design, fully highlighting the function of vocational colleges and universities in the cultivation of human beings. In order to further highlight the quality and effect of the teaching of architectural interior design in vocational colleges and universities, it is necessary to pay attention to the integration of aesthetic education, to promote the innovation of architectural interior design teaching with aesthetic education, and to improve the level of talent cultivation in vocational colleges and universities and their effectiveness. Therefore, the paper analyzes the current challenges of teaching innovation in architectural interior design based on aesthetic education, and puts forward corresponding teaching countermeasures to help improve the effectiveness of teaching architectural interior design and cultivate a steady stream of outstanding talents in architectural interior design.

Keywords: Aesthetic education orientation; Architectural interior design; Teaching innovation

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1. Introduction

In China's social development and construction, the public's pursuit of quality of life has been enhanced according to law. As a result, it has also given rise to a huge demand for the field of architectural interior design, which is increasingly valued and recognized by the public. Therefore, the importance of interior design professional education is also more and more prominent. This specialized education provides a long-term supply of high-quality personnel for the interior design field. In order to further improve the quality of teaching of architectural interior design and realize teaching innovation, it is necessary to vigorously construct an innovative mode of teaching architectural interior design oriented by aesthetic education, to effectively realize the integration of the elements of aesthetic education in the teaching of architectural interior design, and then

promote the innovation and change of the traditional teaching mode, and strengthen the quality as well as the level of the cultivation of talents in the field of architectural interior design.

2. The significance of aesthetic orientation in the teaching of architectural interior design

2.1. Enhance students' aesthetic quality and creativity

In the teaching of architectural interior design education, the integration of aesthetic orientation is a crucial link. Carrying out architectural interior design teaching based on aesthetic education can form a more perfect education model, stimulate students' learning motivation and enthusiasm, and gradually promote students to form a good aesthetic quality, help students deeply understand the professional knowledge of architectural interior design, so that students can form a good professional level and ability. For example, in the teaching of architectural interior design through systematic aesthetic education can effectively cultivate students' aesthetic vision, so that students learn to appreciate different styles of art, different genres of works, so that students' aesthetic vision is more keen, which helps students to design architectural interior programs full of aesthetic elements, stimulate students' imagination and creativity at the same time, while also strengthening its aesthetic qualities as well as professional level.

2.2. Promote the integration of disciplines and enrich the teaching content

The integration of aesthetic education into the teaching of architectural interior design helps to realize the integration of disciplines, thus ensuring that the content of education and teaching is richer, and realizing the innovation of teaching also strengthens the level and effectiveness of student education. In the actual teaching stage, the aesthetic education oriented architectural interior design teaching can effectively integrate other related disciplines, such as aesthetics, art history, psychology and other types of disciplinary knowledge, through the depth of integration and condensation of multidisciplinary knowledge, it can not only make the architectural interior design teaching content more rich, but also let the students come into contact with more systematic and specialized knowledge. Moreover, the integration of interdisciplinary knowledge in the teaching of architectural interior design can not only exercise students' aesthetic quality, but also broaden their professional horizons, which allows students to understand aesthetics based on multiple perspectives, and surprisingly, allows students to design more personalized, differentiated, and distinctive architectural interior programs, and improves the quality and effect of the cultivation of architectural interior design talents.

3. The feasibility of promoting the innovation of teaching architectural interior design with the orientation of aesthetic education

3.1. The compatibility of aesthetic education and architectural interior design teaching

In the teaching of architectural interior design, it is crucial to build an aesthetic education-oriented teaching mode, which can effectively integrate aesthetic education and professional education of architectural interior design, thus strengthening the educational effect and quality of students. Moreover, there is a natural fit between aesthetic education and architectural interior design education, so it is highly feasible to realize the in-depth integration of the two, which has become a key part of improving the level and quality of education in vocational colleges and universities. From the perspective of architectural interior design itself, it belongs

to a kind of artistic creation process, so it also requires designers to have a good aesthetic quality, unique aesthetic vision, aesthetic education is to stimulate students' aesthetic quality, aesthetic creativity as the center of education, so that students show good artistic potential. Therefore, there is a natural fit between aesthetic education and architectural interior design teaching, and it is also more feasible to realize the integration and innovation between the two.

3.2. Potential role of aesthetic orientation in improving students' comprehensive quality

Teaching architectural interior design with an aesthetic orientation can help to improve the comprehensive quality of students, which also determines the feasibility of integrating an aesthetic orientation into the teaching of architectural interior design. In practice, the teaching of architectural interior design requires teachers to focus on the cultivation of students' imagination and creativity, so students are required to learn to discover, pursue and create beauty in the stage of architectural interior design, and therefore students are required to maintain a keen insight into the beautiful things in life. Therefore, the teaching of architectural interior design based on aesthetic education has a strong possibility. Aesthetic education helps to strengthen students' comprehensive quality and cultivate students' aesthetic quality, so that students can learn to create and explore beauty in the architectural interior design stage, to improve students' professional ability in architectural interior design, and enhance students' comprehensive quality.

4. Challenges of promoting teaching innovation of architectural interior design with aesthetic education as the orientation

4.1. Challenges brought about by insufficient teacher strength

In the innovation of architectural interior design teaching, the integration of aesthetic education in it faces the challenge of insufficient teacher strength, and whether it can break this challenge also determines the level and quality of vocational colleges and universities. In practice, the integration of aesthetic education in the teaching of architectural interior design constantly requires teachers to have good professional ability, but also requires teachers to have a profound artistic literacy and aesthetic ability, on this basis to build up an aesthetic-oriented architectural interior design teaching mode. However, for the current group of teachers in vocational colleges and universities, the construction of their aesthetic education is relatively insufficient, and more teachers focus on professional growth in the professional knowledge reserve of architectural interior design teaching, and do not put enough energy into the study and understanding of aesthetic knowledge, which leads to the integration of aesthetic knowledge in architectural interior design teaching faces many challenges, and the teachers appear to be unable to do their best in the teaching, which affects the teaching mode of architectural interior design.

4.2. Challenges brought by the limitation of the traditional teaching mode

The limitations of the traditional teaching mode will also become a major challenge for the integration of aesthetic education orientation into the innovation of architectural interior design teaching, affecting the effectiveness and quality of architectural interior design teaching innovation. This is mainly due to the traditional teaching of architectural interior design will often focus on the teaching of professional knowledge to students, design skills training, and does not pay attention to the targeted cultivation of students' aesthetic qualities. In addition, the traditional education model often does not pay attention to highlighting the subject status of students, and the process of classroom teaching is also based on teachers' knowledge and students'

passive acceptance, so the students in the classroom learning subjective initiative is not strong, the sense of participation is low, which will lead to the effect of the teaching of architectural interior design is not good, and it is relatively difficult to integrate aesthetic education into it. Therefore, how to break the traditional teaching mode limitations becomes a key part of the teaching innovation of architectural interior design.

4.3. Challenges from the lack of interdisciplinary integration

In the teaching of architectural interior design in vocational colleges and universities, the integration of aesthetic education orientation will also face the challenge of the lack of interdisciplinary integration, and how to break this challenge has become a crucial link. In practice, the teaching of architectural interior design often involves multi-disciplinary fields of knowledge, the integration of aesthetic education in which the integration of interdisciplinary knowledge is needed, such as knowledge of architecture, aesthetics, psychology, materials, art development history knowledge, etc., through the interdisciplinary integration of this knowledge can promote the innovation of the aesthetic education, and lead students to learn more comprehensive professional knowledge of architectural interior design. However, it is difficult to integrate the knowledge of various disciplines, and the knowledge of various disciplines is also in a divided state in vocational education, which increases the difficulty of interdisciplinary integration, so how to effectively realize the integration of interdisciplinary knowledge and form a more complete and systematic education system has become an important challenge.

4.4. Challenges brought by students' aesthetic differences and inconsistent evaluation standards

The innovation of teaching architectural interior design oriented to aesthetic education faces the challenges brought by students' aesthetic differences and inconsistent evaluation standards. This is mainly due to the fact that aesthetics is a kind of subjective index, which is related to students' feelings and evaluation, and students have certain individualized differences, with different aesthetic standards and different aesthetic preferences among students, which will lead to uneven effects of aesthetic education. In practice, teachers are required to respect students' aesthetic differences and encourage students to carry out individualized aesthetic expression, based on which they can highlight the teaching characteristics and improve the quality and effect of architectural interior teaching^[1]. However, the realization of this teaching idea is relatively difficult. How to guide students to establish a correct aesthetic concept while combining the students' aesthetic differences in personalized teaching is an important challenge for teachers, determining the quality of architectural interior design teaching, as well as the cultivation of students' aesthetic literacy. Therefore, it becomes crucial to break the challenges brought by students' aesthetic differences and inconsistent evaluation standards.

5. Suggested countermeasures to promote the teaching innovation of architectural interior design with aesthetic education as the orientation

5.1. Strengthen the construction of teachers and improve teachers' aesthetic education quality

In order to further improve the quality and effectiveness of the teaching of architectural interior design in vocational colleges and universities and improve the teaching mode, it is necessary to vigorously build an aesthetic-oriented model of education, to effectively promote the integration of aesthetic knowledge in the teaching of architectural interior design in vocational colleges and universities and effectively cultivate the

students' aesthetic qualities and improve their professional abilities. Strengthening the construction of the teacher team is a key link, through the enhancement of the teacher's aesthetic education, which can guarantee the orderly conduct of education and teaching, and systematically promote the aesthetic education in the education of architectural interior design, to form an aesthetic education-oriented model of education ^[2]. In practice, vocational colleges need to vigorously strengthen the training of teachers, organize teachers to participate in the study and further study of aesthetics, art history and other courses on a regular basis, so that teachers can have a deeper grasp and understanding of aesthetic principles through training, and gradually promote the improvement of teachers' aesthetic vision. Only on this basis can teachers gradually improve their professional ability, make teachers competent for the integration of aesthetic education in architectural interior design teaching, ensure that architectural interior design teaching can effectively form an aesthetic education-oriented education model, and strengthen the quality and effect of talent training.

5.2. Innovate the teaching model and introduce interdisciplinary content

The innovation of teaching mode is crucial in the teaching of architectural interior design, and it is also a key part of the effective integration of aesthetic orientation. As a result, teachers need to vigorously innovate the teaching mode in the teaching phase of architectural interior design and comprehensively integrate interdisciplinary teaching content to effectively promote the cultivation of students' aesthetic qualities through interdisciplinary teaching and enhance the quality and effect of architectural interior design teaching ^[3]. In practice, teachers are required to integrate multidisciplinary knowledge, such as the knowledge of aesthetics, psychology, environmental studies, history of art development, etc., to guide students to learn comprehensive aesthetic knowledge through the integration of multidisciplinary knowledge, and then to explore interdisciplinary knowledge by teaching professional knowledge of architectural interior design. This will not only enable students to learn to understand aesthetic knowledge from different perspectives, but also gradually strengthen students' professional knowledge of architectural interior design, gradually cultivate students' interdisciplinary learning ability, and ultimately improve students' aesthetic ability, professional level, and then complete the high-quality training of architectural interior design talents.

5.3. Establish diversified evaluation standards, respect students' aesthetic differences

In order to further promote the innovation of architectural interior design teaching, and effectively integrate the aesthetic orientation, it is necessary to establish a diversified evaluation criteria, while focusing on respecting the aesthetic differences of students, and then use this as a starting point to strengthen the quality and effectiveness of architectural interior design teaching. In practice, teachers need to fully realize that aesthetics is a subjective feeling, so different students have different perceptions and preferences for beauty, and on this basis, teachers should pay attention to the diversification of evaluation standards ^[4]. For example, teachers can establish a multi-dimensional evaluation and evaluate students' work based on their creativity, practicality, aesthetics, and other dimensions. In the design stage, students can also combine their own understanding of beauty and professional expertise to create personalized works. Then, teachers can evaluate students' work in multiple dimensions, reflect on the creation effect and quality of students' work, and put forward improvement suggestions for students. This process can highlight the diversity of evaluation criteria, and respect the individual aesthetic differences of the students at the same time, which helps to promote the continuous optimization and improvement of the quality and level of architectural interior design teaching, and complete the teaching task of

architectural interior design with high quality.

5.4. Strengthen practical teaching and provide more aesthetic practice opportunities

To carry out the teaching innovation of architectural interior design based on aesthetic education orientation, practical teaching should be strengthened to provide students with more opportunities for aesthetic education practice, and on this basis, students' practical operation ability should be improved, students' aesthetic quality should be cultivated and the teaching effectiveness of architectural interior design should be improved ^[5]. In practice, vocational colleges and universities can cooperate with design companies or studios within the region to establish off-campus student practice bases through in-depth cooperation between the two parties. Students can be required to participate in actual design projects after learning professional knowledge of architectural interior design. Then, through the participation of students in the project practice, they can feel the integration of aesthetic elements in the design more deeply. This will enable students to form a deep understanding of aesthetic elements, and also stimulate students' creative inspiration, strengthen students' knowledge and understanding of professional knowledge of architectural interior design, and then achieve the educational effect of enhancing students' professional level and practical ability.

6. Conclusion

In summary, in the teaching of architectural interior design, carrying out education and teaching oriented by aesthetic education is an important link, and it is also the key to realizing teaching innovation. Therefore, the thesis has carried out in-depth exploration and research on the teaching innovation of architectural interior design guided by aesthetic education, and put forward the corresponding educational innovation countermeasures, such as strengthening the construction of teachers, building interdisciplinary teaching mode, the establishment of diversified evaluation standards, strengthening students' aesthetic education practice teaching, etc. Through the above measures, this paper helps improve the teaching quality of architectural interior design, forms an aesthetic education-oriented education model, and provides high-quality talents for the development of architectural interior design.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Zhou X, 2023, Combination of Architectural Interior Design Teaching and Ethnic Traditional Cultural Elements. Textile Report, 2023(10): 109–111.
- [2] Wang Y, Zhang XD, Cheng X, 2019, The Construction and Implementation of Project-based Curriculum Group in Higher Vocational Education — Taking Interior Design Major as an Example. Education and Teaching Forum, 2019(27): 261–263.
- [3] Mao TB, Li X, 2020, Reflections on the Teaching Reform of Interior Design Principles Course for Architecture Majors. Daguan, 2020(3): 31–32.
- [4] Cai XY, Sun S, 2024, Innovation and Practice of Integrating Local Culture into the Ideological and Political

Teaching Model of “Residential Space Interior Design” Course in Universities. *Journal of Xingtai University*, 2024(2): 152–159.

- [5] Yang H, Yang PX, Li ZY, 2024, Research on the Practice of Teaching Aesthetic Education in Colleges and Universities Based on General Education: Taking Interior Design and Appreciation Course as an Example. *Art Education Research*, 2024(3): 124–126.

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Research on the Comprehensive Evaluation of the Curriculum System for the Higher Vocational Pharmacy Operation and Management Major Based on the OBE Theory

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Abstract: This research is based on the OBE theory and aims to construct a scientific and reasonable comprehensive evaluation system for the curriculum system of the higher vocational pharmacy operation and management major. Through various research methods, it deeply analyzes the current situation and problems of the curriculum system, clarifies the evaluation indicators and standards, aiming to provide strong support for optimizing the curriculum system of the higher vocational pharmacy operation and management major, so as to improve the quality of talent training and meet the development needs of the pharmaceutical industry.

Keywords: OBE theory; Higher vocational pharmacy operation and management major; Curriculum system evaluation

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1. Introduction

With the rapid development of the pharmaceutical industry, the demand for professionals in pharmacy operations and management is increasing, and the requirements are also constantly rising. Higher vocational education, as an important way to cultivate applied talents, the rationality and scientificity of its curriculum system for the pharmacy operation and management major is of great significance. The outcome-based education (OBE) theory emphasizes taking students' learning outcomes as the core, and designing and implementing educational and teaching activities around the abilities and qualities that students should achieve upon graduation^[1-2]. Applying the OBE theory to the evaluation of the curriculum system of the higher vocational pharmacy operation and management major helps to improve the pertinence and effectiveness of talent training and better meet the needs of the industry.

2. Theoretical Basis

2.1. Overview of the OBE theory

The OBE theory was proposed by American educator William G. Spady in the 1980s. Its core idea is that all activities in the education system should revolve around the learning outcomes ultimately achieved by students. In higher vocational education, the OBE theory requires that the design of the curriculum system, the selection of teaching methods, and the construction of the evaluation system should all be guided by the abilities and qualities that students can demonstrate in practical work after graduation.

Its core idea is that all activities in the education system should revolve around the learning outcomes ultimately achieved by students. This means that from the setting of educational goals, the planning of curriculum content, the selection of teaching methods, to the implementation of teaching evaluation, everything should start from and end with the abilities and qualities that students can achieve after graduation^[3]. Under the OBE theory framework, educators first need to clarify what knowledge, skills, and values students should possess after completing their studies, and then reverse-design the entire educational process based on these expected outcomes.

2.2. Necessity of applying the OBE theory to the higher vocational pharmacy operation and management major

In higher vocational education, the application of the OBE theory is of great significance. As an important part of higher education, higher vocational education undertakes the important task of cultivating high-quality applied talents for society. Guided by the abilities and qualities that students can demonstrate in practical work after graduation, the OBE theory requires that the design of the curriculum system be closely combined with industry's actual needs. For example, for students majoring in pharmacy operation and management, the curriculum system should cover content such as drug market analysis, drug marketing skills, and drug quality management regulations to ensure that students can quickly adapt to the jobs in drug operation enterprises after graduation.

The higher vocational pharmacy operation and management major aims to cultivate applied talents with professional skills in drug procurement, sales, storage, quality management, as well as good professional ethics and teamwork spirit. Applying the OBE theory can better connect with industry needs, clarify the ability goals that students should possess, make the curriculum system more scientific and reasonable, and make the teaching process pay more attention to the cultivation of students' practical and innovative abilities, thereby improving the quality of talent training and enhancing students' employment competitiveness^[4-5].

3. Construction of the curriculum system evaluation model for the higher vocational pharmacy management major

3.1. Evaluation framework design

Based on the OBE theory, a “three-dimensional and nine-element” evaluation framework is constructed to comprehensively evaluate the curriculum system of the higher vocational pharmacy management major from the goal dimension, curriculum dimension, and evaluation dimension (Table 1).

Table 1. “Three-dimensional and nine-element” evaluation framework

| First-level indicators | Second-level indicators | Scoring standards | Score range |
|------------------------|---|---|---|
| Goal dimension | (1) Degree of fit with industry requirements (2) Degree of compliance with national standards (3) Degree of match with school positioning | Comparison with the “Vocational education specialty catalog” Analysis of pharmaceutical industry research reports Integration of school characteristics | Enterprise research reports Professional filing materials Talent training programs |
| Curriculum dimension | (1) Modular curriculum structure (2) Practical teaching system (3) Resource guarantee conditions | Curriculum offering based on post abilities Work-study integrated training model Digital teaching resource library | Curriculum system architecture diagram Implementation of in and out-of-school training Teaching platform data |
| Evaluation dimension | (1) Multiple evaluation subjects (2) Process-oriented evaluation content (3) Outcome-oriented indicators | Proportion of enterprise participation in evaluation Formative assessment methods Degree of achievement of post abilities | Assessment record sheets Third-Party evaluation reports Graduate tracking data |

3.2. Evaluation index system

Table 2 shows the index system determined through three rounds of expert consultations using the Delphi method.

Table 2. The index system determined through three rounds of expert consultations using the Delphi method

| First-level indicators | Second-level indicators | Scoring standards | Score range |
|--|--|---|-------------|
| Goal rationality (Weight 30%) | Depth of industry demand analysis (8%) | Conduct more than 2 industry research surveys per year (5 points), and the surveys cover more than 80% of cooperative enterprises (3 points) | 0-8 points |
| | Degree of compliance with national standards (10%) | Fully comply with the “Higher Vocational Pharmacy Management Major Teaching Standards” (6 points), with characteristic and innovative content (4 points) | 0-10 points |
| | Measurability of training goals (12%) | Set more than 6 quantifiable ability indicators (8 points), and establish a goal-achievement calculation model (4 points) | 0-12 points |
| Curriculum scientificity (Weight 40%) | Modular curriculum structure (15%) | Designed based on post abilities (9 points) Set up new-format and new-standard modules (6 points) | 0-15 points |
| | Practical teaching system (18%) | Practical class hours account for $\geq 45\%$ (10 points) Have a virtual simulation training system (8 points) | 0-18 points |
| | Resource update mechanism (7%) | Revise more than 50% of textbooks every three years (3 points) Have a dynamic case library (4 points) | 0-7 points |
| Evaluation effectiveness (Weight 20%) | Multiple evaluation methods (8%) | Implement the “1 + X” certificate assessment (3 points) Jointly cultivate students by schools and enterprises, and participate in the formulation of evaluation content and methods (5 points) | 0-8 points |
| | Proportion of process-oriented evaluation (6%) | Formative evaluation accounts for $\geq 40\%$ (4 points) Use learning outcome portfolios (2 points) | 0-6 points |
| | Feedback application effect (6%) | Evaluation results are used for curriculum improvement (4 points) Establish a continuous improvement loop (2 points) | 0-6 points |

Table 2 (Continued)

| First-level indicators | Second-level indicators | Scoring standards | Score range |
|--|--------------------------------------|--|-------------|
| Improvement sustainability (Weight 10%) | Dynamic adjustment mechanism (5%) | Adjust 10% of the curriculum content every year (3 points) Establish a channel to quickly respond to industry changes (2 points) | 0-5 points |
| | Quality assurance system (5%) | Teachers win awards in vocational ability competitions (2 points) Students win awards in vocational ability competitions (3 points) | 0-5 points |

3.3. Application instructions

Composition of the review group: When evaluating, a review group composed of education experts (40%), industry representatives (30%), teachers (20%), and students (10%) needs to be formed. The participation of different subjects can evaluate the curriculum system from multiple perspectives to ensure the comprehensiveness and objectivity of the evaluation results.

Evaluation method: The “evidence chain” evaluation method is adopted, which requires providing relevant evidence such as talent training programs (goal dimension), curriculum teaching documents (curriculum dimension), assessment records, and improvement reports (evaluation dimension). Through the analysis and evaluation of this evidence, it is possible to more accurately understand the implementation situation and effects of the curriculum system.

Dynamic weight adjustment mechanism: Implement a dynamic weight adjustment mechanism, and update 10%-15% of the index content every year according to changes in pharmaceutical industry policies. This ensures that the evaluation index system can timely reflect the development and changes of the industry and improve the accuracy and effectiveness of the evaluation.

4. Construction of the curriculum system for the higher vocational pharmacy operation and management major based on the OBE theory

In the process of constructing the curriculum system for the higher vocational pharmacy operation and management major based on the OBE theory, through extensive market research, in-depth enterprise interviews, analysis of industry development trends, and policy interpretation, etc., the industry’s demand for talents was comprehensively and deeply analyzed. Then, multiple core positions were determined, and each position has its unique ability requirements, suitable courses, modular projects, and teaching methods.

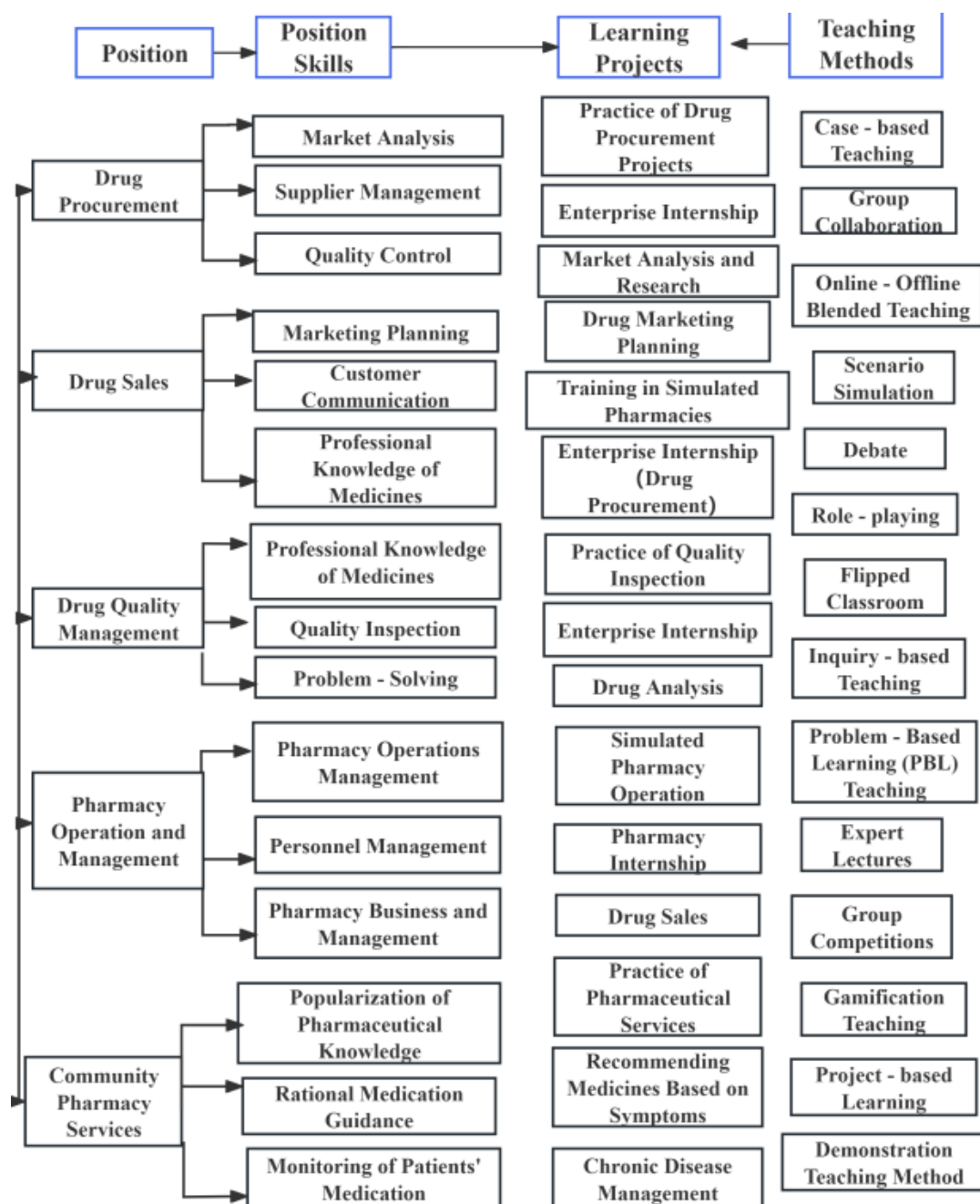


Figure 1. Flow chart of positions-skills-projects-teaching methods

5. Empirical research: Verification of the curriculum evaluation model based on dynamic weights

5.1. Data collection and processing methods

5.1.1. Experimental design

In order to scientifically and rigorously verify the effectiveness of the curriculum evaluation model based on dynamic weights, this research adopts a “double-blind controlled experiment.” The specific settings are as follows.

Experimental group: Three higher vocational colleges were carefully selected as the experimental group. From September 2023 to December 2024 (covering two complete semesters), the curriculum evaluation system constructed in this research was applied. These three colleges are representative in terms of professional settings, teaching staff, and student scale, and can better reflect the application effect of the model under different conditions.

Control group: Three higher vocational colleges were also selected as the control group. During the same period, the traditional curriculum evaluation method was used. The control group was selected to have similar basic conditions as the experimental group to ensure the comparability of the experimental results.

5.1.2. Data characteristics

The data sources of this research are extensive and have been strictly screened and processed to ensure the reliability and effectiveness of the data. The specific data characteristics are as follows.

Sample data: Through a carefully designed teacher questionnaire, 287 valid questionnaires were collected. The questionnaire content covers teachers' evaluations and feedback on various aspects of curriculum teaching. 109 evaluation data were obtained from enterprises. These evaluations come from enterprises that have cooperative relationships with higher vocational colleges and mainly involve the performance of graduates in enterprises and their views on the school's curriculum settings. 423 students were tracked and investigated to comprehensively understand students' experiences, gains during the curriculum learning process, and their employment situations after graduation.

Industry data: The position requirement information of the five school-enterprise cooperative pharmaceutical enterprises in the past three years was deeply mined. These data detail the knowledge, skills, and quality requirements of different positions in the pharmaceutical industry, providing an important basis for analyzing the matching degree between the curriculum and industry needs.

Curriculum data: The files of 8 core courses of the pharmacy operation and management major were sorted out. The curriculum files contain detailed information such as curriculum standards, teaching plans, and assessment methods, which is helpful for comprehensively understanding the setting and implementation of the courses. All original data have been desensitized to protect data privacy while ensuring data availability.

5.2. Model validity verification

5.2.1. Content validity verification

Form a small expert group: Invite 3–5 senior teachers majoring in pharmacy operation and management, and 2–3 business backbones from cooperative enterprises. Introduce in detail the various indicators in the curriculum evaluation model to them. For example, for the “depth of industry demand analysis” in “goal rationality”, explain that it is measured based on the number of industry research surveys per year and the proportion of covered enterprises. Ask the experts to judge whether these indicators can comprehensively and accurately reflect the curriculum quality. Let the experts provide feedback in the form of scoring and written comments, and then comprehensively organize and adjust, and improve the model according to the opinions of the majority of experts.

Refer to the excellent curriculum standards within the school: Find out the evaluation standards of the excellent courses of the pharmacy operation and management major selected by the school in the past. Compare the existing curriculum evaluation model with them to see if the indicators are similar. If the excellent curriculum standards emphasize the proportion of practical teaching, and the weight of this part in the existing

model is low, consider appropriately increasing the weight to make the model more in line with the evaluation logic of high-quality courses recognized by the school.

5.2.2. Structural validity verification

Simple factor analysis attempt: Use the data statistical function of Excel to preliminarily sort out the collected data, such as student grades and teacher evaluations. Group the data with high correlations. For example, the “Pharmaceutical Comprehensive Knowledge and Skills Course Grade” and the “Pharmacy Operation and Management” data are closely related and can be grouped into the “Pharmaceutical Service” group. Similarly, sort out other groups and see if the grouping results can correspond to the first-level indicators such as “curriculum scientificity” and “evaluation effectiveness” in the model. If most of them can correspond, it indicates that the model structure has a certain degree of rationality.

Internal consistency test: Calculate the consistency of the scores of the same type of indicators. For example, under the “curriculum scientificity” indicator, there are secondary indicators such as “modular curriculum structure” and “practical teaching system”. Use a simple calculation method (such as calculating the standard deviation of the scores of these indicators; A small standard deviation indicates high consistency) to see if the evaluations of these secondary indicators by students or teachers are similar. If they are similar, it indicates that the model structure in this part is relatively stable, and each indicator can jointly reflect the “curriculum scientificity” dimension.

5.2.3. Criterion-related validity verification

Compare employment data: Collect the employment information of graduates from colleges using the new model (experimental group) and the traditional model (control group). Mainly focus on the employment rate and the employment match rate. The data can be obtained through the school’s employment guidance center, and then the data of the two groups are compared. If the employment match rate of graduates in the experimental group is significantly higher than that in the control group, for example, 10% higher, it can be preliminary explained that the new curriculum evaluation model has a positive effect on improving the employment match degree of students and is related to the actual employment results.

Student feedback survey: Design a simple questionnaire and ask graduates about the help of the courses in school in their work. Questions such as “Did the practical teaching links in the courses help you a lot in your actual work after employment?” Let graduates answer with “very helpful”, “helpful”, “average”, “less helpful”, and “not helpful at all.” Compare the feedback of graduates in the experimental group and the control group. If more people in the experimental group think it is helpful, it indicates that the courses under the new model are more in line with actual needs, verifying the criterion-related validity of the model and students’ actual gains.

6. Conclusion and prospect

Prospect of model application: Elaborate on the potential expansion directions of this model in the future construction of the curriculum system for the higher vocational pharmacy operation and management major. For example, with the accelerated digital transformation of the pharmaceutical industry, the model can further incorporate the evaluation of digital skills training, such as adding evaluation indicators for students’ abilities to master drug e-commerce operations and the operation of intelligent warehousing management systems, helping the major keep up with the pace of industry development. It can also explore the possibility of promoting the

model to other related majors or different levels of education, such as expanding it to secondary vocational or undergraduate pharmaceutical majors to improve the versatility of educational evaluation ^[6].

Analysis of limitations: Honestly point out the shortcomings of the model. For example, in the data collection process, due to the limited number of sample colleges, the results may not fully cover all types of higher vocational colleges. Although the dynamic weight adjustment mechanism takes into account changes in industry policies, its response to sudden market situations (such as short-term drastic changes in the industry caused by the epidemic) may not be timely enough. In addition, in terms of evaluation indicators, it may not be possible to comprehensively and accurately measure some difficult-to-quantify ^[7-8].

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References

- [1] Wang T, Wang YZ, Lv CZ, 2024, Analysis of the Quality Assurance System of Open Universities Based on the OBE Concept. *Contemporary Vocational Education*, 2024(5): 105–112.
- [2] Xu WJ, Zhang XY, Zhang YX, 2023, Research on the Optimization of the Curriculum Evaluation System in Colleges and Universities under the OBE Concept. *Journal of Heilongjiang Institute of Teacher Development*, 42(11): 41–43.
- [3] He YH, Zhu H, 2019, OBE: Origin, Core and Practice. *China Higher Education Research*, 2019(3): 45–52.
- [4] Li SQ, Xie J, 2023, Research on the Reform of the Vocational College Curriculum Evaluation Based on the OBE Concept. *Journal of Shunde Polytechnic*, 21(4): 62–68.
- [5] Zhang E, Wang LG, Sun G, 2023, Research on the Curriculum Assessment and Evaluation System in Colleges and Universities Based on the OBE Concept and Blockchain Technology. *China Education Informatization*, 29(18): 21–26.
- [6] Hu QH, Cai XL, Zhang Y, 2022, Construction of the Undergraduate Teaching Quality Assurance System Based on the OBE Concept — Taking Huizhou University as an Example. *Journal of Huizhou University*, 42(6): 112–116.
- [7] Jiang Y, Wu X, Song P, et al., 2021, Construction of the Curriculum Assessment and Evaluation System in Colleges and Universities under the OBE Concept. *Education Teaching Forum*, 2021(35): 141–144.
- [8] Li HM, Lu GD, Zhang JP, 2017, Design and Case Analysis of MOOC Courses Based on the OBE Concept. *Modern Educational Technology*, 27(1): 68–74.

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Research on the Collaborative Education of College Counselors, Ideological and Political Theory Teachers, and Professional Course Teachers from the Perspective of “Three-wide Education”

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Abstract: In the new era, the educational work in colleges and universities is facing new challenges and opportunities. The concept of “Three-wide Education” provides important theoretical guidance and practical paths for the education work in colleges and universities. This paper takes the research on the collaborative education of college counselors, ideological and political course teachers, and professional course teachers from the perspective of “Three-wide Education” as the entry point to explore the construction of a trinity collaborative education mechanism to enhance the effectiveness of education. The research of this paper aims to provide theoretical support and practical guidance for the collaborative education of college counselors, ideological and political course teachers, and professional course teachers, and contribute to improving the level of education work in colleges and universities.

Keywords: “Three-wide Education”; College counselors; Ideological and political course teachers; Professional course teachers; Collaborative education

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1. Introduction

With the continuous deepening of higher education reform in China, cultivating socialist builders and successors with comprehensive development in moral, intellectual, physical, aesthetic, and labor education has become a crucial mission for universities. The “Three-wide Education” concept-encompassing whole-staff education, whole-process education, and all-round education, emphasizes the collective participation of all university staff. It integrates educational efforts throughout students’ entire academic journey from enrollment to graduation,

extending to academic studies, daily life, ideological development, and other domains to construct a holistic educational ecosystem. Currently, the pilot reform of Three-wide Education is at a critical stage of nationwide implementation, institutional deepening, and quality enhancement ^[1]. Extensive research reveals persistent limitations in educational agents, content design, and institutional mechanisms within the Three-wide Education framework ^[2]. Challenges such as misaligned objectives among stakeholders, insufficient motivation, and fragmented coordination hinder the formation of synergistic educational forces. Since its inception, this concept has been tasked with consolidating university-wide resources, spanning students' entire growth trajectory, and covering all aspects of campus life to fulfill the fundamental mandate of fostering virtue through education ^[3]. Within this system, university counselors, ideological and political education teachers, and discipline-specific faculty members assume distinct yet interconnected roles: counselors monitor ideological dynamics, political educators deliver theoretical instruction, and discipline faculty cultivate professional competencies, collectively forming a collaborative education network. However, systemic discrepancies persist between talent cultivation and other institutional priorities such as teaching and research. Imbalances manifest as overemphasis on knowledge transmission over character development, research over teaching, and intellectual training over moral cultivation ^[4]. Current deficiencies in effectively integrating these three forces underscore the urgency to clarify role boundaries, optimize collaboration mechanisms, and strengthen synergies in ideological-political guidance, academic mentoring, and life coaching. Addressing these challenges is essential for holistically enhancing student development, representing a pressing practical imperative in contemporary higher education.

2. The theoretical background of the concept of “Three-wide Education”

2.1. Definition of “Three-wide Education”

The Opinions on Strengthening and Improving Ideological and Political Work in Higher Education Under New Circumstances issued by the CPC Central Committee and the State Council explicitly advocates the “Three-wide Education” framework-whole-staff education, whole-process education, and all-round education, as a guiding principle for talent cultivation ^[5]. Recognized as a cornerstone of ideological-political education in the new era, this framework seeks to establish an integrated mechanism engaging all stakeholders across all stages and dimensions. Whole-staff education mandates that all educational agents, administrators, faculty, and support staff assume collaborative responsibilities through differentiated functional capacities ^[6]. Whole-process education emphasizes continuous ideological guidance spanning students' academic journey from enrollment to graduation, extending into their professional trajectories. All-round education transcends classroom instruction to encompass intellectual, psychological, ethical, and lifestyle development, ensuring comprehensive student formation. Notably, all-round education serves as both an expansion and safeguard for the whole-staff and whole-process dimensions ^[7].

2.2. The core content of “Three-wide Education”

As an integral component of China's educational policy, the “Three-wide Education” framework centers on fostering virtue through education as its fundamental mission. It requires universities to balance knowledge acquisition and skill development with moral cultivation, guiding students to establish scientifically grounded worldviews, life philosophies, and value systems. To operationalize this vision, institutions must construct multi-tiered collaborative mechanisms that shift education from isolated efforts (“single-combat mode”) to

systemic synergy (“joint-operations mode”). This involves forging an educational consortium integrating counselors, ideological-political educators, and discipline-specific faculty, collectively advancing students’ holistic development.

2.3. The relationship between “Three-wide Education” and higher education in colleges and universities

Universities, as primary incubators of talent, bear the critical responsibility of nurturing youth for the new era. Traditional classroom-centric models increasingly prove inadequate amid societal evolution and pedagogical reforms. The Three-Wide Education framework addresses this gap by redefining education as a systemic endeavor transcending disciplinary boundaries. It positions ideological-political education not as isolated courses but as a pervasive force synergized through counselor-student interactions, ideological instruction, and disciplinary mentorship. Such integration enables systematic enhancement of students’ political literacy while catalyzing holistic competency development, critical for cultivating well-rounded professionals equipped to meet 21st-century challenges.

3. The role of college counselors in the “Three-wide Education”

3.1. The role positioning of counselors

College counselors are the intermediate bridges for the exchange of opinions and communication of viewpoints among the school management, teaching staff, and students’ families. Therefore, college counselors play an active role in the “Three-wide Education” work ^[8]. They are not only responsible for the daily affairs management and ideological and political education of students, but also undertake multiple tasks such as mental health counseling and academic planning guidance. Through close daily contact with students, counselors can deeply understand the ideological trends and psychological states of students and provide personalized educational guidance in a timely manner. In addition, counselors also promote the ideological growth and all-around development of students through regular heart-to-heart communication and organization of campus activities, and play an important role in students’ study, life, and maintenance of mental health.

3.2. The role of counselors in ideological and political education

College counselors, as the “front line” of students’ ideological and political education, play a key role in ideological guidance. Although the role of counselors has been constantly adjusted in recent years, their core responsibility of ideological and political education has never changed. Through frequent daily contact, they grasp the ideological trends of students in a timely manner and help students solve the ideological confusion and psychological problems encountered in the growth process in a targeted manner. In addition, counselors actively organize activities such as theme class meetings and the construction of the party and the league to enhance students’ political quality and sense of social responsibility. At the same time, they closely collaborate with ideological and political course teachers and professional course teachers to guide students to truly transform ideological and political theoretical knowledge into actions and achieve the unity of knowledge and action.

3.3. The responsibilities of counselors in the daily management of students

Another important responsibility of counselors is the daily management of students, which includes the management of students’ attendance, dormitory management, and the implementation of the reward

and punishment system. Through the handling of these specific affairs, counselors not only ensure the implementation of the school's rules and regulations but also can discover problems and carry out targeted education in their daily interactions with students. As the group most closely related to students in colleges and universities, every word and deed of college counselors will have a profound impact on students^[9]. Although the daily management work seems cumbersome, it is an important platform for students' ideological education. Through these management works, counselors can better grasp the dynamics of students and discover and solve students' ideological problems in a timely manner.

4. The contribution of ideological and political course teachers in the “Three-wide Education”

4.1. The roles and responsibilities of ideological and political theory teachers

Ideological and political education teachers serve as the main force in higher education's ideological and political work, playing an indispensable role within the “Three-wide Education” framework. By teaching Marxist theory, the president of the CCP's Thought on Socialism with Chinese Characteristics for a New Era, and socialist core values, they guide students to establish correct political stances and deepen their awareness of responsibilities to the nation, society, and individuals. Beyond imparting theoretical knowledge, these educators emphasize integrating classroom teaching with social practice, encouraging students to apply theories to real-world contexts. This approach fosters the cultivation of scientifically grounded worldviews, life philosophies, and value systems through experiential learning, positioning them as pivotal mentors in students' ideological growth and architects of their ethical frameworks.

4.2. The role of ideological and political courses in ideological and political education in colleges and universities

The theory of the subject of ideological and political education holds that both educators and students are the subjects of ideological and political education^[10]. Ideological and political courses in colleges and universities are important channels for carrying out ideological and political education and play a fundamental role in the ideological growth of college students. Through systematic study of the basic principles of Marxism, national history, national conditions, and the current situation of social development, students can enhance their identification with the path of socialism with Chinese characteristics, improve their ideological and political quality, and sense of social responsibility. In teaching, ideological and political course teachers not only impart theoretical knowledge, but also pay more attention to guiding students to think and discuss in depth by combining social hotspots and current affairs issues, closely combine theory with practice, and organize social practice activities, allowing students to deepen theoretical understanding in personal experience, clarify their own historical mission, and lay a solid ideological foundation for serving the society and contributing to the country.

4.3. The collaborative work of ideological and political course teachers and counselors

College counselors and ideological and political course teachers undertake different but complementary important functions in students' ideological and political education. Through daily management and close contact with students, counselors can grasp students' ideological trends in a timely manner; ideological and political course teachers provide theoretical guidance for students through systematic classroom teaching.

However, in actual work, there is often a certain degree of separation between ideological and political courses and daily ideological and political education work ^[11]. To maximize the educational effect, the two should establish a close collaboration mechanism and achieve information sharing through regular communication. Counselors promptly provide feedback on students' ideological problems to ideological and political course teachers, and ideological and political course teachers then provide targeted theoretical guidance, thereby integrating ideological and political education both inside and outside the classroom and truly achieving the goal of educating all students throughout the entire process and in all aspects.

5. The function of professional course teachers in the “Three-wide Education”

5.1. The educational responsibilities of professional course teachers

Professional course teachers are important guides for the career development of college students. Their responsibilities not only lie in imparting professional knowledge and skills, but also include cultivating students' professional spirit and professional ethics. Under the background of “Three-wide Education”, professional course teachers are not only disseminators of academic knowledge, but also should become important participants in ideological and political education. In their daily teaching and research guidance, through words and deeds, they imperceptibly influence students' ideological concepts and behavioral norms, integrate elements of ideological and political education into the professional teaching process, guide students to achieve the integration of professional skills and social responsibility, and cultivate professional talents with a sense of responsibility.

5.2. The integration of professional education and ideological and political education

With the promotion of the concept of “Three-wide Education”, the deep integration of professional education and ideological and political education has become an important trend in the teaching reform of colleges and universities. Under the traditional teaching mode, ideological and political education and professional education were separated from each other with loose connections. However, the “curriculum ideology and politics” mode emphasizes the integration of the two. Professional course teachers closely combine disciplinary knowledge with national development and social needs, enabling students to enhance their sense of social responsibility and mission awareness while mastering professional skills. For example, engineering professional teachers guide students to reflect on technological development and social responsibility by discussing engineering ethics; economics professional teachers, by combining economic policy analysis, strengthen students' understanding of national policies and economic development, thereby achieving the coordinated progress of ideological and political education and professional education.

5.3. The interaction between professional course teachers and ideological and political course teachers, as well as counselors

From the connotation of the “Three-wide Education”, “Whole-Staff Education” first requires all groups of teachers and students in the university to participate in the educational work. “Whole-Process Education” also requires the implementation of education in all academic periods for college students. “All-Round Education” further demands the implementation of education in all aspects of college students ^[12]. In the “Three-wide Education” system, the collaborative cooperation among professional course teachers, ideological and political course teachers, and counselors is of vital importance to the educational work in colleges and universities. They

respectively undertake different but complementary responsibilities: Professional course teachers cultivate students' values imperceptibly through the teaching of disciplinary knowledge. Ideological and political course teachers provide systematic ideological and political theory education. Counselors, through daily management and guidance, help students transform the learned theories into practical actions. To effectively exert the collaborative education function of the three, colleges and universities should establish a perfect communication mechanism, hold regular exchange meetings, and timely share students' ideological trends and learning conditions; enhance the professional ability of counselors, build a communication bridge for all counselors to participate in, and break through the "last mile" of the "Three-wide Education" work ^[13]. Meanwhile, in major campus activities or social practices, all three parties should be encouraged to participate and cooperate jointly.

6. Mechanism building for tripartite collaborative education

6.1. The importance of collaborative education

In modern higher education systems, collaborative education transcends the responsibility of isolated departments or individuals, it requires the collective participation of all campus units, faculty categories, and administrative personnel. While counselors, ideological-political educators, and discipline-specific faculty have distinct roles in student development, their objectives align: to cultivate well-rounded, high-caliber talent through the integration of ideological-political education and disciplinary instruction. Thus, establishing an effective collaborative education mechanism is imperative.

6.2. The design of the collaborative education mechanism

To achieve efficient synergy among counselors, ideological-political educators, and discipline-specific faculty, institutions must structurally design and refine their systems. Institutional mechanisms serve as a robust guarantee for implementing the Three-wide Education framework with precision and granularity ^[14]. Firstly, schools need to clarify the job responsibilities of the three and the specific requirements for collaborative education to ensure that the work goals and tasks of all parties are consistent. Secondly, a regular communication and feedback mechanism among the three should be established. Through communication and interaction, problems existing in students' ideological and political and academic development can be discovered in a timely manner, and solutions can be discussed jointly. In addition, schools should also encourage the three to cooperate with each other in specific work, such as jointly designing course modules that combine ideological and political education and professional education, or jointly carrying out social practice activities, etc.

6.3. The evaluation of the effect of collaborative education

The effect of collaborative education is not only reflected in students' academic achievements, but also in the improvement of their ideological and political literacy, sense of social responsibility, and comprehensive quality. Therefore, schools should establish corresponding evaluation systems to assess and provide feedback on the collaborative work of counselors, ideological and political course teachers, and professional course teachers. Through the evaluation of students' ideological and political level, academic progress, and social practice performance, schools can timely adjust and optimize the mechanism of collaborative education to ensure its effectiveness and sustainability.

7. Conclusion and prospect

“Three-wide Education” is a key approach for universities to achieve moral education and cultivate talents in the new era, and an important guarantee for improving the quality of talent cultivation^[15]. With the in-depth advancement of higher education reform, the collaborative mechanism of “Three-wide Education” will play an increasingly important role in university education in the future. The core value of the new-era “Three-wide Education” philosophy lies in cultivating a pervasive institutional awareness of “education by everyone, education at all times, and education in all contexts”^[16]. The deep integration among college counselors, teachers of ideological and political courses, and teachers of specialized courses will directly determine the quality of students’ ideological and political literacy and professional development. To continuously optimize the effectiveness of collaborative education, universities should, through institutional arrangements, clarify role positioning and responsibility boundaries, and construct a regular communication and exchange mechanism to ensure efficient collaboration among the three. Meanwhile, universities should also actively utilize modern technological means such as big data and artificial intelligence to establish intelligent student information analysis and sharing platforms, grasp students’ ideological trends and academic conditions in real time, and provide precise guidance and intervention, thereby improving the efficiency of collaborative education. Furthermore, universities should further improve the teacher evaluation and incentive mechanism, pay special attention to the ideological and political education ability of counselors and professional course teachers, enhance teachers’ educational quality through special training and curriculum construction; actively promote diversified and in-depth social practice activities, guide students to deepen the understanding and application of ideological and political theories in practice, and effectively enhance the pertinence and effectiveness of education.

Disclosure statement

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References

- [1] Feng G, 2023, The Theoretical Implications and Deepening Paths of “Three-Whole Education” in Colleges and Universities in the New Era. *Journal of Xiamen University (Philosophy and Social Sciences Edition)*, 2023(1): 1.
- [2] Xia R, Liu M, 2022, Review and Prospect: A Research Review of “Three-Whole Education”. *Cultural and Educational Materials*, 2022(15): 46–50.
- [3] Wu F, 2025, Exploration of the “Three-Whole Education” Model in Local Colleges and Universities Enabled by New Media. *Communication and Copyright*, 2025(5): 101–103 + 107.
- [4] Zhu P, 2019, Construction of the Synergy and Long-Term Mechanism of the “Three-Whole Education” System in Colleges and Universities — An Investigation Centered on Whole-Staff Education. *Ideological and Theoretical Education*, 2019(2): 100.
- [5] The Central Committee of the Communist Party of China, The State Council, 2017, The Central Committee of the Communist Party of China and the State Council Issued “Opinions on Strengthening and Improving Ideological and Political Work in Colleges and Universities under the New Situation”.
- [6] Liu JK, 2024, The Role Positioning and Realization Path of Counselors in the “Three-Whole Education” in Colleges and Universities. *Education Theory and Practice*, 44(3): 43–47.

- [7] Chen CF, Liang WN, Lu LY, 2023, Practical Exploration and Experience Summary of “Three-Whole Education” from the Perspective of the “One-Stop” Student Community — Based on the Construction Pilot of the “One-Stop” Student Community of South China University of Technology. *Higher Education Exploration*, 2023(6): 20–26.
- [8] Gao XX, 2023, Research on the Role Positioning and Function Play of Counselors under the “Three-Whole Education” System. *Public Relations World*, 2023(23): 58–60.
- [9] Xu FY, 2024, The Performance Path of Counselors in Higher Vocational Colleges under the “Five Entries and Five Excellences” Education Model of “Three-Whole Education”. *Shanxi Youth*, 2024(2): 150–152.
- [10] Dong XN, Li HB, 2020, Research on the Construction of the Collaborative Mechanism of “Three-Whole Education” in Colleges and Universities. *Studies in Ideological Education*, 2020(8): 150.
- [11] Liang Y, 2025, Research on the Collaborative Education of Ideological and Political Courses and Daily Ideological and Political Education in Colleges and Universities from the Perspective of “Three-Whole Education”. *Public Relations World*, 2025(4): 157–159.
- [12] Shi ZJ, 2025, Composing High-Quality Articles on Practical Education and Promoting the Expansion, Quality Improvement, and Efficiency Enhancement of “Three-Whole Education”. *Beijing Education (Moral Education)*, 2025(2): 4–7.
- [13] Song XX, 2025, The Practice of Psychological Education for Special Groups of College Students under the Concept of “Three-Whole Education”. *Education and Teaching Forum*, 2025(6): 173–176.
- [14] Yang XH, 2018, The Theoretical Implications, Practical Challenges and Practical Paths of “Three-Whole Education” in Higher Education. *China Higher Education*, 2018(18): 4–8.
- [15] Li HY, 2025, Analysis of the Practical Path of Integrating Excellent Traditional Chinese Culture into the “Three-Whole Education” System in Colleges and Universities in the New Era. *Shaanxi Education (Higher Education)*, 2025(3): 61–63.
- [16] Yang DJ, 2021, The Concept and Practice of “Three-Whole Education” in Colleges and Universities in the New Era. Jiangsu University Press, Zhenjiang, 23.

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Exploration on the Teaching Reform of Finance Major in Higher Vocational Colleges from the Perspective of Digital Economy

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Abstract: The transformation of the social development situation urges vocational colleges to strengthen teaching reform to cultivate professional talents in line with the development of the times. At present, the course content of the finance major in some higher vocational colleges lacks novelty, and some even remain at the outdated level of several years ago. This is seriously out of step with the pace of social development and will also affect students' future employment. After entering the new century, the digital economy era has arrived. Finance, as a major directly related to economic development, needs to keep pace with the times and cultivate more financial talents. Based on the background of the digital economy, this paper explores the teaching of the finance major in higher vocational colleges for reference.

Keywords: Digital economy; Higher vocational colleges; Finance major; Teaching reform

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1. Introduction

Under the rapid development of the digital economy, financial transformation is also proceeding simultaneously. Traditional finance not only has to accept the new challenges brought by the times but also needs to innovate on traditional ills and gradually develop towards digitalization and intelligence. It is precisely in this context that financial institutions have accelerated the pace of digital operation, continuously carried out product and service innovations, and combined online and offline, enabling users to obtain more personalized services and meet the diverse needs of different customers^[1]. At present, the financial field is no longer in the traditional mode. The arrival of digital finance requires vocational colleges to reform the finance major to cope with the demand for talent in the industry transformation. However, judging from the actual situation of finance majors teaching in vocational colleges, much of the finance major teaching tends to be at the theoretical level and lacks integration with the cutting-edge content in the financial field, resulting in a discrepancy between teaching effectiveness and expectations.

2. The necessity of teaching reform of finance majors in higher vocational colleges from the perspective of the digital economy

2.1. The need for the integration of finance and technology

Currency, as one of the main constituent elements in the financial field, the emergence of encrypted digital currencies has attracted widespread attention worldwide, with Bitcoin being the most typical. The centralized distributed ledger system built using blockchain technology can maximize transaction security and trace transaction history ^[2]. Under such a development trend, the RMB is making steady progress and attempting to expand the scope of pilot projects. Digital RMB, supported by encryption technology and smart contract functions, not only makes contactless payment a reality but also can meet targeted distribution and supervision in different scenarios, which is highly beneficial for the implementation of monetary policy. By applying big data analysis technology, intelligent investment advisors can mine financial market data and precisely depict investors' personal risk preferences, investment goals, etc. Since intelligent investment advisors are not affected by emotions or biases, this further helps small and medium-sized enterprises overcome the problem of difficult financing. Utilizing advanced technology to link enterprise supply chain transaction data enhances information transparency and credit rating, enabling the continuous upgrading of the financial industry.

2.2. The need for the transformation of the financial model

The Internet, artificial intelligence, and big data technologies are increasingly integrated with people's lives. Many financial institutions have developed their own mobile apps and online banks to improve service quality. Users do not need to go out. As long as they have access to the Internet and a mobile phone, they can operate, such as transferring funds, making financial investments, or applying for loans. These are all breakthroughs from the original model ^[3]. When opening an account, by using advanced technologies such as current face recognition and live body detection, remote account opening is possible. The account opening process has been shortened from several hours in the past to just a few minutes now. In the process of personalized services, financial institutions combine the needs of customers to formulate financial product and service plans for them. For example, for users' wealth management, big data methods can be used to analyze customers' consumption habits, risk tolerance, etc., to provide customers with diversified management services ^[4]. Such scenario-based services allow financial services to permeate different links of life and better meet the needs of users.

3. “Obstructions” in the teaching of finance majors in higher vocational colleges from the perspective of the digital economy

3.1. The teaching content lags behind

Under the vigorous development of the digital economy, the teaching content of the finance major in higher vocational colleges has not kept pace and has shown obvious lag. The update speed of teaching content is significantly slower than the actual development, which is its characteristic. Traditional financial teaching knowledge still dominates, such as Money and Banking or Fundamentals of Securities Investment. Although it can enable students to form a basic cognition, the coverage of blockchain finance, digital currency, or intelligent investment consulting in the teaching content is limited ^[5]. The development of the digital economy has promoted financial transaction models and service methods. Students only learn outdated teaching content, and naturally, it is difficult for them to grasp the cutting-edge trends in the industry ^[6]. For example, in the finance teaching of some higher vocational colleges, there is no detailed explanation on how to apply blockchain

technology for cross-border payment, resulting in students' cognition not keeping up with the development of the times. When they are engaged in related jobs upon employment, they cannot adapt to the work at the fastest speed, thus causing employment anxiety.

3.2. The teaching methods are monotonous

In the reform of higher vocational specialties, the innovation of teaching methods is one of the main components. In recent years, vocational colleges have successively joined the tide of reform. The most common problem in the teaching of finance majors is the simplification of the teaching mode, that is, the main way is for teachers to lecture and students to listen passively, and the interaction between teachers and students is insufficient^[7]. Looking at the current new era, the characteristics of the digital economy determine that if financial talents are to meet market demands, the current situation of lacking innovative thinking and practical ability needs to be innovated as soon as possible. Many current teachers are unidirectionally outputting knowledge, and students' initiative is insufficient. For example, when teachers analyze financial cases for students, most of the time it is the teachers who explain, and students answer questions according to the inherent process. Students have limited thinking time and do not have sufficient time to conduct an in-depth analysis of typical cases in the digital economy era^[8]. In addition, although online teaching is also applied in practice, some teachers simply move the offline content online, and the teaching methods do not fully match the characteristics of the digital economy, all of which make it difficult to mobilize students' initiative.

3.3. The teaching staff is limited

Teaching reform of finance majors in higher vocational colleges in the era of digital economy, the teaching staff is also an important component. Under the alternation of eras, it is difficult for teachers' inherent teaching methods to completely change, and most of their teaching concepts are still restricted by traditions, all of which have an impact on the reform of the teaching staff^[9]. Most teachers have been on the front line of education for a long time, and the students are the ones they have the most contact with, and their daily main job is to teach and educate. However, they rarely have time to replenish the "ammunition depot" for educating people and lack sufficient time to go to the front line of enterprises to learn and understand cutting-edge knowledge, all of which results in less practical experience of digital finance for teachers. During the specific teaching period, the knowledge that teachers impart to students mostly remains at the theoretical level and lacks deep integration with digital finance^[10]. In addition, the schools themselves have many aspects to be improved in the era of the digital economy, and the systematic training system for teachers in the digital economy is not perfect either. The imperfect training mechanism also makes teachers' professional knowledge not updated simultaneously and unable to meet the actual needs.

4. Measures for teaching reform of finance majors in higher vocational colleges from the perspective of the digital economy

4.1. Optimize the curriculum system and integrate digital elements

In the education of finance majors in higher vocational colleges, not only do new digital finance courses need to be added, but also the curriculum system needs to be further adjusted and integrated. The knowledge related to the digital economy should be integrated into it to make it an organic part of the finance major courses, to achieve the complementarity of the existing curriculum system and the digital curriculum system, enabling

students to master traditional financial knowledge and have a deeper and more comprehensive understanding of financial development trends and practical application issues.

For example, when teachers adjust the teaching content of “Basic Knowledge of Financial Markets”, they should incorporate knowledge related to new fields such as digital currency market research and digital currency market management, based on maintaining the core concepts and analysis methods of the original professional basic content ^[11]. When elaborating on the basic structure and operating mechanism of financial markets, in addition to traditional financial elements such as stocks, bonds, and futures, teachers can also elaborate in detail on the relevant situations of the digital currency market, explain in detail the specific natures of digital currencies such as Bitcoin and Ether, including their trading procedures, price fluctuation patterns, and composition of market entities. Compared with traditional financial products, the trading rules of the digital currency market are completely different. It is a trading strategy without a central point formed based on the underlying framework of blockchain technology. All transaction information is recorded in a distributed accounting system, which is highly transparent and immutable ^[12]. Additionally, the degree of its price fluctuation is generally greater than that of traditional financial products, being influenced by a variety of complex factors such as market supply and demand, scientific research, legislative policies, and investor mentality. For instance, when teachers explain the content of “financial supervision” to students, they can incorporate the issue of “digital financial supervision” ^[13]. Because digital development is both an opportunity and a challenge for financial supervision in the new era, supervisors need to combine digital financial development and upgrade supervision methods and tools at any time. Teachers can guide students to discuss the composition and role of supervision methods. Regulatory technical means include big data, AI, blockchain, etc., to achieve real-time observation, early warning, compliance, and other management of financial institutions, improving supervision efficiency and accuracy. Besides, discussions can also be held on the differences in supervision strategies and laws and regulations in the fields of digital currencies and online finance among various countries’ regulatory authorities. For example, China’s strict control measures are aimed at digital currency transactions to prevent the outbreak of major financial risks, maintain financial security and social stability, and protect the interests of investors ^[14]. Through the learning of this information, students can form the awareness of abiding by regulations and laws and the awareness of risk prevention, so that they can better resolve various risks brought by digital finance in the future.

4.2. Innovate teaching methods and utilize digital technology

Based on the background of the digital economy era, applying financial simulation tools and systems to the cultivation of practical experience for students majoring in finance in colleges and universities can enable students to improve their skills and ability to solve practical problems in a simulated environment during the practical link.

At present, there is a large number of powerful financial simulation training software in the market, enriching teaching resources and expanding teaching methods. Take Tonghuashun Futures Connect as an example. Tonghuashun Futures Connect is a very good simulation software for learning and practical operation of futures trading. It can analyze the real-time price and trend of futures, and then give prescriptions to realize the simulation training of futures trading. In the absence of danger in futures trading, it simulates the operation of the market and familiarizes users with the market and trading methods ^[15]. Teachers can explain the relevant systems and contents of futures trading to students through the simulation teaching of Tonghuashun Futures

Connect, and guide students to simulate the purchase or sale operations of futures trading. For futures hedging strategies, teachers can also help students choose different types of futures and contracts through the simulation trading function of this software, simulate making hedging transactions according to the market situation, observe the improvement degree of hedging in reducing market risks, so that students can have a deeper understanding of the principle and purpose of hedging, learn how to use futures tools to control risks, and improve the operational ability in the futures market. Guotai Junan Futures is also a widely popular, functionally diverse, and practically effective financial simulation software, covering crude oil, precious metals, non-ferrous metals, energy and chemical industry, agricultural products, options, stock index futures, gold, silver, live pig futures, etc. During the teaching process, teachers use this software to guide students to conduct investment analysis and trading simulation in the related fields of research and bulk commodity trading through Guotai Junan Futures.

4.3. Strengthen the teaching staff and enhance digital literacy

The abovementioned text states that the strength of the teaching staff has a significant impact on the teaching reform of the finance major in the digital economy. Given the limited teaching staff, vocational colleges still need to strengthen the teaching team and focus on improving teachers' digital literacy to act as a bridge for students' employment and learning. To build a strong teaching team, vocational colleges can start from two aspects: external recruitment and internal training. Specifically, on the one hand, external recruitment can start from campus recruitment and social recruitment. Campus recruitment mainly involves cooperation with well-known domestic financial universities. Regularly visit the cooperative universities to select talents, choosing fresh graduates with solid theories and certain experience to reduce the difficulty of later internal training. Outstanding fresh graduates often have cutting-edge professional theories and are more sensitive to dynamic analysis. On the other hand, internal training is also an approach that schools can consider. Internal training should focus on the training content and training methods. In terms of training content, the most advanced financial technologies and methods should be imparted to teachers, such as big data, artificial intelligence, and even the commonly used DeepSeek nowadays, allowing teachers to learn to use application software to analyze financial data. In terms of training methods, the current MOOC platform should be combined. Live lectures or online discussions can be conducted according to actual needs to enhance communication among teachers and improve the training effect.

5. Conclusion

To sum up, the advent of the digital age is bound to affect the development of the financial field, and the development of the financial field will in turn affect talent cultivation and education, and teaching. This article, against the background of the digital age, conducts an analysis of the teaching of finance majors in higher vocational colleges. The teaching reform of the finance major is not only the need for the integration of financial technology but also the inevitable transformation of the talent cultivation model in finance. However, the problems in teaching content, teaching methods, and teaching staff cannot be ignored at present. It still requires the joint efforts of the school to start from different aspects and solve the inherent problems, to promote the process of the teaching reform of the finance major.

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References

- [1] Hu JW, 2025, Research on the Online and Offline Integrated Brand Teaching Quality Assurance Mechanism in Higher Vocational Colleges — Taking “Digital Marketing of Financial Products” as an Example. *China Brand and Anti-counterfeiting*, 2025(2): 128–130.
- [2] Wang QX, 2024, Research on the Path of Deep Integration of Grassroots Party Building and High-quality Development of Finance Major in Higher Vocational Colleges under the Background of Digital Economy. *Journal of Higher Education*, 10(29): 107–110 + 115.
- [3] Lu LZ, 2024, Research on the Improvement of Ideological and Political Education Ability of Higher Vocational Professional Teachers Based on Competency Theory — Taking the Teaching Practice of Finance Professional Courses as an Example. *Industrial and Technology Forum*, 23(17): 189–191.
- [4] Wei Q, 2024, Research on the Teaching Practice of Integrating Ideological and Political Education into the Marketing Course in Higher Vocational Colleges — Taking Liaoning Finance Vocational College as an Example. *Journal of Liaoning Economic Vocational and Technical College. Liaoning Economic Management Cadre College*, 2024(4): 166–168.
- [5] Chen XL, 2024, Research on the Linkage Closed-loop Management Mechanism of “Enrollment - Cultivation - Employment” in Higher Vocational Colleges — Taking Zhejiang Financial College as an Example. *Modern Vocational Education*, 2024(13): 81–84.
- [6] Song FC, 2024, Practice and Reflection on UK NARIC International Professional Evaluation and Certification in Higher Vocational Colleges — Taking the Financial Services and Management Major as an Example. *Journal of Guangxi College of Education*, 2024(2): 85–91.
- [7] Wang YC, 2024, Research on the Current Situation and Countermeasures of Cultural Confidence Cultivation in Ideological and Political Courses in Higher Vocational Colleges from the Perspective of “Grand Ideological and Political Courses” — Taking Liaoning Finance Vocational College as an Example”. *Industrial & Science Tribune*, 23(3): 184–187.
- [8] Jiao Z, 2023, Research on the Functional Value and Path of the Comprehensive Education Model of “Post-Course-Competition-Certificate-Innovation” for Higher Vocational Finance Talents — From the Perspective of “Government-Enterprise-Family-School’ Collaboration”. *Education Theory and Practice*, 43(30): 25–29.
- [9] Yang XY, Qi YQ, Liu RX, 2023, Analysis of Talent Cultivation in Higher Vocational Colleges under the Background of Modern Apprenticeship - Based on Questionnaire Research and Analysis of the Financial Technology Application Major. *Economist*, 2023(9): 252–253.
- [10] Hu JW, Zhou YQ, Chen YT, 2023, Construction and Implementation of the Integrated Teaching Model of Post-Course-Competition-Certificate for Finance Majors in Higher Vocational Colleges — Taking the Digital Marketing of Financial Products Course as an Example. *Journal of Ningbo Institute of Education*, 25(4): 98–102 + 107.
- [11] Deng W, 2023, Practice and Exploration of the Training Mode of Practical Talents in Higher Vocational Colleges from the Perspective of Industry-Education Integration — Taking the Cross-Border E-Commerce Major of Shanxi Finance Vocational College as an Example. *Science and Technology Innovation and Productivity*, 44(6): 22–25.
- [12] Han XG, 2022, “Exploration and Practice of the Accounting Talent Training Model in Higher Vocational Colleges under the Background of Improving Quality and Cultivating Excellence - Taking Liaoning Finance Vocational

College as an Example”. *Vocational and Technical Education*, 43(29): 53–56.

- [13] Shi DW, 2022, Reform and Exploration on the Diversification of Graduation Design Forms for Finance and Economics Majors in Higher Vocational Colleges — Taking the Financial Services and Management Major of Zhejiang Business Technology Institute as an Example. *Journal of Zhejiang Business Technology Institute*, 21(2): 90–92 + 96.
- [14] Wang CH, 2021, Research and Practice on Improving Students’ Humanistic Quality in Higher Vocational Colleges — Taking the Chinese Excellent Traditional Culture and Art Festival of the School of Humanities and Arts of Zhejiang Financial College as an Example. *Modern Vocational Education*, 2021(43): 10–11.
- [15] Tang NS, 2021, Exploration and Practical Research on Promoting the Scientificization of Party Building in Higher Vocational Colleges in the New Era through the Party Building and Education Model — Taking the School of Business Administration of Zhejiang Financial College as an Example. *Modern Vocational Education*, 2021(38): 12–13.

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Analysis of Talent Cultivation Strategies for Mechanical Majors in Applied Universities under the Background of Intelligent Manufacturing

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Abstract: With the continuous development and popularization of intelligent manufacturing technology, the requirements for talent in the machinery industry are also constantly increasing. Against the background of intelligent manufacturing, mechanical professionals not only need to have solid professional knowledge, but also need to have innovative thinking, practical ability, and teamwork ability to adapt to the rapidly changing market environment and technological innovation. Application-oriented universities, as an important base for the cultivation of mechanical professionals, the adjustment and optimization of their training strategies are of great significance to meet the needs of the industry and promote industrial upgrading. Therefore, application-oriented universities should actively reform the talent training strategies to improve the comprehensive quality and competitiveness of mechanical professionals and provide strong talent support for the development of the intelligent manufacturing field. In this regard, this paper first expounds the new requirements for the cultivation of mechanical professionals in application-oriented universities under the background of intelligent manufacturing, and then puts forward effective reform strategies to provide certain reference and guidance for relevant educational researchers.

Keywords: Intelligent manufacturing; Application-oriented universities; Mechanical major; Talent cultivation

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1. New requirements for cultivating mechanical professionals in applied universities under the background of intelligent manufacturing

1.1. Focus on cultivating high-tech compound talents

With the steady advancement of industrial upgrading and the transformation of the manufacturing industry, mechanical enterprises are constantly developing in the direction of intelligence and automation. Basic operators and junior technical workers will gradually be replaced by intelligent production systems. Therefore, enterprises urgently need talents with high skills and compound capabilities ^[1]. In this regard, applied

universities should closely focus on industrial demands, adjust the training goals of mechanical professionals to meet the requirements of the intelligent manufacturing era. While strengthening the professional skills training of students, it is necessary to attach importance to the shaping of their sustainable development ability and focus on improving their overall professional quality, including but not limited to professional skills, innovative thinking, continuous learning, critical thinking, hands-on operation, and teamwork, among other capabilities.

1.2. Focus on cultivating innovative and entrepreneurial talents

With the wide application of modern intelligent technologies in various fields, the patterns and goals of the global machinery industry have undergone earth-shaking changes. Countries have been intensifying their efforts, investing in the race of scientific and technological innovation and technological research and development, and vigorously promoting the development of intelligent manufacturing. In this process, innovation is regarded as the most core productive force, and the transformation and upgrading of the intelligent manufacturing industry also rely on this. Only through continuous innovation can its vitality be maintained. In this regard, application-oriented universities should take cultivating innovative talents as the core goal, simultaneously promote the innovation of the talent cultivation model, balance theoretical and practical teaching, strengthen the cultivation of students' innovative consciousness and entrepreneurial ability, and thereby promote them to grow into innovative and entrepreneurial talents that meet the needs of the intelligent era ^[2].

1.3. Focus on cultivating craftsmanship-oriented talents

In the current context of the rapid development of intelligent manufacturing, the cultivation of craftsmanship-oriented talents is particularly important. Craftsmanship-oriented talents, with their exquisite craftsmanship skills, rigorous working attitude, and ultimate pursuit of details, have become the key force promoting the high-quality development of the manufacturing industry. In the process of cultivating mechanical professionals, application-oriented universities should focus on cultivating students' craftsmanship spirit. Through various approaches such as curriculum setting, practical teaching, and school-enterprise cooperation, guide students to establish the professional concept of striving for excellence and continuously improve their own technical level and professional quality. For example, application-oriented universities can offer elective courses related to the craftsmanship spirit and invite master craftsmen in the industry to the campus to hold lectures or workshops, allowing students to closely experience the charm of the craftsmanship spirit ^[3].

2. Training strategies for mechanical professionals in applied universities under the background of intelligent manufacturing

2.1. Clarify the goal of talent cultivation and focus on cultivating compound talents

At present, the skills of mechanical professionals cultivated by colleges and universities are relatively single, and the knowledge structure is not wide enough, making it difficult for them to meet the requirements put forward by the machinery industry under the background of intelligent manufacturing. Teachers should optimize and clarify the talent training goals based on the talent demands in the background of intelligent manufacturing, and promote the transformation of talent training from "specialization" to "compound." Therefore, in the specific talent cultivation, teachers need to analyze the talent ability demands of mechanical positions and markets under the background of intelligent manufacturing, as well as the employment standards and job requirements of most mechanical manufacturing units, and adjust the teaching goals of mechanical

majors to cultivate students' development awareness^[4]. In this regard, teachers can set the following teaching goals: Strengthen the integration of interdisciplinary knowledge. Students are not only required to master a solid foundation of mechanical engineering, but also incorporate knowledge in related fields such as information technology, automation technology, and electronic technology to form a diversified knowledge system; Strengthen the cultivation of innovation ability, encourage students to participate in scientific research projects, innovation competitions and other activities, stimulate their innovative thinking and practical ability, and provide compound talents with innovation potential for the intelligent manufacturing field; Pay attention to the expansion of international vision. Given the globalization trend of intelligent manufacturing technology, encourage students to understand international industry trends, learn international advanced technologies and concepts, and enhance international competitiveness. Focus on the improvement of students' professional ethics and humanistic quality to ensure that students have good professional ethics and social responsibility while mastering professional skills. In this way, under the guidance of teaching goals, the cultivation of mechanical professionals will be more targeted and effective, and compound talents adapted to the needs of intelligent manufacturing will be cultivated, thereby contributing to promoting the upgrading of China's intelligent manufacturing industry^[5].

2.2. Reform and optimize the curriculum system to enhance the effect of talent cultivation

In the cultivation of mechanical professionals, reforming the curriculum system in application-oriented universities is an important step in shaping students' core abilities. By carefully adjusting the course content, constructing interdisciplinary modules, introducing "innovation and entrepreneurship" courses, and building a curriculum system that adapts to the development of the times, a curriculum structure that fits the background of the intelligent manufacturing era can be created, laying a solid foundation for students' core literacy and comprehensive abilities^[6]. First of all, application-oriented universities should streamline and improve the course content of mechanical major, carefully review the existing courses, eliminate outdated, redundant or out-of-date courses that are disconnected from the development of the times, and introduce cutting-edge technology courses such as intelligent manufacturing and Internet of Things to ensure that students master the latest knowledge and skills^[7]. Secondly, application-oriented universities should recognize that the mechanical major does not exist in isolation and actively build interdisciplinary course modules to promote the deep integration of the mechanical major with electronics, information, computer, and other disciplines. In the interdisciplinary course module, students can master knowledge and skills outside their major while learning the knowledge and skills of the mechanical major. In addition, innovative and entrepreneurial courses should be added to teach students innovative thinking and entrepreneurial skills and stimulate their innovative potential and entrepreneurial passion. Finally, to build a curriculum system that keeps up with the trend of the times, application-oriented universities should update and review the curriculum system regularly to ensure that the course content is in sync with the development trend of the times, and maintain close cooperation with mechanical enterprises and industries, grasp the latest technological trends and industry demands, and adjust the courses and teaching content in a timely manner, thereby improving the quality of mechanical professional talent training^[8].

2.3. Take the initiative to improve teaching methods and mobilize the enthusiasm of students

In the teaching of mechanical majors, teachers adopt teaching models such as small-class, discussion-

based, and research-oriented ones to make the teaching of mechanical majors more effective and interesting, unclog students' thinking patterns, and interact with teachers and other students. Meanwhile, diversified teaching activities should also be carried out. Besides explaining professional knowledge in the classroom, case analysis, group discussion, experimental simulation, interactive games, etc., are introduced to create an interesting teaching atmosphere for mechanical majors, enabling students to actively explore professional knowledge and practice professional skills, and effectively improve their learning efficiency ^[9]. For instance, in practical teaching, teachers can ask students to form groups and, by using the professional knowledge they have mastered and consulting relevant materials, study the changes in the machinery industry in the era of intelligent manufacturing. They should also encourage students to actively carry out group discussions based on scientific independent innovation, create corresponding PPTs, elaborate in detail the development prospects of the machinery industry in the era of intelligent manufacturing, and clarify the job skills that should be mastered, thereby guiding students to actively participate in scientific research and innovation. At the same time, teachers can also set discussion topics and ask students to randomly draw lots to determine the affirmative and negative sides. This process effectively enhances students' ability to apply knowledge and strengthens their spirit of unity and collaboration. Besides, teachers can utilize digital platforms to implement information-based teaching of mechanical specialties. Through the combination of online and offline methods, the limitations of time and space in traditional teaching are broken, enabling students to learn professional knowledge anytime and anywhere and interact with teachers ^[10]. Teachers can upload teaching videos, courseware, experimental guidance, and other teaching resources for students to study and review independently, and select cutting-edge knowledge and technologies in the industry to prompt students to keep up with the development trends of the times and help further improve the teaching quality.

2.4. Attach importance to the implementation of practical teaching and strengthen students' comprehensive qualities

Against the background of the development of the intelligent manufacturing era, the machinery industry has a very high practical operation requirement for applied technologies. Therefore, application-oriented universities should keep pace with the times and make adjustments to the cultivation of mechanical professionals around intelligent manufacturing, with particular attention to strengthening practical teaching to ensure a close connection with actual engineering projects. The details are as follows. Firstly, strengthen the practical links of professional courses, increase the proportion of practical class hours, design practical teaching links together with industry senior experts, introduce "real problems" such as real engineering problems and project cases into practical teaching, optimize the teaching process, and achieve the combination of course theory and experimental practice, as well as the combination of course learning and engineering practice, so as to enhance students' comprehensive ability to solve practical problems ^[11]. Secondly, for in-depth school-enterprise cooperation, both the school and the enterprise should be committed to establishing various platforms such as practice bases and industrial colleges, realize the sharing of equipment and instruments, make practical teaching closer to the real manufacturing environment, and also enable students to be exposed to the most advanced technologies in the industry. In this way, students can not only acquire theoretical knowledge but also better understand and master the skills and knowledge in practical work through practical learning. Finally, in today's era of rapid digital development, application-oriented universities make full use of advanced digital technologies to build modern teaching venues such as smart classrooms and virtual simulation laboratories. In these venues,

various results in theoretical knowledge verification, design concepts, and implementation processes can be achieved through simulation technology or the combination of simulation and physical experiments ^[12]. In this way, in addition to enhancing students' interest in learning, it can also help them better understand and master complex concepts, thereby achieving the goal of improving teaching quality and learning effects ^[13].

2.5. Deepen school-enterprise cooperation and create a collaborative education model

From the perspective of intelligent manufacturing, enterprises are actively undergoing digital and intelligent transformation. This change has led to a sharp increase in the demand for professional and technical talent in enterprises. However, it is difficult for enterprises to quickly attract a large number of talents by their own efforts alone, and the help of colleges and universities is urgently needed. Therefore, application-oriented colleges and universities should firmly grasp this development opportunity, actively strive for the support of the government and society, and jointly build an intelligent manufacturing industry-education integration community with mechanical enterprises, to deepen the integration of industry and education and accurately deliver talents to enterprises. The details are as follows. Firstly, focus on exerting the “siphon effect” to attract more enterprises to participate in the process of cultivating mechanical professionals, thereby obtaining highly skilled talents that are in line with their own development needs ^[14]. Secondly, application-oriented universities should shorten the “distance” with enterprises and jointly integrate the resources of both sides. For example, enterprises provide internship and employment positions to schools, while schools can carry out industry-university-research cooperation, jointly solve technical problems, and invite enterprises to participate in the assessment of talent cultivation quality, to continuously optimize the talent cultivation plan for mechanical majors. In addition, actively establish industrial alliances, give full play to the leading role of the government and the main role of enterprises, and strengthen the guidance and direction of the integration of industry and education from the policy level. Through the continuous optimization of the integration model of industry and education, application-oriented universities establish a complete collaborative education system for the integration of industry and education, ensuring the close combination of professional settings and industrial demands, teaching content and vocational standards, practical processes and production processes, and graduation certificates and vocational skill certificates, closely connecting the government, application-oriented universities, enterprises and industries, and realizing the vision of collaborative education ^[15].

3. Conclusion

In conclusion, in the current rapid development of intelligent manufacturing, new requirements have been put forward for the cultivation of mechanical professionals in application-oriented universities. To ensure that the talent cultivation model is adapted to the development needs of intelligent manufacturing and to cultivate mechanical students into high-quality and competent compound talents, application-oriented universities should clarify the new requirements under the background of intelligent manufacturing and start from strategies such as clarifying the talent cultivation goals and focusing on cultivating compound talents; reforming and optimizing the curriculum system to enhance the effect of talent cultivation; actively improving teaching methods to mobilize students' enthusiasm; attaching importance to the implementation of practical teaching to strengthen students' comprehensive qualities; deepening school-enterprise cooperation to create a collaborative education model. Only in this way can the quality of mechanical professional talent cultivation be highly consistent

with social needs, and high-quality mechanical professionals who have both solid theoretical knowledge and excellent practical ability, and innovative thinking can be cultivated. These talents will play an important role in the field of intelligent manufacturing, promoting industrial upgrading and technological innovation, and contributing wisdom and strength to social and economic development.

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References

- [1] Zhang MJ, 2021, Research on the Integration of Mechanical Majors and Curriculum Systems in Higher Vocational Colleges under the Evolution of Intelligent Manufacturing. *Journal of Jining Normal University*, 43(2): 1–8.
- [2] Zuo PL, Deng XZ, Wang JP, 2019, Research on the Cultivation of Mechanical Professionals in Higher Vocational Colleges under the Background of the Intelligent Manufacturing Era. *Contemporary Education Practice and Teaching Research*, 2019(11): 27–28.
- [3] Zhang WF, Li YM, Dong XG, et al., 2020, Information Transformation of the Curriculum System of Mechanical Engineering Major under the Background of Intelligent Manufacturing. *Wireless Internet Technology*, 17(21): 157–159.
- [4] Qu JL, Xi XQ, Zheng LL, 2021, Research on the Cultivation of Information Literacy of Mechanical Majors in Colleges and Universities Oriented to Intelligent Manufacturing. *Southern Agricultural Machinery*, 52(6): 99–100.
- [5] Sun XY, Yuan L, Wang JJ, 2022, Research on the Comprehensive Quality Cultivation and Skill Improvement of Undergraduate Students of Mechanical Majors under the Background of Intelligent Manufacturing. *Journal of Chizhou University*, 36(3): 109–111.
- [6] Xia TJ, 2020, Research on the Teaching Reform of “CNC Machine Tools” Course for Mechanical Manufacturing Majors in Secondary Vocational Schools under the Background of Intelligent Manufacturing, thesis, Hunan Normal University.
- [7] Shi J, Zhang YJ, Yang LL, et al., 2022, Reform of the Talent Cultivation Mode for Intelligent Manufacturing in Mechanical Majors of Agricultural Colleges and Universities: Based on the Practice and Exploration of the Major of Mechanical Design, Manufacturing and Automation in Yunnan Agricultural University. *Journal of Yunnan Agricultural University (Social Science)*, 16(1): 150–155.
- [8] Zhang XQ, 2020, Research on the Talent Cultivation of Mold Design and Manufacturing Major in Higher Vocational Colleges under the Background of Intelligent Manufacturing. *Journal of Jilin Engineering Normal University*, 36(10): 8–12.
- [9] Pu Y, 2019, Construction of the Curriculum System for Compound Talents in Higher Vocational Education under

- the Background of “Made in China 2025”: Taking the Major of Mechanical Manufacturing and Automation as an Example. *Journal of Ningbo Polytechnic*, 23(4): 1–4.
- [10] Xu YL, Zhang Q, 2022, Demands, Dilemmas and Choices of the Reform of the Talent Cultivation Model for New Engineering Disciplines in the Intelligent Manufacturing Era. *Heilongjiang Researches on Higher Education*, 40(9): 47–52.
 - [11] Lin XQ, 2023, Research on the Cultivation Model of Innovative Talents in Application-oriented Undergraduate Universities under the Background of Intelligent Manufacturing, thesis, Liaoning University.
 - [12] Zhang P, 2023, Exploration of Ways to Enhance the Cultivation of Electromechanical Applied Talents through Deep School-Enterprise Integration under the Background of Intelligent Manufacturing. *Equipment Manufacturing and Education*, 37(3): 37–39.
 - [13] Tao W, Yang KM, 2024, Exploration of the Cultivation Model of Applied Talents in Mechanical Specialty under the Background of Intelligent Manufacturing. *Journal of Wuyi University*, 43(9): 101–104.
 - [14] Wang GP, Liu JX, Cheng S, et al., 2023, Research and Practice on the Construction of the “Introduction to Intelligent Manufacturing” Course under the Background of New Engineering Disciplines. *Machine Design and Manufacturing Engineering*, 52(7): 130–134.
 - [15] Liu YH, 2024, Research on the Cultivation Model of Applied and Innovative Talents in Machinery under the Background of Intelligent Manufacturing. *Modern Agricultural Machinery*, 2024(4): 114–115.

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The Current Situation and Promotion Strategies of Digital Literacy of Foreign Language Teachers in Colleges and Universities in the Digital Intelligence Era

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Abstract: In the context of the digital intelligence era, teachers' digital literacy has gradually become a major factor in promoting innovation and educational reform in colleges and universities and optimizing talent cultivation. As direct contacts for students' all-around development, foreign language teachers in colleges and universities shoulder the important mission of cultivating talents with high-level foreign language skills, digital awareness, and internationalization. This makes the digital literacy of foreign language teachers a focus of attention in society, colleges, and universities. In this regard, foreign language teachers should constantly improve their own digital literacy to better carry out digital teaching activities and contribute to the comprehensive development of students.

Keywords: Professional development; Digital literacy; Colleges and universities; Foreign language education; Information technology

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1. Introduction

Against the background of the rapid development of the social economy, digital technology has profoundly influenced the pattern and competitive situation of the global economy. Promoting the digital transformation of higher education has become an inevitable choice. Moreover, college teachers are an important driving force for the modernization of higher education and a key force and participant in the digital transformation of education, undertaking the important responsibility of cultivating high-quality talents for society and industries. The digital literacy level of foreign language teachers in colleges and universities is closely related to the comprehensive ability of students. The mastery of digital knowledge and the application ability of technology play an important role in innovating teaching models and enriching teaching content. Therefore, how to improve the digital

literacy of college teachers in the digital intelligence era has become an important issue that needs to be urgently solved.

2. The value of improving the digital literacy of foreign language teachers in colleges and universities in the digital intelligence era

2.1. It is the fundamental guarantee for building a high-quality teaching team

The core of the high-quality development of higher education in colleges and universities is teachers. Facing the new challenges of higher education in the new era, strengthening the construction of the teaching team in colleges and universities and improving the overall quality and professional level of the teaching team is the key to achieving the digital transformation of education ^[1]. With the wide application of modern information technologies such as artificial intelligence, big data, and cloud computing in the field of education, the role of teachers is no longer merely a disseminator of knowledge, but also a guide in students' learning process, a cultivator of innovation ability, and a nurturer of information literacy. Teachers need to constantly improve their own information technology application ability and use digital tools to design personalized teaching plans to meet the individualized needs of students.

2.2. It is a key approach to promoting the digital transformation of colleges and universities

The "Digital Literacy of Teachers" issued by the Ministry of Education emphasizes the main framework for the improvement of educational digital literacy and particularly points out the significance of enhancing teachers' digital literacy in promoting the digital transformation of higher education institutions ^[2]. In the context of the new era, digital technologies have profoundly influenced the development trends of industries and education, innovating new forms and models of education. As the main implementers of education, teachers must possess a relatively high digital literacy to effectively utilize digital technologies for education and teaching, meet the individualized learning needs of students, and thereby further promote the digital transformation of colleges and universities. Meanwhile, the wide application of information technologies such as artificial intelligence and big data has led to changes in the industry's demand for foreign language talents. Only talents with innovative capabilities and digital skills can better adapt to the changes of the times, making the digital transformation of colleges and universities an urgent matter. On this basis, teachers should be aware of the importance of their own digital literacy for students' development. Therefore, the improvement of teachers' digital literacy has become a key approach to promoting the digital transformation of colleges and universities ^[3].

2.3. It is the inexhaustible driving force for the professional development of teachers

With the rapid development of society and the continuous update of science and technology, the emergence of a new generation of information technologies such as artificial intelligence, big data, and the Internet of Things has brought new reform opportunities to the field of education ^[4]. The wide application of information technology has effectively promoted the transformation of higher education to digital and intelligent education. It has created basic conditions for the improvement of digital literacy and professional development of college teachers. Digital and intelligent teaching methods are integrating into college curricula with an irresistible trend, bringing huge changes to the field of education. The organic integration of digital and intelligent technologies and education and teaching in higher education institutions has, to a certain extent, broken the traditional

teaching model. Diversified teaching methods and means are constantly emerging, and students' learning methods and learning environments are more inclined to be intelligent ^[5]. This requires teachers to transform their educational concepts and continuously improve their digital literacy, thereby expanding the depth and breadth of professional knowledge, improving the effect and quality of teaching, and further achieving high-quality development of professional ability, and enabling their professional ability to better serve the digital transformation of colleges and universities.

3. The current situation of digital literacy of foreign language teachers in colleges and universities

3.1. Weak digital awareness

Against the background of the digital transformation of higher education, the improvement of digital literacy of foreign language teachers in colleges and universities has become the basis for teachers' professional development and the construction of high-quality teaching teams in colleges and universities ^[6]. However, from the current educational situation, some teachers, influenced by age, teaching habits, and traditional educational concepts, have only a superficial understanding of digital technology and lack a systematic understanding and in-depth knowledge of the digital transformation of foreign language education. Some teachers simply regard digital technology as computer technology, which limits their improvement of their own digital literacy to the improvement of the application ability of computer technology. In addition, in the actual teaching process, some teachers overly rely on their own teaching experience and a single teaching mode, lack recognition of digital teaching, think that digital technology is too complex and difficult to master, and even worry that digital technology will pose a threat to their career development. They have a low acceptance of digital skills and cannot effectively integrate digital technology into classroom teaching, making it difficult to meet the personalized and diversified learning needs of students ^[7].

3.2. Insufficient integration of digital resources

The ability to integrate digital resources is the basis for college foreign language teachers to innovate educational models and carry out diversified educational activities. Insufficient digital resource integration ability will have an impact on teachers' teaching effects and professional development. Firstly, some foreign language teachers have insufficient digital literacy and lack theoretical and practical knowledge of teaching resource integration, unable to effectively integrate and apply various teaching resources, resulting in waste and duplication of resources ^[8]. Secondly, some colleges and universities have not established high-quality teaching resource databases and resource sharing platforms, making educational resources relatively scattered. Teachers need to spend a lot of time and energy collecting and integrating resources, resulting in low efficiency and poor quality of educational resource integration, making it difficult to guarantee the quality of teaching.

3.3. Deficiency in application ability

Digital technology has great application value in the field of education and has become an important force promoting the digital transformation of higher education institutions. The improvement of teachers' digital application ability is related to the speed of educational innovation and intelligent development in colleges and universities. However, some foreign language teachers have relatively weak abilities in the application of digital technology. They merely use computers and multimedia equipment to conduct teaching, lacking the

ability to carry out teaching activities by comprehensively applying digital tools. They are unable to flexibly utilize digital technology to innovate educational and teaching models, nor can they conduct personalized teaching based on the characteristics and needs of students. At the same time, some foreign language teachers have relatively insufficient digital teaching experience and weak practical experience, making it difficult to deeply integrate digital technology into classroom teaching. Especially when facing new technologies and new equipment, due to the lack of sufficient training and support, teachers find it difficult to take the initiative to try new technologies and methods ^[9].

4. Strategies for improving the digital literacy of foreign language teachers in colleges and universities in the digital intelligence era

4.1. Transform educational concepts and enhance teachers' awareness of digital literacy

In the context of the new era, digital technology has been widely applied in all walks of life, especially in the field of education. Digital technology has become a key force promoting the innovation of education and teaching in colleges and universities ^[10]. Against this background, digital transformation has become an important carrier for foreign language teachers in colleges and universities to improve their digital literacy. In this regard, colleges and universities should focus on cultivating teachers' digital awareness and guide them to transform traditional educational concepts.

First of all, foreign language teachers should be aware of their responsibilities in promoting the digital transformation of colleges and universities, transforming from traditional knowledge imparters to learning guides and innovation promoters. When innovating teaching methods, they should actively accept and understand digital technologies and integrate them into classroom teaching to improve the quality and effectiveness of education. With the support of digital technologies, teachers can break the inherent model of traditional education and actively explore new teaching models in the digital environment, such as blended learning and flipped classrooms.

Secondly, teachers need to recognize the transformation brought about by digital technology in education and be aware of the importance of the digital transformation of foreign language education ^[11]. Specifically, due to the deep-rooted traditional educational concepts, teachers need to complete the transformation of educational concepts subjectively. This requires teachers to actively learn knowledge related to digital technology, understand the role and value of artificial intelligence, big data, and cloud computing in education, and proactively analyze teaching cases related to digital technology and integrate teaching resources, to strengthen their own digital awareness, improve the conversion rate of digital technology, and thereby further promote the digital transformation of foreign language education.

Finally, college foreign language teachers should actively face the challenges brought by digital technology to education with an open mind and positive curiosity. They should actively participate in various trainings on foreign language education innovation and the improvement of the application ability of digital technology, understand the latest educational concepts and the most advanced digital technology, and learn to carry out teaching with the help of diverse digital platforms to enhance their digital awareness.

4.2. Establish an intelligent platform to promote mutual assistance and communication among teachers

Different universities can promote resource sharing and collaborative development by building intelligent

cooperation platforms ^[12]. In the context of the digital intelligence era, cooperation among universities plays an important supportive role in improving the digital literacy of foreign language teachers. First of all, on the intelligent platform, teachers from different universities can upload teaching resources, teaching experience, and some effective outcome cases to the platform for other teachers to download and use, to realize resource sharing and complementarity, and improve teaching quality. In this regard, the establishment of an open intelligent platform can integrate high-quality teaching resources from all parties, such as courseware, video tutorials, teaching cases, etc., continuously enrich teaching resources, and achieve joint construction and sharing.

Secondly, intelligent platforms should establish communication communities to encourage academic discussions, problem-solving, and experience sharing among teachers. In the communication communities, teachers can learn about the latest teaching trends, technological advancements, and industry developments, draw on the successful experiences of others, and stimulate new teaching inspirations and innovative ideas. At the same time, universities can set up resource modules, including resource sharing modules, cooperation modules, and scientific research modules. With the support of these modules, universities can guide teachers to manage teaching resources, conduct academic discussions, share cooperation projects, etc. Finally, universities can establish appropriate incentive mechanisms on the platform, such as point systems and medal systems, to encourage foreign language teachers from different institutions to actively upload resources, participate in discussions, and conduct cooperative research. The rewards can be used to exchange for teaching resources on the platform, participate in training opportunities, or obtain other forms of recognition.

Finally, on the intelligent platform, teachers can not only share their own achievements and experiences but also come into contact with different teaching methods and concepts, thereby stimulating new teaching inspirations and innovative ideas ^[13]. For example, teachers can carry out teaching activities better and enhance their digital literacy through the sharing of successful cases and experiences on the platform. In addition, teachers from different universities can jointly discuss the challenges faced in the digital transformation of higher foreign language education on the platform, such as technical difficulties and the shortage of teaching resources, and find solutions together to jointly promote the process of digital transformation and enhance digital literacy.

4.3. Strengthening the training of foreign language teachers and building a high-quality team

By providing all-around and multi-angle training, universities can help foreign language teachers understand the role and value of digital technology in teaching and improve their digital literacy ^[14]. To enhance the effectiveness of the training, universities need to build a teaching team with digital literacy. The teaching team not only needs to have rich teaching experience and rigorous professional ability, but also needs to master digital knowledge and the application ability of digital technology.

Interdisciplinary cooperation can promote the integration and blending of knowledge from different disciplines and stimulate the innovation of teaching methods. Colleges and universities need to organize foreign language teachers to participate in academic conferences, teaching salons and other activities, and exchange experiences with colleagues from different disciplines; encourage them to share successful cases of digital technology in teaching, discuss the potential and strategies of interdisciplinary teaching, prompt foreign language teachers to understand and master the cutting-edge technologies and teaching methods of other disciplines, such as information technology and psychology, and integrate these interdisciplinary knowledge

into foreign language teaching, innovate teaching methods and improve teaching effects.

To enhance the training effect of foreign language teachers, in addition to carrying out theoretical knowledge training, universities also need to focus on the cultivation of teachers' digital skills and practical abilities, and build an online training platform for digital literacy based on practice^[15]. With its powerful functions, the online training platform can provide rich learning resources for digital literacy, including video tutorials, online courses, case studies, etc. All foreign language teachers can access the platform resources equally, without being limited by factors such as region and school type. At the same time, teacher training should focus on the application of digital technology in teaching practice for foreign language teachers, such as the use of online teaching platforms and the production of multimedia teaching resources. Universities can assess teachers' skills by carrying out teaching activities or simulating teaching scenarios and providing them with targeted suggestions to improve their digital technology application ability more comprehensively.

5. Conclusion

To sum up, in the context of the digital intelligence era, the improvement of digital literacy of foreign language teachers in colleges and universities not only helps to enhance the teaching quality but also can effectively promote the digital transformation of colleges and universities. In this regard, colleges and universities can guide teachers to deeply understand the importance of digital technology for innovative education by enhancing teachers' digital awareness, establishing intelligent platforms, strengthening the training of foreign language teachers, and creating a digital environment, and prompt them to deeply integrate digital technology with teaching, to better cultivate high-quality foreign language talents for the society.

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References

- [1] Zeng YY, 2025, Multi-dimensional Approaches to Improving the Literary Literacy of Foreign Language Teachers from the Perspective of Foreign Language Education. *Frontiers in Foreign Language Education Research*, 8(1): 70–79.
- [2] Wang W, Lu T, 2025, Research on Digital Literacy of College Foreign Language Teachers and Its Enhancement Paths under the Background of Digital Transformation in Education. *Journal of Ludong University (Philosophy and Social Sciences Edition)*, 42(1): 62–67.
- [3] Yuan Y, 2025, Discussion on Digital Literacy of College Foreign Language Teachers under the Background of

- New-quality Productivity. Heilongjiang Education (Higher Education Research and Evaluation), 2025(1): 15–19.
- [4] Bian JS, Jiang Q, Huang Z, et al., 2024, Research on Digital Literacy of Pre-service Foreign Language Teachers in China to Adapt to Digital Teaching. *Foreign Language Research*, 2024(6): 61–71.
 - [5] Zhao LZ, 2024, Enhancement of Digital Literacy of College Foreign Language Teachers and Digital-intelligent Foreign Language Teaching Practice. *Journal of Changchun Institute of Technology (Social Science Edition)*, 25(2): 99–104.
 - [6] Jiang X, Pan MW, 2024, Professional Development of College Foreign Language Teachers in China in the New Era: Current Situation and Countermeasures. *Journal of Beijing International Studies University*, 46(5): 102–114.
 - [7] Xiao YH, Zou YM, Feng WQ, et al., 2024, Research on Evaluation Analysis and Enhancement Paths of Digital Literacy Capacity of College Foreign Language Teachers. *Modern Educational Technology*, 34(10): 83–91.
 - [8] Liu XM, 2024, Theoretical Discussion and Enhancement Strategies of Digital Literacy of College Foreign Language Teachers. *Education Observation*, 13(28): 25–28.
 - [9] Shi WZ, Liang J, 2024, Strategies for Improving Digital Literacy of Foreign Language Teachers in Higher Vocational Colleges under the Background of the “Three Education” Reform. *Education Information Forum*, 2024(9): 27–29.
 - [10] Chen Q, 2024, Research and Practice on the Training Model of Digital Literacy for Foreign Language Teachers in Colleges and Universities under the Background of “Internet +”. *Science, Education and Culture Collection*, 2024(10): 23–27.
 - [11] Liu J, Li JP, Wang XL, 2023, Research on Digital Literacy of Foreign Language Teachers in Colleges and Universities Based on Online Teaching. *Journal of Jining University*, 44(6): 81–87 + 95.
 - [12] Han YN, 2023, Research on Strategies for Improving Digital Literacy of Foreign Language Teachers in Colleges and Universities Enabled by Information Technology. *Journal of Jilin Radio and TV University*, 2023(6): 55–57.
 - [13] Liu P, 2023, Challenges and Promotion Paths of Digital Literacy of Foreign Language Teachers in Private Colleges and Universities in the Digital Age. *Modern English*, 2023(22): 30–34.
 - [14] Hu JH, Zhang TF, 2023, Research on the Beliefs and Practices of Digital Literacy of Foreign Language Teachers in Chinese Colleges and Universities. *Foreign Languages and Their Teaching*, 2023(5): 73–85 + 147.
 - [15] Wu J, 2023, Research on the Promotion Path of Ideological and Political Literacy of Foreign Language Teachers in Colleges and Universities in the Digital Context. *Teachers*, 2023(27): 87–89.

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Research on the Reform of Teaching Methods for Hardware Fundamentals Courses in IoT Programs at University

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Abstract: With the rapid development of the Internet of Things (IoT) and the deep implementation of the “Made in China” strategy, higher standards are being set for the cultivation of hardware system competencies in IoT engineering programs at universities. As a core foundational course of the discipline, Fundamentals of IoT Hardware urgently requires systematic reform in its content structure, teaching methodology, and practical approach. Based on the teaching reform practices at Hainan Normal University, this study constructs a modular teaching content system guided by a comprehensive “Device–Model–Circuit–System” knowledge framework. Task-driven and inquiry-based teaching methods are introduced, and the LTspice simulation platform is integrated to enhance the course’s systematicity and hands-on nature. Through two rounds of pilot reforms, significant improvements were observed in students’ learning motivation, system-level understanding, and engineering capabilities, alongside a general increase in teaching satisfaction. The results indicate that this reform path effectively addresses the problems of fragmentation, weak practical engagement, and single-mode evaluation in traditional courses, offering valuable insights for curriculum development under the emerging paradigm of “New Engineering.”

Keywords: IoT engineering; Hardware fundamentals; Teaching reform; LTspice simulation; Task-driven approach

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1. Introduction

1.1. Research background

With the continued advancement of a new wave of global technological revolution and industrial transformation, emerging technologies represented by artificial intelligence, big data, cloud computing, and the Internet of Things (IoT) are rapidly reshaping production methods and organizational structures across various industries. As a core component of next-generation information technology, the IoT plays a fundamental role in supporting the implementation of the “Made in China” strategy. In particular, under the framework of “Intelligent

Manufacturing 2025”, the IoT’s capabilities in sensing, control, communication, and intelligent decision-making have become key driving forces for the transformation and upgrading of the national manufacturing sector^[1].

The “hardware foundation” layer, as a core element within the IoT technology system, has become increasingly important. IoT hardware systems serve as the functional basis for data acquisition, information exchange, and edge computing, and their level of construction directly determines the overall system’s performance, reliability, and energy efficiency. Therefore, the systematic cultivation of talent equipped with modern electronic circuit design and hardware system integration skills has become a pressing issue in contemporary engineering education.

Fundamentals of IoT Hardware is a critical foundational course for IoT engineering majors in university, encompassing multiple modules such as basic electronic devices, circuit principles, embedded interfaces, and circuit simulation. It serves as a key component for students to acquire hardware system design capabilities and to build IoT node devices. However, in most Chinese universities, the teaching of this course still faces common issues such as being “strong in fundamentals but weak in system integration, heavy on theory but light on practice.” The course content is often centered on discrete components, disconnected from the latest developments in integrated circuit technologies and industrial applications, and fails to establish a complete knowledge chain linking “device–circuit–system–application.”

As a nationally significant strategic development region, Hainan Province has clearly outlined in its 13th Five-Year Plan for Scientific and Technological Development the need to develop intelligent sensing systems for sectors such as public safety, modern logistics, tropical agriculture, and intelligent transportation^[2]. The plan emphasizes industrial deployment in key areas, including new sensor technologies, embedded devices, and edge computing. This strategic vision provides universities with both a clear direction and a practical demand for course reform. Against this backdrop, Hainan Normal University launched an educational reform project funded by the Hainan Provincial Higher Education Teaching Research Program. The project focuses on reforming the teaching methods and strategies for the Fundamentals of IoT Hardware course. It aims to construct a panoramic teaching model centered on CMOS devices and extending across the layers of “Device–Model–Circuit–System.” Through content updates, methodological innovations, platform enhancements, and case-driven learning, the project strives to achieve a precise alignment between educational objectives and industrial needs.

1.2. Research significance

With the increasing national support for the development of the integrated circuit industry, there is a growing demand for talent proficient in hardware system design and simulation. The traditional engineering education model that emphasizes software while neglecting hardware is no longer sufficient to meet the talent structure requirements of the new-generation information industry. By optimizing the teaching content of the Fundamentals of IoT Hardware course, strengthening general education in VLSI design, and guiding students to master foundational simulation tools (such as LTspice), the university can effectively address the structural weakness in hardware knowledge among IoT students. This, in turn, contributes to the cultivation of foundational talent for key national sectors such as integrated circuits and secure, autonomous systems.

As a representative of the local university, Hainan Normal University’s reform of this course carries significant practical relevance and replicability. Under constraints of limited funding and resources, the university has constructed a curriculum system that centers on educational software, employs inquiry-based tasks as the learning vehicle, and incorporates real-world case studies as instructional guidance. This approach not only enhances teaching quality but also broadens students’ engineering perspectives, serving as a practical

model for local universities exploring talent cultivation paths based on “specialized disciplines + industry-education integration.”

Fundamentals of IoT Hardware serves as a bridge between theoretical circuit courses and applied system design courses. It requires students to possess a solid theoretical foundation as well as practical skills in modeling engineering problems, selecting devices, simulating circuits, and validating solutions^[5]. This project proposes a reform philosophy centered on “de-emphasizing abstraction, emphasizing application, and aligning with the technological frontier,” thereby strengthening the integration between course content and engineering practice. Students can not only transition their knowledge from “device” to “circuit” to “system” within the classroom, but also extend their learning to extracurricular engineering projects, technology competitions, and capstone designs, ultimately enhancing their comprehensive competencies and engineering capabilities.

2. Current situation analysis of course teaching

As one of the core foundational courses for IoT engineering majors, Fundamentals of IoT Hardware plays a pivotal bridging role in the undergraduate curriculum. It not only connects fundamental courses like circuit theory and analog electronics with follow-up courses such as embedded systems and wireless communication, but also serves as the students’ first gateway to electronic system design and hands-on practice^[3]. However, a review of current teaching practices in most Chinese universities—especially local institutions—reveals prominent issues in areas such as course content, instructional methods, experimental systems, and feedback mechanisms. These challenges call for systematic reform and innovation.

2.1. Outdated content structure lacking a systematic and forward-looking vision

At present, the teaching content of Fundamentals of IoT Hardware in most universities still follows the traditional electronic technology course structure, focusing on fundamental knowledge of discrete components and basic circuit analysis, with emphasis on separately teaching analog and digital circuit fundamentals^[6]. This fragmented approach fails to deliver integrated and system-level design concepts, often leading to superficial and isolated knowledge acquisition. As a result, students struggle to form a cognitive chain that links “Device–Module–System”^[4].

Moreover, current textbooks and syllabi are outdated and fail to incorporate key hardware concepts from emerging information technologies such as SoC design, low-power techniques, CMOS fabrication, and edge computing. This has caused a disconnect between course content and industry developments. For example, while teaching integrated operational amplifiers, their practical applications in embedded ADC interfaces are often neglected, and when introducing filter circuits, there is a lack of explanation regarding real-world system modeling within IoT signal acquisition chains.

2.2. Teacher-centered methods dominate, resulting in low student engagement

Classroom instruction in the Fundamentals of IoT Hardware course is still largely teacher-centered and lecture-driven, lacking effective integration of exploratory, case-based, and project-based teaching strategies. Teachers commonly follow the textbook in a linear fashion, while students rely primarily on note-taking and rote memorization for exams^[7]. There is little inquiry-based interaction with real-world problems or comprehensive design training. This low-interaction, low-engagement teaching model falls short of the goal of cultivating IoT professionals with core engineering competencies. Particularly when tackling more complex topics such as

MOSFET characteristics, circuit modeling, and sequential circuit analysis, students often fall into a passive learning state — “listening without understanding, watching without doing.” Teachers report that students frequently lose focus during class, and while homework completion rates are high, the quality is inconsistent. Students often stay at the stage of shallow imitation, lacking the ability to internalize knowledge or transfer it to new contexts.

2.3. Weakness in experimental teaching: Lacking simulation and engineering orientation

Experimental teaching, a vital part of the Fundamentals of IoT Hardware course, is currently centered on verification-based lab work using basic circuit assembly and measurements. Typical lab projects include building discrete amplifiers, logic gate experiments, and voltage comparator tests. Although these offer some fundamental training, they are often low in complexity, repetitive in nature, and lack design challenges, thus failing to cultivate students’ system modeling and problem-solving capabilities^[8]. Most labs do not incorporate circuit simulation tools or EDA design workflows. Students lack experience with SPICE modeling, simulation analysis, and device parameter tuning, and thus fail to establish a complete experimental chain linking “theory–simulation–construction–testing.” For example, when learning about multistage amplifiers, students can only observe signal waveforms in physical circuits and are unable to fine-tune device biasing or analyze distortion sources in a simulation environment. They also cannot verify performance variations under different process parameters, which severely limits the development of their engineering analysis skills.

2.4. Single-mode assessment system fails to reflect competency development

In terms of assessment, most universities still rely heavily on final exams as the primary grading method, with midterm assignments and lab reports serving as supplementary components. This exam-oriented evaluation model, which emphasizes “knowledge reproduction”, tends to encourage rote learning over deep understanding and fails to foster intrinsic learning motivation. In practice, key engineering qualities such as project competence, creative thinking, teamwork, and communication skills are often overlooked. Although students may complete the “assigned tasks” during the course, they frequently struggle to apply their knowledge in real-world integrated design scenarios, exhibiting difficulty with knowledge transfer and problem-solving in unfamiliar contexts^[9].

3. Teaching reform objectives and overall design

As a core foundational course in the IoT engineering major, Fundamentals of IoT Hardware plays a crucial role in developing students’ understanding of electronic circuits, hardware system modeling, design, and implementation capabilities. In the context of rapidly evolving technologies and industrial demands, traditional course content and teaching methods are no longer sufficient to meet the requirements of cultivating next-generation engineering talent. In response to the issues identified in Chapter 2—such as outdated content, limited instructional approaches, weak experimental systems, and insufficient student skill output—this chapter proposes a systematic teaching reform framework grounded in the principles of “industry-driven needs, system-level capability enhancement, and instructional innovation.” The chapter outlines a set of targeted reform goals and presents a practical and scalable implementation plan for curriculum transformation.

3.1. Teaching reform objectives

The central objective of the teaching reform for the Fundamentals of IoT Hardware course is to align with the

“process + outcome” assessment mechanism to ensure students not only master knowledge but also achieve capability output and overall quality improvement.

3.2. Overall curriculum reform design

To achieve the aforementioned goals, the reform of the Fundamentals of IoT Hardware course follows a guiding framework centered on “content restructuring, methodological innovation, platform upgrading, and evaluation mechanism enhancement.” The overall teaching design is structured as follows.

3.2.1. Constructing a “device–model–circuit–system” knowledge network

Leveraging the widespread relevance and practical significance of CMOS devices, the reform builds a radial instructional framework centered on the MOSFET, as shown in **Figure 1**. Beginning with the structure and characteristics of the MOS transistor, the framework expands to cover small-signal modeling, amplifier and switching circuit design, integrated module development, and system-level interface applications. This approach breaks away from the fragmented, topic-by-topic instruction of traditional curricula, instead forming a horizontally connected and vertically expandable knowledge map.

3.2.2. Implementing a “thematic unit + task-driven” instructional strategy

The reform shifts away from a linear, chapter-based instructional structure toward a thematic unit design centered on real-world engineering tasks. For example, under the theme “Designing a Low-Power Temperature Sensing Node”, students are required to complete subtasks such as thermistor modeling, voltage amplifier design, filter configuration, and ADC interface design. Each subtask serves as a focal module within the curriculum, fostering a holistic learning process.

3.2.3. Integrating industrial-grade simulation platforms to enhance practical training

To address the limitations of traditional lab teaching, such as excessive focus on hands-on work with limited modeling and weak analytical thinking, the reform introduces LTspice as the core simulation tool. LTspice offers high-precision SPICE modeling, cross-platform accessibility, and a rich set of simulation functionalities, enabling students to explore device models and manufacturing processes in depth, thereby strengthening the integration between theory and practical skills.

3.2.4. Embedding real-world application scenarios to enhance relevance and engagement

The course is closely aligned with current industrial technology trends by incorporating real-world cases, such as iPhone Face ID circuitry, Tesla autonomous driving sensor nodes, and Brain-Computer Interface (BCI) circuits, into the instructional process. Through problem-based learning and reverse engineering, students are guided to analyze the core circuit design challenges and component selection logic behind these applications, enhancing their engagement and broadening their technological perspective. For instance, when teaching differential amplifiers, students are encouraged to understand how they suppress common-mode noise in EEG signal acquisition; when covering CMOS inverters, discussions include their role in edge detection modules of image processing chips, highlighting their high-speed, low-power characteristics. This real-world problem-driven approach helps students contextualize and engineer abstract concepts.

3.2.5. Developing a multidimensional evaluation system to support holistic competency growth

Traditional evaluation models rely heavily on summative assessments, which fail to fully reflect students' comprehensive abilities. To address this, the course reform introduces a diversified evaluation framework focused on “knowledge acquisition, competency development, and process participation.” This system comprises three dimensions: Knowledge dimension: Mid-term and final exams, along with simulation reports, assess students' theoretical understanding; Skill dimension: Group project designs and course papers evaluate application skills and innovation capabilities. Participation dimension: Class performance, task progress, and reflective journals measure learning initiative and engagement.

The course emphasizes the integration of formative assessment and final performance presentation, promoting balanced development in cognitive, practical, and critical thinking abilities. Additionally, student self-assessment and peer evaluation mechanisms are incorporated to foster self-regulation and teamwork skills.

4. Teaching implementation path and process design

With the goals and overall framework of the Fundamentals of IoT Hardware course reform clearly established, the key challenge lies in translating these ideas into practical, replicable, and assessable teaching practices. Taking into account students' current learning characteristics, the availability of teaching resources in the university, and the structural features of the course content itself, this chapter systematically outlines the implementation path and process design. The discussion is structured around five aspects: instructional unit design, classroom organization, simulation and lab platform development, teacher–student interaction mechanisms, and the evaluation system.

4.1. Modular design of teaching content

To enhance the logical flow and coherence of the course, the reform restructures the original chapter-based content into a modular format. Content is decomposed into five hierarchical levels—device, model, circuit, system, and application—and divided into corresponding thematic modules (**Table 1**). Each module is aligned with real-world engineering problems and associated with subtasks that foster the integration of theoretical knowledge and practical application.

Table 1. Teaching module design and application examples for the *Fundamentals of IoT Hardware* course

| Teaching module | Teaching topic | Core knowledge points | Application scenario examples |
|-----------------|--|---|---|
| Module 1 | MOSFET Structure and Operating Principles | CMOS devices, current control mechanism, I–V characteristics | Amplifier circuits, switching components |
| Module 2 | Small-Signal Modeling and Circuit Analysis | Small-signal model, gain, frequency response | Sensor interface circuits |
| Module 3 | Digital Circuits and CMOS Logic Gates | Inverter, NAND gate, transmission gate, logic function analysis | Embedded GPIO modules |
| Module 4 | SPICE Modeling and Simulation Practice | SPICE syntax, waveform observation, parameter tuning | Temperature acquisition system simulation |
| Module 5 | Circuit System Design and Interface Applications | Voltage comparators, filters, ADC interface | Smart data acquisition node design |
| Module 6 | Case-Driven System Design Integration | Differential signals, anti-interference design, system integration architecture | EEG acquisition systems, smart lighting control nodes |

Each module is centered around a typical engineering problem, preserving the training of foundational knowledge while placing emphasis on the development of problem-solving skills.

4.2. Classroom instructional organization

In terms of classroom organization, the reform introduces a “thematic inquiry + mind mapping + task collaboration” triadic teaching model. This model emphasizes student-centered learning and promotes deep learning and team collaboration under teacher guidance.

Thematic inquiry-based teaching: Each class begins with a thematic question or application challenge, such as: “How do you design a temperature acquisition circuit that balances power consumption and response speed?” This problem-driven approach sparks student interest and encourages them to actively construct their own knowledge systems.

Mind mapping for conceptual understanding: Teachers construct knowledge maps for each module (Device — Equivalent Model — Submodule — System Architecture) to help students understand the knowledge network at a macro level. Students are also encouraged to build their own personalized learning maps, aiding internalization of knowledge.

Small group task collaboration: Students are divided into groups of 4–6 members to work collaboratively through four stages—ideation, modeling, simulation, and presentation—based on course challenges. Each stage includes deliverables and presentations, enhancing students’ hands-on engagement, teamwork, and communication skills.

Blended flipped classroom with micro-lectures: Teachers pre-record key micro-lectures, including 3D animated explanations of CMOS processes and experimental procedure demos. Students engage in self-paced learning before class, while in-class sessions focus on problem-solving, simulation operations, and idea exchange, improving the overall efficiency of instructional time.

4.3. Construction of the experiment and simulation platform

To create an experimental learning path that is “observable, adjustable, and optimizable,” the course reform builds a simulation platform centered on LTspice, accompanied by the development of six integrated experimental task packages see Table 2 for details.

Table 2. Correspondence between experimental tasks and knowledge modules in the Fundamentals of IoT Hardware course

| Experiment title | Key content | Corresponding module |
|--|---|----------------------|
| MOS Transistor I–V Characteristic Simulation | Analyze the effect of parameter variation on breakdown voltage and current | Module 1 |
| Frequency Response Analysis of Common-Source Amplifier | Observe gain variation, -3dB frequency, and biasing methods | Module 2 |
| CMOS Inverter Transmission Characteristic Simulation | Observe the impact of gain variation, -3dB frequency points, and biasing approaches | Module 3 |
| SPICE Parameter Fitting | Analyze real device models (e.g., 0.18 μm CMOS) | Module 4 |
| Filter + Comparator Interface Design | Design RC filters and simulate the comparator output interfacing with a microcontroller | Module 5 |
| System-Level Simulation of Smart Node | Complete module-level design integrating sensor interfaces, amplification, ADC, and communication logic | Module 6 |

All experimental tasks are supported by: short preview micro-lectures (5–10 minute demonstration videos); foundational design documents and SPICE templates; encouragement for students to optimize designs, introduce noise, and tune advanced parameters such as temperature drift; and support for both in-class demonstrations and post-class deep refinement, thereby expanding students’ initiative and engagement.

4.4. Teacher-student interaction and learning support mechanisms

To enhance instructional interaction quality and student engagement, the course is equipped with dedicated interaction and feedback mechanisms, including: Weekly “Question Wall” Q&A sessions where the instructor addresses and analyzes common student-submitted questions. Open lab sessions are held twice weekly outside of class for simulation-based experimental discussion and support. Online discussion forums hosted on digital platforms (e.g., Rain Classroom, MOOC), with a dedicated discussion area for each module. Peer evaluation system, in which group project assessments incorporate peer review weights to foster responsibility and engagement. Teaching log system, where instructors record reflections and student feedback after each session to inform ongoing course improvement.

4.5. Learning outcome evaluation framework

The course adopts a tri-dimensional evaluation structure consisting of formative assessment + project-based evaluation + summative testing, as shown in **Table 3**. This structure ensures that knowledge mastery, competency development, and learning participation are all taken into account. A multi-dimensional and diversified assessment system effectively guides students to value the learning process and skill enhancement, avoids the pitfalls of one-time high-stakes testing, and allows instructors to continuously monitor and respond to student learning dynamics.

Table 3. Multi-dimensional assessment framework for the Fundamentals of IoT Hardware course

| Evaluation type | Weight | Evaluation content and methods |
|--------------------------|--------|---|
| Formative Assessment | 30% | Classroom participation, completion of phased tasks, simulation report submission, mini-quizzes |
| Project-Based Evaluation | 40% | Group system design deliverables, design documentation, and technical presentations |
| Summative Assessment | 30% | Written final exam + open-ended questions |

5. Teaching practice and analysis of reform effectiveness

Since the implementation of this project, systematic teaching reform and practical exploration have been carried out for the Fundamentals of IoT Hardware course, focusing on content restructuring, instructional method optimization, experimental platform upgrading, and evaluation system enhancement. Over two complete teaching cycles, pilot and iterative practices were conducted for students in the IoT Engineering program from the cohorts of 2019 and 2020. Through a comparative analysis of pre- and post-reform outcomes—supplemented by student feedback, teacher evaluations, and teaching data—this chapter provides a systematic assessment of the reform’s effectiveness and identifies areas that require further optimization.

5.1. Overview of reform implementation

According to the reform objectives, a teaching reform pilot for this course was launched during the 2022–2023 academic year at the School of Information Science and Technology, Hainan Normal University, targeting IoT Engineering majors. The course comprised a total of 48 instructional hours, including 28 hours of theoretical instruction and 20 hours of practical training, fully covering the six modules outlined in the previous chapters. The teaching team consisted of five instructors, all of whom received training in LTspice simulation and task-driven instructional workshops to ensure consistency and standardization in teaching implementation.

5.2. Student feedback and learning outcome analysis

To comprehensively assess the effectiveness of the reform, surveys and interviews were conducted after the course. A total of 96 students who completed the course were invited to participate, and 94 valid responses were collected. The findings indicate significant positive impacts in the following areas.

Marked increase in student learning interest: 89% of students stated that the course content was “more closely aligned with real-world applications and more engaging,” compared to pre-reform responses indicating they studied “just to pass exams.” Most students reported a clearer understanding of hardware systems and greater motivation to learn.

Enhanced practical skills: Over 81% of students felt that LTspice simulation exercises “effectively helped them understand circuit operating principles” and noted that they were able to apply the skills in capstone projects and research work. The overall quality of group system design tasks surpassed previous years, with some projects selected for university innovation competitions.

Improved self-learning and team collaboration abilities: The group task-based structure and phased reporting format of the reformed course significantly enhanced students’ communication and project execution skills. 77% of students reported that “through project development, they gradually mastered design processes and collaborative working methods.”

Stronger system-level understanding of engineering problems: In response to the question “Did the course help build a comprehensive understanding of system design?”, 89% gave positive feedback, stating that “the course bridged the gap between theory and application.” The shift from “learning components” to “understanding systems” notably deepened students’ learning experiences.

5.3. Comparison of teaching evaluation data

The composition of course performance, learning process data, and assignment outcomes before and after the teaching reform for two class cohorts is shown in **Table 4**.

Table 4. Comparison of teaching effectiveness before and after the reform of the Fundamentals of IoT Hardware course

| Evaluation indicator | Pre-reform class | Post-reform class | Change |
|---|------------------|-------------------|------------------------------|
| Average Overall Course Score | 78.5 | 84.2 | Increased by 5.7 points |
| Project Task Completion Rate | 63% | 91% | Increased by 28% |
| Average Number of Simulation Report Submissions per Student | 2.1 | 5.3 | Increased by 3.2 submissions |
| Student Initiative Rate (Classroom/Online Platform) | 18% | 43% | Increased by 25% |
| Course Satisfaction (4-point scale) | 3.2/4 | 3.8/4 | Increased by 0.6 points |

Quantitative data indicate that students in the reformed class demonstrated significant improvements in learning initiative, project performance, and overall competency output, thereby validating the effectiveness of the instructional design and evaluation mechanisms.

5.4. Teacher evaluation and classroom observation results

During course implementation, the teaching team conducted regular teaching reflections and peer evaluations. Overall feedback revealed both positive outcomes and areas for further improvement. Most instructors agreed that task-oriented, modularized teaching effectively captured students' attention, while the introduction of SPICE-based simulation greatly enhanced classroom effectiveness and practical engagement. In terms of instructional organization, the flipped classroom model encouraged students to prepare more thoroughly before class, leading to deeper in-class interaction and cognitive engagement. However, some instructors also noted increasing disparities in student ability, with less-prepared students falling behind in project-based tasks. This highlights the need for more targeted and differentiated instructional support in future iterations of the course.

6. Conclusion

Through the research and practice of this project, a preliminary teaching reform framework for the Fundamentals of IoT Hardware course has been established to meet the evolving demands of talent cultivation in the new era of IoT engineering. Centered on a “device–model–circuit–system” knowledge structure, the course adopts a modular content framework, integrates task-driven and inquiry-based teaching methods, and incorporates the industrial-grade LTspice simulation platform. These reforms have guided students from theoretical understanding toward the development of comprehensive system design capabilities. Teaching practices indicate that the reform has not only significantly increased students' interest and engagement in the course but also substantially enhanced their practical skills and engineering literacy. Course performance, task completion rates, and student satisfaction have all shown notable improvements compared to traditional teaching approaches. However, the reform has also revealed some challenges, such as the wide variance in student capabilities leading to uneven task performance, and the insufficient level of digitalization of course resources. Future efforts will focus on platform-based resource development, layered experimental tasks, and the exploration of integrated “course–competition–research” education models. These initiatives aim to deepen industry-education integration, promote interdisciplinary teaching, and ensure the continued optimization and broader dissemination of reform outcomes. Overall, this project offers a replicable and scalable model for engineering course reform. It also provides valuable insights and practical support for improving the quality of education in local universities and responding to the strategic talent needs of the nation.

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References

- [1] State Council of the People's Republic of China, 2015, Notice on Strengthening the Management of Internet Information Services. http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm
- [2] Hainan Provincial Department of Science and Technology, 2016, Hainan Province Science and Technology Innovation Policy. http://dost.hainan.gov.cn/art/2016/9/30/art_417_78042.html
- [3] Massachusetts Institute of Technology, n.d., 6.915/6.916: Advanced Topics in Artificial Intelligence. <http://www.ai.mit.edu/courses/6.915/6.915.html>
- [4] KU Leuven, n.d., Prof. Dr. Willy Sansen Profile. <http://www.kuleuven.be/wieiswie/nl/person/00008333>
- [5] Stanford University, n.d., Thomas M. (Thm): Stanford Faculty Profile. <http://web.stanford.edu/~thm/>
- [6] Columbia University, n.d., Prof. Unger's Personal Website. <http://www.cs.columbia.edu/~unger/>
- [7] Imperial College London, n.d., Prof. P. Cheung's Profile. <http://www.ee.ic.ac.uk/pcheung/>
- [8] EET China, 2017, Linear Technology Announces New LTspice Enhancements. <http://www.eet-china.com/news/article/201707251206>
- [9] Linear Technology, n.d., LTspice: The Leading SPICE Simulation Software. <http://www.linear.com.cn/solutions/ltspice>

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The Characteristics of the English Translation of Chinese Literary Works in the Context of the New Era

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Abstract: Under the background of the new era, the English translation of Chinese literary works presents diversified characteristics. With the acceleration of globalization and the international dissemination of Chinese culture, more and more Chinese literary works have been translated into English and entered the world. In this process, translators not only need to accurately convey the meaning of the original text, but also need to take into account cultural differences, so that the translation can not only retain the style of the original work, but also be accepted by foreign readers. This paper aims to explore the main characteristics of the English translation of Chinese literary works under the background of the new era and analyze its unique manifestations in terms of language, culture, and aesthetics.

Keywords: New era; Chinese literary works; English translation

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1. Introduction

The increasingly frequent economic exchanges and cultural communication around the world have brought unprecedented development opportunities for the English translation of Chinese literary works. Against this background of time, translation is no longer merely a transformation at the language level but rather a cross-cultural communication and exchange. For a long time, the translation of Chinese literary works has not been coherent or systematic. The translation of many works was carried out by translators based on their own preferences, with strong randomness and contingency. With the development of the times, the English translation of Chinese literary works has gradually moved towards a standardized and professional path. Translators have begun to pay more attention to the in-depth understanding and analysis of the original text, striving to accurately convey the author's intentions and emotions during the translation process, and pay more attention to the understanding of the target language culture in order to properly handle cultural differences in translation and make the translation more idiomatic and natural.

2. The background of the era of the English translation of Chinese literary works

Entering the new era, China's comprehensive strength has further enhanced. Especially with the implementation of the "Belt and Road Initiative", it is even more necessary for Chinese literary works to showcase their unique charm and value on the international stage. This era background provides a broad space for the development of the English translation of Chinese literary works and also puts forward higher requirements for it. With the improvement of China's international status, foreign readers' interest in Chinese literature is growing increasingly intense. They are eager to understand the profound and rich connotations of Chinese culture through English translations. Meanwhile, the popularization of the Internet and the accelerated development of global informatization have enabled the English translations of Chinese literary works to spread more rapidly and widely to countries around the world ^[1].

In the new historical context, China's cultural confidence is inevitably an embodiment of the continuous strengthening of cultural construction. However, a series of problems existing therein still await in-depth thinking and exploration, such as the English translation of Chinese literary works. Regarding the English translation of Chinese literary works, translators first need to conduct rational discussions on Chinese literary works from different perspectives, such as history and development, and understand the unique charm and cultural connotation of Chinese literary works. Translators should not only have a solid language foundation but also possess profound cultural literacy and acute aesthetic insight. Only in this way can they accurately capture the essence of the original text during the translation process and ingeniously integrate Chinese cultural elements into the English expression, making the translation both faithful to the original work and having a distinct contemporary flavor and cultural characteristics. Meanwhile, with the continuous development of translation theories and the continuous innovation of translation technologies, the English translation of Chinese literary works is also facing new challenges and opportunities. Translators need to constantly learn and explore new translation methods and techniques to adapt to the changes of the times and the changes in readers' demands, and promote the continuous development of the English translation of Chinese literary works ^[2].

3. The characteristics of the English translation of Chinese literary works in the context of the new era

3.1. The combination of macro and micro

Under the background of the new era, one of the characteristics of the English translation of Chinese literary works is the combination of the macroscopic and microscopic aspects. Translators not only grasp the cultural connotation and aesthetic features of Chinese literary works as a whole, but also delve into specific language details, striving to accurately convey the meaning of each sentence and each word. At the macroscopic level, most translators have a relatively in-depth understanding of the historical background and cultural context of Chinese literary works and can accurately grasp the theme and emotional color of the works in translation. At the same time, translators also pay close attention to the dissemination effect of the works in the international cultural context to ensure that the translation can overcome cultural barriers and resonate with foreign readers. At the microscopic level, translators conduct meticulous analysis of the language expression of the original text, including the choice of vocabulary, the structure of sentence patterns, and the use of rhetoric, effectively ensuring the consistency of the translation in language style with the original text. This translation strategy that combines the macroscopic and microscopic aspects enables the English translation of Chinese literary works to have both a profound cultural background and a high degree of language accuracy ^[3-4].

For example, when translating Lu Xun's masterpiece "Call to Arms", the translator not only accurately translates each word and sentence but also deeply understands the inner world of the characters and the social background described by Lu Xun, accurately conveying the critical spirit and national emotions in the work to foreign readers. On this basis, the translator also grasps the characteristics of the times and literary style of the work as a whole, making the translation more in line with the reading habits and aesthetic needs of English readers while retaining the spirit of the original work. This translation method that combines the macro and micro perspectives not only enhances the literary value of the translation but also promotes the international dissemination and exchange of Chinese culture.

3.2. Popularity is positively correlated with the research heat

Under the background of the new era, the English translation of Chinese literary works presents another remarkable feature, that is, the popularity of the works and the research heat show a positive correlation. This means that those literary works that enjoy a high reputation in China and even around the world, their English translation versions are often also highly concerned, and the corresponding research interest is relatively high. This phenomenon can be interpreted from multiple perspectives. On the one hand, well-known works often have a wider reader group and profound historical accumulation, and their literary value and cultural connotation have been widely recognized and praised. Therefore, the English translation versions of these works naturally become an important window for foreign readers to understand Chinese culture and appreciate Chinese literature. With the continuous improvement of translation quality and the increasingly diversified dissemination channels, the influence and popularity of these translation works in the international arena have also expanded. On the other hand, the feature of positive correlation between popularity and research interest also reflects the degree of attention paid to the English translation of Chinese literary works in the translation and academic circles. With the continuous improvement of China's cultural soft power and the increasingly frequent international exchanges, more and more scholars and translators have begun to pay attention to the English translation of Chinese literary works and devote a lot of time and energy to research. These studies not only promote the innovation and development of translation theories but also provide more scientific guidance and support for translation practice ^[5-6].

Take Mo Yan's "Red Sorghum: A Novel of China" as an example. This work enjoys an extremely high reputation in the Chinese literary circle due to its unique literary style and profound social connotations. Its English translation version not only accurately conveys the essence of the original text but also successfully attracts the attention and research of a large number of foreign readers. Many scholars and translators have conducted in-depth discussions on the English translation of "Red Sorghum: A Novel of China", analyzing its success from multiple perspectives such as language, culture, and aesthetics, further enhancing the international popularity and influence of this work. Similarly, classic Chinese literary works like "Fortress Besieged" and "Rickshaw Boy", their English translations, have also attracted much attention due to the increase in their popularity and research interest. These English translation versions of the works not only enrich the reading choices of foreign readers but also build an important bridge for the international dissemination and exchange of Chinese culture ^[7].

3.3. The involved scope is wide, and the types are numerous

Under the background of the new era, the scope and types involved in the English translation of Chinese literary works are unprecedentedly wide and numerous. From classical literature to modern literature, from poetry,

prose, to novels and dramas, various types of literary works have all been included in the category of translation. This not only reflects the richness and diversity of Chinese literary works, but also showcases the profundity and extensiveness of Chinese culture^[8].

In the field of classical literature, such as the four great classics like “Dream of the Red Chamber”, “Journey to the West”, “Water Margin” and “Romance of the Three Kingdoms”, as well as classic literary works like Tang poetry and Song ci, their English translation versions keep emerging one after another and are deeply loved by foreign readers. Through the meticulous translation efforts of translators, these works have successfully crossed the barriers of language and culture, enabling foreign readers to appreciate the unique charm of Chinese classical literature. In the realm of modern literature, the English translation of Chinese literary works also shows a vigorous development trend. From the works of modern literary giants such as Lu Xun and Mao Dun to the excellent works of contemporary writers, they have all been translated into English and introduced to the world. Through the efforts of translators, these works not only retain the style and spirit of the original works but also ingeniously incorporate English expressions, enabling foreign readers to better understand and accept them. With the rise of online literature, the English translation of Chinese online literary works has gradually emerged. These works, with their unique creativity and rich imagination, have attracted a large amount of attention from foreign readers. Through ingenious translation, translators convey the Chinese cultural elements and aesthetic characteristics in these works to foreign readers, further promoting the international dissemination and exchange of Chinese culture^[9-10].

3.4. Equal emphasis on classic and modern

Under the background of the new era, the English translation of Chinese literary works not only pays attention to the innovation and diversity of modern literature, but also attaches great importance to the inheritance and development of classical literature. During the translation process, translators not only deeply explore the profound cultural deposits of classical literary works but also skillfully integrate modern aesthetics and expression methods, so that the translations not only retain the classical charm but also have a modern flavor^[11].

In the English translation of classical literary works, translators pay particular attention to the precise grasp of the language style, historical background, and cultural connotation of the original text. For example, in the translation of “Dream of the Red Chamber”, translators not only accurately translate every word and sentence but also deeply analyze the character personalities, emotional entanglements, and historical background in the work, striving to present the essence of this classical masterpiece completely to foreign readers. At the same time, translators also skillfully use modern English expressions to make the translation more fluent and natural, in line with the reading habits of modern readers.

In the English translation of modern literary works, translators pay more attention to conveying the innovative spirit and modern aesthetic characteristics of the original works. Through in-depth analysis and understanding of the language style of the original text, they skillfully use English expressions to accurately convey the unique creativity, novel perspectives, and profound thoughts in modern literary works to foreign readers. For example, in the translation of Mo Yan’s novel “Frog”, the translator not only retains the profound reflection on China’s family planning policy in the original work, but also shows the complex emotions and conflicts within the characters in the work through modern English expressions, enabling foreign readers to better understand and feel the unique charm of this modern literary work. This translation strategy that attaches equal importance to the classical and the modern not only enriches the connotation of the English translation of Chinese literary works, but also injects new vitality into the international dissemination and exchange

of Chinese culture. Through the elaborate translation by translators, classical literary works can cross the boundaries of time and space and resonate with modern readers, while modern literary works, through the ingenious conveyance by translators, showcase the spirit of the times and innovative style of Chinese culture^[12].

3.5. The translation of English is becoming increasingly standardized

The increasing standardization of the English translation of Chinese literary works is manifested in several aspects. Firstly, the formulation and implementation of translation standards have become stricter. To ensure translation quality, many translation agencies and publishing houses have formulated detailed translation standards and norms, requiring translators to strictly abide by them during the translation process. These standards and norms cover multiple aspects such as language style, cultural expression, and professional terms, providing clear guidance and basis for translators. On this basis, the translation field has also strengthened the supervision and evaluation of translation quality. Through expert review, reader feedback, and other methods, translation works are objectively evaluated, and problems and deficiencies existing in the translation are discovered and corrected in a timely manner^[13].

Secondly, the application of translation technology has also promoted the standardization of English translation. With the continuous development of technologies such as artificial intelligence and big data, translation tools such as translation software and online translation platforms have become increasingly mature and improved. These tools not only enhance translation efficiency but also provide more references and examples for translators. By using these tools, translators can understand the meaning and context of the original text more accurately and choose more appropriate words and sentence patterns for expression, thereby improving the accuracy and fluency of the translation^[14].

Lastly, the education and training of translation have also strengthened the standardized construction. Many universities and translation institutions have offered translation major courses, focusing on cultivating students' language abilities and translation skills. At the same time, the guidance and supervision of translation practice have been enhanced. Through methods such as case analysis and translation practice, students are helped to master translation norms and standards. These education and training measures not only improve the professional quality and translation quality of translators but also lay a solid foundation for the sustainable development of the translation industry^[15].

4. Conclusion

Under the background of the new era, the English translation of Chinese literary works has achieved remarkable achievements. The number of translated works keeps increasing, and the translation quality is gradually improving. In this process, translators not only strive to accurately convey the meaning of the original text, but also actively bridge cultural differences, making the translation both faithful to the original work and having a distinct contemporary flavor and cultural characteristics. The English translation of Chinese literary works, through the translation strategies combining macro and micro aspects, the attention to popularity and research heat, the wide range and types of translation involved, the translation concept emphasizing both classics and modernity, as well as the increasingly standardized translation practice, has played an important role in promoting the international dissemination and communication of Chinese culture.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Wu QJ, 2025, The Representation of Humor in Literary Translation: Taking the Translations of Lao She and Dickens' Works as Examples. *Beijing Social Sciences*, 2025(1): 28–40.
- [2] Zhang TY, You J, 2024, The Intervention of Translation Norms in the Translation of Chinese Literary Works. *Proceedings of the Year-end Symposium on Education Innovation and Experience Exchange in 2024*, 469–472.
- [3] Guo LL, Fan X, 2024, The Enlightenment of Reception Theory on the Translation and Publication of Chinese Classic Literary Works: Taking the English Version of “Water Margin” as an Example. *Journal of Liaoning University of Technology (Social Science Edition)*, 26(4): 70–72.
- [4] He PR, 2024, The Adaptation of Chinese Culture in the Translation of Literary Works: Taking “Pride and Prejudice” as an Example. *Jiaying Literature*, 2024(11): 97–99.
- [5] Yan LM, 2023, The Study of the Translation of Chinese Literary Works in a Cross-cultural Context: Taking the English Version of “Border Town” by Jeffrey C. Kinkley as an Example. *Jin Gu Wen Chuang*, 2023(28): 103–105.
- [6] Shen QC, 2022, A Study on the Translation of Chinese Classical Literary Works from the Perspective of Reception Theory. *Journal of Jiangxi Vocational and Technical College of Electricity*, 35(7): 162–163.
- [7] Wei GF, 2022, A Cognitive Study on the Translation of “Local Language” in Chinese Modern Literary Works, thesis, Beijing Foreign Studies University.
- [8] Zhang LL, 2022, Going Global of Chinese Literature Publishing: Three Consciousnesses and Their Linkage Mechanism. *China Publishing Journal*, 2022(2): 66–68.
- [9] Yin FZ, Li Y, 2021, An Analysis of the Control Effect of the Translation and Dissemination Subject: Taking the English Translation and Publication of Contemporary Chinese Literary Works as an Example. *Journal of Social Sciences of Hunan Normal University*, 50(6): 76–82.
- [10] Zhang LF, 2020, A Study on the Translation and International Dissemination of Chinese Literary Works in the Context of the New Era: Taking Howard Goldblatt's Translation Methods and Literary Translation and Dissemination as an Example. *Jin Gu Wen Chuang*, 2020(39): 82–83.
- [11] Chang YH, 2024, The Transformation of Cross-cultural Perspectives and Translation Skills in English Translation. *Modern English*, 2024(3): 115–117.
- [12] Li L, 2023, A Brief Analysis of the Characteristics and Translation Skills of Fuzzy Language in British and American Literary Works. *Journal of Shanxi Institute of Energy*, 2023(4): 73–75.
- [13] Wang GW, 2024, Translation Skills of English Literary Works from an Aesthetic Perspective. *Central Plains Literature*, 2024(11): 60–62.
- [14] Guo YT, 2022, An Analysis of the Handling Methods of Cultural Differences in the Translation of English Literary Works. *Overseas English*, 2022(15): 17–18.
- [15] Wang J, 2020, The Influence of Cultural Differences on the Translation of English Works and the Handling Skills. *Journal of Harbin Vocational & Technical College*, 2020(4): 3.

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A Study on the Influence of Cultural Differences on Purchase Intentions of Chinese and Japanese Consumers: Centered on Chinese Face Culture and Japanese Shame Culture

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Abstract: This study primarily employs the theoretical framework of “self-concept” from consumer psychology and behavior research to systematically explore the differential impacts on purchase intentions between Chinese and Japanese consumers through literature analysis, case studies, and comparative research methods. The findings reveal that “face culture”, driven by luxury consumption and conspicuous consumption, significantly influences Chinese consumers’ purchase intentions. To enhance social status and gain recognition, Chinese consumers often align their self-concept with product images by purchasing high-end brands. In contrast, Japanese consumers are deeply influenced by “shame culture”, exhibiting stable and strong purchase intentions in areas such as personal image management and cosmetics consumption. Driven by group orientation and collectivist values, Japanese consumers are more prone to conformist consumption tendencies. Theoretically, this study deepens the understanding of the cultural dimensions of purchase intentions among Chinese and Japanese consumers, while also providing new perspectives and methodological insights for cross-cultural consumer behavior research.

Keywords: Chinese face culture; Japanese shame culture; Self-concept; Purchase intention

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1. Introduction

Culture influences consumers’ ways of thinking, aesthetic preferences, value judgments, and needs for social recognition in a subtle yet profound manner, shaping their perception of needs, brand perception, the formation of purchase intentions, and the final decision-making process.

In the process of making purchasing decisions, consumers’ symbolic aspirations, purchase intentions, and preferences are influenced by various factors, including their cultural background and societal values. The consumption behavior of Chinese consumers is driven by face culture, exhibiting distinct individualized

and symbolic characteristics. Specifically, they prefer lively and festive atmospheres in consumption settings, favor visually striking designs in product selection, and are drawn to luxury goods, limited-edition items, and exquisitely packaged gifts—categories that signify social status. This consumption tendency reflects the psychological need of Chinese consumers to gain social recognition and express self-worth through commodity consumption.

In contrast, the consumption behavior of Japanese consumers exhibits markedly different characteristics. Deeply influenced by shame culture and collectivist values, their consumption orientation is closely tied to societal norms of etiquette and group consciousness, manifesting in reserved and restrained consumption tendencies. In product selection, they prioritize practicality and minimalist design. They place great emphasis on personal appearance, showing a preference for lightweight, breathable cosmetics that create a natural look. In consumption decisions related to clothing and home goods, their choices of colors and designs often reflect a clear conformity tendency, closely linked to societal normative pressures and the need for group acceptance.

2. Chinese face culture

As early as the Spring and Autumn and Warring States periods, the concept of “face” was embedded in the “ritual” culture of Confucianism founded by Confucius ^[1]. Confucian culture emphasizes the importance of “face” (lian), which refers to the self as perceived by others and the significance of maintaining one’s desired status in the eyes of others ^[2]. Lin Yutang, in his book *My Country and My People*, noted that face is “abstract and elusive, yet it serves as the most delicate standard for regulating social interactions among the Chinese” ^[3]. Hu Hsien-chin proposed that face possesses social attributes, such as “making a public appearance,” and argued that face represents an individual’s social status or reputation ^[4]. Building on Hu’s work, Ambrose King expanded the concept of “face” from the perspective of moral standards, categorizing it into “social face” and “moral face” ^[4]. In Chinese culture, “face” emphasizes the recognition and respect an individual receives from others, the public, and society ^[5].

The “self-concept” theory in consumer psychology and behavior research refers to the totality of individuals’ thoughts and feelings about themselves, which are formed and developed through the integration of self-perception, others’ evaluations, and societal assessments ^[6]. Self-concept reflects how individuals view themselves and position themselves within society; it explains how consumers express themselves, shape their identities, and achieve self-worth through the purchase and use of products. According to the self-image congruence model within the “self-concept” theory, products serve as significant carriers of user identity, and individuals tend to choose products whose attributes align with certain aspects of their self-concept ^[7]. This choice behavior reflects the intrinsic motivation of individuals to express and reinforce their self-image through consumption. Behaviorists use the term “symbolic consumption” to describe the act of purchasing and consuming products for the purpose of social and self-expression, which is defined as the communication of social and personal identity ^[8].

The purchase intentions of Chinese consumers are deeply influenced by the psychological effects of “self-concept” theory and the identity-signaling nature of “face culture.” Consumers express and reinforce their self-identity through purchasing behavior, focusing not only on the functional attributes of products but also on their symbolic meaning and social value. Luxury consumption serves as a typical example, where consumers establish and display their social identity by purchasing high-end brands, aligning with the “ideal self” and “social self” (how consumers believe others perceive them) within the framework of “self-concept”

theory. The “self-concept” theory posits that consumers possess multiple self-images: the actual self, ideal self, social self, extended self, digital self, and looking-glass self, among others. Sometimes, consumers choose products because they align with the “actual self,” while at other times, they select products that help them achieve the standards of the “ideal self” or “social self.” Chinese consumers’ preference for luxury goods is a quintessential manifestation of this psychology. Individuals often engage in impression management, striving to “manage” how others perceive them, and thus deliberately select products that make them appear more distinguished^[9]. Consumers may continually adjust their behavior to match how they wish to be perceived by others in different social contexts (ideal self, social self). Sirgy revealed that the ideal self and social self determine an individual’s preference for conspicuous products^[10].

For instance, many Chinese individuals, when traveling, dining, or visiting social media hotspots for photos, often use beauty cameras or photo-editing tools to enhance their images before sharing them on various social platforms. Similarly, in live streams or short video production, video-enhancing features are frequently employed to meticulously adjust visual effects, presenting a more flawless image. These practices represent a unique fusion of China’s face culture and the “digital self” within the self-concept framework. In cyberspace, traditional face culture finds new expression as individuals utilize digital tools for image management, elevating face maintenance to new heights. Chinese consumers exhibit a strong desire and demand for beauty-enhancing and photo-editing apps, not only because these tools enhance their appearance but also because they fulfill the need for digital face maintenance.

Furthermore, when purchasing luxury or high-end products, Chinese consumers are often driven by interpersonal relationships and face culture, seeking recognition and respect from others to elevate their social status and image^[11]. The evaluations and labels assigned by others are regarded as critical measures of an individual’s social standing, identity, and worth.

The China Luxury Market Insights Report (2024 Edition), jointly released by Tencent Marketing Insight (TMI) and Boston Consulting Group (BCG), provides an in-depth analysis of the evolving behaviors and preferences of Chinese consumers in luxury consumption, as well as new trends in domestic and overseas shopping mobility^[12]. The report reveals the current state and development trajectory of the Chinese luxury market. It indicates that Chinese consumers contribute a stable 20%–25% to the global luxury market. The Chinese market exhibits remarkable vitality and growth potential. Although the growth rate of luxury consumption in China is at the global median level, its vast consumer base and continuously increasing purchasing power make it a key driver of the global luxury market. **Figure 1** below is sourced from this report.

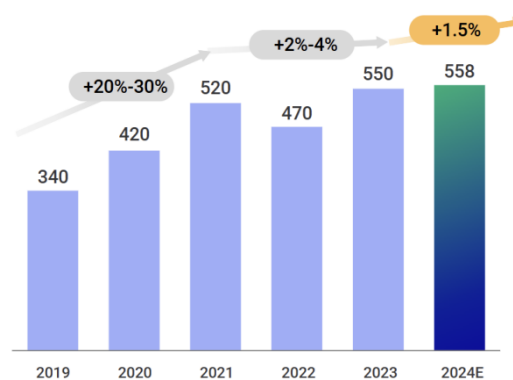


Figure 1. Mainland China’s luxury spending is projected to grow by 4% in 2024, with its share of the global luxury market holding steady at 20%-25% in the past five years

Notably, in recent years, the number of second-hand luxury consignment stores in China has increased significantly, primarily driven by the rapid development of the second-hand luxury market. According to the China report of PwC's 2023 Global Consumer Insights Survey, Chinese consumers' demand for luxury goods remains strong. The Analysis of Development Status and the Report of Investment Prospects of China's Second-Hand Luxury Industry (2025–2032) by Guanyan Research Report Network reveals that the market size of China's second-hand luxury industry reached 26.031 billion yuan in 2023, representing a year-on-year increase of 14% ^[13]. In the first half of 2024, the number of second-hand luxury enterprises in China had already exceeded 9,000. This demonstrates a significant rise in Chinese consumers' acceptance of and demand for second-hand luxury goods, reflecting not only a shift in consumption intentions and attitudes but also the market's pursuit of cost-effectiveness and sustainable consumption models.

In contrast, Japanese consumers place greater emphasis on brand stories and spiritual connotations when it comes to luxury consumption. They tend to choose products that convey brand culture and values rather than merely pursuing material value ^[14]. This shift in consumption attitudes is closely related to Japan's economic and social context. Since the collapse of Japan's economic bubble in the early 1990s, a trend of "de-luxurification" has gradually emerged in Japanese society. Consumers have become more rational and pragmatic, less willing to pay premiums for luxury brands, and more focused on the performance and quality of products themselves. Fewer Japanese individuals now seek to express themselves through ostentatious luxury brands ^[15].

Chinese face culture is not only reflected in the pursuit of luxury goods but also finds new interpretation and extension in personalized customization services. Driven by the culture of face, personalized customization has become a new way to showcase personal identity, taste, and social status. According to the China report of PwC's "2023 Global Consumer Insights Survey", Chinese consumers are more willing to embrace new consumption concepts, such as paying varying degrees of premiums for made-to-order or customized products ^[16]. On July 10, 2024, Mintel released the "2024 Chinese Consumer" report, suggesting that brands need to provide personalized and creative services to meet consumers' desire for emotional value beyond price from offline experiences ^[17]. The report of "Transformation of Chinese Consumers: Driving the New Normal with Precision Strategies", released by AlixPartners in January 2025, indicates that the consumption priorities and behaviors of Chinese consumers are undergoing significant changes in 2025, with strategies like customization remaining a favored channel among consumers ^[18]. The trend of personalized customization consumption among Chinese consumers is becoming increasingly prominent, closely related to the "self-image congruence model" of the "self-concept" theory and the growing need for consumer self-expression.

In China, luxury consumption has long been regarded as a dual symbol of personal taste and social status, with consumers' purchasing behaviors deeply influenced by social environments and collective ideologies. However, as global climate change and environmental issues become increasingly severe, green consumption and environmental awareness are gradually emerging as mainstream values, reshaping Chinese consumers' perspectives on luxury consumption. A growing number of consumers are beginning to pay attention to the environmental practices and sustainability commitments of luxury brands. From the perspective of social psychology, this shift in consumer behavior aligns closely with the "social self" dimension of the "self-concept" theory. When consumers perceive that their social groups generally advocate for environmental values, they often adjust their consumption choices to align with these group values. Nowadays, many consumers prioritize energy-efficient products when purchasing home appliances or prefer using biodegradable packaging, reflecting a shift in consumption intentions to fulfill psychological needs for

group belonging and social recognition.

In recent years, Chinese consumers' purchasing intentions have evolved significantly compared to previous years, where impulsive and trend-following consumption, such as snapping up toilet covers and rice cookers during trips to Japan, was prevalent. Beyond their preferences for luxury goods, personalized customization, and green products, Chinese consumers' purchasing intentions are increasingly shifting toward domestic and nostalgic products. This transformation reflects an upgrade in Chinese consumers' values. With technological innovation and cultural empowerment by domestic brands, an increasing number of Chinese consumers are supporting local products, significantly enhancing their sense of cultural identity and pride. According to the "2024 China New Domestic Products Market Development and Consumer Behavior Survey Data" released by iiMedia Research, over 64.54% of consumers purchase domestic products through e-commerce platforms, while 57.48% choose to shop at offline physical stores^[19]. This demonstrates that domestic brands have successfully integrated into the daily lives of Chinese consumers. Furthermore, the sustained popularity of nostalgic products reflects a new trend in consumer purchasing intentions. Nostalgia emphasizes the emotional connection between the present self and the past self, successfully evoking consumers' childhood memories and emotional resonance. This trend not only reflects the diversified development of the consumer market but also reveals an upgrade in Chinese consumers' emotional needs and cultural identity.

3. Japanese shame culture

The concept of "shame culture" originates from the description of Japanese culture by American anthropologist Ruth Benedict in her book *The Chrysanthemum and the Sword*. Based on cultural typology, the author first proposed the idea that Japanese culture is a "shame culture"^[20]. The ideological roots of shame culture can be traced back to the Confucian cultural tradition, which emphasizes that individual behavior should conform to social norms and avoid causing trouble or negative evaluations from others. This culture shapes individuals' self-perception through social norms and external evaluations, thereby influencing their behavioral patterns. This characteristic of shame culture resonates with the "self-concept" theory in consumer psychology and behavior research. The self-concept theory provides an important theoretical foundation for analyzing the psychological mechanisms of shame culture. This section, combining the characteristics of Japanese shame culture and relying on the self-concept theory, explores the impact of shame culture on Japanese consumers' purchasing intentions from two dimensions: image consciousness and collective consciousness.

3.1. Image consciousness

Japanese shame culture is characterized by a heightened sensitivity to others' evaluations and opinions, making individuals easily influenced or dominated by their surroundings and social environment^[21]. It emphasizes the importance of external constraints and social evaluations, shaping Japanese behavior patterns, ways of thinking, and modes of social interaction. This culture has also profoundly influenced personal image and etiquette in Japan.

In Japan, wearing makeup is regarded as a basic etiquette or social norm. Not wearing makeup may be perceived as impolite or disrespectful to others or the occasion. Makeup has become a means of personal expression and self-enhancement. Japanese shame culture and the emphasis on personal image have driven the prosperity of Japan's cosmetics market. Japanese women generally wear makeup; in recent years, Japanese men have also gradually begun to pay attention to skincare and light makeup, leading to

the emergence of skincare and cosmetic products specifically targeted at men. From the perspective of consumer psychology, Japanese women commonly view makeup as an indispensable part of daily life. This phenomenon aligns with the “multiple selves” (multiple dimensions of self-perception) within the framework of self-concept theory: they construct their “ideal self” through makeup, using it as an important manifestation of the “extended self,” while also reflecting the psychological concept of the “looking-glass self.” The acceptance of cosmetics among Japanese men is significantly increasing, particularly among younger demographics. Especially among young men living in metropolitan areas, there is a growing emphasis on personal image and fashion sense. They are not only willing to try new products and trends but also view the use of cosmetics as an important means of self-expression and enhancing their quality of life.

The Japanese cosmetics industry has long been globally renowned for its high quality and innovation. According to data analysis from the “2024 Research Report of Japan Cosmetics Industry Status and Development Trend” by Bizwit Research & Consulting, the global market size of Japanese cosmetics reached RMB 205.895 billion in 2023, with the Chinese market accounting for RMB 38.049 billion ^[22]. The report predicts that the global market size of Japanese cosmetics will reach RMB 273.326 billion by 2029, with a compound annual growth rate (CAGR) of 4.75% during the forecast period. This indicates that the Japanese cosmetics industry maintains strong growth momentum in the global market, particularly showing significant development potential in the Chinese market.

According to the “2024 Overseas Market White Paper” released by Magic Mirror Insights in October 2024, Japan is one of the largest cosmetics and personal care markets globally, with an estimated market size of USD 32.05 billion in 2024 ^[23]. Japan’s offline retail sector, including drugstores and multi-brand stores, is highly developed, offering diverse product categories at low prices, while online growth has also stabilized. As shown in **Figure 2** of the “2022 Pan-Asia Cross-Border Industry Report,” based on an analysis of the Japanese market, the compound annual growth rate (CAGR) of e-commerce in beauty and personal care from 2020 to 2025 is expected to reach 10%, second only to food and beverages. According to the “2024 Japan Beauty Market Insights Report” by Big Data Cross-Border, the market size is projected to reach USD 36.93 billion by 2029, with a CAGR of 2.87%.

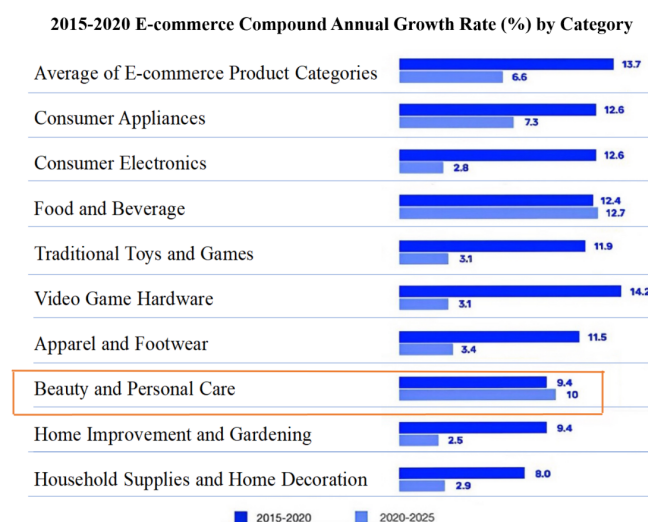


Figure 2. 2015–2022 E-commerce compound annual growth rate (%) by category (2022 Pan-Asia Cross-Border Industry Report)

Based on the above data, it can be concluded that Japanese consumers' demand for cosmetics remains robust, with purchasing intentions showing steady growth. This phenomenon not only reflects the significant role of cosmetics in the daily lives of Japanese people but also deeply reveals the profound impact of makeup behavior on individual self-perception and identity construction. Through makeup, consumers can express their ideal self, extend their self-image, and create personalized appearances, using it as an important medium for self-definition and social recognition. The combination of this consumption trend and psychological needs has further driven the diversified development and innovative upgrading of the Japanese cosmetics market. Sociologists, when studying the relationship between thought and behavior, pay particular attention to the theory of "embodied cognition." This theory posits that "changes in bodily states can influence mental states" ^[24]. Makeup behavior itself can be regarded as a form of "embodied metaphor", which affects an individual's internal psychological state and cognitive patterns by altering external physical features. After applying makeup, individuals often perceive themselves as renewed, thereby gaining a fresh cognitive experience psychologically.

Under the profound influence of Japanese shame culture, individuals meticulously refine their external appearance to meet societal expectations. Makeup not only helps avoid the potential shame associated with inappropriate appearances but also transcends mere aesthetic enhancement. It serves as a crucial component of social etiquette and an essential means of self-presentation. According to the 2024 Japan Beauty Market Insights Report released by Big Data Cross-Border, in recent years, Japanese consumers' preferences for makeup have gradually shifted from pursuing a flawless and perfect look to a more natural and authentic appearance. This trend has led to increased attention on base makeup products that can create a light and translucent finish, such as cushion compacts, primers, and thin-textured color cosmetics ^[25]. This trend has increased the popularity of base makeup products that create lightweight and translucent finishes, such as cushion compacts, primers, and sheer cosmetics. This shift in consumer preferences has not only driven the sustained prosperity of the Japanese cosmetics market but also accelerated rapid advancements in product innovation and technological upgrades. Examples include multifunctional makeup sets and portable makeup tools. Some successful products have gained market recognition by fulfilling consumers' fantasies of their ideal selves. For instance, Shiseido launched "Shiseido Virtual Makeup" as early as 2008, the first smartphone-based virtual makeup try-on application. Additionally, the Japanese market has adopted the "Makeup Simulation" app introduced by the fashion magazine *Vogue*. This app utilizes virtual try-on technology, allowing consumers to visualize the effects of using specific cosmetic products, thereby enhancing the shopping experience and satisfying their pursuit of ideal makeup looks ^[26]. These developments highlight the significant progress Japan has made in virtual makeup and digital experiences.

Based on the above cultural and theoretical analysis, case studies, and data analysis, and in reference to the "Antom China Beauty Cross-Border Insights" report released by E-Commerce Research Institute in March 2024, this study summarizes the core characteristics of consumer purchasing intentions and the development trends in the Japanese cosmetics market as follows ^[27].

3.1.1. Significant trend toward digital consumption

Social media platforms (Instagram, Twitter, TikTok, etc.) have become the primary channels for Japanese young consumers, particularly Generation Z, to access beauty and makeup information.

3.1.2. Accelerated integration of cross-cultural aesthetics

The penetration of Chinese-style makeup and domestic Chinese cosmetics brands in the Japanese market has significantly increased. On social media, “rankings of Chinese cosmetic brands recommended by beauty bloggers” have become an important reference for many Japanese women when choosing makeup products.

3.1.3. Formation of omnichannel consumption models

Traditional channels (such as the Cosme Awards and lifestyle magazines) and digital channels have created a synergistic effect. Japanese consumers’ purchasing intentions exhibit a dual characteristic of “rationality and sensibility coexisting.”

3.1.4. Upgraded product safety standards

Japanese consumers place great emphasis on the quality and safety of cosmetics when making purchases, increasingly favoring products with natural ingredients, low irritability, and high-quality technology.

3.1.5. Personalized needs driving market segmentation

As market segmentation continues to deepen, Japanese consumers’ purchasing intentions for cosmetics are gradually trending toward specialization, refinement, and scenario-specific products. Items targeting specific needs, such as sensitive skin, post-sun repair, and emergency care for late nights, are becoming increasingly popular.

3.1.6. Prevalence of naturalist aesthetics

Japanese consumers prefer compact, portable cosmetics that are suitable for carrying and quick touch-ups. With the growing preference for lightweight, translucent natural makeup, the demand for products like cushion compacts and primers continues to rise, reflecting the current Japanese consumers’ high pursuit of a “burden-free” beauty experience.

3.2. Collective consciousness

Japanese social anthropologist Chie Nakane proposed that “in Japanese society, the latent group consciousness is deeply rooted”^[28]. Japanese society is deeply influenced by the tradition of collectivist culture, characterized by the concept of “uchi-soto” (inside-outside) consciousness. By clearly delineating the boundaries between “inside” and “outside”, the collective’s boundaries and interests are maintained. This distinction between inside and outside not only strengthens the cohesion within the group but also forms a unique mechanism of group identity, shaping the strong collectivist values of the Japanese people. Against the backdrop of Japanese shame culture and collectivist culture, interpersonal interactions in Japanese society exhibit a high degree of sensitivity and attention to detail^[29].

For example, Japanese individuals often use vague and non-committal language in communication, rarely expressing their opinions directly or refuting others outright. Individuals tend to suppress personal expression, preferring to subordinate their views to the collective opinion. There is a widespread tendency toward conformity, achieving harmony with the group through self-restraint. Personal behavior patterns are dominated by group consciousness, with individuals choosing to integrate themselves into the collective and maintaining a deep sense of belonging to their group. Another example is the most visible manifestation of identity across different groups in Japanese society: the standardized dress code, known as Japan’s

“uniform culture.” Whether corporate employees or students, the identity of their respective organizations is first and foremost displayed through standardized uniforms. Uniform attire not only reflects Japanese society’s emphasis on order and norms but also serves as an important visual symbol for distinguishing group affiliation. Dress codes are not only a concrete manifestation of “uchi-soto” consciousness but also a concentrated expression of Japanese shame culture and collective consciousness.

Japanese shame culture and collective consciousness are not only reflected in the daily behaviors of the Japanese people but also profoundly influence the purchasing intentions of Japanese consumers. In the process of brand selection and product purchases, Japanese consumers exhibit a distinct tendency toward conformity, favoring products with high public acceptance. This behavioral pattern not only reflects the high homogeneity of Japanese social culture but also deeply embodies their group-oriented psychology and conformist consumption characteristics. Specifically, when making purchasing decisions, Japanese consumers often prioritize the word-of-mouth effects within their social circles, tending to adopt usage recommendations from their surrounding groups and opting for brands with higher market shares. This consumption tendency stems from a dual psychological motivation: on one hand, it aims to avoid the risk of social evaluation that may arise from choosing niche or unconventional products; on the other hand, it seeks to gain a sense of group identity by imitating mainstream consumption behaviors.

The purchasing intentions of Japanese consumers are particularly pronounced in clothing coordination and home selection. They tend to opt for products that conform to mainstream aesthetics, feature subdued colors, and are socially recognized, thereby highlighting their sense of group belonging and pursuit of the traditional Japanese “wabi-sabi” aesthetic, which advocates simplicity, modesty, and nature. The Japanese color aesthetic exhibits unique cultural characteristics, focusing on sensory experience and aesthetic artistic conception. There is a widespread preference for achromatic colors (such as black, white, and gray) and low-saturation hues (such as beige, light camel, grayish blue, and light brown). This color preference not only reveals the Japanese pursuit of minimalist aesthetics and refined tastes but also profoundly interprets the philosophical connotations of the “wabi-sabi” aesthetic. It reflects the Japanese nation’s unique understanding of simple beauty, that is, through restrained and subdued color expression, it conveys a deep appreciation for the essence of nature, inner depth, and the marks of time. Achromatic and low-saturation colors discard strong visual impact and excessive decoration, creating a soft, tranquil, and implicit atmosphere that perfectly aligns with the core idea of “simplicity over complexity” in the “wabi-sabi” aesthetic. This application of color is not only reflected on the visual level but is also deeply integrated into the very essence of Japanese culture.

For example, the gray tiles and white walls of traditional Japanese architecture showcase the harmony between nature and architecture through their plain and unadorned colors. The sand and moss in karesansui (dry landscape) gardens create a serene and profound artistic conception through low-saturation color combinations. The plain-colored pottery used in the tea ceremony conveys a pursuit of simplicity and restraint in aesthetics.

The purchasing intentions of Japanese consumers are prominently reflected in their clothing choices, characterized by a distinct preference for subdued colors and basic styles. In Tokyo’s business districts (as opposed to fashion hubs such as Harajuku and Shibuya), the prevalence of dark suits and outerwear in achromatic and low-saturation colors illustrates the deep integration of Japanese consumer psychology and cultural aesthetics. Japanese consumers tend to minimize visual impact through simplified colors and styles,

favoring modest and restrained outerwear tones and minimalist, natural clothing materials (such as cotton and linen). This low-key and simple dressing style also fulfills the Japanese consumers' need for group identity, further reinforcing the manifestation of collectivist values in everyday life.

In terms of home selection, Japanese consumers' purchasing intentions are marked by a significant preference for “minimalist” design and natural materials. When purchasing home furnishings, they generally favor designs with clean lines and have a particular penchant for natural materials (such as bamboo, wood, cotton, linen, and ceramics) and muted color schemes (such as natural wood tones, beige, and light gray). Additionally, they pay close attention to storage functions and space utilization, reflecting a pursuit of simplicity, naturalness, and practicality. This not only embodies the principles of the “wabi-sabi” aesthetic—simplicity and naturalness—but also reflects their consumer mindset that emphasizes practical value and intrinsic quality. Such purchasing intentions also reveal the Japanese consumers' conformist psychology—opting for widely accepted design styles ensures that their living environments meet societal aesthetic standards while avoiding potential social evaluation risks associated with being overly distinctive. While striving for personalized living spaces, consumers still prioritize group identity, seeking a balance between personal aesthetics and social acceptance. For instance, the Japanese brand MUJI, which also holds a significant market share in China, predominantly features natural wood tones complemented by beige and light gray, evoking a sense of naturalness, simplicity, and cleanliness. Its product designs are minimalist and streamlined, with a focus on detail and functionality, eschewing excessive decoration. The “minimalist” design, rooted in the concept of “nothingness,” is highly favored by consumers (**Figure 3**).

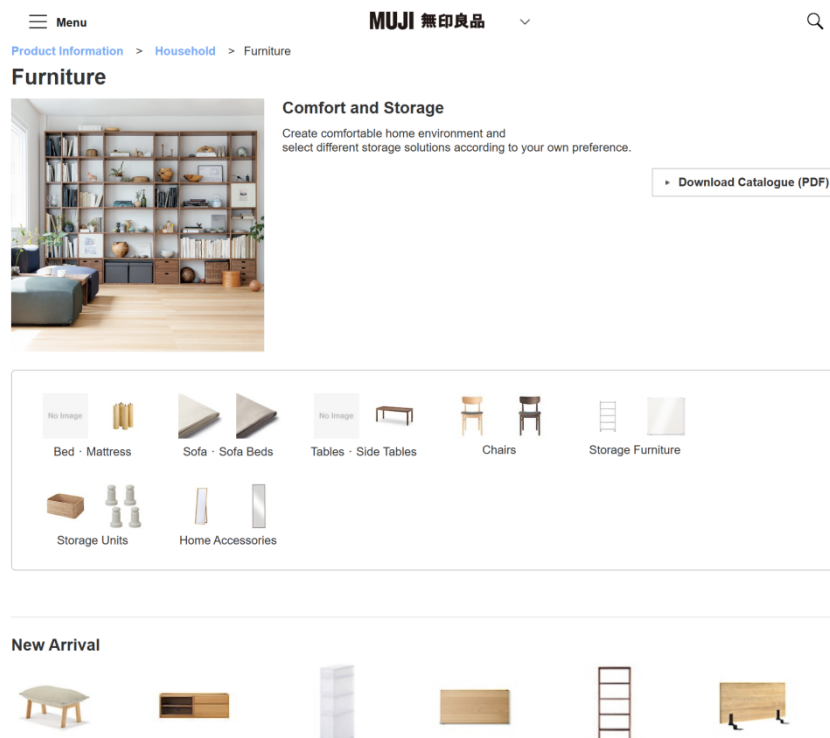


Figure 3. MUJI official website

According to research studies, including the Edelman Trust Barometer, Japanese consumers are generally averse to risk and exhibit a relatively low level of trust towards businesses. This has led them to

rely more heavily on trust mechanisms formed through group consensus. Under the interactive influence of the dimensions of image consciousness and collective consciousness, this trust mechanism further shapes the unique mechanism of purchasing intention formation among Japanese consumers.

In the dimension of image consciousness, consumers construct and maintain their ideal self-image through consumption choices that conform to societal expectations. In the dimension of collective consciousness, Japanese consumers' preferences for apparel and home products tend to favor widely popular brands, colors, and styles in the market. Such choices not only align with mainstream social aesthetics but also avoid unnecessary attention that may arise from being overly conspicuous. This conformist behavior reduces decision-making risks while fulfilling the need for group identification.

Moreover, the high emphasis placed by Japanese consumers on product quality and durability reflects their tendency, under the influence of Japanese shame culture, to avoid the economic burden and social evaluation pressure associated with frequent product replacement. This consumer psychology profoundly reflects the Japanese society's pursuit of harmony, modesty, and practical value.

4. Conclusion

The present study primarily employs the theoretical framework of "self-concept" in consumer psychology and behavior research, through a combination of literature analysis, case studies, and comparative research methods, systematically investigating the differential impacts of Chinese face culture and Japanese shame culture on the purchasing intentions of consumers in the two countries. The study reaches the following principal conclusions:

4.1. The purchasing intentions of Chinese consumers are significantly driven by face culture

Face culture emphasizes social evaluation and the recognition of others, thereby propelling Chinese consumers toward conspicuous and symbolic consumption. As a result, Chinese consumers tend to engage in luxury consumption and ostentatious purchasing behaviors to achieve consistency between self-concept and social image. High-priced goods and exquisite packaging have become important tools for demonstrating social status and obtaining social recognition. This consumer behavior not only reflects the pursuit of self-worth but also highlights the profound influence of face culture on consumption decisions. In recent years, with the continuous evolution of consumer attitudes, green and environmentally friendly products, high-quality domestic brands, and nostalgic products have gradually become important factors in the purchasing decisions of Chinese consumers, fully reflecting the diversification of consumption trends.

4.2. The purchasing intentions of Japanese consumers are predominantly influenced by shame culture

Shame culture emphasizes the importance of external evaluation and social order, and it is customary for individuals to adjust their desires and behaviors based on the evaluations of others. Consequently, Japanese consumers, who place a high value on image and etiquette, invest more in personal image building (such as cosmetic consumption). Moreover, due to the profound influence of group orientation and collective consciousness, Japanese consumers are prone to conformist consumption behaviors. They tend to choose products that conform to social norms and group approval to reduce the social pressure associated with

nonconformity. This tendency encourages Japanese consumers to focus more on restrained, practical, and normative consumption. For example, Japanese consumers are more likely to develop purchasing intentions for products with minimalist, simple, and low-key designs or colors.

4.3. Significance and implications

Through comparative analysis, this study finds that the differences in purchasing intentions between Chinese and Japanese consumers essentially stem from their unique cultural backgrounds. Specifically, Chinese consumers are more inclined to use consumption as a means of demonstrating personal value and exhibit a stronger demand for personalization. In contrast, Japanese consumers place greater emphasis on the alignment of consumption behaviors with social norms, reflecting a stronger sense of collective consciousness. This difference is not only manifested in the choice of specific products but also profoundly reflects the essential distinctions in self-perception and social identification between consumers in the two cultural contexts: Chinese consumers focus more on personal expression and self-actualization, while Japanese consumers are more inclined to maintain social harmony and group identification. This study not only deepens the understanding of the differences in purchasing intentions between Chinese and Japanese consumers from a cultural perspective but also provides new insights and methodological references for cross-cultural consumer behavior research.

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References

- [1] Tian Y, 2020, The Impact of Face Culture on the Behavior of Tourist Consumers. *Contemporary Tourism*, 2020(16): 14.
- [2] Solomon MR, 2020, *Consumer Behavior*, translated by Yang Xiaoyan et al. China Renmin University Press, Beijing, 129.
- [3] Bower J, 2004, *Effective Teaching Methods*, translated by Yi Dongping. Jiangsu Education Press, Nanjing, 226.
- [4] Fan HT, 2019, A Review of Cross-Cultural Studies on “Face” Theory. *Journal of Lvliang Education College*, 36(4): 165–167.
- [5] Zhang SA, 2022, Comparative Study of Chinese and Western “Face” Cultures in Intercultural Communication. *Writers’ World*, 2022: 191.
- [6] Jiang L, Ding, Y, 2024, *Consumer Psychology and Behavior*. China Renmin University Press, Beijing, 99–100.
- [7] Solomon MR, 2020, *Consumer Behavior*, translated by Yang Xiaoyan et al. China Renmin University Press, Beijing, 134–135.
- [8] Fernandes OLC, Fernandes NDCM, Paiva FGD Jr., et al., 2019, Symbolic Consumption and Representation of

- Self: A Study of Interactions in a Virtual Community of Ubuntu-Br Users. *Cadernos EBAPE.BR*, 2019(17): 720.
- [9] Solomon, MR, *Consumer Behavior*, translated by Yang Xiaoyan et al. China Renmin University Press, China, 130.
- [10] Wang W, 2020, Collaboration between East and West: Influence of Consumer Dialectical Self on Attitude towards Co-Brand Personality Traits. *International Marketing Review*, 2020(6): 1156–1162.
- [11] Han TI, 2018, Determinants of Organic Cotton Apparel Purchase: A Comparison of Young Consumers in the U.S.A. and South Korea. *Sustainability*, 10(6): 1–13. <https://doi.org/10.3390/su10062025>
- [12] Discovery Report, 2024, BCG Produces! 2024 China Luxury Market Insight Report. <https://news.qq.com/rain/a/20240909A0322L00>
- [13] Insight and Info, 2025, The Country's Second-hand Luxury Goods Consumption will Remain in a High Growth Trend for a Long Time, and Standardization will Become an Inevitable Trend of Future Development. <https://www.chinabaogao.com/free/202501/739286.html>
- [14] Che M, 2020, Updates in Luxury Purchase Motivation in East Asia: China, Japan & South Korea. 2018 International Conference on Multidisciplinary Research.
- [15] Amazon Special Feature, 2020, Lecture 1: Overview of Japanese Culture and its impact on Consumer Behavior, in Ohayou Japan: Lecture on Japanese Consumer Culture. <https://gs.amazon.cn/japan/consumerinsight>; <https://m.media-amazon.com/images/G/28/AS/AGS/pdf/japan/consumer/pdf1-new.pdf?initialSessionID=000-6519113-0371073&ld=ASCNAGSDirect&pageName=CN%3AAS%3AGS-jp-consumerinsight>
- [16] Ye M, 2023, “2023 Global Consumer Insights Survey” China Report — Act in Time to Sculpt Brands and Seize Opportunities for Resilient Growth. <https://www.pwccn.com/zh/industries/retail-and-consumer/publications/2023-global-consumer-insights-survey-china-report-sep2023.html>
- [17] Mintel, 2024, Mintel releases “Chinese Consumers 2024” Report: Diversified Consumer Demands will Shape Future Trends. <https://china.mintel.com/press-centre/2024-chinese-consumer-report/>
- [18] AlixPartners, 2025, The Transformation of Chinese Consumers: Driving the New Normal with Precise Strategies. https://www.alixpartners.com/media/13say0iv/2025-china-consumer-survey_cn.pdf
- [19] iiMedia, 2024, iiMedia Research: 2024 China's New Domestic Products Market Development Status and Consumer Behavior Survey Data. <https://www.iimedia.cn/c1061/104050.html>
- [20] Li B, 2007, *Cultural Psychology*. Shanghai Education Press, Shanghai.
- [21] Zhao H, Wang J, 2018, Cultural Origins: A Comparative Analysis of Differences in Chinese and Japanese Shame Cultures. *Research on Ideological and Political Education*, 2018(6): 124–127.
- [22] Market Monitor 2024, 2024 Japanese Cosmetics Industry Status and Development Trend Research Report. <https://m.gelonghui.com/p/894936>
- [23] Moojing Market Intelligence, 2024, 2024 Overseas Market White Book. <https://www.fxbaogao.com/view?id=4643734>
- [24] Solomon MR, 2020, *Consumer Behavior*, translated by Yang Xiaoyan et al. China Renmin University Press, Beijing, 137–138.
- [25] Resource Hotpot, 2024, 2024 Japanese Beauty Market Insight Report. https://www.sohu.com/a/791580950_121406416.
- [26] Solomon MR, 2020, *Consumer Behavior*, translated by Yang Xiaoyan et al. China Renmin University Press, Beijing, 131
- [27] Antom, 2024, Antom Chinese Cosmetics Go Global. <https://www.fxbaogao.com/view?id=4176959>
- [28] Tian X, Feng W, 2012, Psychological and Cultural Differences in Chinese and Japanese Luxury Consumption.

Northeast Asia Forum, 2012(4): 72.

[29] Lei C, 2020, A Study of Japanese Shame Culture from “Non-Color”. Knowledge Library, 2020(6): 7.

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A Review of Comparative Studies on the Similarities and Differences between Situational Teaching Method and Task-Based Teaching Method

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Abstract: Both situational language teaching and task-based language teaching occupy important positions in modern education. Situational language teaching relies on creating realistic scenarios to evoke emotional resonance among students and drive the internalization of knowledge. Task-based language teaching, on the other hand, is guided by clear tasks, urging students to master knowledge and skills in the process of completing tasks. Although these two teaching methods share similarities in terms of goal orientation, student autonomy, and practicality, they each have their own focus. This article summarizes relevant literature, outlining the theoretical foundations, practical applications, and effects of the two teaching methods. It explores their potential future developments in English education, aiming to provide theoretical guidance and practical reference for English educators and to promote the optimization and innovation of English teaching methods.

Keywords: Situational language teaching; Task-based language teaching; Constructivist theory; Development trend

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1. Introduction

1.1. Background overview

With the rapid innovation of educational philosophy and increasingly frequent international exchanges, English teaching methods have also evolved and been enriched. From the audio-lingual method emphasizing sentence pattern drills, to the communicative approach focusing on real-context communication, and now to the diverse teaching methods, the underlying trend is an increasing emphasis on student autonomy, language practice, and cross-cultural literacy cultivation. The Ministry of Education issued the “Compulsory Education English Curriculum Standards” in 2022, implementing stricter standards for English teaching. The new

curriculum reform focuses on the cultivation of core literacy, emphasizing students' comprehensive growth. It not only comprehensively regulates teaching objectives, content, and methods to improve the quality and effectiveness of English teaching, but also underscores the importance of cultivating core literacy and valuing students' comprehensive development ^[1]. These new requirements have driven the renewal of English teaching philosophy and provided a broad space for the innovation of teaching methods. It is in this context that situational language teaching and task-based language teaching have become the focus of daily English teaching practice.

1.2. Research significance

The significance of conducting a literature review on the similarities and differences between English situational language teaching and task-based language teaching lies in several aspects. Firstly, systematically sorting out the theoretical frameworks of the two methods can deeply explore the underlying theoretical support, allowing educators to understand the original design intentions of the teaching methods rather than mechanically applying them. Secondly, integrating practical application cases and effectiveness evaluation results can create a detailed "teaching map," helping frontline English teachers accurately select appropriate teaching methods based on academic conditions and teaching objectives, avoid teaching misconceptions, optimize classroom efficiency, and improve teaching quality. Furthermore, reviewing research from different perspectives can also provide inspiration for the integration and innovation of subsequent teaching methods, motivating teachers to explore new methods adapted to English teaching in the new era.

1.3. Scope of literature

The literature for this study primarily comes from professional books and academic journals authored by prominent educational scholars both domestically and internationally, who provide comprehensive and systematic interpretations of teaching methods. It also includes papers from important international and domestic educational conferences, which capture cutting-edge developments and vivid teaching examples in a timely manner. The aim is to gather a wealth of first-hand research materials to present a panoramic view of the similarities and differences between situational language teaching and task-based language teaching.

2. Overview of major schools of thought

2.1. Constructivism theory

Constructivism, originating in the 1960s, was first proposed by psychologist J. Piaget. Piaget suggested that cognition is an active construction based on the subject's existing knowledge and experience. He emphasized that children do not passively receive external information but actively construct their understanding and knowledge of the world through their own experiences, reflections, and interactions ^[2]. The founders of social constructivism, such as Vygotsky, emphasized the importance of the learner's socio-cultural and historical background and introduced the core concept of the "zone of proximal development" ^[3]. Wittrock proposed a generative model of learning, while Jonassen and others introduced the concept of an unstructured experiential background ^[4]. These theoretical viewpoints have greatly enriched and deepened constructivism, providing a solid foundation for its application in teaching practice.

2.2. Constructivist view of teaching and learning

2.2.1. Constructivist view of learning

Constructivism believes that learning is an active process of constructing knowledge, rather than passively receiving information. Based on their existing knowledge and experience, learners continuously construct new understandings and meanings through interaction with the environment. The core viewpoints of the constructivist learning view include ^[5]: (1) Learning is not simply about absorbing external information but rather about learners actively combining new information with their existing knowledge and experience to construct meaning. Each learner interprets and understands new knowledge individually based on their unique knowledge background ^[6]. (2) Learning occurs within a certain socio-cultural environment, where learners share resources, collaborate to solve problems, and promote knowledge construction through communication and interaction with others. This social interaction is not limited to teachers and students but also includes interactions among students. (3) Knowledge is closely related to specific contexts, and learning should take place in real or simulated situations, allowing learners to understand and master knowledge through practical applications. Contextual teaching helps enhance the relevance and practicality of learning.

2.2.2. Constructivist view of teaching

The constructivist view of teaching emphasizes a student-centered approach, focusing on teaching in real-life situations and promoting collaborative learning and self-exploration. Its core viewpoints include: (1) Teaching is student-centered, designing courses based on students' needs, interests, and existing knowledge and experience. It encourages students to actively engage in learning activities, making them the leaders in constructing knowledge. (2) Teachers create situations related to the learning topic, allowing students to learn in an almost real-life context, thus enabling them to grasp and apply knowledge more profoundly ^[7]. (3) It encourages cooperation and communication among learners, promoting knowledge sharing and construction through activities like group discussions and role-playing. Collaborative learning helps cultivate students' teamwork and communication skills ^[8]. (4) It encourages independent learning and self-exploration. Teachers should provide rich learning resources and guidance, enabling learners to continuously improve their knowledge system through practice, reflection, and summation. From the perspective of constructivism theory, Situational language teaching and task-based language teaching share the same theoretical foundation. Both teaching methods emphasize students' subjectivity and practicality, promoting language learning through real or simulated situations and tasks. Therefore, constructivism theory provides a solid theoretical support for situational language teaching and task-based language teaching, facilitating innovation and progress in foreign language teaching methods.

3. Theoretical characteristics of the school

3.1. Situational language teaching and task-based language

Teaching situational language teaching originated in the 1930s in Britain. Its core concept is to learn language in simulated or real language situations, emphasizing practical language use and the cultivation of communication skills. Constructivism theory, which views learning as an active process of knowledge construction and situations as important carriers of knowledge construction, provides a significant theoretical foundation for situational language teaching ^[9]. Task-based language teaching (TBLT), which emerged in the 1980s during the communicative language teaching movement and was influenced by functional

linguistics and cognitive psychology, is a teaching method with tasks as its core. It emphasizes promoting language acquisition through task completion, focusing on practical language use and the development of communication skills. TBLT considers language learning as a process of learning by doing, where tasks serve as an important pathway to language acquisition ^[10].

3.2. In-depth analysis

3.2.1. Understanding of language essence

Situational language teaching views language as a tool for communication and expression, deeply embedded in specific life and social contexts. The meaning of language relies on specific situations to be fully presented. Without context, language is just isolated and abstract symbols. Task-based language teaching sees language essentially as a means to accomplish various real-world tasks and achieve specific goals. Language learning serves task resolution, focusing on how to accurately and appropriately use language to communicate, coordinate, obtain, or transmit information during task completion ^[11].

3.2.2. Learning objective setting

Situational language teaching emphasizes cultivating students' language comprehension and application abilities in specific contexts, while also stimulating emotional attitudes and cultural awareness. The goal is not only to acquire knowledge and skills but also to immerse students in situations, comprehend humanistic connotations, and enhance cross-cultural communication sensitivity ^[12].

Task-based language teaching focuses on improving students' practical skills in independently completing tasks using language, emphasizing problem-solving abilities, independent learning abilities, and team collaboration skills. The set tasks have a clear outcome orientation, enabling students to ultimately produce a complete and usable strategic text ^[13].

3.2.3. Teaching content selection

Situational language teaching revolves around elements needed to create situations, often drawn from real-life fragments, stories, or film and television scenes.

Task-based language teaching selects content based on task themes and goals, prioritizing real task cases and project documents to ensure authenticity and task logic alignment.

3.2.4. Teaching activity organization

Situational language teaching begins with situation creation, followed by diverse activities like explanations, discussions, and role-playing. The activity pace flexibly adapts to the situation's progression, emphasizing on-site atmosphere rendering and guiding students' emotional involvement ^[14].

Task-based language teaching is strictly organized according to the task process, typically involving task assignment, planning, execution, outcome presentation, and evaluation. The steps are compact, well-organized, and closely centered around task completion, with group collaboration throughout.

3.2.5. Teacher role positioning

In situational language teaching, the teacher is the creator and guide of situations, responsible for providing language input and feedback to guide students' language learning and practice.

In task-based language teaching, the teacher is the task designer and mentor, responsible for providing

task guidance and feedback to facilitate task completion and language acquisition.

3.2.6. Student subject role

In situational language teaching, students participate in situations with emotional experiences, actively explore knowledge, and attempt to express and communicate within the situation's influence, deepening their understanding and perception of knowledge from a participant's perspective.

In task-based language teaching, students become task leaders, wielding greater autonomous decision-making power from planning task solutions to coordinating divisions of labor and executing operations. The entire process is self-driven, achieving knowledge and skill internalization and ability growth while tackling task challenges.

4. Comparative analysis

4.1. Differences

4.1.1. Teaching focus

Situational language teaching emphasizes helping students understand and apply knowledge through creating specific situations, where situation setting is key. Task-based language teaching focuses on achieving learning objectives through completing specific tasks, with task design as the teaching core.

4.1.2. Implementation method

Situational language teaching allows students to experience and practice knowledge in situations through simulations or real-life contexts, such as role-playing, simulated dialogues, and group discussions. In task-based language teaching, teachers typically design a series of specific tasks for students, enabling them to learn and master knowledge through task design, implementation, and feedback ^[15].

4.1.3. Evaluation method

In situational language teaching, evaluation may focus more on students' performance in situations, such as situational adaptability and problem-solving abilities. In task-based language teaching, evaluation is usually based on task completion quality and efficiency.

4.2. Similarities

4.2.1. Student-centered

Both situational language teaching and task-based language teaching emphasize students' central role in learning. Situational language teaching focuses on students experiencing and practicing knowledge in specific contexts, while task-based language teaching emphasizes students' active learning and exploration during task completion.

4.2.2. Practical application

Situational language teaching enables students to apply knowledge in simulated or real situations, enhancing practical abilities. Task-based language teaching cultivates students' ability to apply knowledge through completing practical tasks.

4.2.3. Cultivating students' comprehensive abilities

Situational language teaching fosters problem-solving, innovation, and team collaboration skills through situation simulations. In task-based language teaching, students' thinking, problem-solving, and other comprehensive abilities are enhanced during task completion.

In practical teaching, teachers can reasonably apply these two teaching methods based on teaching content and students' actual situations. For example, in teaching English oral communication, Situational language teaching and task-based language teaching can be combined. Oral communication tasks can be designed through creating specific situations, allowing students to complete tasks in simulated contexts and improve their oral expression abilities ^[16]. Simultaneously, teachers can continuously adjust and optimize teaching methods based on students' learning feedback and effectiveness to better achieve teaching goals. In summary, Task-based language teaching and situational language teaching have unique characteristics and can complement and cooperate with each other in practical teaching to achieve better teaching effects.

5. Practical application of teaching methods

5.1. Case studies

5.1.1. Contextual teaching method case

Taking a high school English class as an example, the teacher adopts the contextual teaching method for reading instruction. The teacher first creates a travel-related context, guiding students to imagine they are planning a trip. Then, an article about travel destinations is provided for students to read and understand within the context. During the reading process, the teacher leads discussions on travel plans, attraction selections, and encourages students to express and communicate using the language they have learned. Finally, a role-playing activity is organized to simulate conversations and exchanges during travel, further reinforcing and improving students' language proficiency ^[17].

5.1.2. Task-based learning case

In a university English major class, the teacher employs a task-based approach for oral English instruction. Initially, a task involving ordering in a restaurant is designed, requiring students to role-play in groups and complete the task. During task execution, students engage in communicative activities such as ordering, inquiring about dish information, and expressing personal preferences using the language they have acquired. The teacher provides feedback and guidance based on students' performance, assisting them in correcting language errors and enhancing their oral expression skills. Through task completion, students not only master relevant language knowledge and skills but also improve their communication and self-learning abilities ^[18].

5.2. Implementation effects

In practical teaching, the contextual teaching method successfully ignites students' enthusiasm for reading materials by constructing travel scenes closely related to their daily lives, making reading more vivid and interesting. Reading articles in such contexts enables students to understand the content more deeply and actively use the language they have learned in communication and role-playing, thereby enhancing their language application skills. Simultaneously, this approach encourages students to actively explore, discover, and construct knowledge, promoting their autonomous learning and team collaboration skills.

The task-based teaching method helps students clearly recognize the purpose of learning by assigning

specific learning tasks, enhancing the pertinence and efficiency of learning. In the process of completing tasks, students must communicate using the language they have learned, significantly improving their oral expression and communication skills. Additionally, the task-based approach encourages students to learn and master knowledge through task completion, further cultivating their autonomous learning and problem-solving abilities. By designing authentic tasks and guiding students to complete them, the task-based teaching method not only enhances students' autonomous learning and collaborative learning abilities but also elevates their language proficiency and communication skills.

However, according to relevant literature, both teaching methods have certain challenges and limitations. The contextual teaching method requires teachers to possess high context creation and guidance abilities, while students need a certain language foundation and communication skills. The task-based teaching method demands careful task design from teachers, ensuring task feasibility and effectiveness, and students must have strong autonomous learning and collaborative learning abilities. These pose high demands on teachers' teaching abilities and students' learning capabilities.

6. Analysis of current research status

6.1. Research hotspots

Based on a comprehensive review of relevant studies, the application of contextual and task-based teaching methods in English instruction has emerged as a focal point in current educational research, presenting multiple hotspots.

6.1.1. Student-centered approach

Both methods emphasize a student-centered teaching philosophy in practical instruction. The contextual teaching method creates vivid contexts related to English learning content, making abstract language knowledge concrete and stimulating students' interest and participation. The task-driven approach motivates students to actively apply English knowledge for communication and expression while completing tasks, cultivating their self-learning abilities and team collaboration awareness.

6.1.2. Integration of modern educational technology

The integration of English teaching methods with modern educational technology has garnered significant attention. With the rapid development of information technology, resources such as multimedia and the internet are widely used in these teaching methods.

6.1.3. Cultivation of cross-cultural communication abilities

Additionally, the cultivation of students' comprehensive language skills and cross-cultural communication abilities has become an important goal. The contextual teaching method creates cross-cultural contexts, allowing students to experience cultural differences and enhance their cross-cultural communication awareness. The task-based teaching method designs tasks involving cross-cultural communication content, training students to effectively communicate in English across different cultural backgrounds and comprehensively developing their language skills, cultural understanding, and communication abilities.

6.2. Research gaps

Despite achieving certain results in the application research of contextual and task-based teaching methods in English instruction, there are still research gaps.

Firstly, there are deficiencies in the teaching evaluation system. The current evaluation of these teaching methods primarily focuses on students' learning outcomes, such as mastery of language knowledge and task completion. However, there is a lack of comprehensive and systematic evaluation indicators for students' emotional attitudes, cognitive development, and cultural accomplishment enhancement during contextual experiences and task execution^[19].

Moreover, there is a scarcity of personalized teaching strategy research tailored to students with varying English proficiency levels and learning styles. Contextual and task-based teaching methods often adopt a unified approach in practical applications, inadequately considering individual differences in students' English foundations, learning abilities, and preferences.

Lastly, there are deficiencies in teacher training and professional development. These teaching methods demand high professional qualities and teaching abilities from teachers, such as context creation and task design, and management skills. Nevertheless, the current training system for teachers on effectively utilizing these teaching methods is insufficient, lacking continuous and targeted training content and modes. Teachers may have a limited understanding and improper application of contextual and task-based teaching methods in practical instruction, affecting the full exploitation of their advantages in English teaching.

7. Discussion on development trends

7.1. Trend predictions

7.1.1. Deepening technological integration

In the future, cutting-edge technologies such as virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) will be more tightly integrated with these two teaching methods. For example, VR technology can create a highly realistic English language environment, allowing students to experience the culture and lifestyle of English-speaking countries immersively, thereby effectively improving their language proficiency. AI technology can intelligently adjust contextual content or task difficulty based on students' learning progress and performance, achieving personalized teaching.

7.1.2. Evident trend of interdisciplinary integration

English teaching will no longer be isolated but will have more cross-integration with other subjects such as history, culture, and art. The contextual teaching method can create interdisciplinary contexts, while the task-based teaching method can also design tasks involving multidisciplinary knowledge, which helps broaden students' knowledge and cultivate comprehensive literacy.

7.1.3. Cultivation of intercultural communication skills

The development of globalization will prompt these two teaching methods to focus more on cultivating students' intercultural communication skills. The design of contexts and tasks will revolve more around communication, understanding, and cooperation between different cultures, enabling students to better adapt to the demands of multicultural communication in the context of globalization.

7.2. Strategic suggestions

Regarding the contextual teaching method, teachers should focus on the authenticity and diversity of contexts. On the one hand, they should deeply explore the content of textbooks, combine them with students' real-life situations, and create realistic contexts, such as simulating business negotiations or international travel scenes, allowing students to feel the practical application value of English in real life. On the other hand, various resources, including network resources and multimedia materials, should be utilized to enrich the contextual representations and increase student engagement. Simultaneously, it is essential to strengthen the evaluation of the effectiveness of contextual teaching and establish a diversified evaluation system that not only focuses on students' mastery of language knowledge but also emphasizes their emotional experiences and cooperation abilities in the context^[20].

For the task-based teaching method, task design is crucial. Tasks should have clear goals, reasonable difficulty gradients, and operability. Teachers should design a chain of tasks from simple to complex based on students' English proficiency and learning abilities, such as progressing from word spelling tasks to short essay writing tasks. Additionally, students should be encouraged to explore independently and collaborate during task execution. Teachers can guide students to choose their own task completion methods and organize group collaborations to complete comprehensive tasks, cultivating students' teamwork spirit and autonomous learning abilities. In the teaching process, teacher training should also be strengthened to improve their understanding and application abilities of these two teaching methods. Regular teaching seminars can be organized to share successful teaching experiences and jointly explore teaching modes suitable for different student groups.

In the future, the contextual teaching method and task-based teaching method will play a greater role in intelligent and digital teaching. The application of virtual reality technology and artificial intelligence will further enrich teaching contexts and task designs.

8. Conclusion and prospects

Based on constructivist learning theory, this paper compares and analyzes the contextual teaching method and task-based teaching method, clarifying the differences, advantages, and disadvantages of these two teaching methods. The contextual teaching method focuses on learning language in simulated or real-life contexts, emphasizing practical language application and the improvement of communication skills. The task-based teaching method centers on tasks, promoting language learning through task completion. These two teaching methods have their own characteristics and should be appropriately selected and applied in teaching practice based on teaching content, goals, and student needs to stimulate students' interest and enhance teaching effectiveness. In summary, middle school English teachers should flexibly use these two teaching strategies, deeply study related teaching books and papers, and further integrate and improve these two teaching methods based on classroom reality and student abilities to cultivate students' English learning skills and enhance their English language proficiency.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Mei DM, Wang Q, 2022, New Developments in English Curriculum for Compulsory Education in the New Era — Interpretation of the English Curriculum Standards for Compulsory Education (2022 Edition). Basic Education Curriculum, 2022(10): 19–25.
- [2] Piaget J, 1972, The Principles of Genetic Epistemology, translated by W. Mays. Routledge & Kegan Paul, London.
- [3] Vygotsky LS, 1978, Mind in Society. Harvard University Press, Cambridge.
- [4] Jonassen D, Marra R, 1993, Whither Constructivism. Libraries Unlimited Inc, Englewood.
- [5] Chen Qi, Liu R, 2007, Contemporary Educational Psychology. Beijing Normal University Press, Beijing, 56.
- [6] Wu XY, 2006, On the Enlightenment of Constructivist Theory to English Teaching. Foreign Languages and Their Teaching, 2006(2): 33–35.
- [7] He KK, 2004, On the Educational Ideology and Philosophical Foundation of Constructivism: Reflections on Constructivism. China University Teaching, 2004(7): 15–18 + 23.
- [8] Wang WJ, 2005, Situated Cognition and Learning Theory: Developments of Constructivism. Global Education, 34(4): 56–59 + 33.
- [9] Brown JS, 1989, Situated Cognition and the Culture of Learning. Educational Researcher, 18(1): 32–42.
- [10] Nunan D, 1989, Designing Tasks for the Communicative Classroom. Cambridge University Press, Cambridge.
- [11] Ellis R, 2003, Task-based Language Learning and Teaching. Oxford University Press, Oxford, 69–70.
- [12] Wang Q, 2013, English Teaching Methodology. Higher Education Press, Beijing.
- [13] Willis JA, 1996, Framework for Task-Based Learning. Longman, London, 45–48.
- [14] Li JL, 1996, Experimental Research on Situational Teaching. Sichuan Education Press, Sichuan, 50–60.
- [15] Sui XH, 2012, Research on the Combined Application of Situational Teaching and Task-Driven Teaching in Higher Vocational English Teaching. The Guide of Science & Education, 2012(20): 108–109.
- [16] Cheng XT, 2014, Analysis and Design of English Textbooks. Foreign Language Teaching and Research Press, Beijing.
- [17] Wang Q, 2016, The Application of Situational Teaching Method in High School English Reading Instruction. Basic Education Foreign Language Teaching Research, 2016(5): 34–39.
- [18] Wen QF, 2013, The Application of Task-Based Teaching Method in College English Oral Instruction. Foreign Language Teaching and Research, 2013(4): 54–61.
- [19] Li JL, 1996, Experimental Research on Situational Teaching. Sichuan Education Press, Sichuan, 50–60.
- [20] Wang Q, 2016, The Application of Situational Teaching Method in High School English Reading Instruction. Basic Education Foreign Language Teaching Research, 2016(5): 34–39.

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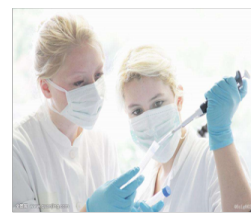
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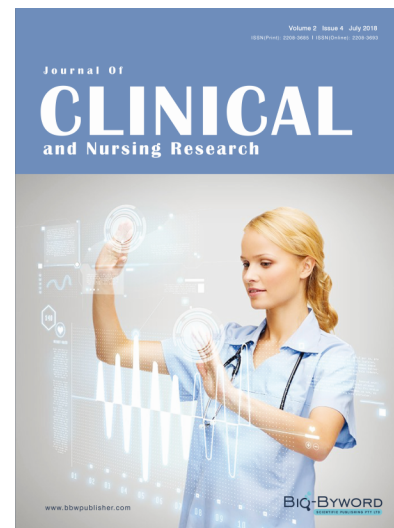
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