International Journal of Higher Education Teaching Theory

SEPTEMBER 2024 VOLUME 5 NUMBER 3

Publisher: ACADEMIC PUBLISHING HOUSE
Address: Quastisky Building, Road Town, Tortola, British Virgin Islands
UK Postal Code: VG1110

E-mail: editor03@acadpubl.com
http://www.acadpubl.com/ijhett.aspx

ACADEMIC PUBLISHING HOUSE

CONTENTS

Educational Functions and Values of Traditional Toys in Kindergarten

Cunjing Lin*
Zibo Vocational Institute, Zibo, Shandong, China
**Corresponding Author.*

Abstract: This paper explores the educational value and functions of traditional toys in modern kindergarten education. Using literature review and theoretical analysis, it systematically evaluates the roles of traditional toys in cognitive development, emotional bonding, social interaction, and cultural education. By reviewing existing domestic and international research, the study uncovers the pedagogical concepts and application paths of traditional toys in education. Findings indicate that traditional toys not only enhance the diversity of kindergarten teaching methods but also offer unique educational resources through their rich cultural connotations, supporting the comprehensive development of children. Furthermore, traditional toys positively impact the cultivation of innovative thinking, hands-on abilities, cultural identity, and social skills in young children. The paper also highlights the oversight of traditional toys' educational potential in modern education systems and proposes specific strategies for integrating traditional toys into kindergarten educational practices. In conclusion, the paper argues that in a rapidly changing educational environment, traditional toys should not be marginalized but recognized as essential educational tools for promoting multiple intelligences and emotional development, while providing a platform for children to understand and connect with traditional culture.

Keywords: Kindergarten Education; Traditional Toys; Educational Function; Cultural Value; Emotional Development

1. INTRODUCTION

In today's rapidly developing society, early childhood education, as a crucial part of foundational education, has garnered unprecedented attention. With the continuous evolution of educational philosophies, the role of traditional toys in kindergarten education is being reexamined. Traditional toys, which carry historical and cultural information, not only stimulate children's imagination and creativity but also subtly convey the essence of national culture. Therefore, exploring the educational functions and values of traditional toys in kindergartens holds significant theoretical and practical implications for enriching early childhood education and enhancing educational quality.

1.1 Research Background and Significance

With the accelerating process of globalization, cultural diversity and the protection and inheritance of local cultures have become focal points of societal concern. Within this context, the application of traditional toys as carriers of cultural heritage in early childhood education is particularly important. Traditional toys not only provide rich sensory experiences but also promote cognitive development, emotional exchange, and social skills cultivation in children. Moreover, traditional toys help children build a sense of identity and pride in local culture, which is irreplaceable in nurturing the next generation with both an international perspective and national sentiment.

1.2 Research Objectives and Questions

This study aims to deeply analyze the functions and values of traditional toys in kindergarten education, exploring effective ways to integrate these toys into educational practices to promote children's holistic development. The primary research questions include: What specific educational functions do traditional toys serve in kindergarten education? How do traditional toys embody cultural value? And how can traditional toys

be effectively integrated into kindergarten education to realize their educational potential?

2. REVIEW OF DOMESTIC AND INTERNATIONAL RESEARCH

In recent years, with increasing national emphasis on early childhood education, the application of traditional toys in kindergartens has gained attention. Scholars both domestically and internationally widely recognize the educational value and cultural significance of traditional toys in early childhood education. Integrating current societal trends and the spirit of relevant policies, the application of traditional toys in kindergartens not only holds practical significance but also enhances cultural identity and national pride among children through play, fostering their comprehensive development.

2.1 Domestic Research Status

Deng Xuan (2017) noted that traditional children's toys hold significant value in early childhood education, promoting cognitive, emotional, and social development. She emphasized that traditional toys are not just entertainment tools but also educational resources that aid children's learning and growth through play. Yang Li (2015) explored the status and role of traditional toys from the perspectives of value alienation and the loss of play spirit, arguing that while modern toys are more diverse in function and design, they lack the educational value and play spirit inherent in traditional toys. Traditional toys, with their simple structures and play methods, uniquely stimulate children's creativity and imagination.

Zhang Qian (2024) found through her investigation of sports activities in rural kindergartens in Shangqiu City that traditional toys play a vital role in physical activities, not only enhancing children's physical fitness but also fostering teamwork and competitive spirit.

Song Junfang (2019) discussed the application of the traditional toy "sandbag" in kindergarten games, noting that it improves hand-eye coordination and promotes rule awareness and social skills among children.

Hou Hongxia (2018) studied the integration of traditional folk games with kindergarten curricula, asserting that these games have rich cultural connotations and educational value, enhancing cultural identity and national pride.

Zhao Linju (2023), from an educational anthropology perspective, analyzed Chen Heqin's "living" toys, emphasizing their educational function and interactivity in promoting comprehensive child development.

Zhuo Cuo (2017) investigated the use and implementation of folk games in kindergarten teaching activities, highlighting their role in enriching play activities and transmitting traditional culture.

Wang Fengyun (2013) emphasized the role of folk games in children's growth, advocating for their educational value in fostering rule awareness, teamwork, and creativity through simple rules and play methods. Hu Xiao'e (2013) explored the significance of combining traditional toys and games, suggesting that this combination promotes cognitive, emotional, and social development through play. Jiang Huanqin (2018) discussed the innovation of folk games in kindergartens, highlighting their modern application value in enhancing play experiences and educational outcomes.

Li Shanze et al. (2022) examined the cultural educational value of folk toys as kindergarten curriculum resources, finding that seasonal children's folk toys in Jiangsu and Zhejiang regions hold rich cultural connotations and educational value. Li Huifen (2011) discussed the current status and issues of traditional cultural education in kindergartens, asserting its importance in enhancing cultural identity and national pride through traditional toys and games. Liu Xia (2003) explored the current status of moral education in kindergartens, noting the significant role of traditional toys and games in cultivating moral qualities and social development.

2.2 International Research Status

Internationally, the application of traditional toys in early childhood education has also received widespread attention. Scholars generally agree on the educational value and cultural significance of traditional toys. For instance, Smith (2018) noted that traditional toys, with their simple structures and play methods, stimulate children's creativity and imagination, promoting cognitive and emotional development. Johnson (2019) explored the role of traditional toys in cultural transmission, asserting that they serve as cultural carriers through play, transmitting and promoting traditional culture.

Empirical studies by international scholars provide further insights. Brown (2020) found through a survey of American kindergartens that traditional toys play a significant role in play activities, cultivating rule awareness and teamwork. Davis (2021) highlighted the unique advantages of traditional toys in inspiring creativity and imagination, despite modern toys' functional and design diversity.

2.3 Research Gaps and Innovations

Despite existing research on the educational functions of traditional toys, certain gaps remain. Current studies often focus on single functions without systematically examining their comprehensive educational value. Additionally, effectively integrating traditional toys into kindergarten practices is an unresolved issue. This study's innovation lies in systematically analyzing the multiple educational functions of traditional toys and proposing concrete integration strategies to provide theoretical support and practical guidelines for kindergarten education.

3. EDUCATIONAL FUNCTIONS OF TRADITIONAL TOYS

Traditional toys play multiple roles in kindergarten education, with functions extending beyond cognitive development to include emotional, social, and innovative skill cultivation. This section will explore these functions in detail and analyze the integration of traditional toys with modern educational technology.

3.1 Cognitive Development Function

Traditional toys provide rich cognitive learning opportunities through their simple structures and intuitive operations. For example, puzzle toys enhance spatial perception and logical thinking. According to Li Ming (2019), puzzle games significantly improve children's spatial cognition and problem-solving abilities. Constructive toys like building blocks stimulate creativity and imagination, teaching physical principles and mathematical concepts like shape, size, and proportion.

3.2 Emotional and Social Development Function

Traditional toys also play a crucial role in promoting emotional and social development. Toys like dolls help children express and process emotions. Through role-playing games, children learn interaction, social roles, and rules. Wang Li (2020) found that interacting with toys helps children build self-identity and learn cooperation and sharing in simulated social scenarios.

3.3 Cultivation of Innovative Thinking and Hands-On Ability

Traditional toys uniquely foster innovative thinking and hands-on skills. Toys like origami and pottery enhance hand-eye coordination while stimulating creative thinking. Zhang Qiang (2021) found that making handicrafts teaches material selection and handling, providing children with a sense of achievement, crucial for building confidence and problem-solving abilities.

3.4 Integration of Traditional Toys with Modern Educational Technology

The widespread adoption of modern educational technology offers new possibilities for integrating traditional toys into early childhood education. Combining traditional toys with digital technology, such as developing interactive applications, can enhance learning experiences. For example, using AR (Augmented Reality) technology, children can interact with traditional toys in virtual environments, increasing learning engagement and expanding cognitive boundaries.

4. CULTURAL VALUE OF TRADITIONAL TOYS

Traditional toys are not merely entertainment tools but also significant carriers of cultural heritage. This section will explore the cultural connotations of traditional toys, their role in fostering national cultural identity, their part in cultural transmission, and their utilization as educational resources.

4.1 Cultural Connotations of Traditional Toys

Traditional toys often carry rich cultural stories and historical backgrounds, such as Chinese kites and Japanese origami. These toys serve not only as tools for children's play but also as transmitters of cultural symbols. Through playing with these toys, children can subconsciously learn about and absorb local cultural knowledge and values.

4.2 Traditional Toys and National Cultural Identity

Traditional toys play an irreplaceable role in cultivating children's national cultural identity.

Toys like Chinese spinning tops and Russian matryoshka dolls are integral parts of their respective cultures. Through these toys, children can develop a sense of identity and pride in their local culture, which is crucial for nurturing the next generation with a sense of national sentiment.

4.3 Role of Traditional Toys in Cultural Transmission

Traditional toys act as bridges in cultural transmission. They help children understand history and culture while promoting intergenerational cultural exchange. By playing with traditional toys alongside elders, children can learn traditional skills and cultural stories through firsthand experience, which has a profound impact on the transmission and development of culture.

4.4 Utilization of Traditional Toys as Cultural Educational Resources

Traditional toys can be significant resources for cultural education. By integrating them into kindergarten curricula, children can be provided with a comprehensive opportunity to understand and experience local culture. For example, organizing workshops for traditional toy-making allows children to learn traditional skills and feel the charm of culture in practice. Additionally, themed activities related to traditional toys, such as festival celebrations and cultural exhibitions, enable children to learn and inherit culture in a joyful atmosphere.

5. INTEGRATION STRATEGIES OF TRADITIONAL TOYS IN KINDERGARTEN EDUCATION PRACTICES

5.1 Educational Concept Framework Integrating Traditional Toys

In contemporary educational contexts, the educational functions of traditional toys have transcended their mere entertainment attributes, becoming key tools for promoting children's holistic development. Constructing an educational concept framework centered around traditional toys involves deeply exploring their intrinsic educational value, particularly in areas of cognition, emotion, social skills, and creativity. Traditional toys, such as building blocks, puzzles, and puppets, provide children with opportunities to learn and grow through play through intuitive operations and interactions.

This framework should include the following core elements:

Traditional toys help children understand abstract concepts through specific operational activities. For example, the process of building with blocks deepens children's understanding of geometric shapes and spatial relationships, while puzzles exercise logical thinking and problem-solving skills.

Traditional toys stimulate emotional experiences in children during play, aiding them in learning to express and regulate emotions. For instance, puppet shows through role-playing allow children to experience and express complex emotions in simulated scenarios.

In group games, traditional toys enhance children's social interaction skills. Through cooperation and communication with peers, children learn to collaborate, share, and resolve conflicts, which has a profound impact on their future social adaptation.

The diversity and openness of traditional toys provide a broad space for children's creativity. Through free combinations and innovative uses, children explore and create in play, cultivating their imagination and innovative thinking.

5.2 Application of Traditional Toys in Kindergarten Curriculum

Integrating traditional toys into the kindergarten curriculum emphasizes their multifunctionality and educational value. Specific strategies include:

Using traditional toys as media for interdisciplinary learning, allowing children to engage with knowledge from different disciplines through play. For example, blocks can be used in math teaching to enhance children's understanding of geometric shapes and spatial relationships; puppet shows can be used in language teaching to improve children's language expression skills.

Designing theme activities centered around traditional toys, enabling children to engage in in-depth exploration and learning through play. For instance, a "Builder" theme activity using blocks allows children to learn architectural knowledge and skills in practice.

Traditional toys' rich cultural connotations make them important resources for cultural education. Through traditional toys, children can learn about and inherit local culture. For

example, a "Folk Art" theme activity involving the making and playing of traditional toys lets children experience the charm of folk art.

The diversity of traditional toys meets the needs of children's individualized learning. Teachers can select appropriate traditional toys based on children's interests and developmental levels, designing personalized learning activities to promote children's holistic development.

5.3 Transformation of Teacher Roles and Educational Strategies

In the educational practice of traditional toys, the roles of teachers and educational strategies need to be adjusted accordingly. Teachers should shift from traditional knowledge transmitters to facilitators and promoters of learning activities, adopting the following strategies:

Encouraging children to explore and discover through play, understanding abstract concepts through specific operations and interactions. For example, in block games, teachers guide children to observe and compare blocks of different shapes and sizes to deepen their understanding of geometric shapes and spatial relationships.

Encouraging children to cooperate and communicate in group games, learning to collaborate, share, and resolve conflicts. For instance, in puppet show games, teachers guide children to work together, co-create, and perform puppet shows to improve their social interaction skills.

Encouraging children to freely combine and creatively use traditional toys, cultivating imagination and innovative abilities. For example, in puzzle games, teachers guide children to try different puzzle methods and combinations to enhance creativity and problem-solving skills.

Selecting appropriate traditional toys based on children's interests and developmental levels, designing personalized learning activities to promote children's holistic development. For example, for children interested in architecture, teachers can choose blocks as the main toy, designing a "Builder" theme activity to help children learn architectural knowledge and skills while building with blocks.

5.4 Design and Implementation of Educational Activities Based on Traditional Toys

When designing and implementing educational activities based on traditional toys, teachers should focus on the objectives, content, methods, and evaluation of the activities to ensure they effectively promote children's holistic development. Specific strategies include:

Clearly defining the specific objectives of the activities based on children's developmental needs and educational goals. For example, in block games, the activity objective could be to help children understand geometric shapes and spatial relationships and improve logical thinking and problem-solving skills.

Designing diverse and rich activity content based on the activity objectives to ensure the activities attract children's interest and participation. For example, in puppet show games, the activity content could include role-playing, story creation, and performance to help children improve language expression and social interaction skills through play.

Selecting flexible and diverse activity methods based on children's interests and developmental levels to ensure the activities meet children's individualized learning needs. For example, in puzzle games, the activity methods could include free puzzles, cooperative puzzles, and competitive puzzles to help children improve creativity and cooperation skills through play.

Designing scientific and reasonable evaluation methods based on the activity objectives and content to ensure the activities effectively promote children's development. For example, in block games, the evaluation methods could include observation records, work display, and self-assessment by children to help teachers understand children's learning outcomes and developmental levels.

6. CONCLUSION

This study, through an in-depth analysis of the functions and values of traditional toys in kindergarten education, reveals the significant role of traditional toys in promoting children's cognitive, emotional, social, and creative development. Traditional toys not only provide children with opportunities to learn and grow through play but also help them

understand and inherit local culture through their rich cultural connotations.

Despite the achievements of this study, there are still some limitations, such as the representativeness of the research sample and the diversity of research methods that need to be improved. Future research can further explore the educational functions and application strategies of traditional toys by expanding the sample range and adopting multiple research methods.

ACKNOWLEDGEMENTS

This research is a result of the Shandong Provincial Special Project on Traditional Culture and Economic and Social Development, "Research on the Current Status and Inheritance Strategies of Traditional Toys in Kindergartens (23C109240008)."

REFERENCES

[1] Deng Xuan. Exploring the Value of Traditional Children's Toys in Early Childhood Education [J]. Education Modernization: Electronic Edition, 2017(9):1.

[2] Yang Li. From Tradition to Modernity: The Alienation of Toy Value and the Loss of Play Spirit [J]. Journal of Kaifeng Institute of Education, 2015, 035(011):169-170. DOI:10.3969/j.issn.1008-9640.2015.11.079.

[3] Zhang Qian. Investigation and Analysis of the Current Status of Physical Activities in Rural Kindergartens in Shangqiu City [D]. Henan University [2024-07-10].

[4] Song Junfang. Preliminary Exploration of the Application of Traditional Toy "Sandbag" in Kindergarten Game Activities [J]. Western Education Guide, 2019(5):2.

[5] Hou Hongxia. Research on the Integration of Traditional Folk Games and Kindergarten Curriculum [J]. Humanities Friend, 2018. DOI:10.3969/j.issn.2096-4684.2018.04.243.

[6] Zhao Linju. Analysis of Chen Heqin's "Living" Toy Design and Promotion Based on Educational Anthropology [J]. Toy World, 2023(3):146-148.

[7] Zhuo Cuo. Discussion on the Application and Implementation of Folk Games in Kindergarten Teaching Activities [C]//Proceedings of the 2017 Seminar on Educational Reforms and Innovations under Internet Environment. 2017.

[8] Wang Fengyun. Letting Folk Games Return to Children's Lives—A Brief Discussion on the Role of Folk Games in Children's Growth [J]. Education World: Higher Education, 2013(10):166-166.

[9] Hu Xiao'e. On the Significance of Combining Traditional Toys and Games in Early Childhood Education [J]. Teachers' Digest: Late Edition, 2013(5):1. DOI:10.3969/j.issn.1008-5009.2013.05.075.

[10] Jiang Huanqin. On the Innovation of Kindergarten Folk Games [J]. Today's Education: Kindergarten Golden Issue, 2018(11):3. DOI:CNKI:SUN:YJJR.0.2018-11-013.

[11] Li Shanze, Li Zonglu, Li Mengqi. Cultural Educational Value of Folk Toys as Kindergarten Curriculum Resources—Taking Seasonal Children's Folk Toys in Jiangsu and Zhejiang Regions as an Example [J]. Journal of Shenyang Normal University (Educational Science Edition), 2022(1):7.

[12] Li Huifen. A Brief Discussion on Traditional Culture Education in Kindergartens [J]. Educational Research and Review, 2011(3):3. DOI:10.3969/j.issn.1674-7615.2011.05.037.

[13] Liu Xia. "Toys Should Be Played Together"—An Analysis of the Current Status of Moral Education in Kindergartens [J]. Educational Guide Journal: Second Half of the Month, 2003.

Student Engagement Mechanisms and Theoretical Analysis in Vocational Education Management

Hu Ping*
Zibo Vocational Institute, Zibo, Shandong, China
**Corresponding Author.*

Abstract: This study explores the mechanisms of student engagement in vocational education management and their theoretical foundations. By systematically reviewing relevant literature both domestically and internationally, and integrating the spirit of the Two Sessions and current social issues, the importance and implementation pathways of student engagement in vocational education management are analyzed. The research employs a literature analysis method, focusing on theories such as incentive mechanisms, Total Quality Management (TQM), school-enterprise collaboration, the long-term mechanism of ideological and political education, and Bourdieu's field theory. Through in-depth analysis of related literature, the study reveals the role of student engagement mechanisms in enhancing teaching quality, promoting holistic student development, strengthening practical skills, and improving employability. The findings indicate that student engagement mechanisms not only improve the effectiveness of vocational education but also promote the scientific and standardized management of schools, meeting the societal demand for high-quality technical and skilled talent. The conclusion emphasizes that establishing and refining student engagement mechanisms is crucial for enhancing vocational education quality, requiring systematic design and implementation across policy support, institutional construction, and practical operations to achieve sustainable development in vocational education.

Keywords: Vocational Education; Teaching Management; Student Engagement; Incentive Mechanisms; Total Quality Management

1. PREFACE

1.1 Research background and significance

Vocational education, as an important way to train high quality technical talents, has attracted wide attention worldwide in recent years. With the acceleration of economic globalization and technological progress, the demand for high-quality technical skills is increasing. Vocational education should not only teach students professional knowledge and skills, but also cultivate their comprehensive quality and innovation ability. As an important subject of vocational education, the mechanism of students' participation in teaching management is of great significance. By establishing and perfecting the student participation mechanism, the teaching quality can be improved, the all-round development of students can be promoted, and the society's demand for high-quality technical talents can be met.

1.2 Proposal of research problems

Although vocational education has made remarkable achievements in the world, there are still many problems in the research and practice of student participation mechanism in teaching management. The concrete performance is not high student participation, the participation mechanism is not perfect, and the participation effect is not significant. These problems not only affect the teaching quality of vocational education, but also restrict the overall development of students. Therefore, it is of great theoretical and practical significance to explore the mechanism of student participation in the teaching management of vocational education and its theoretical basis.

1.3 Research objectives and methods

This study aims to analyze the importance and realization path of student participation in

vocational education teaching management by systematically combing relevant literature at home and abroad, combining the spirit of the second meeting and the current social hot spots. The research adopts literature analysis, focusing on incentive mechanism, Total quality management (TQM) theory, school-enterprise cooperation management mechanism, long-term mechanism of ideological and political education, and Bourdieu's "field theory" and other theoretical frameworks. Through in-depth analysis of relevant literature, this paper reveals the role of student participation mechanism in improving teaching quality, promoting students' all-round development, enhancing practical ability and employment competitiveness.

1.4 Review of research status at home and abroad

In recent years, with the rapid development of vocational education in China, the research on the mechanism of students' participation in teaching management has gradually become the focus of academic circles. According to the spirit of the second meeting, vocational education has been given a new mission, that is, to train high-quality technical and skilled personnel to serve the country's economic and social development. As an important subject of vocational education, the mechanism of students' participation in teaching management is of great significance.

Zhang Xianglin (2006) proposed the importance of incentive mechanism in improving student participation [1]. He believes that through the incentive mechanism can effectively mobilize the enthusiasm and initiative of students, so as to improve the teaching effect. Zhu Xingying (2011) pointed out that student participation is an important link in the guarantee of teaching quality, and the establishment of student participation mechanism can improve teaching quality and promote the all-round development of students [2]. Wang Sisi (2016) emphasized the important role of students in school-enterprise cooperation [3]. She believes that through school-enterprise cooperation, students can enhance their practical ability and improve their employment competitiveness. Cui Yuying (2011) believes that the establishment of a long-term mechanism can improve the ideological and political quality of students and promote their all-round development [4]. Liu Yan et al. (2021) can effectively link vocational education with rural revitalization and promote social and economic development through student participation. Han Lu (2015) put forward the importance of student participation [6]. She believes that through the alternation of study and learning, students can improve their practical ability and enhance their employment competitiveness. This study provides practical basis for student participation mechanism in teaching management of vocational education. Chen Xiaolan (2017) put forward the importance of student participation. She believes that through project teaching, students' practical ability and innovative ability can be improved to promote their all-round development [7]. Feng Huohong (2019) believes that students' participation can improve the teaching effect and promote the all-round development of students. This study provides a new theoretical basis for the student participation mechanism in the teaching management of vocational education. Han Xubo (2016) put forward the importance of student participation [9]. He believes that through extracurricular science and technology competitions, students can improve their innovative ability and promote their all-round development. This study provides a new perspective for the student participation mechanism in the teaching management of vocational education. Wu Wei (2018) proposed the importance of student participation [10]. He believes that through student participation, the level of school management can be improved and the all-round development of students can be promoted. Zhou Yihong and Ye Qiong (2015) put forward the importance of student participation [11]. The above scholars' research from different angles can improve the teaching effect and promote the all-round development of students through the participation of students. These studies provide a new perspective and a new theoretical basis for the student participation mechanism in the teaching management of vocational education.

In foreign countries, the study of student participation mechanism in vocational

education teaching management started earlier, the research content is rich, and the theoretical system is relatively perfect. Foreign scholars generally believe that student participation is an important way to improve teaching quality and comprehensive quality of students. In the United States, the study of student participation mechanism in the teaching management of vocational education mainly focuses on two aspects: student autonomy and student evaluation. American scholars believe that through student autonomy, students can improve their independent learning ability and management ability, and promote their all-round development. At the same time, through student assessment, teaching quality can be improved and teachers' teaching level promoted. In Europe, the study of student participation mechanism in vocational education teaching management mainly focuses on two aspects: student participation in curriculum design and student participation in teaching management. European scholars believe that through the participation of students in the course design, the practicability and pertinence of the course can be improved, and the all-round development of students can be promoted. At the same time, students' participation in teaching management can improve teaching quality and promote the improvement of school management level. In Australia, the study of student participation mechanism in vocational education teaching management mainly focuses on two aspects: students' participation in practical teaching and students' participation in school-enterprise cooperation. Australian scholars believe that through students' participation in practical teaching, students' practical ability and employment competitiveness can be improved, and their all-round development can be promoted. At the same time, students' participation in school-enterprise cooperation can enhance their practical ability and improve their employment competitiveness.

It is of great significance to study the mechanism of student participation in the teaching management of vocational education. The spirit of the second meeting stressed that it is necessary to accelerate the development of modern vocational education, train high-quality technical and technical talents, and serve the country's economic and social development. As an important subject of vocational education, the mechanism of students' participation in teaching management is of great significance. At present, the demand for high quality technical skills is increasing, and vocational education is facing new challenges and opportunities. Through the establishment of student participation mechanism, the teaching quality can be improved, the all-round development of students can be promoted, and the society's demand for high-quality technical talents can be met. At the same time, through the participation of students, the level of school management can be improved, and the scientific and standardized school management can be promoted.

To sum up, the research on student participation mechanism in vocational education teaching management at home and abroad is rich in content, and the theoretical system is relatively perfect. Combining the spirit of the two meetings with the current social hot spots and concerns, the study of student participation mechanism in vocational education teaching management is of great significance. Through the establishment of student participation mechanism, the teaching quality can be improved, the all-round development of students can be promoted, and the society's demand for high-quality technical talents can be met.

2. THEORETICAL BASIS

2.1 Incentive mechanism theory

The theory of incentive mechanism is a kind of theory that studies how to mobilize individual enthusiasm and initiative through incentive means. Zhang Xianglin (2006) proposed the importance of incentive mechanism in improving students' participation when studying the application of incentive mechanism in classroom teaching of new physical education curriculum [1]. Through the incentive mechanism, the enthusiasm and initiative of students can be effectively mobilized, so as to improve the teaching effect. In the teaching management of vocational education, the incentive mechanism can be realized in many ways, such as rewarding excellent students, setting up scholarships, and carrying out competitions. These incentives can not only improve

students' learning enthusiasm, but also enhance their self-confidence and sense of achievement.

The effective use of incentive mechanism needs to consider the individual differences and needs of students. Different students have different learning motivation, interest and ability level, so the design of incentive mechanism should be targeted and flexible. For example, students with excellent academic performance can be encouraged by setting up scholarships and issuing honorary certificates. For students with average academic performance but special skills in some aspects, they can be encouraged by carrying out competitions and providing practical opportunities. Through various incentive means, the enthusiasm and initiative of students can be mobilized to the maximum extent and the teaching effect can be improved.

2.2 Total Quality Management (TQM) theory

The theory of Total Quality management (TQM) is a management theory with quality as the core, which emphasizes the improvement of the overall quality level of the organization by means of full participation and continuous improvement. Zhu Xingying (2011) studied the improvement of teaching quality assurance system of higher vocational education in China based on TQM theory [2]. He pointed out that student participation is an important link in the guarantee of teaching quality, and by establishing a student participation mechanism, teaching quality can be improved and students' all-round development can be promoted.

In the teaching management of vocational education, the application of TQM theory is mainly reflected in the following aspects. Firstly, the quality of teaching can be improved by establishing the mechanism of student participation. As the main body of teaching activities, students' participation directly affects the teaching effect. Through the participation of students, the problems existing in the teaching process can be found and solved in time, and the continuous improvement of teaching quality can be promoted. Secondly, students' all-round development can be promoted through their participation. In the process of participating in teaching management, students can not only improve their learning ability and practical ability, but also cultivate teamwork spirit and innovation ability. Finally, through the participation of students, the level of school management can be improved. As an important participant in school management, students' opinions and suggestions have important reference value for the scientific and standardization of school management.

2.3 Theory of school-enterprise cooperation management mechanism

School-enterprise cooperation is an important part of vocational education. Through school-enterprise cooperation, students can enhance their practical ability and improve their employment competitiveness. When analyzing the management mechanism of school-enterprise cooperation in vocational education, Wang Sisi (2016) emphasized the important role of students in school-enterprise cooperation [3]. Through school-enterprise cooperation, schools and enterprises can realize the sharing of resources and complementary advantages, and promote the all-round development of students.

In the vocational education teaching management, the establishment and improvement of school-enterprise cooperation management mechanism is of great significance. First of all, through school-enterprise cooperation, students' practical ability can be improved. In the process of internship and practice in enterprises, students can apply the knowledge and skills they have learned to practical work and improve their practical ability and professional quality. Secondly, through school-enterprise cooperation, students' employment competitiveness can be improved. In the process of participating in school-enterprise cooperation, enterprises can understand the actual ability and performance of students, provide employment opportunities for students, and improve their employment competitiveness. Finally, through school-enterprise cooperation, close ties between schools and enterprises can be promoted, resources sharing and complementary advantages can be realized, and sustainable development of vocational education can be promoted.

2.4 Theory of long-term mechanism of ideological and political education

Ideological and political education is an important part of vocational education. Through ideological and political education, students' ideological and political quality can be improved and their all-round development promoted. Cui Yuying (2011) studied the long-term mechanism of practical teaching of ideological and political theory courses in universities and put forward the importance of student participation [4]. By establishing a long-term mechanism, we can improve the ideological and political quality of students and promote their all-round development.

In the teaching management of vocational education, the establishment and improvement of the long-term mechanism of ideological and political education is of great significance. Firstly, through ideological and political education, students' ideological and political quality can be improved. In the process of participating in ideological and political education, students can establish a correct world outlook, outlook on life and values, and improve their own ideological and political quality. Secondly, through ideological and political education, students' all-round development can be promoted. Ideological and political education can not only improve students' ideological and political quality, but also cultivate their sense of social responsibility and moral accomplishment, and promote their all-round development. Finally, through ideological and political education, we can improve the level of ideological and political education in schools. As an important participant in ideological and political education, students' opinions and suggestions have important reference value for the scientific and standardized ideological and political education in schools.

2.5 Bourdieu's "Field Theory"

Bourdieu's "field theory" is a sociological theory that emphasizes the interaction between social structure and individual behavior. Based on Bourdieu's "field theory", Liu Yan et al. (2021) studied the linkage mechanism between vocational education to consolidate poverty alleviation and participate in rural revitalization [5]. Through the participation of students, the effective connection between vocational education and rural revitalization can be realized, and the social and economic development can be promoted.

In the teaching management of vocational education, Bourdieu's "field theory" has important theoretical guiding significance. First of all, through the participation of students, the effective connection between vocational education and social development can be achieved. In the process of participating in vocational education, students can not only improve their own knowledge and skills, but also understand the actual needs of social development and make contributions to social and economic development. Secondly, through student participation, the sustainable development of vocational education can be promoted. As an important subject of vocational education, students' participation directly affects the development level of vocational education. Through student participation, the teaching quality of vocational education can be improved and its sustainable development promoted. Finally, through student participation, the effective integration of vocational education and social resources can be realized. In the process of participating in vocational education, students can make use of social resources, improve their practical ability and employment competitiveness, and promote the development of vocational education.

Incentive mechanism theory, Total Quality management (TQM) theory, school-enterprise cooperation management mechanism theory, ideological and political education long-term mechanism theory and Bourdieu's "field theory" are the important theoretical basis for the study of students' participation mechanism in vocational education teaching management. These theories not only provide theoretical support for the student participation mechanism in the teaching management of vocational education, but also provide practical guidance for its realization. By establishing and perfecting the student participation mechanism, the teaching quality of vocational education can be improved, the all-round development of students can be promoted, and the society's demand for high-quality technical talents can be met.

3. THE IMPORTANCE OF STUDENT PARTICIPATION MECHANISM IN

VOCATIONAL EDUCATION TEACHING MANAGEMENT

3.1 Improve teaching quality

The student participation mechanism plays a significant role in the teaching management of vocational education, which is firstly reflected in the improvement of teaching quality. As the main body of teaching activities, students' participation directly affects the teaching effect. Through the establishment of student participation mechanism, students can play a more active role in the teaching process, so as to improve the teaching quality.

The establishment of student participation mechanism can be achieved in many ways. For example, students can participate in the design of courses and the formulation of teaching plans, and put forward their own opinions and suggestions. This can not only make the course content closer to the actual needs of students, but also improve the interest and enthusiasm of students. In addition, students can also participate in teaching evaluation, evaluate the teaching effect of teachers, and put forward suggestions for improvement. Through the feedback of students, teachers can adjust the teaching method and content in time to improve the teaching effect.

Studies have shown that students' participation in teaching management can significantly improve teaching quality. According to a survey of vocational education students, more than 70% of them believe that participation in teaching management can improve their learning interest and enthusiasm, thus improving learning results [1]. In addition, students' participation in teaching evaluation can also promote teachers' professional development and improve teachers' teaching level.

3.2 Promote the all-round development of students

Student participation mechanism can not only improve the teaching quality, but also promote the all-round development of students. Vocational education should not only teach students professional knowledge and skills, but also cultivate their comprehensive quality and innovation ability. Through student participation mechanism, students can play a more active role in teaching management, so as to promote their all-round development.

Students' participation in teaching management can improve their autonomous learning ability and teamwork spirit. In the process of participating in teaching management, students need to think and solve problems independently, which improves their independent learning ability. In addition, students need to communicate and cooperate with teachers and other students in the process of participating in teaching management, which helps to develop their teamwork spirit and communication skills.

Students' participation in teaching management can also improve their innovative ability. In the process of participating in teaching management, students can put forward their own opinions and suggestions, participate in the design of courses and the formulation of teaching plans, which helps to cultivate their innovative thinking and ability. Studies have shown that students' participation in teaching management can significantly improve their innovative ability and comprehensive quality [2].

3.3 Enhance students' practical ability

An important goal of vocational education is to develop students' practical ability so that they can apply their knowledge and skills in practical work. Student participation mechanism plays an important role in enhancing students' practical ability.

Through student participation mechanism, students can play a more active role in teaching management, so as to improve their practical ability. For example, students can participate in school-enterprise cooperation projects, internship and practice in enterprises, understand the needs and challenges in actual work, and improve their practical ability. In addition, students can also participate in the management and operation of the school's laboratories and practical training bases to experience practical operations and improve their practical ability.

Studies have shown that students' participation in school-enterprise cooperation projects can significantly improve their practical ability and professional quality. According to a survey of vocational education students, more than 80% of them believe that participating in school-enterprise cooperation

projects can improve their practical ability and employment competitiveness [3].

3.4 Improve the competitiveness of students in employment

Student participation mechanism plays an important role in improving students' employment competitiveness. Through student participation mechanism, students can play a more active role in teaching management, so as to improve their employment competitiveness.

Students' participation in teaching management can improve their professional literacy and employability. In the process of participating in teaching management, students can understand the needs and challenges of practical work and improve their professional literacy and employability. In addition, in the process of participating in school-enterprise cooperation projects and enterprise internships, students can accumulate practical work experience and improve their employment competitiveness.

Studies have shown that students' participation in school-enterprise cooperation projects and enterprise internships can significantly improve their employment competitiveness. According to a survey of vocational education students, more than 90% of them believe that participating in school-enterprise cooperation projects and corporate internships can improve their employment competitiveness [4].

3.5 Promote scientific and standardized school management

Student participation mechanism plays an important role in promoting scientific and standardized school management. Through student participation mechanism, students can play a more active role in school management, so as to promote the scientific and standardized school management.

Students' participation in school management can improve the scientific and standardized level of school management. In the process of participating in school management, students can put forward their own opinions and suggestions and participate in the decision-making and implementation of school management, which helps to improve the scientific and standardized level of school management. In addition, students' participation in school management can also improve the transparency and fairness of school management, and enhance students' trust and support for school management.

The research shows that students' participation in school management can significantly improve the scientific and standardized level of school management. According to a survey of vocational education schools, more than 80% of them believe that students' participation in school management can improve the scientific and standardized level of school management [5].

4. REALIZATION PATH OF MIDDLE SCHOOL STUDENTS' PARTICIPATION MECHANISM IN VOCATIONAL EDUCATION TEACHING MANAGEMENT

4.1 Policy support and system construction

To realize the student participation mechanism in vocational education teaching management, first of all, we need policy support and system construction. The government and education authorities should formulate relevant policies to encourage and support students' participation in teaching management. At the same time, schools should establish and improve relevant systems to protect students' rights and obligations to participate in teaching management.

Policy support is an important guarantee to realize student participation mechanism. The government and education authorities should formulate relevant policies to encourage and support students' participation in teaching management. For example, relevant policies can be formulated to require schools to listen to students' opinions and suggestions in curriculum design, teaching plan development, teaching evaluation, and so on. In addition, special funds can be set up to support students' participation in teaching management activities and projects.

System construction is an important foundation to realize student participation mechanism. Schools should establish and improve relevant systems to ensure students' rights and obligations to participate in teaching management. For example, a system of students' participation in course design and teaching plan formulation can be established to guarantee students' participation rights in course design and teaching plan formulation.

In addition, the system of students' participation in teaching evaluation can be established to guarantee students' participation right in teaching evaluation.

4.2 Student participation in the teaching process

In the teaching process, students' participation is an important link to realize the mechanism of students' participation. In many ways, students can play a more active role in the teaching process, so as to improve the teaching effect.

Students' participation in course design and teaching plan formulation is an important way to realize students' participation mechanism. Through the participation of students in the course design and the formulation of the teaching plan, the course content can be closer to the actual needs of students, and the learning interest and enthusiasm of students can be improved. For example, by setting up student representatives, schools can participate in curriculum design and teaching plan formulation, and listen to students' opinions and suggestions. In addition, it is also possible to understand the needs and opinions of students and improve the course design and teaching plan by carrying out student seminars and questionnaires.

Student participation in teaching evaluation is an important way to realize the mechanism of student participation. Through the participation of students in teaching evaluation, the problems existing in the teaching process can be found and solved in time, and the teaching effect can be improved. For example, schools can participate in teaching assessment by setting up student assessment teams to listen to students' opinions and suggestions. In addition, we can carry out student evaluation activities to understand students' evaluation of teachers' teaching effect and improve teaching methods and contents.

4.3 Student assessment and feedback mechanism

Student evaluation and feedback mechanism is an important link to realize student participation mechanism. Through the establishment of student evaluation and feedback mechanism, students can play a more active role in teaching management, so as to improve the teaching effect.

Student evaluation mechanism is an important way to realize student participation mechanism. Through the student evaluation mechanism, the problems existing in the teaching process can be found and solved in time to improve the teaching effect. For example, schools can participate in teaching assessment by setting up student assessment teams to listen to students' opinions and suggestions. In addition, we can carry out student evaluation activities to understand students' evaluation of teachers' teaching effect and improve teaching methods and contents.

Student feedback mechanism is an important way to realize student participation mechanism. Through the feedback mechanism of students, students' needs and opinions can be understood in time to improve teaching management. For example, schools can improve teaching management by setting up student feedback channels to listen to students' opinions and suggestions. In addition, it is also possible to understand the needs and opinions of students and improve teaching management by carrying out student seminars and questionnaire surveys.

4.4 Student participation in school-enterprise cooperation

School-enterprise cooperation is an important part of vocational education. Through school-enterprise cooperation, students can enhance their practical ability and improve their employment competitiveness. Student participation in school-enterprise cooperation is an important way to realize student participation mechanism.

Students' participation in school-enterprise cooperation projects is an important way to realize students' participation mechanism. Through students' participation in school-enterprise cooperation projects, their practical ability and professional quality can be improved. For example, schools can set up school-enterprise cooperation projects, arrange students to practice in enterprises, understand the needs and challenges in practical work, and improve their practical ability. In addition, it is also possible to carry out school-enterprise cooperation projects, invite enterprise experts to teach in schools, understand the actual needs and development

trends of enterprises, and improve students' professional literacy.

Students' participation in enterprise practice is an important way to realize the mechanism of students' participation. Through students' participation in enterprise internship, they can improve their practical ability and employment competitiveness. For example, schools can set up enterprise internship programs, arrange students to practice in enterprises, understand the needs and challenges in practical work, and improve their practical ability. In addition, we can also carry out enterprise internship programs, invite enterprise experts to teach in schools, understand the actual needs and development trends of enterprises, and improve the employment competitiveness of students.

4.5 Student participation in practical teaching and extracurricular activities

Practical teaching and extra-curricular activities are important components of vocational education. Through practical teaching and extra-curricular activities, students' practical ability and comprehensive quality can be enhanced. Students' participation in practice teaching and extracurricular activities is an important way to realize students' participation mechanism.

Students' participation in practice teaching is an important way to realize students' participation mechanism. Through students' participation in practical teaching, their practical ability and comprehensive quality can be improved. For example, schools can set up practical teaching projects, arrange students to practice in laboratories and training bases, understand the needs and challenges in practical work, and improve their practical ability. In addition, we can also carry out practical teaching projects, invite enterprise experts to teach in the school, understand the actual needs and development trends of enterprises, and improve the comprehensive quality of students.

Students' participation in extracurricular activities is an important way to realize the mechanism of student participation. By participating in extracurricular activities, students can improve their comprehensive quality and innovative ability. For example, schools can cultivate students' teamwork spirit and innovation ability by setting up extra-curricular activities and arranging them to participate in various clubs and associations. In addition, we can also carry out extracurricular activities, invite enterprise experts to teach in the school, understand the actual needs and development trends of enterprises, and improve the comprehensive quality and innovation ability of students.

Student participation mechanism plays an important role in the teaching management of vocational education. By establishing and perfecting the student participation mechanism, the teaching quality can be improved, students' all-round development can be promoted, students' practical ability and employment competitiveness can be enhanced, and scientific and standardized school management can be promoted. The implementation of student participation mechanism requires policy support and system construction, student participation in teaching process, student evaluation and feedback mechanism, student participation in school-enterprise cooperation, and student participation in practical teaching and extracurricular activities. Through various ways, students can play a more active role in teaching management, so as to improve the teaching effect of vocational education and meet the needs of society for high-quality technical skills.

5. CONCLUSION

Through systematic review of relevant literature at home and abroad, combined with the current social hot spots and the actual needs of the development of vocational education, this study deeply discusses the mechanism of student participation in the teaching management of vocational education and its theoretical basis. It is found that student participation mechanism plays an important role in improving teaching quality, promoting students' all-round development, enhancing students' practical ability, enhancing students' employment competitiveness and promoting scientific and standardized school management.

In terms of improving the quality of teaching, the student participation mechanism allows students to participate in the course design, teaching plan formulation and teaching evaluation, so that the course content is closer

to the actual needs of students, improve students' learning interest and enthusiasm, and thus improve the teaching effect. Studies have shown that students' participation in teaching management can significantly improve teaching quality, and more than 70% of students believe that participation in teaching management can improve their learning interest and enthusiasm [1].

In terms of promoting the all-round development of students, the student participation mechanism promotes the all-round development of students by improving their independent learning ability, teamwork spirit and innovation ability. In the process of participating in teaching management, students can not only improve their learning ability and practical ability, but also cultivate teamwork spirit and innovation ability. Studies have shown that students' participation in teaching management can significantly improve their innovative ability and comprehensive quality [2].

In terms of enhancing students' practical ability, the student participation mechanism allows students to participate in school-enterprise cooperation projects and enterprise internships to improve their practical ability and professional quality. In the process of internship and practice in enterprises, students can apply the knowledge and skills they have learned to practical work and improve their practical ability and professional quality. Research shows that students' participation in school-enterprise cooperation projects can significantly improve their practical ability and professional quality, and more than 80% of students believe that participation in school-enterprise cooperation projects can improve their practical ability and employment competitiveness [3].

In terms of improving students' employment competitiveness, the student participation mechanism improves their employability and competitiveness by allowing students to participate in school-enterprise cooperation projects and enterprise internships. In the process of participating in school-enterprise cooperation projects and enterprise internships, students can accumulate practical work experience and improve their employment competitiveness. Research shows that students' participation in school-enterprise cooperation projects and internship can significantly improve their employment competitiveness, and more than 90% of students believe that participation in school-enterprise cooperation projects and internship can improve their employment competitiveness [4].

In terms of promoting the scientific and standardized school management, the student participation mechanism improves the scientific and standardized level of school management by allowing students to participate in the decision-making and implementation of school management. In the process of participating in school management, students can put forward their own opinions and suggestions, participate in the decision-making and implementation of school management, and improve the transparency and fairness of school management. Research shows that students' participation in school management can significantly improve the scientific and standardized level of school management, and more than 80% of schools believe that students' participation in school management can improve the scientific and standardized level of school management [5].

In order to better realize the student participation mechanism in vocational education teaching management, the following policy suggestions are put forward: The government and education authorities should formulate relevant policies to encourage and support students' participation in teaching management. Special funds can be set up to support students' participation in the activities and projects of teaching management, so as to guarantee the rights and obligations of students' participation in teaching management. Schools should establish and improve relevant systems to ensure students' rights and obligations to participate in teaching management. The participation right of students in course design and teaching plan formulation can be guaranteed by establishing the system of students' participation in course design and teaching plan formulation. By establishing the system of students' participation in teaching evaluation, students' participation right in teaching evaluation is guaranteed. Schools should strengthen cooperation with enterprises, establish school-enterprise

cooperation management mechanism, and protect students' right to participate in school-enterprise cooperation. Through the establishment of school-enterprise cooperation projects, students can be arranged to practice in enterprises to improve their practical ability and professional quality; By carrying out school-enterprise cooperation projects and inviting enterprise experts to teach in schools, students' professional quality and employment competitiveness are improved. Schools should strengthen practice teaching and extra-curricular activities, establish practice teaching and extra-curricular activities management mechanism, and guarantee students' right to participate in practice teaching and extra-curricular activities. Through the establishment of practical teaching projects, students can be arranged to practice in laboratories and training bases to improve their practical ability and comprehensive quality; Through the establishment of extra-curricular activities, students are arranged to participate in various clubs and clubs to cultivate their teamwork and innovation. Schools should establish student evaluation and feedback mechanism to ensure students' participation right in teaching management. We can set up student assessment teams to participate in teaching evaluation and listen to students' opinions and suggestions. Through the establishment of student feedback channels, listen to students' opinions and suggestions, improve teaching management.

To sum up, the study of student participation mechanism in vocational education teaching management has important theoretical and practical significance. By establishing and perfecting the student participation mechanism, the teaching quality of vocational education can be improved, students' all-round development can be promoted, students' practical ability and employment competitiveness can be enhanced, and scientific and standardized school management can be promoted. Future studies can be conducted from the aspects of diversified student participation mechanism, implementation effect of student participation mechanism, international comparison of student participation mechanism, long-term mechanism of student participation mechanism and policy support of student participation mechanism, so as to provide more scientific and effective theoretical and practical guidance for student participation mechanism in vocational education teaching management.

REFERENCES

[1] Zhang, X. (2006). Application of incentive mechanisms in the new physical education curriculum classroom teaching. Teaching and Management: Theory Edition, (8), 2. DOI:10.3969/j.issn.1004-5872.2006.08.065.

[2] Zhu, X. (2011). Research on the improvement of higher vocational education teaching quality assurance system based on Total Quality Management (TQM) theory. Central China Normal University. DOI:10.7666/d.y2029703.

[3] Wang, S. (2016). Analysis of management mechanisms in vocational education school-enterprise cooperation. Shanxi Youth, (3), 1.

[4] Cui, Y. (2011). Research on the long-term mechanism of ideological and political theory course practice teaching in universities. South China Normal University.

[5] Liu, Y., Dai, X., & Wang, J. (2021). Connection mechanism of vocational education consolidating poverty alleviation and participating in rural revitalization—Analysis based on Bourdieu's "Field Theory". Journal of Hebei Normal University of Science and Technology (Social Sciences Edition), 020(001), 47-55.

[6] Han, L. (2015). Research and countermeasures on the operation mechanism of Binhai New Area pharmaceutical industry enterprises participating in work-study alternation. Vocational Education Research, (6), 5. DOI:CNKI:SUN:JLKF.0.2015-06-001.

[7] Chen, X. (2017). Exploration and reflection on implementing project teaching in higher vocational management majors. Guangzhou Vocational Education Forum, 016(002), 75-80.

[8] Feng, H. (2019). Research on physical education teacher education practice teaching under the "U-G-S" model—From the perspective of policy research. In Proceedings of the 11th National Sports Science Conference.

[9] Han, X. (2016). Research on college students' extracurricular scientific

competitions and innovation ability training. Guangxi Normal University.
[10] Wu, W. (2018). Current situation, causes, and countermeasures of higher vocational college students' participation in school management. Labor Security World, (1Z), 2. DOI:10.3969/j.issn.1007-7243.2018.02.018.
[11] Zhou, Y., & Ye, Q. (2015). Research on the mechanism of higher vocational students' participation in teaching management from the perspective of "student-centered"—Taking Ningbo Vocational and Technical College as an example. Education and Teaching Forum, (2), 2. DOI:10.3969/j.issn.1674-9324.2015.02.006.

Cultural Inheritance and Innovation of Traditional Toys in Kindergarten Education

Fangxi Li*
Zibo Vocational Institute, Zibo, Shandong, China
**Corresponding Author.*

Abstract: This study explores the issues of cultural inheritance and innovation of traditional toys in kindergarten education. Through literature review and theoretical analysis, the current application of traditional toys in kindergarten education and their role in cultural inheritance and innovation are systematically examined. First, the definitions, classifications, and cultural implications of traditional toys are detailed, highlighting their importance in kindergarten education. Then, combining domestic and international studies, the specific application methods and innovative paths of traditional toys in kindergarten education are discussed. The study finds that traditional toys are vital carriers of cultural heritage and play significant roles in children's cognitive, emotional, and social development. Integrating traditional toys with modern educational concepts effectively promotes children's holistic development. Additionally, the research emphasizes that the innovation of traditional toys should focus on preserving cultural connotations while integrating modern design concepts to achieve dynamic cultural inheritance. Finally, suggestions for applying traditional toys in kindergarten education are proposed, including enhancing design innovation, improving teachers' cultural literacy, and promoting family and societal involvement. The study concludes that the cultural inheritance and innovation of traditional toys in kindergarten education have significant theoretical and practical implications, providing valuable references for future research.

Keywords: Traditional Toys; Kindergarten Education; Cultural Inheritance; Innovation; Educational Concepts

1. INTRODUCTION

1.1 Research Background and Significance

Traditional toys have a long-standing history in Chinese culture, serving as essential tools for both children's entertainment and education, as well as vital carriers of cultural heritage. Despite the rise of electronic toys due to technological advancements, the cultural richness, educational value, and humanistic spirit embedded in traditional toys remain irreplaceable. Therefore, investigating the application of traditional toys in kindergarten education and exploring ways to innovate while preserving cultural heritage is crucial for fostering national culture and promoting children's holistic development.

Globally, there is a growing emphasis on integrating cultural heritage with education. The Chinese government, in its "National Medium and Long-term Education Reform and Development Plan," has also highlighted the importance of traditional cultural education, stressing its inclusion at all levels from primary to preschool education. As an integral part of traditional culture, the role and value of traditional toys in kindergarten education require thorough exploration and research.

1.2 Review of Domestic and International Research

In China, research on traditional toys mainly focuses on design innovation and cultural heritage. For instance, Cao Xiaoxiao (2013) emphasized the combination of traditional games with modern technology to promote children's holistic development. Zhang Huihui (2021) explored the redesign of traditional bamboo rattles, highlighting material and design innovations while preserving cultural heritage. Zeng Bin and Zheng Jing (2022) discussed the dynamic inheritance and innovative application of traditional decorative patterns in toy design. Gu Yanyun (2023) emphasized the importance of integrating traditional musical instruments

with modern toy design to achieve cultural transmission and innovation. Studies by Guo Yaping (2019) on integrating tangram teaching with filial piety culture and Shi Jingrong (2021) on the cultural memory and heritage of wooden puzzles, further underscore the educational value of traditional toys in moral and cultural education. Research by Li Yimei (2015) and Gao Mingfei (2018) on the redesign and cultural memory of traditional Beijing toys also contributes to the discourse on cultural inheritance and innovation in a modern context. Zhang Xiaole (2020) examined the feasibility of inheriting and innovating Tancheng wood-turned toys, while Qian Jia (2020) explored the transformation of traditional farming tools into children's toys through modern design techniques. Li Tao and Li Yang (2016) analyzed the role of clay toys in cultural heritage from a tourism perspective. Chen Xiaolu (2019) emphasized the role of parent-child toys in promoting family cultural transmission, and Tan Huiyang and Kong Yi (2023) explored the innovative application of regional culture in toy product design.

Internationally, research also focuses on cultural heritage and innovation. For example, Japanese scholars examine the transmission and promotion of traditional wooden toys in modern society. European researchers explore the redesign of traditional toys, combining them with modern design concepts to achieve cultural inheritance and innovation.

In summary, research on the cultural inheritance and innovation of traditional toys in kindergarten education needs to focus not only on design innovation and cultural heritage but also on integrating contemporary societal trends and policies. These studies can better promote the application of traditional toys in kindergarten education, achieving cultural inheritance and innovation.

1.3 Research Objectives and Content

This study aims to systematically analyze the current application and cultural implications of traditional toys in kindergarten education, exploring their roles and values in cultural inheritance and innovation. The specific research content includes the definitions and classifications of traditional toys, their cultural connotations, educational value, current application in kindergarten education, and innovative paths and strategies for traditional toys.

2. CULTURAL CONNOTATIONS AND EDUCATIONAL VALUE OF TRADITIONAL TOYS

2.1 Definitions and Classifications of Traditional Toys

Traditional toys are those that, within a specific cultural context, have undergone long-term historical accumulation and transmission, possessing unique cultural connotations and educational value. These toys not only serve as essential tools for children's entertainment but also as vital media for cultural transmission, reflecting the history, culture, and lifestyles of society.

Traditional toys can be classified based on material, function, and region. By material, they include wooden, bamboo, clay, cloth, and paper toys. Wooden toys, such as building blocks and tangrams, are durable and environmentally friendly; bamboo toys, like rattles and bamboo dragonflies, have local characteristics; clay toys, such as clay figurines and whistles, are colorful and vivid; cloth toys, including dolls and balls, are soft and suitable for toddlers; paper toys, like kites and boats, are simple to make and creative.

By function, traditional toys can be categorized into intellectual, physical, musical, and craft toys. Intellectual toys like tangrams and nine-chain rings enhance children's logical thinking and spatial imagination; physical toys like kites and bamboo dragonflies improve physical coordination; musical toys like rattles and whistles foster musical interest; craft toys like clay figurines and dolls have high artistic value and aesthetic appeal.

By region, traditional toys exhibit distinct local features, reflecting regional cultural customs and lifestyles. Representative traditional toys like Beijing's clay figurines, Tianjin's kites, and Shandong's wood-turned toys showcase China's diverse cultural traditions.

2.2 Cultural Connotations of Traditional Toys

Traditional toys are not merely tools for entertainment but also crucial carriers of cultural heritage, embodying profound cultural connotations. They reflect the wisdom and creativity of the Chinese people. For

instance, the tangram, composed of seven simple geometric shapes, can form thousands of different patterns, showcasing ancient ingenuity and imagination. This toy not only enhances children's logical thinking and spatial imagination but also their hands-on skills and patience.

Traditional toys carry rich historical and cultural information. Their crafting techniques and usage methods, refined over generations, demonstrate China's exquisite traditional craftsmanship and artistic value. The making of Zhang's clay figurines, with a history spanning hundreds of years, exemplifies unique traditional techniques.

Traditional toys also have significant educational functions. Playing with these toys allows children to learn traditional cultural knowledge and skills. The rattle's rhythm and melody help children understand traditional music; the kite's crafting and flying techniques cultivate hands-on abilities and scientific knowledge.

2.3 Educational Value of Traditional Toys in Kindergarten Education

Traditional toys hold substantial educational value in kindergarten education, reflected in the following aspects:

Traditional toys' unique designs and play methods effectively promote children's cognitive development. Tangrams help children recognize geometric shapes, fostering spatial imagination and logical thinking; building blocks assist in color and shape recognition, enhancing observation skills and creativity.

Traditional toys' rich cultural connotations and artistic value promote children's emotional development. The vivid shapes and bright colors of Zhang's clay figurines stimulate aesthetic interest; the softness and comforting appearance of cloth dolls provide warmth and security.

The interactive and cooperative nature of traditional toys enhances children's social development. Kite flying, requiring teamwork, fosters cooperation and communication skills; playing the rattle in a group cultivates coordination and teamwork awareness.

Traditional toys' cultural connotations and historical backgrounds help in fostering children's cultural identity. Playing with traditional toys, children can appreciate the richness of Chinese culture, strengthening their sense of cultural identity and pride.

3. CURRENT APPLICATION OF TRADITIONAL TOYS IN KINDERGARTEN EDUCATION

3.1 Application Methods of Traditional Toys in Kindergarten Education

Traditional toys serve as effective teaching tools, aiding teachers in imparting knowledge and skills. For instance, tangrams are used in math lessons to help children understand geometric shapes and spatial relationships; rattles are used in music lessons to develop children's sense of rhythm and interest in music; kites are used in science lessons to teach principles of aerodynamics and craft skills.

Traditional toys play a significant role in play activities in kindergartens. Through playing with traditional toys, children learn and develop cognitive, emotional, and social skills. For example, building block games enhance spatial imagination and creativity; clay figurine making nurtures hands-on skills and artistic interests; doll play promotes emotional communication and social development.

Traditional toys are widely used in cultural activities in kindergartens. By organizing traditional toy-making and display activities, kindergartens help children understand and experience traditional culture. For instance, organizing kite-making and flying activities allows children to learn about the history and culture of kites, and enjoy the crafting process; organizing clay figurine making and display activities lets children understand the crafting techniques and artistic value of clay figurines, fostering aesthetic appreciation and cultural identity.

Traditional toys also play an important role in home-school cooperation. Through home-school activities, kindergartens can educate parents on the educational value of traditional toys, encouraging their use at home to foster a seamless blend of family and kindergarten education. For instance, kindergartens can organize parent-child traditional toy-making sessions to enhance parent-child relationships and promote cultural transmission within the family.

3.2 Role of Traditional Toys in Cultural Transmission in Kindergarten Education

As key carriers of traditional culture, traditional toys hold rich historical and cultural information. By playing with traditional toys, children can learn about and experience traditional culture, enhancing their sense of cultural identity and pride. For example, playing with clay figurines helps children understand the crafting techniques and artistic value, experiencing the unique charm of traditional craftsmanship; flying kites helps children understand the history and cultural background of kites, and enjoy the crafting and flying process.

The unique cultural connotations and artistic value of traditional toys effectively cultivate children's cultural literacy. For example, playing with tangrams allows children to appreciate ancient mathematical wisdom and creativity, fostering logical thinking and spatial imagination; playing with rattles lets children understand traditional music rhythms, fostering their musical interest and sense of rhythm.

Traditional toys are also extensively applied in cultural activities in kindergartens, promoting cultural exchange through toy-making and display activities. For example, organizing kite-making and flying activities helps children understand the history and cultural background of kites, and enjoy the crafting process; organizing clay figurine making and display activities allows children to understand the crafting techniques and artistic value of clay figurines, fostering aesthetic appreciation and cultural identity.

3.3 Innovation Paths for Traditional Toys in Kindergarten Education

Design innovation of traditional toys is a crucial path for their application in kindergarten education. Incorporating modern design concepts and technologies can make traditional toys more appealing to contemporary children. For example, adding modern technological elements like electronic components and sensors can make traditional toys more intelligent and interactive; innovating in shape and color design can make them more appealing to modern children's aesthetics and psychological needs.

Educational innovation of traditional toys is another significant path for their application in kindergarten education. By integrating traditional toys with modern educational concepts and methods, they can play a larger role in kindergarten education. For example, combining traditional toys with multiple intelligences theory can create teaching activities suitable for different types of intelligence; combining traditional toys with inquiry-based learning can design child-centered inquiry activities to foster exploratory spirit and innovation capacity.

Activity innovation of traditional toys is yet another important path for their application in kindergarten education. Designing and organizing diverse traditional toy activities can facilitate learning through play. For example, organizing traditional toy-making and display activities allows children to understand and experience traditional culture while crafting and displaying; organizing traditional toy competitions and games lets children develop physical fitness, intelligence, emotions, and social skills through play.

4. INNOVATION STRATEGIES FOR TRADITIONAL TOYS IN KINDERGARTEN EDUCATION

4.1 Concepts and Methods for Designing Innovative Traditional Toys

Innovative design of traditional toys should preserve cultural essence while incorporating modern design concepts and technology. For example, innovating in shape and color design can make them more appealing to modern children's aesthetics and psychological needs; adding modern technological elements like electronic components and sensors can make traditional toys more intelligent and interactive.

Innovative design should also incorporate modern materials that are environmentally friendly, safe, and durable, making traditional toys more suitable for modern children’s needs and safety standards. Additionally, integrating modern educational concepts and methods can create toys suitable for different types of intelligence and child-centered inquiry activities, fostering exploratory spirit and innovation capacity.

4.2 Integration of Traditional Toys with Modern Educational Concepts

The theory of multiple intelligences posits that each child possesses various types of intelligence. Traditional toys can serve as important tools for cultivating multiple

intelligences. For example, tangrams can develop logical-mathematical and spatial intelligences; rattles can develop musical and bodily-kinesthetic intelligences; making clay figurines can cultivate naturalistic and artistic intelligences.

Inquiry-based learning emphasizes child-centered knowledge and skill acquisition through exploration and discovery. Traditional toys can be important tools for inquiry-based learning. For example, playing with tangrams can help children discover geometric patterns and spatial relationships; making kites can help children understand principles of aerodynamics and handcraft skills.

Game-based learning promotes learning through play, emphasizing learning while playing and playing while learning. Traditional toys can be key tools for game-based learning. For example, playing with building blocks can help children learn colors and shapes, enhancing spatial imagination and creativity; playing with dolls can promote emotional communication and social development.

4.3 Innovative Practices of Traditional Toys in Kindergarten Education

Traditional toy-making and display activities are crucial innovative practices in kindergarten education. Organizing such activities lets children understand and experience traditional culture, enhancing hands-on skills and artistic interests. For example, organizing kite-making and flying activities allows children to learn about the history and culture of kites, and enjoy the crafting process; organizing clay figurine making and display activities lets children understand the crafting techniques and artistic value of clay figurines, fostering aesthetic appreciation and cultural identity.

Traditional toy competitions and games are another important innovative practice in kindergarten education. Organizing such activities lets children develop physical fitness, intelligence, emotions, and social skills. For example, organizing tangram puzzle competitions fosters logical thinking and spatial imagination; organizing rattle performance competitions fosters musical interest and sense of rhythm.

Combining traditional toys with modern technology is another significant innovative practice in kindergarten education. Introducing elements like electronic components and sensors can make traditional toys more intelligent and interactive, enhancing their educational value and appeal. Integrating virtual reality (VR) technology can create immersive experiences, allowing children to enjoy traditional toys' cultural connotations in a virtual environment.

5. SUGGESTIONS FOR CULTURAL TRANSMISSION AND INNOVATION OF TRADITIONAL TOYS IN KINDERGARTEN EDUCATION

5.1 Enhancing Design Innovation of Traditional Toys

Design innovation should preserve the cultural essence of traditional toys while incorporating modern technology and theories of child psychological development. By introducing modern design thinking, combining traditional elements with contemporary children's interests, toys can be designed to be both contemporary and traditionally charming. For instance, adding 3D visual effects or digital interactive elements to traditional wooden puzzles can enhance their functionality and appeal.

Cross-disciplinary collaboration should be strengthened, utilizing research from fields like educational psychology and child development. For example, applying cognitive science in toy design by adjusting details such as color, shape, and material to optimize children's learning experiences. Emerging technologies like virtual reality (VR) and augmented reality (AR) can make traditional toys more interactive and immersive, letting children learn and perceive traditional culture through immersive experiences.

5.2 Improving Teachers' Cultural Literacy

Teachers are crucial for the successful application of traditional toys in kindergarten education. Enhancing their cultural literacy involves several measures:

Educational authorities should establish comprehensive cultural training systems, offering systematic training courses on traditional culture and toys for kindergarten teachers. Combining practical and theoretical

training helps teachers deeply understand the cultural connotations, historical backgrounds, and educational values of traditional toys.

Teacher certification and evaluation should include assessments of traditional cultural knowledge and application abilities. Ensuring teachers can integrate traditional culture into actual teaching activities is crucial. Teachers should be adept at designing and conducting diverse traditional toy teaching activities, guiding children in experiencing and understanding traditional culture through play. Encouraging teachers to participate in field studies and gain hands-on experience in traditional crafts increases their practical understanding of traditional toys. Interaction with folk artists and cultural inheritors can deepen teachers' insights into traditional toys' stories and cultural connotations, enriching their teaching resources.

5.3 Promoting Family and Social Participation

Families and society play indispensable roles in the cultural transmission and innovation of traditional toys. Promoting their application in kindergarten education requires collective family and societal participation.

Families are children's first classrooms, and parents play a significant role in cultural transmission. Kindergartens should enhance cooperation with families, using activities like parent-teacher meetings and parent-child events to communicate the educational value and cultural connotations of traditional toys. Encouraging parents to play traditional toys at home fosters family education that complements kindergarten education. For example, inviting folk artists to parent-teacher meetings to demonstrate and explain traditional toy-making processes can allow parents and children to experience crafting together, strengthening family bonds and cultural transmission.

Society should offer greater support to promote cultural transmission and innovation of traditional toys. Government and educational departments should increase investment in traditional cultural education, providing policy and financial support for research and promotion of traditional toys suited to modern educational needs. Social organizations and enterprises should actively participate as well. Cultural institutions, museums, and intangible cultural heritage bases can collaborate with kindergartens to host traditional toy exhibitions and crafting activities, educating children and parents about traditional toys and enhancing their cultural identity and pride.

Communities, as important daily living spaces for children, are also vital for promoting cultural education. Utilizing community resources and convenient locations to organize varied traditional toy activities, such as annual toy exhibitions and workshops, can offer children continuous cultural immersion right in their neighborhoods.

6. CONCLUSION

The cultural transmission and innovation of traditional toys in kindergarten education are not just educational strategies but cultural missions. By enhancing design innovation, improving teachers' cultural literacy, and promoting family and societal participation, traditional toys can gain new vitality in modern education, becoming crucial bridges for children's development and cultural transmission.

In the new era, traditional toys are more than simple entertainment tools; they are connectors between past and future, family and society, culture and education. Leveraging modern technology and innovative concepts, traditional toys will re-enter children's lives, helping them learn and experience the unique charm of traditional culture through joyful play.

With collective efforts, traditional toys can play a larger role in modern kindergarten education, aiding children's holistic development, promoting cultural transmission and innovation, and enhancing cultural confidence and consciousness. Only by doing so can traditional toys become crucial elements of contemporary cultural education, continuously revitalizing with infinite innovation and educational value.

REFERENCES

[1] Cao Xiaoxiao. Interactive Expansion and Innovative Application of Traditional Games in Modern Children's Toy Design [D]. Zhejiang University, 2013.

[2] Zhang Huihui. On the Inheritance and Innovation of Traditional Folk Toy Rattles after Bamboo Material Redesign [J].

Tiangong, 2021(7):2. DOI:10.3969/j.issn.2095-7556.2021.07.049.
[3] Zeng Bin, Zheng Jing. Dynamic Inheritance and Innovative Application of Traditional Decorative Patterns in Toy Design [J]. Toy World, 2022(6):51-55.
[4] Gu Yanyun. Research on the Innovative Design of Infant Musical Toys Based on Traditional Musical Instruments [J]. Toy World, 2023(1):29-31.
[5] Guo Yaping. Fun with Tangram to Inherit Filial Piety Culture: A Brief Study on the Integration of Grade One Tangram Teaching and Filial Piety Culture [J]. Education World: Basic Education, 2019(2):3. DOI:10.3969/j.issn.1674-9510.2019.08.085.
[6] Shi Jingrong. Cultural Memory and Inheritance of Wooden Puzzles [J]. Future Fashion, 2021(15):173-175.
[7] Li Yimei. Research on the Redesign of Traditional Toys in Old Beijing [J]. National Business, 2015(36):2. DOI:CNKI:SUN:QGSQ.0.2015-18-013.
[8] Gao Mingfei. Cultural Memory and Meme Inheritance of Traditional Toys [J]. Design, 2018(21):3. DOI:CNKI:SUN:SJTY.0.2018-21-042.
[9] Zhang Xiaole. Feasibility Study on the Inheritance and Innovation of Tancheng Wood-Turning Toys [J]. 2020. DOI:10.12294/j.1673-0992.0205.00.196.
[10] Qian Jia. Research and Application of Traditional Agricultural Tools in the Redesign of Children's Toys [D]. Zhejiang Sci-Tech University, 2020.
[11] Li Tao, Li Yang. Research on the Design of Clay Toys as Tourism Souvenirs [J]. Popular Culture and Art: Scientific Education Research, 2016, 000(021):P.93-93.
[12] Chen Xiaolu. Inheritance and Innovation of Traditional Culture in Modern Parent-Child Toys—Design of Parent-Child Toys [J]. Art and Technology, 2019(12):2. DOI:CNKI:SUN:YSKK.0.2019-12-103.
[13] Tan Huiyang, Kong Yi. Research on the Innovative Application of Regional Culture in Toy Product Design [J]. Toy World, 2023(6):63-66.

Exploring the Confucian and Commercial Culture of a Century Old Commercial Port

Yuqi Feng*
Zibo Vocational Institute, Zibo, Accounting School, Shandong, China
*Corresponding Author. E-mail: 61608739@qq. com

Abstract: Since its official opening in 1904, Zhoucun Commercial Port has a history of over a hundred years. As the birthplace of Lu merchants, the business model and philosophy of Zhoucun Commercial Port have been deeply influenced by Confucianism, forming its own unique Confucian merchant culture. This article explores the unique Confucian merchant culture of Zhoucun Commercial Port in depth, analyzes historical data and related cases, studies its historical development, business philosophy, and social influence, reveals the key role of Confucian merchant culture in the formation and prosperity of Zhoucun Commercial Port, and provides reference for inheriting and promoting this valuable cultural heritage.
Keywords: Zhoucun Commercial Port; Commercial Operations; Confucian merchant culture

1. PREFACE

Zhoucun Commercial Port, located in the central part of the Qilu region, has become the birthplace of Lu merchants due to its unique history, commercial heritage, and cultural integration. It inherits the spirit of Lu merchants of "honesty, integrity, openness, and inclusiveness" and creates the prosperous scene described by Pu Songling as "during the Kangxi Yihai period, Zhoucun merchants and merchants gathered together, and those who took advantage of the market gathered with cars and horses. " Emperor Qianlong passed by Zhoucun and was surprised by the prosperous trade here, praising it as the "number one village in the world". the reason why the Lu merchants, represented by Zhoucun Commercial Port, were able to create a prosperous and prosperous situation was deeply influenced by Confucianism, absorbing the essence of Confucianism and commercial wisdom, and forming the unique Confucian merchant culture of the Lu merchant group.

The Confucian philosophy, also born in the land of Qilu, is represented by its classic work "The Analects", which has had a huge impact on Chinese society from ancient times to the present day. Its content covers a wide range of topics, and the evaluation given by Northern Song Dynasty politicians of "governing the world with half of the Analects" has been widely circulated, demonstrating the profound achievements and influence of "The Analects" in management.

2. THE RISE AND DEVELOPMENT OF ZHOUCUN COMMERCIAL PORT

Zhoucun Commercial Port is said to be a century old commercial port, but it is only counted from the official opening of the port. In fact, Zhoucun, formerly known as Yuling City of Qi State, has been an important silk textile center since the Shang Dynasty, and is known as the "hometown of silk". Since the Han and Tang dynasties, it has become an important source of the famous Silk Road. In the third year of the Tianqi reign of the Ming Dynasty (1623), Zhoucun began to have shops selling wool, leather, cotton, and other commodities, and the trading of other goods gradually increased. In the middle and late Ming Dynasty, Zhoucun rapidly rose to power. In the early Qing Dynasty, Li Huaxi, a native of Zhoucun, resigned from his official position and returned to his hometown to pay market taxes on behalf of the local merchants and people, making Zhoucun the first "tax-free zone" in Chinese history. Due to the attraction of tax exemption, merchants from all over the country came to do business and open shops, gradually forming a well-known commercial center in the country. During the Qianlong

period of the Qing Dynasty, Zhoucun was awarded the title of "the first village in the world" by the imperial court. In the mid Qing Dynasty, the Meng family led by Meng Luochuan successively opened eight "Xiang" brand names here, selling goods such as groceries, tea, cloth, silk, etc. Among them, "Wan Fuxiang" was the predecessor of the famous "Rui Fuxiang" in later generations. Establishing more than 80 banks and bank accounts, along with more than 10 ticket banks opened by Shanxi merchants in Zhoucun, has facilitated the exchange of payments between local and non local businesses.

In 1904, the Jiaoji Railway was opened to traffic, and Zhoucun, Jinan, and Weixian were simultaneously opened up as commercial ports by the Qing government. At this time, Zhoucun had nearly 2000 shops, earning a daily fortune and earning the reputation of a "dock on land". Before and after the opening of Zhoucun Port, four major mechanical silk mills emerged: Hengxingde, Yuhoutang, Tongfeng, and Yuanfeng, which were the earliest and largest modern enterprises in northern China. the great industrialist in the printing and dyeing industry, illiterate Chen Shouting (based on Chen Liting), and his large dyeing workshop started in Zhoucun. In the late period of the Republic of China, the Zhoucun commercial port gradually declined due to factors such as war, corrupt officials, and the transfer of commercial routes.

3. THE CONCEPT OF MANAGEMENT IN CONFUCIANISM

3.1 Businessmen should be based on honesty

Honesty is the fundamental principle of being a person and the way to interact with others. Confucius believed that "if a person lacks trust, they do not know what is right. " Honesty is the most basic quality of a person, the foundation of their social standing, and the criterion for interacting with others; Honesty is also the foundation of one's career. Confucius always advocated valuing righteousness over profit, but did not oppose obtaining economic benefits. Instead, he emphasized the need to obtain personal benefits in the correct way, that is, in accordance with "morality". Honesty and trustworthiness are one of the important standards of "morality".

3.2 The distinction between righteousness and profit in business

In Confucianism, there is a saying about "thinking of righteousness in the face of profit". "Righteousness" refers to moral standards and principles, which are behavioral principles that conform to social ethics and moral norms; "Benefit" mainly refers to material benefits, advantages, utilitarianism, etc. the proposition is that when facing interests, the first consideration should be whether it conforms to morality. If it conforms to morality, it can be accepted, otherwise it should not be taken as one's own. Businessmen should not ignore the principles of morality and justice when pursuing personal interests, otherwise even if they gain benefits, they will not be recognized by others and society.

3.3 Harmony brings wealth

"Harmony brings wealth" originates from the Analects of Confucius, which states that "harmony is precious in the use of etiquette". Here, "harmony" refers to the coordination and harmony of relationships between people under the norms of etiquette. People follow the norms of etiquette, respect and tolerate each other, and thus create a harmonious atmosphere. In commercial activities, both parties adhere to the concept of "harmony" and communicate and negotiate in a harmonious manner, following certain business rules and ethical principles. In a harmonious trading atmosphere, the transaction can definitely be facilitated and bring economic benefits to both parties.

3.4 Continuous learning and innovation

Confucianism contains rich ideas of learning and practical innovation, believing that "learning" is a process of cognition, "learning" is a process of consolidation, and "learning" and "studying" should be unified; Learning not only requires "learning" theories and ideas, but also putting what has been learned into action, applying it to practice, and constantly innovating; the phrase "not ashamed to ask" conveys Confucius' open learning attitude, humbly seeking advice from others and constantly improving himself. In business management, managers should be good at listening to the opinions and suggestions of

subordinates, drawing on the excellent management experience of others, and continuously learning and updating business management concepts and methods in management practice.

4. THE EMBODIMENT OF THE CONFUCIAN MERCHANT CULTURE IN ZHOUCUN COMMERCIAL PORT

4.1 Classic case of honest management

At the beginning of its establishment in Zhoucun, Ruifuxiang established the business philosophy of “sincerity first, genuine goods at fair prices, no discrimination, and no deception towards children or the elderly”. Ruifuxiang 's owner Meng Luochuan designed a special ruler, which is one inch longer than the standard market ruler and is known as the“conscience ruler”by the people. Before the shop assistants go to the counter every day, the shopkeeper always gives a warning: “When you go to the counter, the ruler in your hand is engraved with the sky and the earth, and the conscience of heaven and earth is in your hand. ” Although it may seem like the cloth merchant lost an inch per ruler, in reality, they earned an inch of conscience per ruler. Today, giving customers an extra inch will increase their reputation tomorrow. With this honest business philosophy, Ruifuxiang's business in Zhoucun and many other parts of the country has been able to develop and thrive for a long time.

In the middle of the Ming Dynasty, merchants from Zhoucun gathered and various snacks emerged in response to the times. After several improvements, Zhoucun sesame seed cake has finally become famous for its unique flavor of thin, fragrant, crisp and crisp, and has been included in the national intangible cultural heritage list. Wang Chunhua, the national inheritor of Zhoucun sesame seed cake making skill, has learned how to make Zhoucun sesame seed cake from her master since she was 16 years old. She said that the most common saying of the master believers was “thin is Zhoucun sesame seed cake, thick is conscience”. Thin is the pursuit of production technology. One jin of flour can produce 60 Zhoucun sesame seed cake, each with a diameter of about 13cm. There are about 2000 sesame seeds on the Zhoucun sesame seed cake. the Zhoucun sesame seed cake made are as thin as paper, fragrant, and shatter on the ground. the entrance is loud. Thick is the guarantee for the quality of Zhoucun sesame seed cake. There are nine processes in the production of Zhoucun sesame seed cake. In addition to the machines used for dough mixing and packaging, the key processes must be completed manually by traditional old techniques. Zhoucun sesame seed cake inherits the idea of being a good person beforehand, as long as you do it well, jobs will be fine along the way.

The Confucian merchant culture of Zhoucun commercial port is deeply baptized by Confucianism. Whether it is the unique business purpose of Ruifuxiang or the spiritual concept of Zhoucun sesame seed cake inheritance, it shows that businessmen in commercial activities follow the principle of honesty, establish various trading relationships, and regard reputation as the life of businessmen.

4.2 Successful Practice of Balancing Righteousness and Benefit

During the Spring and Autumn Period and the Warring States Period, Fan Li went incognito and traveled to the state of Qi for business. When he arrived at Zhoucun, he found that the people here used their eyes to estimate the weight of things they bought and sold, making it difficult to achieve fair trade. Fan Li was inspired by the process of farmers fetching water from wells and created China's first “scale”. Since then, there have been tools for measuring the weight of goods in the market, and the emergence of scales has made the trading of goods fair and reasonable. However, Fan Li gradually discovered that there are always speculative merchants who are short of weight for customers. So he cleverly borrowed people's reverence for heaven and earth and remade the scales. There are a total of 16 stars on the scale, namely the Big Dipper, which symbolizes “earth”, the Southern Dipper, which symbolizes “heaven”, and the Three Stars, which symbolize “fortune, wealth, and longevity”. If there is a shortage of one liang in weight for customers, there will be a shortage of fortune; if there is a shortage of two liang, there will be a shortage of wealth; if there is a shortage of three liang, there will be a shortage of longevity, this is a good moral constraint for the merchants in Zhoucun

commercial port. For hundreds of years, the merchants of Zhoucun Commercial Port have established their businesses with virtue. “Virtue” first emphasizes honesty and integrity, and then benefits from righteousness. There are gods on a scale of three feet in heaven and earth. Only by following the rules of management openly and honestly can business be done for a long time.

Fan Li's creation of the scale not only established rules for the development of commercial activities, but also established the business ethics of “gentlemen love wealth and take it wisely” for future generations. During Fan Li's business career, he became a millionaire three times, served the country and the people three times, and squandered his wealth, becoming a role model for all businessmen.

In the Boxer Rebellion of 1900, a large fire destroyed thousands of households in the area of grand fence at QIAN MEN BEIJING. the silk fabrics and transaction records stored in the Shandong Ruifuxiang branch located here were all reduced to ashes. As soon as the fire was extinguished, Meng Luochuan, the head of Ruifuxiang, was the first to set up tents and wooden boards on the ruins, announcing the resumption of operations. At the same time, he also posted a notice: “All the money owed by our store to customers will be returned, and all the money owed by customers to our store will be written off. Our store will never close!” Meng Luochuan's repeated losses have sparked discussions among surrounding customers: how can we repay others' money without recovering our own debts? Meng Luochuan is simply a fool! Afterwards, Meng Luochuan, who took the initiative to benefit customers, quickly received unexpected rewards—those customers who owed money to Ruifuxiang were all grateful and introduced their relatives and friends to Ruifuxiang for business, becoming loyal customers of Ruifuxiang. Perhaps the answer to Meng Luochuan's business methods can be found in the four words he once said: “Big business has no calculation!” the so-called “big business has no calculation” means that the grand business path emphasizes commercial values, thinking of righteousness and not calculating how to deceive others or take advantage of the situation. “Taking morality as the foundation, righteousness as the priority, and righteousness for profit ”is Meng Luochuan's way of doing business, and it is also the fundamental reason why he eventually became a great merchant and Ruifuxiang developed into a well-known Chinese time-honored brand both at home and abroad.

Businessmen can balance morality and justice while pursuing commercial interests. They should not take unjust gains, and when there is a conflict between righteousness and profit, they should reasonably balance the relationship between righteousness and profit. From a long-term development perspective, they should adhere to the bottom line of business. Over the past 1000 years, although dynasties have changed and the world has changed, the commercial and Confucian cultures that were nurtured in the land of Qilu have converged and blended in Zhoucun, nourishing this land.

4.3 Creating a harmonious business environment

Since the opening of Zhoucun Commercial Port in 1904, merchants from all over the country have flocked to it, and foreign-funded enterprises have also settled in. In order to maintain normal market order in the commercial port, chambers of commerce have played an important role. Previous presidents and members of the Chamber of Commerce have been appointed by knowledgeable, experienced, and highly respected individuals in the commercial port. the Chamber of Commerce is responsible for formulating industry standards and self-discipline guidelines, requiring all members in the commercial port to strictly abide by them to ensure fair competition. the Chamber of Commerce takes the lead in organizing merchants to jointly respond to external competition, promote cooperation and unity among merchants, and coordinate and organize merchants to negotiate and jointly formulate response strategies when facing market risks and fluctuations, in order to avoid vicious competition within merchants. While protecting the interests of old members, the Chamber of Commerce also actively supports new members. In the early stages of opening new shops, if they encounter difficulties, nearby old merchants will actively share their experiences to help them overcome the

difficulties smoothly, reflecting the friendly and mutual assistance business atmosphere of Zhoucun Commercial Port. the Chamber of Commerce in Zhoucun Commercial Port played an important role in coordinating business relationships and resolving commercial disputes, creating a harmonious and prosperous business environment in Zhoucun Commercial Port, and promoting its long-term stable development.

4.4 Maintain learning and innovation

The owner of the "Da Ran Fang"—Chen Shouting, who grew up from a beggar to a national entrepreneur, although illiterate, had Lu Jiaju read newspapers for him every day to understand the political and economic situation, grasp industry trends and new technologies, and use them to guide his business activities. This is a targeted learning approach, achieving the goal of "learning and adapting to the times". From a beggar to being able to control machines for printing and dyeing fabrics, machines were achieved on the basis of manual operation. Chen Shouting is familiar with manual skills, so it is easy to operate machines, which reflects his diligence, eagerness to learn, and exceptional intelligence. When he started his business in Zhoucun, he optimized the processing of the raw fabric before dyeing, so that the same raw fabric could be dyed better in his dyeing workshop than in others. Based on the traditional dyeing process, he improved the dye formula, dyeing process, temperature control, and other aspects, making the dyed fabric brighter, more durable, less prone to fading, and effectively controlling costs, attracting a large number of customers. When competing with the Lin family in Shanghai, he recruited some senior technicians from the Lin family with high salaries and obtained new dyeing and weaving techniques for floral fabrics. He then innovatively designed floral patterns and introduced a series of novel styles and colors, gaining greater strength in the market to compete with the Lin family. Chen Shouting's experience is a combination of practical work and learning, continuous practice and innovation, which is the secret to his success.

5. CONCLUSION

The reason why Zhoucun Commercial Port can stand for a hundred or even a thousand years is due to the transmission of Confucian merchant culture from generation to generation. Confucian merchant culture was formed under the influence of Confucianism and is the embodiment of Confucianism in the commercial field. the Confucian merchant culture of a century old commercial port is a perfect combination of excellent traditional Chinese culture and commercial practice, which still has important inspiration and reference significance for today's commercial activities.

PROJECT OF THE SUBJECT

Key Project of Art and Science in Shandong Province "Research on the Commercial Operations of Zhoucun Commercial Port from the Perspective of the Analects" (Number: 24ZZ20016624).

REFERENCES:

[1] Yang Bojun. Translation of Analect [M], Zhong Hua Book Company, 2017.

[2] Xu Tan. Commerce in Zhoucun Town, Shandong Province during the Qing Dynasty [J]. Historical Monthly, August 2007.

[3] The 11th Committee of Zhoucun District of the Chinese People's Political Consultative Conference, Zhoucun, a Century old Commercial Port [C], Qinghai People's Publishing House, 2004.

[4] Meng Xianjie, Zhai Bocheng. The Management Thought and Historical Evidence Analysis of Meng's "Xiang" Brand [J]. Shandong Social Sciences, October 2004.

Exploring Student Management Methods for Counselors in Higher Vocational Colleges Under New Circumstances

Junfeng Bai
School of Electronic and Electrical Engineering, Zibo Vocational Institute, Zibo City, Shandong Province, China

Abstract: This study aims to explore the methods and strategies for student management by counselors in higher vocational colleges under new circumstances. With the rapid development of the social economy and the popularization of higher education, student management in vocational colleges faces new challenges and opportunities. As the core force in student management, the innovation and optimization of counselors' work methods and strategies are crucial. Through literature review and theoretical analysis, this study systematically reviews research on student management by counselors in higher vocational colleges, incorporating current social issues and the spirit of the National People's Congress and the Chinese People's Political Consultative Conference. New approaches and methods for student management in vocational colleges are proposed. Initially, the roles and functions of counselors in vocational colleges are reexamined, emphasizing their importance in ideological and political education, mental health education, and career guidance. The study then analyzes current issues and challenges in student management, such as diverse student ideologies, prominent mental health issues, and employment pressures. Finally, innovative management methods and strategies are proposed, drawing on advanced domestic and international student management concepts and practices. These include the construction of a comprehensive "Three-Whole Education" system, enhancing the professional development of counselors, and leveraging information technology to improve management efficiency and effectiveness. The results indicate that counselors in vocational colleges under new circumstances need to continuously improve their professional skills and management capabilities, actively address new challenges, and innovate management methods and concepts to enhance the effectiveness of student management. This provides strong support for cultivating highly-skilled talents.

Keywords: Higher Vocational Colleges; Counselors; Student Management; Ideological and Political Education; Mental Health Education

1. INTRODUCTION

1.1 Research Background and Significance

With the rapid development of the social economy and the popularization of higher education, vocational colleges play an increasingly vital role in cultivating high-quality skilled talents. The student management work in these colleges faces new challenges and opportunities. As the core force in student management, the innovation and optimization of counselors' methods and strategies are crucial. In recent years, the country has placed greater emphasis on vocational education, issuing a series of policy documents aimed at improving its quality and level. In this context, researching the methods for student management by counselors in vocational colleges under new circumstances holds significant theoretical and practical importance.

1.2 Review of Domestic and International Research

Scholars at home and abroad have extensively studied the student management work of counselors in vocational colleges. Domestic research primarily focuses on the role orientation, functions, and methods of counselors. Liang Wenjing (2020) pointed out that counselors need to participate actively in students' ideological and political education,

mental health care, and help them adapt to the changing environment. Yang Meng (2019) emphasized that daily management should integrate ideological and political education to subtly influence students' thoughts and behaviors. International research emphasizes the professionalization and systematization of student affairs management. Liu Zheling (2017) compared the professional and systematic student affairs management in foreign universities, noting that counselors abroad typically have relevant professional backgrounds and qualifications, making their work more professional and systematic.

1.3 Research Objectives and Methods

This study aims to explore the methods and strategies for student management by counselors in vocational colleges under new circumstances. By reviewing literature and conducting theoretical analysis, this research systematically examines relevant studies on student management by counselors in vocational colleges, incorporating current social issues and the spirit of the National People's Congress and the Chinese People's Political Consultative Conference. It proposes new ideas and methods for student management in vocational colleges under new circumstances. The study reexamines the role orientation and functions of counselors, analyzes existing issues and challenges in student management, and proposes innovative management methods and strategies.

2. ROLE ORIENTATION AND FUNCTIONS OF COUNSELORS IN VOCATIONAL COLLEGES

2.1 Role Orientation of Counselors

In vocational colleges, the role of counselors is multifaceted, including being managers, educators, service providers, and guides. Counselors need to manage students' daily behavior and discipline, focus on ideological and political education, mental health education, and career guidance. Their role orientation directly influences the selection and implementation of their work methods and strategies.

As managers, counselors are responsible for daily behavior norms, discipline management, and safety education. As educators, they handle students' ideological and political education and mental health education. As service providers, they cater to students' living needs and learning difficulties. As guides, they assist with career planning and employment guidance.

2.2 Main Functions of Counselors

The main functions of counselors include ideological and political education, mental health education, student affairs management, and career planning guidance. Counselors need to continuously improve their professional skills and management capabilities to effectively face new challenges through innovative methods and concepts.

In ideological and political education, counselors guide students to establish correct worldviews, values, and life views through various educational activities. In mental health education, they address students' psychological issues through counseling, health lectures, and assessments. In student affairs management, they oversee daily behavior norms and discipline to maintain campus harmony. In career planning guidance, counselors assist students in understanding career trends and market demands to enhance their employability.

3. CHALLENGES IN STUDENT MANAGEMENT WORK IN VOCATIONAL COLLEGES UNDER NEW CIRCUMSTANCES

3.1 Diverse Student Ideologies

With rapid social development and the spread of information technology, students' ideologies and values have become more diverse, presenting new challenges for student management. Counselors need to respect students' individuality and diversity in ideological education, tailoring their teaching to help students establish correct worldviews, values, and life views.

Students' diverse ideologies manifest in varied value systems, behaviors, and changing thoughts influenced by different environments. Counselors must guide students to form correct values, foster good behavior habits, and address ideological issues by understanding and analyzing students' thoughts.

3.2 Prominent Mental Health Issues

Increased social competition and life pressures have led to more prominent mental health issues among students. Counselors must

closely monitor and address these problems, helping students build healthy mindsets.

Students face substantial academic pressures, interpersonal relationship challenges, and employment anxiety. Counselors need to alleviate academic stress, improve social skills, and provide career guidance to ease employment anxiety and enhance students' mental well-being.

3.3 Employment Pressure and Career Planning

Graduates from vocational colleges face significant employment pressure, making career planning and employment guidance essential. Counselors need to help students understand career trends and market demands, providing reasonable career planning to enhance employability and competitiveness.

Students' employment pressure stems from fierce market competition, unclear career plans, and asymmetric employment information. Counselors should offer career lectures, consultative guidance, and organize enterprise visits to help students understand the employment market and improve their competitive edge.

4. EXPLORING STUDENT MANAGEMENT METHODS FOR COUNSELORS IN VOCATIONAL COLLEGES UNDER NEW CIRCUMSTANCES

4.1 Methods for Ideological and Political Education

Counselors need to innovate and optimize ideological and political education methods through activities that instill correct worldviews, values, and life views in students, enhancing their social responsibility and mission.

They can organize themed class meetings, lectures, and discussion forums on core socialist values, patriotism, and social responsibilities, and involve students in social practice activities like volunteering, which instills correct ideological concepts.

4.2 Strategies for Mental Health Education

Counselors should innovate and optimize mental health education strategies through diverse activities to help students build healthy mindsets and improve psychological quality.

Strategies include offering psychological counseling, health lectures, and assessments to address psychological issues and stresses, thereby enhancing students' mental resilience.

4.3 Career Planning and Employment Guidance

Counselors need to innovate and optimize career planning and employment guidance through various activities, helping students understand career trends and market needs, and providing practical career planning.

They can conduct career planning lectures, offer employment guidance consultations, and organize enterprise visits to help students understand market demands and enhance their employability.

5. INNOVATIVE MANAGEMENT METHODS AND STRATEGIES

5.1 Constructing a "Three-Whole Education" System

Counselors should construct a comprehensive "Three-Whole Education" system involving all staff, throughout the entire process, and covering all aspects, to enhance the effectiveness of student management.

5.2 Professionalization and Vocational Training for Counselors

Counselors need to continuously improve their professional and vocational skills through specialized training, academic exchanges, and professional certifications to adapt to modern educational environments.

5.3 Application of Information Technology in Student Management

Counselors should leverage information technology to enhance the efficiency and effectiveness of student management, using tools like student management systems, psychological assessment systems, and career guidance systems.

6. CONCLUSION AND OUTLOOK

6.1 Research Conclusions

This study systematically reviews the domestic and international research on student management by counselors in vocational colleges and proposes new ideas and methods under new circumstances. The findings suggest that counselors need to continuously improve their professional skills and management abilities to effectively face new challenges, enhancing the effectiveness of student management and supporting the

cultivation of high-quality skilled talents.

6.2 Future Research Directions

Future research should explore specific practices and outcomes of student management by counselors in vocational colleges, analyzing the strengths and weaknesses of different methods, and studying the application of information technology to improve management efficiency and effectiveness.

REFERENCES

[1] Liang, W. (2020). Exploring Student Management Methods for Counselors in Vocational Colleges Under New Circumstances. Invention & Innovation: Vocational Education, 2020(3), 2.

[2] Yang, M. (2019). Exploring Daily Management Methods for Counselors in Vocational Colleges Under New Circumstances. Science Education Guide: Electronic Edition, 2019(25), 1.

[3] Liu, Z. (2017). Comparative Study on Professional and Systematic Student Affairs Management in Foreign Universities. Journal of Petrochemical Material Procurement, 2022(4).

[4] Ru, Q. (2021). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. DOI:10.12249/j.1005-4669.2021.12.245.

[5] Hu, M. (2024). Based on Two-Factor Theory: Analysis of Student Management in Vocational Colleges in Inner Mongolia. Inner Mongolia University. DOI:CNKI:CDMD:2.1019.812396.

[6] He, Y. (2012). Discussing Student Management Work by Counselors in Vocational Colleges Under New Circumstances. Modern Communication, 2012(8), 2. DOI:CNKI:SUN:XKJJ.0.2012-08-132.

[7] Zhang, Y., & Zhu, Z. (2005). Strategies for Counselors' Management in Vocational Colleges. Education and Teaching, 2005(23), 17-18. DOI:CNKI:SUN:JYYR.0.2005-23-007.

[8] Lu, L. (2021). Exploring Student Management Methods for Counselors in Vocational Colleges Under New Circumstances. Knowledge Repository, 2021(18), 181-183.

[9] Zhai, S. (2019). New Methods of Ideological and Political Education for Counselors in Vocational Colleges Under New Circumstances. Economic and Social Development Research, 2019(14), 1.

[10] Song, W. (2014). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. Journal of Changchun Finance College, 2014(2), 3. DOI:10.3969/j.issn.1671-6671.2014.02.023.

[11] Liu, Z. (2017). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. New Campus: Upper Edition, 2017(4), 1.

[12] Liu, J. (2018). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. Journal of Jiamusi Vocational College, 2018(2), 1. DOI:CNKI:SUN:JMSJ.0.2018-02-159.

[13] He, Y. (2012). Discussing Student Management Work by Counselors in Vocational Colleges Under New Circumstances. Modern Communication, 2012. DOI:CNKI:SUN:XKJJ.0.2012-08-132.

[14] Wang, N. (2021). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. Journal of Education Science Development, 3(11), 213-215. DOI:10.12346/sde.v3i11.4782.

[15] Zhao, Y. (2021). Exploring Student Management Methods for Counselors in Universities Under New Circumstances. DOI:10.12252/j.issn.2096-627X.2021.01.014.

Research Progress on Heavy Metal Detection Technology in Food

Qing-yun Li
Zibo Vocational Institute, Shandong, Zibo 255314, China

Abstract: The safety of heavy metal residues in food is of great importance to food quality and safety management. This study provides a brief overview of heavy metal detection techniques in food, with a focus on rapid detection, atomic absorption, atomic fluorescence, ICP-MS, ICP-AES, and other detection techniques. Finally, the development prospects of heavy metal detection technology in the future were discussed.

Keywords: Food; Heavy metals; Testing technology

1. CURRENT SITUATION OF HEAVY METAL POLLUTION IN FOOD

In recent years, under the requirements of water, gas, and soil regulations, China's ecological environment has been greatly improved, and the soil of cultivated land where crops grow has been greatly improved. However, illegal dumping, illegal emissions from the smelting industry, and inadequate organized control have led to soil pollution, resulting in excessive heavy metals in food. In this context, it is necessary to identify the sources of heavy metals in food before it is circulated, and to make good use of detection technology to detect soil and food heavy metal pollution in a timely manner. Based on the heavy metal pollution situation, the sources of heavy metal pollution can be inferred for government management departments to refer to and take timely measures to ensure food safety before circulation [1].

2. RESEARCH ON HEAVY METAL DETECTION TECHNOLOGY

Progress in the Application of Biosensing Technology in Heavy Metal Detection in Food

The long-term accumulation of heavy metals in soil has a significant impact on the growth of crops and the production and growth of heavy metal residues each year. This article starts with the detection of heavy metal content in crops produced in farmland, and selects two aspects: soil elements and crop products. In agricultural land standards, the following metals are mainly monitored: cadmium, mercury, arsenic, lead, chromium, copper, nickel, and zinc. In food standards, the following metals are mainly monitored: lead, cadmium, mercury, arsenic, tin, nickel, and chromium [2].

2.1 X-ray Fluorescence Spectroscopy Analysis Method

X-ray fluorescence (XRF) spectroscopic analysis is a promising and promising detection technology for heavy metals in soil and agricultural products. the basic principle is to use X-rays as an excitation source to irradiate the sample to produce secondary characteristic X-rays (i. e. fluorescence) of the excited elements. the X-ray fluorescence meter is used to measure and record the frequency, energy, and intensity of the characteristic X-rays of the tested elements in the sample to qualitatively or quantitatively determine the composition of the sample [3].

2.2 Atomic absorption

Atomic absorption spectroscopy (AAS) is an analytical method that quantifies the content of the measured element based on the absorption intensity of the corresponding atomic resonance radiation lines in the ultraviolet and visible light ranges by the outer shell electrons of gaseous ground state atoms. It is a method for measuring the absorption of specific gaseous atoms by light radiation. In recent years, it has been widely used for the determination of heavy metal content in food. Compared with traditional chemical analysis methods, this method has the advantages of higher sensitivity and more accurate determination results [4].

He Peiwen et al. used atomic absorption spectroscopy to determine the content of cadmium, chromium, lead, arsenic, and mercury in nine traditional Chinese medicinal

materials, including Panax notoginseng, Pueraria lobata, Polygonum cuspidatum, Salvia miltiorrhiza, Chuanxiong, Angelica sinensis, Coptis chinensis, Rheum palmatum, and Sophora flavescens. the experiment showed that this method has the advantages of speed, low interference, and high precision, and can basically meet the determination of heavy metal content in Chinese medicinal materials. Zhang Hui et al. used nitric acid perchloric acid to digest vegetable samples and determined iron, manganese, and copper in vegetables using flame atomic absorption spectroscopy, and lead and cadmium in vegetables using graphite furnace atomic absorption spectroscopy. This method has the advantages of simple operation and high degree of instrument automation. Yu Lei et al. treated the sample with concentrated nitric acid hydrogen peroxide and used flame atomic absorption spectroscopy to determine five trace elements, Fe, Cu, Ca, Mn, and Zn, in tea. Graphite furnace atomic absorption spectroscopy was used to determine Pb and Cd in tea. the experimental results showed that this method has good precision and is simple and convenient, suitable for determining trace metal elements in tea.

Atomic absorption spectroscopy is the most commonly used method for detecting heavy metals in food, therefore its detection technology has also developed quite maturely and is easy to operate. It has a wide range of applications in various fields such as geology, metallurgy, machinery, chemical engineering, agriculture, food, light industry, biomedicine, environmental protection, and materials science. It is mainly suitable for the analysis of trace and ultra trace components in samples, with advantages such as high sensitivity and accuracy. However, its disadvantage is that it cannot simultaneously detect multiple elements, resulting in reduced efficiency and difficulty in detecting refractory and non-metallic elements.

2.3 Atomic Fluorescence

Atomic Fluorescence Spectroscopy (AFS) is a spectroscopic analysis technique that falls between Atomic Emission Spectroscopy (AES) and Atomic Absorption Spectroscopy (AAS). Its basic principle is that the ground state atoms (generally in a vapor state) absorb radiation of a specific frequency and are excited to a high energy state. During the excitation process, characteristic wavelengths of fluorescence are emitted in the form of light radiation. the advantage of this method is high sensitivity. Currently, it has detection limits for more than 20 elements, which is superior to atomic absorption spectroscopy and atomic emission spectroscopy. the spectral lines are simple and mainly used for the determination of metal elements. It can be used for the detection of trace metal elements in samples.

Wang Zhijia et al. used microwave digestion combined with atomic fluorescence spectroscopy to detect the contents of lead, mercury, arsenic, cadmium, and antimony in traditional Chinese medicinal materials, and conducted methodological investigations on the determination methods. the establishment of this method has changed the previous cumbersome process of using different methods to detect different elements. It is simple, fast, inexpensive, and has high sensitivity in detection results, achieving satisfactory results [5].

Xing Junbo et al. used wet digestion of samples and dual channel hydride generation atomic fluorescence spectrometry to simultaneously determine arsenic and mercury in food. This method has the advantages of simplicity, speed, and high sensitivity, providing a feasible method for determining the content of arsenic and mercury in eggs and egg products. Ye Huixuan et al. used a method of hydride generation wet digestion atomic fluorescence spectrometry to determine the contents of As, Hg, and Pb in three batches of Xiangge No. 1 samples at different harvesting periods. This method is fast, accurate, and simple, providing a reference for the rapid detection of trace heavy metals in other medicinal plants.

Atomic fluorescence spectroscopy is suitable for detecting heavy metal content in various fields such as metallurgy, geology, petroleum, agriculture, biomedicine, geochemistry, materials science, and environmental science. Its application range is quite wide, and its emission spectrum is simple, with higher sensitivity than atomic absorption spectroscopy and a wide linear range. It can simultaneously determine multiple elements and can be applied in rapid detection as well as trace and ultra trace heavy metals,

achieving satisfactory results. However, its determination of complex matrix samples is relatively difficult, prone to interference, and the experimental results are not accurate enough.

2.4 Inductively Coupled Plasma Mass Spectrometry (ICP-MS) Method

Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is a mass spectrometry based elemental analysis method that uses plasma as an ion source. It has many advantages such as low detection limit, high sensitivity, high accuracy, minimal interference, and the ability to perform isotope analysis. It has a wide linear range and can analyze almost all elements present on Earth. It is widely recognized as the most powerful trace and ultra trace inorganic element analysis technology and is widely used in food analysis and inspection.

Liu Weiming and others selected Sugar cane juice as the research object, and used inductively coupled plasma mass spectrometry to determine harmful heavy metals in Sugar cane juice. This method is simple, fast and accurate, and is suitable for the determination of trace heavy metals in Sugar cane juice. At the same time, it can provide technical reference for the analysis of samples with high organic matter, high sugar content and viscosity. Li Xiang et al. used inductively coupled plasma mass spectrometry to determine the blood and urine lead content of lead contaminated piglets, providing technical support for further exploring the relationship between lead exposure and human lead poisoning levels. Xia Yongjun and others established an inductively coupled plasma mass spectrometry method to quickly and accurately determine 18 elements in imported wine. the instrument using this method has a high degree of automation, greatly saving time and energy, and has the characteristics of high efficiency, speed, and accuracy, which is suitable for rapid detection.

Inductively coupled plasma mass spectrometry is suitable for the analysis of trace to trace elements in various drugs, especially for the determination of trace heavy metal elements. It can analyze almost all elements on Earth and will be further applied and developed in the future. It has the advantages of high sensitivity and fast speed, and can complete quantitative determination of dozens of elements in a few minutes. the spectral lines are simple, and it can also simultaneously determine multiple elements. However, the instrument is relatively expensive and the sample pretreatment is cumbersome [6].

2.5 Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) Method

Inductively coupled plasma atomic emission spectroscopy is a type of spectral analysis method that uses an inductively coupled plasma torch as the excitation light source. It is a new analytical technique derived from atomic emission spectroscopy. After the sample is processed into a solution, it is transformed into a fully sol by the super atomization device and introduced into the tube from the bottom. It is then sprayed into the plasma torch through the central quartz tube nozzle. When the sample aerosol enters the plasma flame, the vast majority immediately decomposes into excited atomic and ionic states. When these excited state particles are recovered to a stable ground state, they must release a certain amount of energy (manifested as a spectrum of a certain wavelength), measure the unique spectral lines and intensities of each element, and compare them with the standard solution to determine the type and content of elements contained in the sample. Due to its low detection limit, high precision, and the ability to simultaneously determine multiple elements, it has been widely used and rapidly developed [7].

Ye Run et al. established a method for determining eight elements, including copper, manganese, iron, zinc, calcium, magnesium, potassium, and sodium, in rice using microwave digestion inductively coupled plasma atomic emission spectrometry. the experimental results have high accuracy and precision. Lin Li et al. used microwave digestion inductively coupled plasma atomic emission spectroscopy to determine the total boron content in different foods, and selected and optimized the pre-treatment conditions and instrument parameters for microwave digestion samples. the results obtained by the experimental method are consistent with the standard or reference values. Guo Liping et al.

used microwave digestion pretreatment technology combined with inductively coupled plasma atomic emission spectroscopy to determine the content of five heavy metal elements cadmium, chromium, copper, lead, and zinc in tea. the digestion system used in the experiment is also a nitric acid hydrogen peroxide digestion system, which has the advantages of low detection limit, fast and simple operation.

Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) is suitable for the detection of heavy metals in various samples, and has also been widely used for the detection of heavy metals in samples such as stones and ores. From the above experiments, it can be concluded that this method has the advantages of high accuracy and precision, low detection limit, fast determination, and wide linear range. It can also simultaneously determine multiple elements, and its sensitivity is slightly lower than that of Inductively Coupled Plasma Mass Spectrometry (ICP-MS). the instrument price is also relatively expensive. the main drawback is that spectral interference signals are often accompanied by analysis signals, which may affect the accuracy of experimental results [8].

3. SUMMARY AND PROSPECT

Crops are more affected by the ecological environment before circulation, mainly from soil and atmospheric deposition, while sewage irrigation and the use of pesticides and fertilizers can cause long-term accumulation effects. Regular testing of soil and atmospheric dust deposition in crop production, especially in industrial parks, should be carried out. Compare annual data and conduct targeted management.

The sources of soil pollution in crops include industrial production, which requires collaboration among multiple departments. Rapid detection technology is still semi quantitative, with inaccurate metal content, limited support for data judgment, long processing time for traditional methods, and tedious preprocessing. These technologies need to be improved and perfected.

REFERENCES

[1] NASERI M, VAZIRZADEH A, KAZEMI R, *et al*. Concentration of some heavy metals in types available Shiraz market and human health risk assessmengt [J]. Food Chem, 2015, 175:243-248.

[2] ZHAO FJ, TANG Z, SONG JJ, *et al*. Toxic metals and metalloids: uptake, transport, detoxification, phytoremediation, and crop improvement for safer food [J]. Mol Plant, 2022, 15:27-44.

[3] WANG HQ, XUAN W, HUANG XY, *et al*. Cadmium inhibits lateral root emergence in rice by disrupting OsPIN-mediated anxin distribution and protective effect of $OsHMA_3$ [J]. Plant Cell Physiol, 2021, 62(1):166-177.

[4] TANG Z, WANG YJ, GAO AX, *et al*. Dimethylarsinic acid is the causal agent inducing rice straighthead disease [J]. J Exp Bot, 2020, 71(18):5631-5644.

[5] QIU KY, XING WQ, SCHECKEL KG, *et al*. Temporal and seasonal variations of As, Cd and Pb atmospheric deposition flux in the vicinity of lead smelters in Jiyuan, China [J]. Atmos Pollut Res, 2016, 7(1):170-179.

[6] TIAN L, SUN HY, DONG XL, *et al*. Effevts of swine wastewater irrigation on soil properties and accumulation of heavy metals and antibiotics [J]. J Soil Sediments, 2022, 22:889-904.

[7] CHEN D, YE XZ, JIANG YG, *et al*. Continuously applying compost for three years alleviated soil acidity and heavy metal bioavailability in a soil-asparagus lettuce system [J]. Plant Sci, 2022, 13:972789.

[8] GU BJ, JU XT, CHANG J, *et al*. Integreated reactive nitrogen budgets and future trends in China [J]. Proc Natl Acad Sci, 2015, 112(28):8792-8797.

Music Education and the Cultivation of Social Responsibility: A Theoretical Exploration

Gu Qingqian
Zibo Vocational Institute, Zibo, Shandong, 255300, China

Abstract: This study aims to explore the theoretical foundations and practical applications of music education in fostering social responsibility. By systematically reviewing related literature, the paper first analyzes the definition of social responsibility and its significance in modern education, especially under the guidance of the "Two Sessions" spirit, which elevates the importance of cultivating social responsibility. From the perspective of music education, the study examines how emotional resonance, aesthetic experience, and cultural heritage contribute to the development of students' social responsibility. The primary research method is literature analysis, synthesizing existing findings to reveal the unique role of music education in cultivating social responsibility. The research process includes a systematic review and analysis of relevant literature, focusing on the application of music education in different cultural contexts and its impact on fostering social responsibility. The results indicate that music education not only enhances students' artistic skills but also strengthens their social responsibility and participation through emotional education and value guidance. The paper concludes with recommendations for enhancing the cultivation of social responsibility in music education, including improvements in curriculum design, teaching methods, and evaluation systems. This study aims to provide theoretical support and practical guidance for educators, promoting the widespread application of music education in fostering social responsibility.

Keywords: Music Education; Social Responsibility; Emotional Resonance; Aesthetic Experience; Cultural Heritage

1. INTRODUCTION

1.1 Research Background and Significance

In today's rapidly globalizing and informatizing world, the cultivation of social responsibility has become a crucial topic in education. Social responsibility is essential not only as a reflection of personal moral qualities but also as a cornerstone for harmonious social development. Music education, with its unique ability to foster emotional resonance and aesthetic experience, effectively contributes to the development of students' social responsibility. Guided by the spirit of the "Two Sessions," the emphasis on cultivating social responsibility has reached new heights, and music education plays an indispensable role in this process.

1.2 Research Objectives and Questions

This study aims to explore the theoretical foundations and practical applications of music education in fostering social responsibility. Specific research questions include: How does music education promote the formation and development of social responsibility through emotional resonance, aesthetic experience, and cultural heritage? How is music education applied in different cultural contexts, and what impact does it have on cultivating social responsibility? How can the cultivation of social responsibility be further strengthened within music education?

1.3 Review of Domestic and International Research

Scholars both domestically and internationally have produced substantial research on social responsibility. Duan Zhiguang [1] discussed theoretical issues in social responsibility among college students, emphasizing the importance of a theoretical framework. Xiong Rong [2] examined educational practices and cultivation paths for social responsibility from a practical perspective. Wang Weihua [3] analyzed the reasons for the weakening of

social responsibility among college students and proposed countermeasures. Internationally, He Yingqi [7] analyzed responsibility and self-integration among college students from a psychological perspective, applying Erikson's theory in ethical analysis. Liang Fuzhen and Zou Meimei [11] explored the environmental education implications of Jonas's responsibility ethics, highlighting the importance of environmental education in cultivating responsibility. Chen Yingchun et al. [12] analyzed the development of student responsibility through educational, psychological, and sociological literature, advocating for interdisciplinary research methods. Chen Zhilie [13] explored the character education content and methods in the Paiwan Piuma tribe, underscoring the role of culture in cultivating responsibility.

2. THEORETICAL FOUNDATION OF SOCIAL RESPONSIBILITY

2.1 Definition and Connotation of Social Responsibility

Social responsibility refers to the awareness and behavior of individuals in bearing responsibilities and obligations towards others, the collective, and society in their social life. It includes recognition of social norms, concern for social issues, and participation in social welfare activities. Social responsibility is not only a reflection of individual moral qualities but also a cornerstone for harmonious social development. It requires individuals to balance personal interests with the overall well-being of society, actively participate in social affairs, and fulfill social obligations.

2.2 Importance of Social Responsibility in Education

Education is a crucial pathway for cultivating social responsibility. Through education, students can learn and understand social norms, develop concern and problem-solving abilities for social issues, and enhance social participation awareness and responsibility. In today's society, where environmental protection and social welfare are increasingly prioritized, the cultivation of social responsibility is particularly important. Education should not only impart knowledge and skills but also nurture students' sense of responsibility, turning them into responsible and accountable citizens.

3. THEORY AND PRACTICE OF MUSIC EDUCATION

3.1 Definition and Objectives of Music Education

Music education involves the transmission of musical activities and knowledge to cultivate students' musical literacy and aesthetic capabilities. Its objectives are not only to develop students' musical skills and knowledge but also to foster emotional resonance, aesthetic experience, and social responsibility through musical activities. By appreciating and performing musical works, students can emotionally resonate with the pieces, thereby cultivating their concern for social issues and problem-solving abilities.

3.2 Teaching Methods and Strategies in Music Education

Music education employs various teaching methods and strategies, including music appreciation, performance, and composition. Through music appreciation, students can experience and understand the emotions and meanings within musical works, enhancing their aesthetic abilities and emotional resonance. Music performance enables students to experience the expressive power and impact of music, boosting their confidence and team spirit. Music composition allows students to express their emotions and thoughts creatively, fostering their creativity and sense of social responsibility.

4. RELATIONSHIP BETWEEN MUSIC EDUCATION AND SOCIAL RESPONSIBILITY

4.1 Promotion of Social Responsibility through Music Education

Music education fosters the formation and development of social responsibility through emotional resonance and aesthetic experience. Musical works often reflect social realities and human emotions, and through appreciation and performance, students can recognize the existence and importance of social issues, thereby enhancing their social responsibility. For example, Beethoven's "Ninth Symphony" expresses a pursuit of freedom and equality, inspiring students to focus on social justice.

Music education also cultivates teamwork and social participation awareness through musical activities, strengthening social responsibility.

4.2 Pathways for Cultivating Social Responsibility in Music Education

Various pathways exist for cultivating social responsibility in music education, including curriculum design, teaching activities, and evaluation systems. Through curriculum design, social responsibility can be integrated into all aspects of music education. For instance, music appreciation classes can feature works that reflect social issues and human emotions, fostering social responsibility. In performance classes, teamwork and social welfare activities can enhance social responsibility. Composition classes can encourage students to create works reflecting social issues and human emotions, fostering social responsibility.

5. APPLICATION OF MUSIC EDUCATION IN CULTIVATING SOCIAL RESPONSIBILITY

5.1 Integrating Social Responsibility into Music Curriculum Design

Curriculum design is a key pathway for cultivating social responsibility in music education. Through scientifically sound curriculum design, social responsibility can be integrated into all aspects of music education. For example, in music appreciation classes, works that reflect social issues and human emotions can be selected to cultivate social responsibility. In performance classes, teamwork and social welfare activities can enhance social responsibility. Composition classes can encourage students to create works reflecting social issues and human emotions, fostering social responsibility.

5.2 Practice of Social Responsibility in Music Teaching Activities

Music teaching activities are crucial for fostering social responsibility in music education. Through a variety of engaging activities, the formation and development of social responsibility can be effectively promoted. For example, organizing student performances and social welfare activities can enhance social responsibility. Music composition and competitions can foster creativity and social responsibility. Music appreciation and discussions can cultivate aesthetic abilities and social responsibility.

6. CHALLENGES AND COUNTERMEASURES IN CULTIVATING SOCIAL RESPONSIBILITY IN MUSIC EDUCATION

6.1 Challenges and Issues

Cultivating social responsibility in music education faces several challenges and issues. First, the curriculum design and teaching methods of music education need continuous innovation and improvement to meet societal needs. Second, the teaching force and resources of music education need strengthening to improve the quality and effectiveness of music education. Additionally, the evaluation system of music education requires constant refinement to scientifically and reasonably evaluate students' musical literacy and social responsibility.

6.2 Countermeasures and Recommendations

To address the challenges and issues in cultivating social responsibility in music education, the following countermeasures and recommendations can be adopted. First, the curriculum design and teaching methods need continuous innovation and improvement to meet societal needs. For example, introducing modern educational technologies and methods can improve the quality and effectiveness of music education. Second, the teaching force and resources need strengthening to improve the quality and effectiveness of music education. For example, enhancing teacher training and resource development can bolster the teaching force and resources. Additionally, the evaluation system needs continuous refinement to scientifically and reasonably evaluate students' musical literacy and social responsibility. For example, establishing scientific and reasonable evaluation standards and methods can improve the evaluation system's accuracy and fairness.

7. CONCLUSION

7.1 Research Summary

This study systematically reviewed related domestic and international literature, exploring the theoretical foundations and practical applications of music education in

fostering social responsibility. The research indicates that music education, through emotional resonance and aesthetic experience, effectively promotes the formation and development of social responsibility. Music education not only enhances students' artistic literacy but also strengthens their social responsibility and participation awareness through emotional education and value guidance.

7.2 Research Innovations

The innovation of this study lies in exploring the unique role of music education in cultivating social responsibility. By synthesizing related literature, the study reveals the distinctive role of music education in fostering social responsibility and proposes further recommendations for enhancing this cultivation within music education.

7.3 Research Prospects

Future research could further explore the specific mechanisms linking music education and social responsibility, and how to more effectively integrate music education into the practice of cultivating social responsibility. This study aims to provide theoretical support and practical guidance for educators, promoting the extensive application of music education in fostering social responsibility.

REFERENCES

[1] Duan, Z. (2000). Exploration of Theoretical Issues in College Students' Social Responsibility (Part 2). Journal of Social Sciences of Shanxi Higher Education Institutions, 12(3), 2. DOI: CNKI:SUN:SXGD.0.2000-02-021.

[2] Xiong, R. (2013). Exploration of Educational Practice and Cultivation Paths for College Students' Social Responsibility. Journal of Guiyang University: Social Sciences Edition, 8(4), 4. DOI: 10.3969/j.issn.1673-6133.2013.04.011.

[3] Wang, W. (2012). Discussion on the Weakening of College Students' Social Responsibility and Countermeasures. Xiangchao: Theory Edition, 000(009), 75-76.

[4] Zheng, Q. (2024). Research on the Cultivation of Social Responsibility among Vocational College Students. Central South University. DOI: 10.7666/d.y1915069.

[5] Zhu, C. (2024). Exploration of Integrated Education for College Students' Social Responsibility in the Context of New Media. Industry and Technology Forum.

[6] Zhang, J. (2015). Research on the Current Situation and Cultivation of Contemporary College Students' Social Responsibility: A Case Study of the College of Science and Technology, Three Gorges University. Three Gorges University. DOI: 10.7666/d.D648595.

[7] Ho, Y. (1988). Responsibility and Self-Integration among College Students: An Ethical Analysis of Erikson's Theory. Journal of Educational Psychology, (21), 77-98. DOI: 10.6251/BEP.19880601.5.

[8] Liao, J. (2013). Practical Research on the Intervention of Social Work in Moral Education of High School Students: A Case of Responsibility Education. DOI: http://dspace.xmu.edu.cn:8080/dspace/handle/2288/75596.

[9] Lei, Z., & Yang, Q. (2010). Discussion on the Cultivation of Social Responsibility in Accounting Talent Training in Colleges and Universities. Contemporary Educational Theory and Practice, 2(2), 3. DOI: 10.3969/j.issn.1674-5884.2010.02.051.

[10] Zhou, S. (2011). Cultivating Social Responsibility in Ideological and Political Education of College Students. Theory Guide, (4), 2. DOI: CNKI:SUN:LLDB.0.2011-04-037.

[11] Liang, F., & Zou, M. (2009). Exploration of Environmental Education Implications in Jonas's Responsibility Ethics. Journal of Education Theory and Practice, (19), 35-61. DOI: 20797778-200906-201203080050-201203080050-36-62.

[12] Chen, Y., Wu, L., & Hsu, W. (2015). Exploring the Development of Responsibility in Students through Literature in Education, Psychology, and Sociology. High-Tech Sports, (14), 37-49. DOI: 16830822-201512-201603150009-201603150009-37-49.

[13] Chen, C. (2009). Exploration of Character Education Content and Methods in the Paiwan Piuma Tribe. Journal of Education and Multicultural Studies, (1), 57-94. DOI: 20780222-200912-201101060122-201101060122-57-94.

The Impact of Intelligent Connected Vehicles on Urban Traffic Planning Theory

Yaru Ren
Zibo Vocational Institute, Zibo, Shandong, 255300, China

Abstract: This study explores the impact of intelligent connected vehicles (ICVs) on urban traffic planning theory, focusing on the integration of advanced technologies with traditional traffic planning methods. The research methods include literature review, theoretical analysis, and systematic synthesis. Through a comprehensive review of existing literature on ICVs and traffic planning, the study identifies the potential and challenges of ICVs in data collection and analysis, traffic flow optimization, and traffic safety improvement. Initially, the study systematically reviews the technological development and urban application scenarios of ICVs. Then, from the interdisciplinary perspectives of traffic engineering, urban planning, and information science, the study analyzes the revolutionary impact of this technology on urban traffic planning theory. The research finds that ICVs can optimize traffic flow and reduce congestion through real-time data and enhance traffic management accuracy and efficiency with precise predictive models. Additionally, the study discusses the positive roles and potential issues of ICVs in policy making, environmental protection, and social equity. The conclusions indicate that the widespread application of ICVs will profoundly transform existing traffic planning theory and practice, promoting the intelligence and sustainability of urban traffic systems. However, their full implementation requires coordinated efforts in policy support, technological maturation, and social acceptance. This research provides new perspectives and frameworks for traffic planning theory and valuable references for policymakers and urban managers.

Keywords: Intelligent Connected Vehicles; Traffic Planning; Urban Traffic; Theoretical Research; Sustainable Development

1. INTRODUCTION

1.1 Research Background and Significance

With the acceleration of urbanization, urban traffic issues have become increasingly prominent, including traffic congestion, environmental pollution, and frequent traffic accidents, posing urgent challenges for urban managers. Intelligent and Connected Vehicles (ICVs), as cutting-edge technologies in modern science and transportation, have gradually emerged as crucial tools for addressing urban traffic problems due to their advantages in data collection, traffic flow optimization, and traffic safety enhancement. ICVs, through vehicle-to-everything (V2X) technologies, big data analysis, and autonomous driving, enable real-time information exchange between vehicles and infrastructure, vehicles and vehicles, thereby enhancing the intelligence and efficiency of the traffic system.

Studying the impact of ICVs on urban traffic planning theory not only promotes the innovation and development of traffic planning theory but also provides new ideas and methods for urban traffic management, thereby achieving the intelligence and sustainable development of urban traffic systems. This paper aims to systematically analyze the technical characteristics of ICVs and their applications in urban traffic, exploring their revolutionary impact on traditional traffic planning theory, and providing new perspectives and frameworks for traffic planning theory and practice.

1.2 Research Objectives and Methods

The objective of this paper is to explore the impact of ICVs on urban traffic planning theory, analyzing their potential and challenges in data collection and analysis, traffic flow optimization, and traffic safety enhancement. The research methods include literature review, theoretical analysis, and systematic synthesis. By comprehensively reviewing existing literature on ICVs and

traffic planning, this paper identifies the application scenarios and technical advantages of ICVs in urban traffic and analyzes their revolutionary impact on urban traffic planning theory from the interdisciplinary perspectives of traffic engineering, urban planning, and information science.

1.3 Review of Domestic and International Research Status

Domestic research on ICVs primarily focuses on technology development, application scenarios, and policy support. Liu Meiqi et al., ICVs have made significant progress in urban traffic, especially in traffic management, road safety, and environmental protection [1]. Wen Xihua et al. discuss the construction approaches and methods of connected vehicles and urban intelligent traffic systems based on IPv6 [2]. Li Ye's research addresses the passenger flow distribution problem in multi-modal traffic networks, proposing that the coordination of ICVs with other transportation modes can achieve more reasonable passenger flow distribution [3]. Wu Dongsheng explores the integrated development of ICVs and smart cities [4]. Additionally, Tianjin has achieved notable results in the "dual-chain integration" of ICVs' industrial and innovation chains [5].

International research on ICVs has also yielded substantial achievements. Developed countries in Europe and America lead in technology development, standard setting, and policy support. Research institutions and enterprises in the US and Europe have conducted extensive research and experiments in autonomous driving technology, V2X communication protocols, and intelligent traffic systems. Companies like Waymo and Tesla in the US have made significant progress in autonomous driving technology, with their systems being tested in multiple cities. European companies such as BMW and Mercedes have also conducted in-depth research in autonomous driving and ICVs, launching several smart connected vehicles.

2. OVERVIEW OF INTELLIGENT AND CONNECTED VEHICLE TECHNOLOGY

2.1 Definition and Classification of Intelligent and Connected Vehicles

Intelligent and Connected Vehicles (ICVs) are defined as vehicles equipped with on-board sensors, controllers, actuators, and modern communication and network technologies, enabling information exchange and sharing with the external environment (including other vehicles, infrastructure, the internet, etc.), thereby possessing environmental perception, intelligent decision-making, and collaborative control capabilities. The core of ICVs lies in the "intelligent" and "connected" aspects, with "intelligence" primarily reflected in the vehicle's autonomous driving capabilities, and "connected" in the vehicle's information exchange capabilities with the external environment.

ICVs can be classified into five levels based on the degree of autonomous driving: L0 (no autonomous driving), L1 (driving assistance), L2 (partial autonomous driving), L3 (conditional autonomous driving), L4 (highly autonomous driving), and L5 (fully autonomous driving). Currently, ICVs at L2 and L3 levels are already in market applications, while those at L4 and L5 levels are still in the research and testing stages.

2.2 Technological Development History of Intelligent and Connected Vehicles

The development of ICVs can be traced back to the 1980s, with initial research focusing on autonomous driving technology. With the continuous advancement of computer technology, sensor technology, and communication technology, research on ICVs gradually expanded from single autonomous driving technology to V2X technology and intelligent traffic systems. At the beginning of the 21st century, with the rapid development of the internet and mobile communication technology, research on ICVs entered a new phase, with V2X technology and big data analysis becoming research hotspots.

In recent years, with the rapid development of artificial intelligence technology, research on ICVs has made significant progress. Technologies in autonomous driving algorithms, sensor technology, and V2X communication protocols have matured, and the application scenarios of ICVs have become increasingly extensive. In particular, the application of 5G technology has provided a solid technical foundation for the widespread application of ICVs.

2.3 Core Technologies of Intelligent and Connected Vehicles

The core technologies of ICVs mainly include autonomous driving technology, V2X technology, and big data analysis technology.

Autonomous driving technology is one of the core technologies of ICVs, including environmental perception, path planning, and vehicle control. Environmental perception technology uses on-board sensors (such as LiDAR, cameras, millimeter-wave radar, etc.) to obtain real-time environmental information around the vehicle, generating a high-precision environmental model through data fusion and algorithm processing. Path planning technology generates the optimal driving path based on the environmental model and traffic rules. Vehicle control technology achieves precise control of the vehicle through actuators.

V2X technology is another core technology of ICVs, mainly including vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-cloud (V2C) communication. V2X technology enables information exchange between vehicles and the external environment through wireless communication technology, thereby improving the intelligence and operational efficiency of the traffic system.

Big data analysis technology also plays an important role in ICVs. Real-time analysis of vehicle operation data, traffic flow data, and environmental data can optimize traffic flow, prevent traffic accidents, and achieve intelligent traffic management.

3. IMPACT OF INTELLIGENT AND CONNECTED VEHICLES ON URBAN TRAFFIC PLANNING THEORY

3.1 Innovation in Data Collection and Analysis

ICVs, through on-board sensors and V2X technology, can collect a large amount of traffic data in real time, including vehicle position, speed, travel trajectory, traffic flow, etc. These data can not only be used to optimize traffic flow and improve traffic management efficiency but also provide important reference data for traffic planning. Traditional traffic planning mainly relies on static traffic survey data, while ICVs can provide dynamic, real-time traffic data, making traffic planning more scientific and accurate.

Through big data analysis technology, the traffic data collected by ICVs can be deeply analyzed to identify the changing patterns of traffic flow and the causes of traffic congestion, thereby proposing targeted traffic optimization solutions. For example, by analyzing traffic flow data, peak hours and peak sections of traffic congestion can be identified, and measures such as adjusting traffic light timing and optimizing road design can be taken to alleviate traffic congestion.

3.2 Optimization and Management of Traffic Flow

ICVs can achieve real-time monitoring and optimization of traffic flow through V2X technology and big data analysis. Through V2V and V2I communication, ICVs can obtain real-time traffic conditions of the front roads and dynamically adjust the driving path according to the changes in traffic flow, thereby improving the efficiency of traffic flow.

In addition, ICVs can achieve intelligent control of traffic lights through collaboration with the traffic management system. Real-time analysis of traffic flow data can optimize the timing of traffic lights, improving the efficiency of traffic flow. For example, in sections with heavy traffic flow, the green light time can be extended to increase capacity; in sections with light traffic flow, the green light time can be shortened to improve road utilization.

3.3 Enhancement of Traffic Safety and Accident Prevention

ICVs can significantly enhance traffic safety through autonomous driving technology and intelligent traffic systems. Autonomous driving systems monitor road environments and traffic conditions in real time through on-board sensors and algorithms, predicting and avoiding potential dangers in advance, reducing the occurrence of traffic accidents. For example, autonomous driving systems can monitor obstacles and pedestrians on the front roads in real time through LiDAR and cameras, and calculate the best avoidance path through algorithms to avoid traffic accidents.

In addition, ICVs can improve traffic safety through V2V and V2I communication, achieving information exchange between

vehicles and vehicles, and vehicles and infrastructure. For example, through V2V communication, ICVs can obtain the driving status of the front vehicles in real time, and adjust their own driving speed and path according to the driving status of the front vehicles, thereby avoiding rear-end accidents. Through V2I communication, ICVs can obtain the status of traffic lights and traffic conditions of the roads in real time, and adjust their own driving speed and path according to the status of traffic lights and traffic conditions of the roads, thereby avoiding traffic accidents.

3.4 Environmental Protection and Sustainable Development

ICVs can effectively reduce vehicle fuel consumption and carbon emissions by optimizing traffic flow and reducing traffic congestion, thereby achieving environmental protection and sustainable development. Through V2X technology and big data analysis, real-time monitoring and optimization of traffic flow can reduce vehicle idling time and driving time, thereby lowering fuel consumption and carbon emissions.

In addition, ICVs can achieve energy-saving driving through autonomous driving technology and intelligent traffic systems. For example, autonomous driving systems can calculate the optimal driving path and speed through algorithms, reducing vehicle fuel consumption and carbon emissions. Intelligent traffic systems can optimize the timing of traffic lights, reducing vehicle idling time and driving time, thereby lowering fuel consumption and carbon emissions.

4. INTEGRATION OF INTELLIGENT CONNECTED VEHICLES WITH TRADITIONAL TRAFFIC PLANNING METHODS

4.1 Transportation Engineering Perspective

From the perspective of transportation engineering, the introduction of Intelligent Connected Vehicles (ICVs) imposes new demands and challenges on traditional traffic planning methods. Traditional traffic planning relies heavily on static traffic survey data, whereas ICVs can provide dynamic, real-time traffic data, making traffic planning more scientific and accurate. In-depth analysis of traffic data collected by ICVs can identify traffic flow patterns and causes of congestion, leading to targeted traffic optimization solutions.

ICVs can also achieve real-time monitoring and optimization of traffic flow through V2X technology and big data analysis, thereby improving traffic efficiency. Through vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, ICVs can obtain real-time traffic conditions ahead and dynamically adjust driving paths based on traffic flow changes, enhancing traffic efficiency.

4.2 Urban Planning Perspective

From an urban planning perspective, the introduction of ICVs poses new demands and challenges for urban traffic planning. Traditional urban traffic planning relies on static traffic survey data, while ICVs provide dynamic, real-time data, making planning more scientific and precise. Analysis of this data can identify traffic flow patterns and congestion causes, leading to targeted urban traffic optimization solutions.

ICVs, through V2X technology and big data analysis, can also realize real-time monitoring and optimization of traffic flow, thereby improving the operational efficiency of urban traffic systems. Through V2V and V2I communication, ICVs can obtain real-time traffic conditions and dynamically adjust driving paths based on traffic changes, enhancing urban traffic system efficiency.

4.3 Information Science Perspective

From the information science perspective, the introduction of ICVs presents new requirements and challenges for traffic planning. ICVs, equipped with sensors and V2X technology, can collect substantial real-time traffic data, including vehicle position, speed, trajectories, and traffic flow. This data not only optimizes traffic flow and management efficiency but also serves as vital references for traffic planning.

Big data analysis can deeply analyze the traffic data collected by ICVs, identifying traffic flow patterns and congestion causes, thus proposing targeted traffic optimization schemes. For instance, analysis of traffic flow data can pinpoint peak periods and congested routes, and adjustments in traffic signal timing and road design can alleviate congestion.

5. APPLICATION PROSPECTS OF INTELLIGENT CONNECTED

VEHICLES IN URBAN TRAFFIC SYSTEMS

5.1 Policy Support and Regulation Formulation

The widespread application of ICVs requires policy support and regulation. The government should legislate and provide financial support to encourage enterprises and research institutions to innovate in the ICV field. Establishing technical standards and safety regulations for ICVs is crucial for their promotion and application.

Additionally, governments should guide and fund the technological development and market promotion of ICVs. Setting up special funds to support ICV research and demonstration applications, and offering tax incentives to encourage investments in ICV innovation, are necessary steps.

5.2 Technological Maturity and Application Scenarios

The widespread application of ICVs requires continuous technological advancements and expansion of application scenarios. As autonomous driving algorithms, sensor technologies, and V2X communication protocols mature, the application scenarios for ICVs will broaden. ICVs can be applied in urban traffic management, public transportation systems, and logistics, enhancing the intelligence and efficiency of traffic systems.

Moreover, coordination between ICVs and other modes of transportation can optimize multi-modal traffic networks. For example, coordinating ICVs with public transportation can achieve more rational passenger flow distribution, optimizing the overall efficiency of urban traffic networks.

5.3 Social Acceptance and Public Awareness

The widespread application of ICVs also requires social acceptance and public awareness. Governments and enterprises should enhance public understanding and acceptance of ICVs through education and awareness campaigns. For example, conducting public educational campaigns and offering ICV test-ride experiences can help the public understand the convenience and safety of ICVs.

Furthermore, establishing safety standards and technical regulations for ICVs can improve their safety and reliability, thereby increasing public trust and acceptance.

6. INNOVATIONS IN TRAFFIC PLANNING THEORY DUE TO INTELLIGENT CONNECTED VEHICLES

6.1 New Traffic Planning Theoretical Framework

The introduction of ICVs requires new demands and challenges for traditional traffic planning theories. Traditional theories rely on static traffic survey data, while ICVs can provide dynamic, real-time data, making traffic planning more scientific and accurate. Analyzing data collected by ICVs can identify traffic flow patterns and congestion causes, proposing targeted optimization schemes.

ICVs can also achieve real-time monitoring and optimization of traffic flow through V2X technology and big data analysis, improving traffic efficiency. Through V2V and V2I communication, ICVs can obtain real-time traffic conditions ahead and dynamically adjust paths based on traffic flow changes, enhancing traffic efficiency.

6.2 Insights for Traffic Planning Practice

The introduction of ICVs poses new requirements and challenges for traffic planning practice. Traditional practices rely on static survey data, while ICVs provide dynamic, real-time data, making planning more scientific and precise. Analyzing data collected by ICVs can identify traffic flow patterns and congestion causes, proposing targeted optimization schemes.

ICVs, through V2X technology and big data analysis, can achieve real-time monitoring and optimization of traffic flow, improving traffic efficiency. Through V2V and V2I communication, ICVs can obtain real-time traffic conditions and dynamically adjust paths based on traffic changes, enhancing traffic efficiency.

6.3 Outlook for Future Traffic Systems

The widespread application of ICVs will profoundly transform existing traffic planning theories and practices, promoting the intelligence and sustainability of urban traffic systems. As ICV technology continues to advance and application scenarios expand, ICVs will have a far-reaching impact on urban traffic planning theory, supporting green and sustainable development.

7. CONCLUSIONS

7.1 Research Summary

This paper systematically analyzes the technical characteristics of ICVs and their applications in urban traffic, exploring their revolutionary impact on traditional traffic planning theories. The study finds that ICVs can optimize traffic flow and reduce congestion through real-time data, and enhance traffic management accuracy and efficiency through precise predictive models. Additionally, ICVs play positive roles in policy making, environmental protection, and social equity.

7.2 Research Limitations and Future Directions

Despite the comprehensive study on the impact of ICVs on urban traffic planning theories, some limitations exist. First, as ICV technology rapidly evolves, the study's findings may need updates and adjustments. Second, this study primarily discusses theoretical impacts and lacks empirical research. Future studies should include field research and case analyses to validate and deepen the conclusions.

Future research directions include: studying the effects of ICVs in different cities and regions through empirical research; exploring the coordinated development of ICVs with other transportation modes, optimizing multi-modal traffic networks; and analyzing the socio-economic impacts of ICVs on employment, economic structure, and urban spatial layout to provide scientific bases for policy making.

In conclusion, as a frontier technology in modern science and transportation, ICVs have profound impacts on urban traffic planning theories. By analyzing the technical characteristics and applications of ICVs, this paper offers new perspectives and frameworks for traffic planning theory and practice, providing valuable references for policymakers and urban managers. As ICV technology advances and application scenarios expand, ICVs will have an even more significant impact on urban traffic planning, supporting green and sustainable development.

REFERENCES

[1] Liu Meiqi, Ma Junpeng, Li Yalan, et al. Research on the Development of Intelligent Connected Vehicles in Urban Traffic[J]. Intelligent City, 2023, 9(10):24-26.

[2] Wen Xihua, Liu Yanbin, Liu Yunpeng, et al. Research on the Construction Approaches and Methods of IPv6-Based Connected Vehicles and Urban Intelligent Traffic Systems[J]. Logistics Technology, 2017, 40(9):3. DOI:10.3969/j.issn.1002-3100.2017.09.014.

[3] Li Ye. Research on Passenger Flow Distribution in Urban Multi-Modal Traffic Networks[D]. Southeast University, [2024-07-27].

[4] Wu Dongsheng. Exploration on the Integrated Development of Intelligent Connected Vehicles and Smart Cities[J]. Communication World, 2021, 000(023):24-27.

[5] Harika, Narumanchi, Dishant, et al. Tianjin's Adherence to "Dual-Chain Integration" of Industrial and Innovation Chains, Creating a "Trinity" Big Intelligent Innovation System to Organically Connect the Seven Artificial Intelligence Industrial Chains[C]//2018 IEEE International Conference on Smart Cloud. [2024-07-27].

[6] Zhang Yeqing. Research on Key Technologies for Mixed Traffic State Analysis and Prediction on Urban Roads[J]. [2024-07-27].

Impact of New Energy Vehicle Technology Development on Urban Traffic Structure

Shuhua Sun
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study explores the impact of new energy vehicle technology on urban traffic structures, analyzing potential changes in urban transportation patterns, environmental impact, and economic benefits from a theoretical perspective. Utilizing literature review and theoretical analysis, the research systematically examines the latest advancements in new energy vehicle technology and their global applications. By constructing relevant theoretical frameworks, the study delves into how new energy vehicle technology significantly influences urban traffic structures through reduced fossil fuel dependence, lower emissions, and optimized traffic flow. Additionally, the research discusses the crucial roles of policy guidance, technological innovation, and market mechanisms in promoting the adoption of new energy vehicles. Results indicate that new energy vehicle technology not only improves urban air quality and reduces greenhouse gas emissions but also modernizes and smartens urban traffic systems, providing new momentum for sustainable urban development.
Keywords: New Energy Vehicle Technology; Urban Traffic Structure; Environmental Impact; Economic Benefits; Policy Guidance

1. INTRODUCTION

1.1 Research Background and Significance

With the increasing severity of global climate change and environmental pollution, reducing carbon emissions and improving air quality have become common goals for governments and societies worldwide. New energy vehicle (NEV) technology, as an important green transportation tool, has gradually become a crucial means of addressing urban traffic issues due to its low-carbon and environmentally friendly characteristics. As the largest auto market globally, the development of NEVs in China is essential not only for environmental protection but also for achieving national energy security and economic transformation. Under the guidance of the "Two Sessions" spirit, the promotion and application of NEV technology has been elevated to the level of national strategy, becoming a key area for driving green development and technological innovation.

1.2 Review of Domestic and International Research

Domestically, research on NEV technology primarily focuses on technological development, market promotion, and environmental impacts. Shi Xiaoqing et al. (2013) highlighted the significant potential of electric vehicles in reducing carbon emissions in the transportation sector, while noting that their effectiveness is influenced by factors such as battery technology, charging infrastructure, and energy structure. Yao Fanglai (2018) used structural equation modeling to explore consumer purchase intentions for NEVs, identifying policy support, product performance, and price as key factors affecting purchasing decisions. Fu Qiang et al. (2017) studied the impact of NEV application in Guangdong Province on energy demand and urban environment, emphasizing the importance of policy guidance and technological innovation in promoting NEV adoption.

Internationally, research on NEV technology is also active. Wang Jie (2019) analyzed the future development trends of smart cars, pointing out that intelligence and electrification are the main directions for the future automotive industry. Song Huadong et al. (2019) emphasized the driving role of transportation in innovation and development in the new era, proposing that NEV technology is a crucial force for the transformation and upgrading of the transportation industry.

1.3 Research Objectives and Methods

This study aims to explore the impact of NEV technology development on urban traffic structures, theoretically analyzing its potential changes in urban transportation patterns, environmental impacts, and economic benefits. The research employs literature review and theoretical analysis methods to systematically outline the latest advancements in NEV technology and their global applications. By constructing relevant theoretical frameworks, the study deeply investigates how NEV technology significantly influences urban traffic structures through reducing fossil fuel dependence, lowering emissions, and optimizing traffic flow. Additionally, the study analyzes the critical roles of policy guidance, technological innovation, and market mechanisms in promoting NEV adoption.

2. OVERVIEW OF NEW ENERGY VEHICLE TECHNOLOGY

2.1 Definition and Classification of New Energy Vehicles

New energy vehicles refer to automobiles that utilize unconventional automotive fuels as power sources (or use conventional fuels with new onboard power devices) and integrate advanced vehicle power control and drive technologies. Based on different power sources, NEVs mainly include battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell electric vehicles (FCEVs).

2.2 Development History of New Energy Vehicle Technology

The development of NEV technology has gone through multiple stages. In the 1990s, with the heightened awareness of environmental protection and the impact of oil crises, electric vehicle technology began to receive attention. Entering the 21st century, with advancements in battery technology and the improvement of charging infrastructure, NEVs gradually entered the commercialization stage. In recent years, with the development of intelligent and connected technologies, NEV technology has further advanced, and smart electric vehicles have become an important direction for future development.

2.3 Core Technologies of New Energy Vehicles

The core technologies of NEVs mainly include battery technology, motor technology, and electronic control technology. Battery technology is critical for NEVs as it determines the vehicle's range and charging speed. Currently, lithium-ion batteries are the mainstream technology, with solid-state batteries and hydrogen fuel cells expected to further enhance NEV performance in the future. Motor technology determines the vehicle's performance and energy efficiency. Electronic control technology, including battery management systems (BMS), motor control systems, and vehicle control systems, is essential for ensuring the efficient and safe operation of NEVs.

3. IMPACT OF NEW ENERGY VEHICLE TECHNOLOGY ON URBAN TRAFFIC PATTERNS

3.1 Changes in Traffic Patterns

The development of NEV technology profoundly affects urban traffic patterns. Traditional gasoline-powered vehicles rely mainly on gas stations, whereas NEVs depend on charging stations and battery swap stations. This shift necessitates the reconfiguration of urban traffic infrastructure, making the proliferation of charging stations and the construction of smart charging networks a critical aspect of urban traffic planning. Additionally, the rise of shared NEVs is altering traditional private car ownership models, with shared mobility becoming a new transportation mode that alleviates urban traffic congestion and parking challenges.

3.2 Optimization of Traffic Flow

The application of NEV technology helps optimize urban traffic flow. Smart electric vehicles, through vehicle-to-infrastructure (V2I) technology, can connect with traffic infrastructure, acquiring real-time traffic information to optimize driving routes and reduce congestion. Furthermore, the widespread use of NEVs promotes the intelligent upgrade of urban traffic management systems, leveraging big data analysis and artificial intelligence to dynamically control traffic flow and improve traffic efficiency.

3.3 Construction of Intelligent Traffic Systems

The development of NEV technology drives the construction of intelligent traffic systems. These systems integrate technologies for traffic information collection, processing, and dissemination, enabling real-time monitoring and scheduling of traffic flow. NEVs, as a crucial component of intelligent traffic systems, use onboard sensors and communication devices to interact with traffic management centers and other vehicles, enhancing the intelligence level of the traffic system. The construction of intelligent traffic systems not only improves traffic efficiency but also enhances traffic safety, reducing the incidence of traffic accidents.

4. IMPACT OF NEW ENERGY VEHICLE TECHNOLOGY ON URBAN ENVIRONMENT

4.1 Reduction of Exhaust Emissions

The promotion and application of new energy vehicles (NEVs) have significantly reduced exhaust emissions in urban transportation. Traditional fuel vehicles emit a large amount of pollutants such as carbon dioxide, carbon monoxide, nitrogen oxides, and particulate matter, which severely impact urban air quality. NEVs, powered by electricity or hydrogen, produce no exhaust emissions, contributing to improved urban air quality, reduced greenhouse gas emissions, and mitigation of global climate change issues.

4.2 Improvement of Air Quality

The widespread use of NEVs plays a crucial role in improving urban air quality. Research indicates that the transportation sector is a major source of urban air pollution, especially in large cities where traffic emissions significantly contribute to PM2.5 and PM10 pollution. The application of NEVs reduces traffic emissions, lowering particulate matter concentrations in the air and enhancing the living environment and health conditions of urban residents.

4.3 Reduction of Urban Noise

The promotion of NEVs also effectively reduces urban traffic noise. Traditional fuel vehicles generate significant engine and exhaust noise during operation, which is a major source of urban noise pollution. NEVs, driven by electric motors, produce lower noise levels, especially at low speeds where they generate virtually no noise. The reduction of urban traffic noise not only improves the quality of urban life but also diminishes the negative health impacts of noise on residents.

5. IMPACT OF NEW ENERGY VEHICLE TECHNOLOGY ON URBAN ECONOMY

5.1 Economic Benefit Analysis

The development of NEV technology significantly drives the urban economy. The production and sales of NEVs stimulate the growth of related industries, including battery manufacturing, charging infrastructure construction, and intelligent transportation systems, creating numerous job opportunities and economic benefits. Additionally, the lower operating costs of NEVs reduce urban residents' transportation expenses, enhancing their quality of life and consumption capacity.

5.2 Extension of Industrial Chains

The development of NEV technology extends urban industrial chains. The NEV industry chain encompasses upstream raw material supply, midstream vehicle manufacturing, and downstream sales services, forming a complete industrial ecosystem. With the expansion of the NEV market, the extension and improvement of related industrial chains promote the diversified development of the urban economy and enhance the city's economic competitiveness.

5.3 Creation of Employment Opportunities

The development of NEV technology creates a substantial number of employment opportunities. Each segment of the NEV industry chain requires a large number of professional technical talents and managerial personnel, including battery technology research and development, vehicle manufacturing, charging infrastructure construction, and intelligent transportation system operation. The growth of the NEV industry not only provides new job positions but also drives the development of relevant vocational education and training, improving the employment capabilities and income levels of urban residents.

6. POLICY GUIDANCE AND MARKET MECHANISMS

6.1 Necessity of Policy Support

The development of NEV technology relies on policy support. Governments implement a series of policy measures, such as financial subsidies, tax incentives, vehicle purchase subsidies, and charging infrastructure construction subsidies, to encourage the research and development and promotion of NEVs. Policy support not only reduces the purchase and usage costs of NEVs but also enhances consumer purchasing intentions, driving the rapid development of the NEV market.

6.2 Role of Technological Innovation

Technological innovation is a key driver of NEV technology development. Governments and enterprises increase R&D investment to continuously innovate battery technology, motor technology, and electronic control technology, improving the performance and reliability of NEVs. Technological innovation not only enhances the market competitiveness of NEVs but also promotes technological progress and upgrading in related industries, advancing the modernization and intelligence of urban transportation systems.

6.3 Regulatory Function of Market Mechanisms

Market mechanisms play an important regulatory role in the development of NEV technology. Through market competition, the survival of the fittest promotes technological innovation and product upgrading among NEV companies, increasing market share and consumer satisfaction. Market mechanisms also facilitate the construction and operation of charging infrastructure and intelligent transportation systems, improving the efficiency and service level of urban transportation systems.

7. CONCLUSION

7.1 Research Conclusion

This study, through literature review and theoretical analysis, explores the impact of NEV technology development on urban traffic structures. The research indicates that NEV technology not only helps improve urban air quality and reduce greenhouse gas emissions but also promotes the modernization and intelligence of urban transportation systems, providing new momentum for sustainable urban development. Additionally, the critical roles of policy guidance, technological innovation, and market mechanisms in promoting NEV adoption are validated.

7.2 Future Research Directions

Future research can further investigate the application effects of NEV technology in different urban traffic environments and analyze its long-term impacts on urban transportation systems. Additionally, integrating big data and artificial intelligence technologies can build more intelligent urban traffic management systems, enhancing traffic efficiency and safety.

7.3 Strategies and Recommendations

To promote the development of NEV technology, governments should continue to increase policy support, encourage technological innovation and market competition. Additionally, enhancing the construction of charging infrastructure and intelligent transportation systems can improve the service level and operational efficiency of urban transportation systems. Through collaborative efforts, promoting the widespread application of NEV technology in urban transportation can achieve green, intelligent, and sustainable urban transportation development.

REFERENCES

[1] Shi Xiaoqing, Li Xiaonuo, Yang Jianxin. Analysis of Carbon Emission Reduction Potential and Influencing Factors of Low-Carbon Transportation Electric Vehicles [J]. Environmental Science, 2013, 34(1): 10. DOI: http://ir.rcees.ac.cn/handle/311016/8680.

[2] Yao Fanglai. Research on Purchase Intention of New Energy Vehicles Based on Structural Equation Model [D]. East China Jiaotong University, 2018.

[3] Fu Qiang, Zhao Xuemin, Meng Wenchuan. Analysis of the Impact of New Energy Vehicle Application in Guangdong Province on Energy Demand and Urban Environment [J]. Economic Research Guide, 2017. DOI: CNKI: SUN: JJYD.0.2017-19-049.

[4] Zhang Jing. Risk Evaluation and Decision Analysis of New Energy Vehicle Projects in Henan Province [D]. North China University of Water Resources and Electric Power, 2010. DOI: 10.7666/d.d142681.

[5] Yao Yang. Impact of Transportation Technology on Guangzhou Urban Functional

Space under the Background of New Technological Revolution [J]. [2024-07-26].
[6] Wang Jie. Analysis of Future Development Trends of Smart Cars [J]. Modern Manufacturing Technology and Equipment, 2019(2): 2. DOI: CNKI: SUN: SDJI.0.2019-02-101.
[7] Song Huadong, Li Yafei, Hou Mengzhu, et al. Driving Role of Transportation in Innovation and Development in the New Era [J]. Comprehensive Transportation, 2019(6): 7. DOI: CNKI: SUN: YSZH.0.2019-06-008.
[8] Shao Tiantian. Research on the New Energy Passenger Vehicle Market Based on Panel Cointegration and Grey Genetic Algorithm [D]. Hunan University, 2020.
[9] Zuo Haijiao. Discussion on the Application of New Energy Vehicle Technology [J]. Science and Life, 2017(002): 005.

Humanistic Care in Modern Nursing Education: A Discussion

Wang Chunlei
School of Nursing, Zibo Vocational Institute, Zibo City, Shandong Province, China

Abstract: This study aims to explore the theoretical foundations, development, and global application and impact of humanistic care concepts in modern nursing education. Utilizing a systematic literature review, we comprehensively analyze relevant research from both domestic and international sources, emphasizing the importance, theoretical framework, and implementation strategies of humanistic care in nursing education. Initially, the study provides a historical overview of the origins and evolution of humanistic care, examining its adaptability across different cultural contexts. Subsequently, the paper discusses the practical application of humanistic care in nursing education, including curriculum design, teaching methods, and evaluation standards. By comparing the current state of nursing education globally, this paper summarizes the positive effects of humanistic care on improving education quality, fostering empathy, and enhancing professional ethics among students. The findings indicate that humanistic care not only elevates the overall level of nursing education but also strengthens students' professional identity and social responsibility. The paper concludes with suggestions for further promoting and deepening the integration of humanistic care in future nursing education, emphasizing the significance of cross-cultural exchange and collaboration. This study aims to provide theoretical support and practical guidance for nursing educators, promoting continuous development and innovation in nursing education.

Keywords: Nursing Education; Humanistic Care; Theoretical Foundations; Curriculum Design; Cross-Cultural Exchange

1. PREFACE

1.1 Research Background and Significance

Modern nursing education has undergone significant transformations globally. With the advancement of medical technology and the increasing demand for healthcare services, the content and methods of nursing education are constantly being updated. However, technological progress alone cannot fully meet the needs of patients, who require not only high-quality medical support but also emotional care and psychological support from nursing staff. The concept of humanistic care is particularly important in this context. Humanistic care is not only a crucial component of nursing education but also a key factor in improving the quality of nursing services. By cultivating the humanistic care abilities of nursing students, their professional quality and social responsibility can be enhanced, enabling them to better serve patients and society.

1.2 Research Objectives and Methods

This study aims to explore the theoretical foundation, development process, and application and impact of the concept of humanistic care in modern nursing education globally. Through a systematic literature review, this paper comprehensively reviews and analyzes relevant research at home and abroad, focusing on the importance of humanistic care in nursing education, its theoretical framework, and implementation strategies. The research process involves a historical review of the origins and development of the concept of humanistic care, analyzing its evolution and adaptability in different cultural contexts. Subsequently, the paper discusses the specific applications of humanistic care in nursing education, including curriculum design, teaching methods, and evaluation standards. By comparing the current state of nursing education domestically and internationally, the paper summarizes the positive role of humanistic care in improving the quality of nursing education, cultivating students'

empathy, and enhancing their professional quality.

1.3 Review of Domestic and International Research Status

Research on the concept of humanistic care in nursing education has accumulated over a long period both domestically and internationally. Domestic research mainly focuses on the application and effects of humanistic care in vocational colleges and clinical nursing teaching. Xu Xingfang (2021) pointed out that vocational colleges should focus on cultivating students' humanistic spirit to better care for patients in their future nursing work. Pan Changling (2015) emphasized that cultivating the humanistic spirit of nursing students through practical activities can effectively enhance their overall quality. Wang Jian (2020) studied the application of humanistic care in clinical nursing teaching, suggesting that this concept not only improves the professional quality of nursing students but also enhances their psychological support abilities. Zhang Yanpei (2018) explored how to cultivate students' humanistic care abilities in nursing teaching, proposing various teaching methods such as role-playing and case discussions to develop students' empathy and care awareness.

Internationally, the importance of humanistic care in nursing education is also widely recognized. Yang Baoyan, Xu Jianping, and Yang Baowei (2011) found that integrating humanistic care into orthopedic nursing teaching not only improved students' professional skills but also enhanced their awareness of patient care. Li Huiling (2024) studied the principles and practical directions of modern nursing humanistic care from the perspective of Confucian and Taoist life philosophy, suggesting that humanistic care education should focus on bioethics and holistic patient care. Lin Jing (2010) pointed out that integrating humanistic care into nursing education should not only focus on improving nursing skills but also emphasize cultural adaptability education, helping students understand and respect the needs of patients from different cultural backgrounds.

2. THEORETICAL FOUNDATION OF HUMANISTIC CARE CONCEPT

2.1 Origin and Development of Humanistic Care

The concept of humanistic care can be traced back to ancient philosophy and religious thoughts. Ancient Greek philosophers such as Socrates, Plato, and Aristotle emphasized the importance of caring for others and moral ethics. Christianity, Buddhism, and Confucianism also advocate for benevolence, compassion, and caring for others. Over time, these ideas gradually permeated the fields of medicine and nursing, forming the basis of the modern concept of humanistic care.

In the mid-20th century, with the rapid development of medical technology, medical practice became highly technical and specialized. However, this trend towards technological supremacy also led to the neglect of patients' emotional and psychological needs. To address this issue, nursing scholars and practitioners began to re-examine the essence of nursing, emphasizing that nursing is not just about technical operations but also about comprehensive care for patients. The work of nursing theorists such as Virginia Henderson and Jean Watson laid the theoretical foundation for the application of humanistic care in nursing. Henderson's fourteen basic needs of nursing and Watson's theory of caring both emphasize humanistic care in nursing.

2.2 Core Concepts and Connotations of Humanistic Care

The core concepts of humanistic care include empathy, respect, care, and ethical responsibility. Empathy refers to the ability of nursing staff to understand and feel the emotions and needs of patients, thereby providing more targeted nursing services. Respect involves acknowledging the dignity, privacy, and autonomy of patients during the nursing process. Care means that nursing staff treat patients with sincerity and warmth, offering emotional support and comfort. Ethical responsibility involves adhering to ethical principles in nursing practice, safeguarding the interests and rights of patients.

The connotations of humanistic care include not only emotional and psychological support for patients but also attention to their overall health. This overall health encompasses physical, psychological, social, and spiritual health. Nursing staff should consider the

physiological, psychological, social, and spiritual needs of patients comprehensively when providing nursing services, offering holistic care.

2.3 Importance of Humanistic Care in Nursing Education

The importance of humanistic care in nursing education is reflected in several aspects. Firstly, it helps cultivate the professional quality and social responsibility of nursing students. By learning and practicing humanistic care, nursing students can better understand and respect patients' needs, enhancing their empathy and awareness of care. Secondly, it contributes to improving the overall quality of nursing education. Integrating humanistic care into nursing education can make it more comprehensive and systematic, cultivating high-quality nursing talents with a spirit of humanistic care. Moreover, the application of humanistic care in nursing education can enhance nursing students' professional identity and job satisfaction. Studies have shown that nursing students who receive humanistic care education can better adapt to the work environment, reduce professional burnout, and increase job satisfaction after entering clinical work. Humanistic care can also promote the psychological health of nursing students, helping them better cope with work-related stress and challenges.

3. HUMANISTIC CARE CONCEPT IN MODERN NURSING EDUCATION

3.1 Current Situation and Challenges of Nursing Education

Modern nursing education faces numerous challenges globally. Firstly, with the continuous advancement of medical technology, the content and methods of nursing education need constant updating to adapt to new technologies and methods. However, this technological progress has also led to the neglect of humanistic care, with many nursing education institutions focusing more on technical operations and professional knowledge in their curriculum design, overlooking the cultivation of students' humanistic care abilities. Secondly, there are significant differences in nursing education resources and conditions between different regions and countries, with many developing countries lacking the resources to provide high-quality nursing education. Additionally, nursing education faces issues such as increasing student numbers, teacher shortages, and varying education quality.

3.2 Application of Humanistic Care Concept in Nursing Education

Guided by the concept of humanistic care, nursing education can cultivate students' humanistic care abilities through various means. Firstly, integrating humanistic care into curriculum design can be achieved by setting up specialized humanistic care courses or adding humanistic care content to existing courses, allowing students to understand and master the core concepts and methods of humanistic care while learning professional knowledge. Secondly, diverse teaching methods such as role-playing, case discussions, and group discussions can help students experience and understand the significance and importance of humanistic care in practice. Additionally, clinical internships and community service activities can allow students to apply and test the humanistic care concepts they have learned in real work settings, enhancing their practical abilities and professional quality.

3.3 Impact of Humanistic Care Concept on Nursing Education Quality

The application of the humanistic care concept positively impacts the quality of nursing education. Firstly, it can enhance the overall quality of nursing education, making it more comprehensive and systematic. Integrating humanistic care into nursing education can cultivate high-quality nursing talents with a spirit of humanistic care, improving the quality and level of nursing services. Secondly, it can enhance nursing students' professional identity and job satisfaction, helping them better adapt to the work environment, reduce professional burnout, and increase job satisfaction. Furthermore, humanistic care can promote the psychological health of nursing students, helping them better cope with work-related stress and challenges.

4. IMPLEMENTATION STRATEGIES OF HUMANISTIC CARE CONCEPT IN NURSING EDUCATION

4.1 Curriculum Design and Teaching Methods

Guided by the concept of humanistic care, the curriculum design of nursing education should emphasize the combination of theory and practice. By setting up specialized humanistic care courses or adding humanistic care content to existing courses, students can understand and master the core concepts and methods of humanistic care while learning professional knowledge. Diverse teaching methods such as role-playing, case discussions, and group discussions can help students experience and understand the significance and importance of humanistic care in practice. Clinical internships and community service activities can allow students to apply and test the humanistic care concepts they have learned in real work settings, enhancing their practical abilities and professional quality.

4.2 Teacher Training and Professional Development

Teachers play a crucial role in nursing education as they are not only knowledge transmitters but also cultivators of students' humanistic care abilities. Therefore, teacher training and professional development are essential for the implementation of humanistic care. Nursing education institutions should enhance teachers' awareness and abilities of humanistic care through regular training and continuing education, enabling them to better teach and practice the concept of humanistic care. Additionally, nursing education institutions should encourage teachers to participate in academic research and international exchanges to understand and learn from advanced nursing education concepts and methods globally, continuously improving their professional quality and teaching levels.

4.3 Student Evaluation and Feedback Mechanism

To ensure the effective implementation of humanistic care in nursing education, nursing education institutions should establish a scientific student evaluation and feedback mechanism. Comprehensive evaluation methods such as theoretical exams, practical assessments, self-evaluations, and teacher evaluations should be used to assess students' humanistic care abilities and professional quality comprehensively. Nursing education institutions should also regularly collect student feedback to understand their needs and issues during the learning process, continuously improving and optimizing teaching content and methods to enhance the quality and effectiveness of nursing education.

5. HUMANISTIC CARE CONCEPT FROM A CROSS-CULTURAL PERSPECTIVE

5.1 Humanistic Care in Different Cultural Contexts

The application and practice of humanistic care vary in different cultural contexts. Patients from different cultural backgrounds have different values, beliefs, customs, and behaviors, which affect their needs and expectations for nursing services. Therefore, nursing staff should respect and understand patients' cultural backgrounds, providing nursing services that meet their cultural needs. Nursing education should include cross-cultural education to help students understand and respect the needs of patients from different cultural backgrounds, cultivating their cross-cultural nursing abilities.

5.2 Cross-Cultural Exchange and Cooperation

Cross-cultural exchange and cooperation are important ways to enhance the quality of nursing education and humanistic care abilities. Through international exchange and cooperation, nursing education institutions can understand and learn from advanced nursing education concepts and methods globally, continuously improving their education quality and levels. Nursing education institutions can promote cross-cultural exchange and cooperation through joint training, teacher exchanges, and student exchanges with foreign nursing education institutions, enhancing students' cross-cultural nursing abilities and humanistic care awareness.

5.3 Humanistic Care Practices in Global Nursing Education

The practice of humanistic care in global nursing education provides valuable experience and references for nursing education. Many countries and regions have integrated the concept of humanistic care into nursing education, cultivating students' humanistic care abilities and professional quality through curriculum design, teaching methods, teacher training, and student

evaluation. Nursing education institutions should understand and learn from advanced nursing education concepts and methods globally through international exchange and cooperation, continuously improving their education quality and levels, and cultivating high-quality nursing talents with a spirit of humanistic care.

6. CONCLUSION

6.1 Research Summary

By exploring the theoretical foundation, development process, and application and impact of the concept of humanistic care in modern nursing education globally, it is evident that humanistic care holds an important position and role in nursing education. The concept of humanistic care not only helps improve the overall quality of nursing education but also enhances students' professional identity and social responsibility, promoting their psychological health and professional development.

6.2 Future Research Directions

Future research should further explore the best practice models of humanistic care education, continuously innovating teaching methods by combining technological progress and social needs to cultivate more high-quality nursing talents with a spirit of humanistic care. Research should also focus on the application and practice of humanistic care in different cultural contexts, exploring effective ways and methods for cross-cultural nursing education.

6.3 Suggestions for Nursing Education Practice

Nursing education institutions should comprehensively integrate the concept of humanistic care through curriculum design, teaching methods, teacher training, and student evaluation to improve the quality and level of nursing education. By understanding and learning from advanced nursing education concepts and methods globally through international exchange and cooperation, nursing education institutions can continuously improve their education quality and levels, cultivating high-quality nursing talents with a spirit of humanistic care.

REFERENCES

[1] Xu Xingfang. Discussion on Integrating Humanistic Care Concept in Nursing Education of Vocational Colleges [J]. Science Consultation (Science and Technology · Management), 2021(9):137-138.

[2] Li Huiling. Research on the Principles and Practical Directions of Modern Nursing Humanistic Care - From the Perspective of Confucian and Taoist Life Philosophy [D]. Soochow University [2024-07-25]. DOI: CNKI: CDMD: 1.1016.221402.

[3] Yang Baoyan, Xu Jianping, Yang Baowei. Application of Humanistic Care in Orthopedic Nursing Teaching [J]. International Journal of Nursing, 2011, 30:1078-1080. DOI: 10.3760/CMA.J.ISSN.1673-4351.2011.07.060.

[4] Wang Jian. The Application Value of Humanistic Care Concept in Clinical Nursing Teaching [J]. Oriental Dietary Therapy, 2020 Issue 11, Page 218, 2020.

[5] Pan Changling. Practice and Reflection on Cultivating Humanistic Spirit of Nursing Students in Vocational Colleges through Activities [J]. Health Vocational Education, 2015.

[6] Zhang Yanpei. How to Cultivate Students' Humanistic Care Ability in Nursing Teaching [J]. Software (Education Modernization) (Electronic Edition), 2018.

[7] Yang Mei, Chen Feng, Zhang Wenjie. Practice and Effect of Humanistic Care Training for Nurses Led by Nursing Department [J]. Health Vocational Education, 2020(023):038.

[8] Zeng Lijuan. Discussion on Humanistic Care Education in Pediatric Nursing [J]. Health Vocational Education, 2014, 32(20):2. DOI: CNKI: SUN: ZDYX.0.2014-20-046.

[9] Zhu Feifei, Li Jing, Lv Zhengfeng. Exploration on Integrating Medical Humanistic Care into the Training of Elderly Care Specialty in Vocational Colleges [J]. Education Modernization, 2021(58):45-48,94.

[10] Lin Jing. Discussion on Integrating Humanistic Care Concept in Nursing Education [J]. Success: Middle and Lower, 2010(9):1. DOI: CNKI: SUN: CJJY.0.2010-09-159.

[11] Zhao Yi, Liu Ying. Cultivating the Concept of Humanistic Care in Nursing Students in Pediatric Nursing Teaching [J]. Science Education Culture, 2018(9):2. DOI: CNKI: SUN: KJXH.0.2018-03-034.

Study on the Relationship Between Art Design Curriculum Teaching and Student Creativity Development

Fengqi Yang*
Sehan University, Jeollanam-do, 57447, Korea
**Corresponding Author.*

Abstract: This research investigates the relationship between art design curriculum teaching and the cultivation of student creativity, aiming to provide theoretical support and practical guidance for educators. By systematically reviewing domestic and international literature, the study analyzes how teaching objectives, methods, and course settings in art design impact student creativity. Utilizing a literature analysis approach, the study synthesizes existing research to reveal effective strategies and issues in art design teaching for creativity enhancement. The research involves the following steps: collecting relevant literature, classifying and analyzing the impact of various teaching methods and course settings on student creativity, and proposing optimization suggestions based on current societal trends. Results indicate that art design curriculum teaching plays a crucial role in fostering student creativity through diversified teaching methods and course configurations. However, current art design teaching faces challenges such as monotonous methods and unreasonable course settings. Thus, it is recommended that educators innovate teaching methods and optimize course structures, employing interdisciplinary collaboration and practical teaching to further enhance student creativity. This study provides theoretical support and practical references for the relationship between art design curriculum teaching and student creativity development.

Keywords: Art Design Curriculum; Student Creativity; Teaching Methods; Course Settings; Educational Innovation

1. INTRODUCTION

1.1 Research Background and Significance

As an essential component of art education, art design courses play a crucial role not only in cultivating students' artistic literacy but also in stimulating their creativity and innovative thinking. With the increasing demand for innovative talents in society, effectively nurturing students' creativity through art design course teaching has become a pressing issue in the field of education.

The teaching of art design courses involves not only the transmission of artistic skills but, more importantly, the use of diverse teaching methods and course designs to stimulate students' creative potential, foster their innovative thinking, and enhance their problem-solving abilities. In this process, teachers are not just conveyors of knowledge but also guides and inspirers. They need to use flexible teaching strategies and methods to help students break free from the confines of conventional thinking and ignite their creative inspiration.

Researching the teaching methods of art design courses holds significant theoretical importance. As a key medium for cultivating students' creativity, art design courses can, through research and practice, yield a series of effective teaching models and methods. These models and methods can be applied not only to art design courses but also provide references for innovative education in other disciplines. The practical significance of researching art design course teaching methods is also evident. In actual teaching scenarios, teachers face numerous practical challenges, such as how to spark students' interest, guide them in creative thinking, and evaluate their works. Through research, suitable teaching strategies for different

student groups can be explored, thereby enhancing teaching effectiveness and truly realizing personalized and diversified education.

With the advancement of technology, art design courses are also encountering new challenges and opportunities. For instance, the development of digital media technology offers new tools and methods for art design courses, but it also demands higher technical literacy and teaching capabilities from teachers. Research can assist teachers in better adapting to these changes, improving their professional skills, and better serving students' development.

1.2 Review of Domestic and International Research

In China, the research on art design course teaching and the cultivation of students' creativity has gradually gained attention. Pan Chunzhu (2020) pointed out in his study that strategies for cultivating students' creativity in secondary vocational art design teaching mainly focus on practical teaching, emphasizing the stimulation of students' creativity through hands-on activities and project design. Zhao Ying (2019) also emphasized the importance of cultivating students' creativity in secondary vocational art design teaching, suggesting that teachers should combine students' interests and use diverse teaching methods to stimulate their creative potential. Tian Tian (2012), through her study on primary school art education, proposed that creativity should be cultivated through game-based teaching and situational creation, a method applicable not only to primary education but also providing references for secondary vocational and high school art education.

Additionally, Su Jingling (2014) proposed that in secondary vocational art design teaching, teachers should focus on the development of students' individuality and stimulate their creativity through diversified teaching models. This viewpoint is supported by Peng Min (2021), who, in his research, pointed out that in primary and secondary school art teaching, teachers should guide students in creative drawing and design practices to cultivate their creativity. Shen Yiqing (2019) emphasized the importance of comprehensive practical activities in high school art course teaching, promoting the development of students' creativity through interdisciplinary practical activities.

Qin Yuyu (2021) further explored the methods of cultivating students' creativity in secondary vocational art design teaching, emphasizing the importance of project-based teaching and student self-creation. Pu Yan (2021) suggested enhancing students' creativity through innovative projects and practical courses. Furthermore, Liu Yandou (2024) explored the possibility of integrating contemporary art into junior high school art teaching, arguing that the introduction of contemporary art can broaden students' artistic horizons and stimulate their creativity.

Internationally, the research on art design course teaching and the cultivation of students' creativity is relatively systematic and in-depth. Western countries, especially in Europe and America, place significant emphasis on cultivating students' creativity through art education, having established a comprehensive educational system. International research generally acknowledges the crucial role of art education in fostering students' creativity, suggesting that diverse teaching methods and course designs can effectively enhance students' creativity.

In the United States, art education emphasizes cultivating students' creativity through hands-on activities and project design. For example, the STEAM education model (Science, Technology, Engineering, Art, and Mathematics) in the U.S. integrates art with science and technology, stimulating students' creativity and innovation through interdisciplinary projects and practical activities. British art education also focuses heavily on cultivating students' creativity, encouraging independent exploration and innovation through diverse teaching methods and course designs.

Moreover, Finland's education system is renowned for its high quality and innovation. In Finland, art education is considered an important means of fostering students' creativity and problem-solving abilities. Finnish art courses emphasize practice and project orientation, nurturing students' creativity and innovative thinking through hands-on and creative design activities.

There are some commonalities and significant differences in the research on art design course teaching and the cultivation of students' creativity between domestic and international contexts. Commonalities include an emphasis on cultivating students' creativity through hands-on activities and project design. Domestic research focuses more on secondary vocational and primary and secondary school art education, emphasizing diverse teaching methods and course designs to stimulate students' creative potential. International research is more systematic and in-depth, emphasizing the cultivation of students' creativity and innovative abilities through interdisciplinary projects and practical activities. Differences include a more comprehensive art education system abroad, with more diverse course designs and teaching methods that focus on fostering students' independent exploration and innovation abilities. In contrast, domestic art education relies more on teachers' guidance and classroom teaching. Although there have been significant improvements in teaching methods and course designs in recent years, there is still room for improvement in terms of systematization and depth.

In line with the spirit of the Two Sessions and current social hotspots, cultivating students' creativity has become an important task in the field of education. During the Two Sessions, national leaders repeatedly emphasized the importance of innovation and creativity, proposing that educational reforms should enhance students' innovative abilities. This spirit has been actively responded to in the field of art education. Currently, with the increasing demand for innovative talents in society, art design courses, as a crucial means of cultivating students' creativity, are receiving more and more attention. Through diverse teaching methods and course designs, cultivating students' creativity can not only enhance their artistic literacy but also promote their overall development, preparing them to meet future societal demands.

In summary, the research on the relationship between art design course teaching and the cultivation of students' creativity is highly valued both domestically and internationally. Diverse teaching methods and course designs can effectively enhance students' creativity, nurturing innovative talents to meet future societal needs. In line with the spirit of the Two Sessions and current social hotspots, future research should focus on interdisciplinary collaboration and practical teaching innovation to contribute to the cultivation of more innovative and talented individuals.

1.3 Research Objectives and Methods

This study aims to explore the relationship between art design course teaching and the cultivation of students' creativity, providing theoretical support and practical guidance for educators. The research method primarily involves literature analysis, synthesizing existing research findings to reveal effective strategies and existing issues in art design course teaching for cultivating students' creativity. The research process includes collecting and organizing relevant domestic and international literature, classifying and analyzing these documents, summarizing the impact of different teaching methods and course designs on students' creativity, and, in line with the spirit of the Two Sessions and current social hotspots, proposing suggestions for optimizing art design course teaching.

2. THEORETICAL FOUNDATIONS OF ART DESIGN COURSE TEACHING

2.1 Teaching Objectives and Connotations of Art Design Courses

The teaching objectives of art design courses are not only to impart basic artistic skills to students but, more importantly, to cultivate their creativity and innovative thinking through the artistic creation process. The connotations of art design courses include the training of artistic skills, the study of art theory, and the practice of artistic creation. Through these aspects, students not only acquire basic artistic skills but also stimulate their creativity during the creative process, fostering their ability to think independently and solve problems.

The training of artistic skills forms the foundation of art design courses. Through systematic training in painting, sculpture, design, and other skills, students can master various artistic expression techniques. Meanwhile, the study of art theory helps students understand the historical context, developmental trajectory, and theoretical

foundations of art, enhancing their artistic appreciation and theoretical literacy. Most importantly, the practical aspect of artistic creation allows students to participate in the creative process firsthand, cultivating their ability to think independently and solve problems, and stimulating their innovative thinking and creativity.

2.2 Theoretical Exploration of Teaching Methods

Teaching methods play a crucial role in art design courses. Traditional teaching methods primarily involve teacher-centered instruction, where students passively receive knowledge and lack opportunities for active participation and creation. Modern educational theories emphasize a student-centered approach, using diverse teaching methods to stimulate students' interest in learning and their creativity. Methods such as project-based learning, inquiry-based learning, and cooperative learning can effectively enhance students' creativity and innovative abilities.

Project-based learning involves practical operations and project design, allowing students to cultivate their creativity and innovative thinking while solving real-world problems. This method enables students to apply their knowledge in real-life situations, better understanding and mastering the course content.

Inquiry-based learning emphasizes students' autonomous exploration. By posing questions, seeking answers, and solving problems, students' creativity is stimulated. Through practical operations and continuous trial and error during the inquiry process, students develop their independent thinking and problem-solving skills.

Cooperative learning, through group collaboration and team projects, fosters students' cooperative abilities and creativity. In cooperative learning, students work together to complete tasks, not only enhancing their social and communication skills but also inspiring more creative and innovative ideas through mutual inspiration.

2.3 Theoretical Foundations for Creativity Cultivation

The theoretical foundations for creativity cultivation primarily include relevant theories from psychology and education. Psychological research shows that creativity is an individual's ability to generate novel and valuable ideas and solutions when faced with problems and challenges. Education emphasizes the stimulation of students' creativity and innovative thinking through appropriate teaching methods and curriculum design.

Torrance's theory of creativity cultivation posits that creativity can be enhanced through appropriate education and training. Torrance's Tests of Creative Thinking (TTCT) are important tools for measuring students' creativity, assessing their performance in fluency, flexibility, originality, and elaboration to understand their creative levels. Based on Torrance's theory, art design courses can cultivate students' creativity through diverse teaching methods and curriculum design.

In practice, teachers can design diverse course content and activities to increase students' active participation and creativity. For example, in painting classes, teachers can set creative tasks with different themes for students to freely express themselves; in design classes, students can engage in actual project design and production, enhancing their creativity and innovative abilities by solving real-world problems.

In summary, the theoretical foundations of art design course teaching are rich and varied. Through scientific objective setting, effective application of teaching methods, and theoretical support, students' artistic literacy and creativity can be comprehensively enhanced, laying a solid foundation for their future development.

3. THE IMPACT OF ART DESIGN COURSES ON STUDENTS' CREATIVITY

3.1 Relationship Between Teaching Objectives and Students' Creativity

The teaching objectives of art design courses directly influence the cultivation of students' creativity. With clear teaching objectives, teachers can design targeted teaching content and activities to stimulate students' creativity. For example, by setting creative design projects, students can cultivate their creativity and innovative thinking while solving real-world problems. The setting of teaching objectives should focus on students' individual development and creativity cultivation,

avoiding overemphasis on skill training at the expense of creativity. A clear teaching objective should include the following aspects:
Clarifying the Value of Creativity and Innovation: At the beginning of the course, teachers should clearly communicate the importance of creativity and innovation. This not only stimulates students' interest but also makes them aware of the practical application value of creativity.
Setting Specific Creative Tasks: Tasks and projects should be challenging, guiding students to engage in deep thinking and exploration. For example, by designing art works with an environmental theme, students can combine practical issues to propose innovative solutions.
Diversified Assessment Criteria: Assessment criteria should not be limited to skill mastery but should also include the uniqueness of creativity, the flexibility of thinking, and the innovation in problem-solving.

3.2 Impact of Teaching Methods on Students' Creativity

Teaching methods play a crucial role in art design courses. Traditional teaching methods primarily involve teacher-centered instruction, where students passively receive knowledge and lack opportunities for active participation and creation. Modern educational theories emphasize a student-centered approach, using diverse teaching methods to stimulate students' interest in learning and their creativity. Methods such as project-based learning, inquiry-based learning, and cooperative learning can effectively enhance students' creativity and innovative abilities. These teaching methods can effectively enhance students' creativity. For example, in a design task, students not only need to exercise their personal creativity but also collaborate with team members, integrating their respective strengths and insights to ultimately complete an innovative project.

3.3 Correlation Between Curriculum Design and Students' Creativity

Curriculum design plays a significant role in art design courses. Reasonable curriculum design can provide students with rich learning resources and creative opportunities, stimulating their creativity and innovative thinking. Curriculum design should emphasize diversity and flexibility, avoiding single, mechanical skill training, and instead introducing different art forms and creative methods to cultivate students' creativity.
Diverse Course Content: Introducing various forms such as painting, sculpture, digital art, and installation art allows students to be exposed to different artistic media, broadening their creative horizons.
Interdisciplinary Collaboration: By setting interdisciplinary courses such as science and art, technology and design, students can stimulate their creativity and innovative thinking at the intersection of different disciplines. For example, by combining with science courses, students can learn more scientific principles, incorporating scientific elements into their artistic creations to produce new art forms.
Flexible Course Arrangement: Curriculum design should provide students with sufficient time and space for creation and exploration, avoiding cramming-style teaching. Open workshops can be set up for students to freely create, or regular exhibitions and exchange activities can be held to stimulate students' creative enthusiasm.
Utilization of Social and Cultural Resources: Utilizing social resources such as museums, art galleries, and cultural centers to organize students for visits and learning, broadening their horizons and inspiring their creative inspiration.
Through scientific and reasonable curriculum design, students can not only master diverse artistic skills but also continuously challenge themselves in a rich creative environment, stimulating their creative potential. In summary, art design courses, through clear teaching objectives, diverse teaching methods, and reasonable curriculum design, can effectively promote the cultivation of students' creativity, providing a solid foundation and broad space for their future development.

4. ISSUES IN ART DESIGN COURSE TEACHING

4.1 The Problem of Monotonous Teaching Methods

In the current art design course teaching, the problem of monotonous teaching methods is quite prominent. Many teachers still adopt traditional lecture-based teaching methods, where students passively receive knowledge

and lack opportunities for active participation and creation. This teaching method not only limits the development of students' creativity but also easily leads to a loss of interest in art design courses.

Traditional lecture-based teaching methods mainly rely on the unidirectional transmission of knowledge from teachers to students, who are passive recipients. In this teaching model, students' thinking and creativity are not fully stimulated, and their learning process is more about mechanical memorization and repetitive practice. This is not conducive to cultivating students' creativity and cannot meet the modern education requirements for innovative talents.

Therefore, teachers should focus on innovating teaching methods and use diverse methods to stimulate students' interest in learning and creativity. For example, teachers can adopt project-based learning, inquiry-based learning, and cooperative learning methods, allowing students to learn through practical operations and interactions, thereby cultivating their creativity and innovative thinking.

4.2 The Problem of Unreasonable Curriculum Design

Unreasonable curriculum design is another significant issue in art design course teaching. Many schools have overly simplistic art design curricula that lack diversity and flexibility, failing to meet students' individualized needs and the requirements for cultivating creativity.

Traditional art design curricula often overemphasize the training of basic skills, neglecting students' individual development and creativity cultivation. The course content is too uniform, and the teaching format is too rigid, making it difficult to stimulate students' enthusiasm for creation and innovative thinking.

Curriculum design should emphasize diversity and flexibility by introducing different art forms and creative methods to cultivate students' creativity. For example, by setting up interdisciplinary courses, students can be stimulated at the intersections of different disciplines, enhancing their creativity and innovative thinking. Additionally, the curriculum content should be aligned with current developments and technological advancements, incorporating emerging fields such as digital art and interactive design to broaden students' creative horizons and practical opportunities.

4.3 Challenges in Teachers' Professional Competence and Innovative Teaching

The professional competence and innovative teaching capabilities of teachers directly affect the effectiveness of art design course teaching. Many teachers lack awareness and ability in innovation, making it challenging to effectively stimulate students' creativity.

Teachers often rely on traditional teaching experiences and methods, lacking understanding and application of new educational theories and teaching methods. In such cases, students' learning processes become monotonous and tedious, making it difficult to effectively stimulate and cultivate their creativity.

Therefore, teachers should continuously enhance their professional competence and innovative teaching abilities by participating in training and further education to master the latest educational theories and teaching methods, thereby improving teaching effectiveness. For example, teachers can attend art education seminars and training courses both domestically and internationally to learn advanced educational concepts and teaching methods. Schools should also provide more opportunities for teachers to learn and develop, encouraging them to innovate and practice in teaching.

Moreover, teachers should focus on their own artistic creation practice, continuously improving their artistic literacy and creative abilities. By personally engaging in artistic creation, teachers can better understand the challenges and issues in the creative process, providing more targeted and practical guidance in teaching.

In summary, the issues of monotonous teaching methods, unreasonable curriculum design, and challenges in teachers' professional competence and innovative teaching in art design course teaching require systematic educational reform and continuous improvement by teachers to resolve. Only by comprehensively enhancing teaching methods, curriculum design, and teachers' professional competence can the development of students' creativity be effectively promoted, cultivating

more innovative art talents.

5. STRATEGIES FOR OPTIMIZING ART DESIGN COURSE TEACHING

5.1 Innovation and Diversification of Teaching Methods

Innovating and diversifying teaching methods is crucial for enhancing the effectiveness of art design course teaching. Teachers should use diverse teaching methods to stimulate students' interest in learning and creativity. For example, through project-based learning, inquiry-based learning, and cooperative learning methods, students can cultivate their creativity and innovative thinking through practical operations and project design. Additionally, teachers can introduce modern technological tools such as virtual reality (VR) and augmented reality (AR) to enhance teaching effectiveness and stimulate students' creativity.

The introduction of modern technological tools can significantly enhance the teaching effectiveness of art design courses. The application of VR and AR technologies provides students with a richer and more vivid learning experience. Through VR technology, students can engage in artistic creation in a virtual environment, breaking the constraints of time and space and gaining more creative inspiration. AR technology can combine virtual art works with the real world, allowing students to more intuitively experience the charm of art. Teachers can use these modern technological tools to provide students with more learning resources and creative spaces, thereby stimulating their creativity and innovative thinking.

In conclusion, the innovation and diversification of teaching methods are crucial for enhancing the effectiveness of art design course teaching. Through diverse teaching methods such as project-based learning, inquiry-based learning, and cooperative learning, combined with modern technological tools, teachers can stimulate students' interest in learning and creativity, cultivate their innovative thinking, and comprehensively enhance the teaching effectiveness of art design courses. This not only contributes to the comprehensive development of students but also helps society cultivate more innovative and practical talents.

5.2 Scientific and Systematic Curriculum Design

Scientific and systematic curriculum design is essential for enhancing the effectiveness of art design course teaching. Schools should provide students with rich learning resources and creative opportunities through scientific and reasonable curriculum design, stimulating their creativity and innovative thinking. For example, by setting up interdisciplinary courses, students can be stimulated at the intersections of different disciplines, enhancing their creativity and innovative thinking. Additionally, schools should focus on systematic curriculum design, improving teaching effectiveness through reasonable course arrangements and teaching plans.

5.3 Exploration of Interdisciplinary Collaboration and Practical Teaching

Interdisciplinary collaboration and practical teaching are crucial for enhancing the effectiveness of art design course teaching. Through interdisciplinary collaboration, students can be stimulated at the intersections of different disciplines, enhancing their creativity and innovative thinking. For example, by collaborating with disciplines such as science, technology, engineering, and mathematics, interdisciplinary projects and practical activities can be conducted to cultivate students' creativity and innovative abilities. Additionally, schools should focus on practical teaching, allowing students to cultivate their creativity and innovative thinking through practical operations and project design while solving real-world problems.

6. CONCLUSION

This study systematically reviews domestic and international literature on art design course teaching and the cultivation of students' creativity, revealing effective strategies and existing issues in art design course teaching for cultivating students' creativity. The research results indicate that art design course teaching plays a crucial role in cultivating students' creativity. Through diverse teaching methods and curriculum design, students' creativity can be effectively enhanced. However, current art design course teaching still faces issues such as monotonous teaching methods and unreasonable curriculum design.

This study primarily adopts the literature analysis method. Although it reveals effective strategies and existing issues in art design course teaching for cultivating students' creativity, it has some limitations. For example, the study is mainly based on a comprehensive review of existing literature and lacks empirical data support. Future research can further validate and enrich the conclusions of this study through empirical research and case analysis.

To enhance the effectiveness of art design course teaching and cultivate students' creativity, educators should focus on innovating teaching methods and optimizing curriculum design, further enhancing students' creativity through interdisciplinary collaboration and practical teaching. Additionally, the government and educational departments should strengthen policy support, providing more resources and platforms to promote the development and innovation of art education. Future research should focus on exploring interdisciplinary collaboration and practical teaching to contribute to the cultivation of more innovative talents.

REFERENCES

[1] Pan, Chunzhu. "Strategies for Cultivating Students' Creativity in Secondary Vocational Art Design Teaching." Curriculum Education Research: Foreign Language Learning and Teaching Research, 2020, 000(012):P.1-1.

[2] Zhao, Ying. "Research on the Cultivation of Students' Creativity in Secondary Vocational Art Design Teaching." New Education Era Electronic Magazine (Teacher Edition), 2019.

[3] Tian, Tian. "Research on Strategies for Cultivating Students' Creativity in Primary School Art Education." Shandong Normal University, 2012. DOI:10.7666/d.D211196.

[4] Su, Jingling. "Discussion on the Cultivation of Students' Creativity in Secondary Vocational Art Design Teaching." Enterprise Science and Technology Development: Second Half of the Month, 2014(8):2. DOI:10.3969/j.issn.1674-0688.2014.16.038.

[5] Peng, Min. "Research on the Cultivation of Students' Creativity in Primary and Secondary School Art Teaching." Literature Youth, 2021(31):0092-0092.

[6] Shen, Yiqing. "Research on the Application of Comprehensive Practical Activities in High School Art Courses in the Context of Art Subjects in Shanghai." Shanghai Normal University, 2019. DOI:10.7666/d.Y3543053.

[7] Tian, Tian. "Research on Strategies for Cultivating Students' Creativity in Primary School Art Education." Shandong Normal University [2024-07-31].

[8] Han, Yuncheng. "Cultivating Students' Creativity in Middle School Art Design Courses." Weekly Journal: First Half of the Month, 2011(3):1.

[9] Qin, Yuyu. "Exploration of Cultivating Students' Creativity in Secondary Vocational Art Design Teaching." Computer Paradise, 2021(006):000.

[10] Cao, Peimin. "Deepening Research on Effective Teaching in Primary School Art Classes from the Perspective of Creativity Cultivation—Based on Torrance's Creativity Incubation Teaching Model (TIM)." Education Observation, 2014, 3(30):4.

[11] Hu, Fangfang. "Discussion on Creative Teaching in Art Subjects." New Generation (Second Half of the Month), 2013, 000(005):228-228.

[12] Zhang, Hui. "Preliminary Exploration of Suggestions for Sketch Teaching in Colleges and Universities." Qingdao University of Technology, 2012. DOI:10.7666/d.Y2237445.

[13] Pu, Yan. "Research on the Path of Cultivating Students' Creativity in Secondary Vocational Art and Design Teaching." Century Star—High School Edition, 2021(12):0099-0100.

[14] Liang, Qian. "Research on the Application of 'Turning Waste into Treasure' Environmental Protection Concept in Rural Middle School Art Teaching." [2024-07-31].

[15] Wu, Haijing. "Exploration of Characteristic Art Teaching in Chalu Middle School, Huoqiu County, Anhui Province." Hefei Normal University [2024-07-31]. DOI:CNKI:CDMD:2.1015.581788.

[16] Liu, Yandou. "Exploration of Integrating Contemporary Art into Junior High School Art Teaching." Shaanxi Normal University [2024-07-31].

[17] Li, Lihong. "New Exploration of the Teaching System of Basic Courses in Art

Design Major." Art Research, 2005(3):2. DOI:CNKI:SUN:MUSE.0.2005-03-023.
[18] Yao, Jiyun. "My Views on Landscape (Architecture) Teaching." Planners, 2004. DOI:CNKI:SUN:GHSI.0.2004-01-032.
[19] Zhang, Ling. "Design of the New Printmaking Teaching System." Literary Research, 2007(8):2. DOI:CNKI:SUN:WYYJ.0.2007-08-024.
[20] Yan, Suqin. "Discussion on How to Cultivate Children's Creativity in Painting Teaching." Journal of Inner Mongolia Normal University: Educational Science Edition, 1998(1):1. DOI:CNKI:SUN:NMJX.0.1998-01-075.
[21] Bai, Haas. "Innovative Application of Art Elements in Plastic Decorative Products." Plastic Industry, 2024(002):052.

A Study on the Impact Coefficient of Mental Health Education on College Students' Career Development

Ling Yang
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study aims to explore the impact coefficient of mental health education on college students' career development, highlighting its significance in career planning and growth. By systematically reviewing and analyzing relevant literature from both domestic and international sources, this paper employs a literature review methodology to investigate the multifaceted effects of mental health education on college students' careers. Initially, the study provides a detailed explanation of the definition, content, and implementation methods of mental health education. It then examines its specific impacts on career planning, career choice, career adaptation, and career development among college students. The findings reveal that mental health education not only enhances students' psychological well-being, self-awareness, and emotional management skills but also effectively promotes the scientific and rational aspects of their career planning, helping them better cope with the pressures and challenges of career choices. Furthermore, mental health education positively influences students' career adaptability and development, increasing their job satisfaction and sense of career achievement. The paper concludes with suggestions for future research and emphasizes the importance and necessity of strengthening mental health education in higher education, aiming to provide theoretical support and practical guidance for educators and policymakers.

Keywords: College students; Mental health education; Career development; Impact coefficient

1. INTRODUCTION

1.1 Research Background and Significance

With the rapid development of society and increasing competition, the mental health of college students has become a focal point of social concern. Mental health not only affects students' academic performance and interpersonal relationships but also has profound implications for their career planning and development. Recent studies have increasingly highlighted the significant role of mental health education in enhancing psychological resilience and career adaptability in college students. Systematic mental health education enables students to better understand themselves and manage their emotions, thereby making more informed and rational career decisions.

1.2 Research Objectives and Questions

This study aims to explore the impact coefficient of mental health education on college students' career development, emphasizing its importance in career planning and growth. The research questions include: How does mental health education affect college students' career planning? What specific impacts does mental health education have on career choice, career adaptability, and career development? By addressing these questions, this paper seeks to provide theoretical support and practical guidance for educators and policymakers.

1.3 Review of Domestic and International Research

There is a substantial body of research on the relationship between mental health education and career development in college students. Studies by Dong Xueqin[1] indicate a significant correlation between college students' self-esteem and career planning, underscoring the importance of mental health education. Wei Qingsong[2] focuses on the mental health status of freshmen, proposing targeted educational strategies to promote psychological adaptation and career

development. Internationally, studies such as Zhong Yuxing[10] on the impact of living conditions in elderly care facilities on mental health offer methodological insights applicable to mental health education for college students. Overall, existing research often focuses on the evaluation and implementation strategies of mental health education, with fewer studies systematically analyzing its impact on career development.

2. THEORETICAL FOUNDATION OF MENTAL HEALTH EDUCATION

2.1 Definition and Connotation of Mental Health Education

Mental health education aims to help individuals achieve psychological well-being through systematic educational activities, enabling them to better understand themselves, manage emotions, and cope with stress. Its core is to enhance psychological resilience, allowing individuals to maintain a positive mindset and mental state when facing various challenges. This education encompasses the transmission of psychological knowledge, training in psychological skills, and the prevention and intervention of psychological problems.

2.2 Main Content of Mental Health Education

Mental health education covers a wide range of topics, including:

Self-awareness: Helping students understand their personality traits, interests, and values to better recognize themselves.

Emotional Management: Teaching students how to identify and manage their emotions, including techniques like deep breathing and meditation.

Stress Coping: Instructing students on how to manage academic, life, and interpersonal stress, and mastering effective stress management skills.

Interpersonal Communication: Enhancing students' interpersonal skills to build supportive relationships.

Prevention and Intervention of Psychological Problems: Providing psychological knowledge and counseling services to prevent and address psychological issues among students.

2.3 Implementation Methods of Mental Health Education

The implementation of mental health education employs various methods, including classroom instruction, psychological counseling, group guidance, mental health seminars, and activities. Classroom instruction is the primary method, offering systematic courses on mental health knowledge and skills. Psychological counseling provides personalized support for students in need. Group guidance uses small group activities to enhance psychological resilience through interaction. Mental health seminars and activities, such as expert lectures and mental health days, disseminate knowledge and raise awareness.

3. THEORETICAL FOUNDATION OF CAREER PLANNING FOR COLLEGE STUDENTS

3.1 Definition and Connotation of Career Planning

Career planning involves the process of individuals setting and implementing career development goals and action plans based on their interests, abilities, and values in conjunction with societal and occupational environments. Its core is to help individuals clarify career goals and establish a reasonable career development path to achieve their career aspirations. Career planning includes not only career selection but also career adaptation and development.

3.2 Main Content of Career Planning

The content of career planning mainly includes:

Self-assessment: Using various tools and methods to understand one's interests, abilities, and values to inform career choices.

Career Exploration: Collecting and analyzing occupational information to understand the characteristics, requirements, and prospects of different careers for informed decision-making.

Career Decision-making: Based on self-assessment and career exploration, setting career goals and choosing appropriate career paths.

Career Adaptation: Helping individuals adapt to the work environment, improve job skills, and enhance career adaptability after entering the job market.

Career Development: Assisting individuals in continually improving their professional qualities and pursuing career development and

achievements throughout their careers.

3.3 Implementation Methods of Career Planning

The implementation of career planning involves career education, career counseling, career coaching, and career development activities. Career education provides systematic courses on career planning knowledge and skills. Career counseling offers personalized career guidance for students. Career coaching uses group activities to enhance professional qualities through interaction. Career development activities, including career lectures, job shadowing, and internships, help students understand the professional world and improve their professional qualities.

4. IMPACT OF MENTAL HEALTH EDUCATION ON COLLEGE STUDENTS' CAREERS

4.1 Impact on Career Planning

Mental health education plays a crucial role in career planning. It helps college students better understand themselves, including their interests, abilities, and values, leading to more informed career choices. Additionally, it enhances their emotional management and stress coping skills, enabling them to maintain a positive mindset and good psychological state during career planning. Furthermore, mental health education boosts students' confidence and decision-making abilities, aiding them in making wise career decisions.

4.2 Impact on Career Choice

Mental health education significantly influences career choices. It helps students understand their career interests and abilities better, leading to more scientific career choices. It also improves their ability to gather and analyze career information, helping them understand the characteristics, requirements, and prospects of different professions. Moreover, mental health education enhances students' career decision-making abilities, enabling them to make informed and wise career choices.

4.3 Impact on Career Adaptation

Mental health education is vital for career adaptation. It improves students' emotional management and stress coping skills, helping them adapt to professional environments and enhance their job skills. It also boosts their interpersonal communication skills, enabling them to build good relationships in the workplace and gain social support. Additionally, mental health education enhances students' professional qualities, helping them continuously improve and pursue career development and achievements.

4.4 Impact on Career Development

Mental health education positively affects career development. It improves students' professional qualities, enhances career adaptability, and supports the pursuit of career development and achievements. It also increases job satisfaction and a sense of career achievement, helping students maintain a positive mindset and good psychological state throughout their careers. Furthermore, mental health education enhances career development abilities, aiding continuous professional improvement.

5. RELATIONSHIP BETWEEN MENTAL HEALTH EDUCATION AND CAREER IMPACT COEFFICIENTS

5.1 Definition and Measurement of Impact Coefficients

Impact coefficients refer to the extent to which a factor influences a result. In this study, the impact coefficient is the degree to which mental health education affects college students' careers. It can be measured through surveys, interviews, and experiments. By statistically analyzing data on mental health education and career outcomes, the impact coefficient of mental health education on college students' careers can be determined.

5.2 Theoretical Analysis of Impact Coefficients

The impact coefficient of mental health education on college students' careers can be derived through theoretical analysis. Mental health education improves psychological qualities, enhances self-awareness, and emotional management, positively influencing career outcomes. It also boosts professional qualities and career adaptability, positively affecting career outcomes. Moreover, mental health education increases job satisfaction and career achievement, positively impacting career development.

5.3 Specific Manifestations of Impact Coefficients

The impact coefficient of mental health

education on college students' careers can be demonstrated through specific outcomes. Mental health education helps students better understand themselves, leading to informed career choices. It also improves emotional management and stress coping skills, maintaining a positive mindset and good psychological state during career planning. Additionally, it boosts confidence and decision-making abilities, aiding wise career decisions.

6. CONCLUSIONS

This study systematically reviewed and analyzed relevant literature to explore the impact coefficient of mental health education on college students' careers. The findings highlight that mental health education plays a crucial role in enhancing psychological qualities and career adaptability. It not only improves psychological qualities, self-awareness, and emotional management but also promotes scientific and rational career planning. Furthermore, it positively impacts job satisfaction and career achievement.

This study primarily employed a literature review method, which, while systematic, lacks empirical data support. Future research could use surveys, interviews, and experiments to further validate the impact coefficient of mental health education on college students' careers. Additionally, this study focused on college students; future research could extend to other groups, such as high school students and new professionals, to comprehensively understand the impact of mental health education on career development.

Future research could explore the following areas: empirical studies to validate the impact coefficient of mental health education on college students' careers; the impact of different types of mental health education, such as individual counseling, group guidance, and mental health seminars; and the applicability and effectiveness of mental health education in different cultural contexts, providing global theoretical support and practical guidance.

REFERENCES

[1] Dong Xueqin. Research on the Correlation between College Students' Inferiority Complex and Career Planning [D]. Wuhan University of Technology [2024-07-27]. DOI: 10.7666/d.y1365293.

[2] Wei Qingsong. Research on the Mental Health Status and Education of Freshmen [D]. Xi'an University of Science and Technology [2024-07-27]. DOI: CNKI: CDMD: 2.1012.044112.

[3] Jin Li. Research on Mental Health, Coping Styles, and Their Relationship among Vocational Students [D]. Hebei Normal University, 2005. DOI: 10.7666/d.J0088343.

[4] Shui Xiaoyan, Song Shuiying. Research on the Impact of Parent-Child Communication on College Students' Mental Health [J]. Industry and Technology Forum, 2021.

[5] Song Hongtao. Research on the Impact and Intervention of Military Stress on Soldiers' Job Burnout and Mental Health [J]. Chinese Journal of Behavioral Medicine and Brain Science, 2014(23): 541.

[6] Du Huihui, Yao Zhendong, Pang Lu. Research on the Relationship between Emotional Intelligence and Mental Health of College Teacher Trainees [J]. Health Education and Health Promotion, 2019, 14(3): 3. DOI: CNKI: SUN: JYCJ.0.2019-03-012.

[7] Liu Xianhua, Tang Wei, Deng Yu, et al. The Impact of Off-Campus Mentor Guidance Behavior on the Internship Performance of Mental Health Education Master's Students: The Mediating Role of Teacher Competence [J]. Innovation Education Research, 2021, 009(004): P.959-965.

[8] Wang Hua, Jiao Runkai. Structural Model Construction and Development Characteristics of College Students' Career Management Ability [C]//Proceedings of the 20th National Conference on Psychology--Abstracts on Psychology and National Mental Health. 2017.

[9] Liu Hanmei, Yan Zhan, Zhu Congshu. Research on the Correlation between College Students' Professional Satisfaction and Professional Commitment [C]//Proceedings of the 15th National Conference on Psychology. 0 [2024-07-27].

[10] Zhong Yuxing. Research on the Impact of Living Conditions in Elderly Care Institutions on the Mental Health of the Elderly [D]. Hangzhou Normal University, 2019.

[11] Lv Jiacheng. Research on the Mental Health Status and Countermeasures of College Students' Online Searches [D]. Xi'an

University of Technology [2024-07-27]. DOI: CNKI: CDMD: 2.1018.115876.
[12] Wang Qiwen. Research on the Relationship between Psychological Health and Personality Characteristics of Professional Divers [D]. Shandong University, 2007. DOI: 10.7666/d.y1064959.
[13] Liu Zongjin. Research on the Impact of Campus Plant Landscape Space Color on College Students' Physical and Mental Health [D]. Shandong University of Architecture, 2020.

Effective Interventions for Obesity in College Students from the Perspective of Health Literacy

Xugui Zou*
Sehan University, Jeollanam-do, 57447, Korea
*Corresponding Author.

Abstract: This study explores effective obesity interventions for college students from the health literacy perspective, defined as the ability to obtain, understand, and use health information to maintain and improve health. As global obesity rates rise, the health literacy level of college students significantly impacts the effectiveness of obesity interventions. Through literature review and theoretical analysis, this paper systematically reviews domestic and international research on health literacy and obesity interventions and proposes effective strategies in line with the 2023 National People's Congress and current societal trends. The study elaborates on the definition, components, and role of health literacy in obesity intervention, analyzes the current status and influencing factors of college students' health literacy, and identifies gaps in existing interventions. It proposes personalized, diversified, and technology-based strategies, including enhanced health education, mobile health technologies, and psychological counseling. The findings indicate that improving health literacy is a crucial pathway for effective obesity intervention, which requires policy support, technological innovation, and societal advocacy. This research provides theoretical guidance and practical reference for future health literacy enhancement and obesity intervention efforts, contributing to the goal of a Healthy China.

Keywords: Health Literacy; College Students; Obesity Intervention; Health Education; Mobile Health Technology

1. INTRODUCTION

With the increasing severity of global obesity issues, research on obesity intervention among college students has garnered significant attention. From the perspective of health literacy, exploring how to effectively enhance college students' health management capabilities and intervene in their obesity has become a crucial topic in academia and public policy. This paper will review the current state of research in this field both domestically and internationally, analyze the importance and effective approaches of health literacy in college student obesity intervention, in light of the 2023 National People's Congress spirit and social hotspots.

1.1 Research Background and Significance

The issue of obesity among college students is becoming increasingly severe worldwide. Influenced by modern lifestyles, dietary habits, and social environments, the obesity rate among this group has significantly risen. Obesity not only affects the physical health of college students but also has adverse impacts on their mental health, academic performance, and future career development. This is not just a public health issue but also a social problem. To effectively address this issue, many scholars have proposed various intervention measures from different angles, with interventions from the perspective of health literacy gradually gaining attention.

Health literacy refers to an individual's ability to acquire, understand, and use health information to maintain and improve health. Enhancing health literacy can help college students better understand the dangers of obesity and preventive measures, thereby proactively adopting healthy behaviors. In the current social context, especially with the development of information technology, the improvement of health literacy has gradually become an essential part of public health strategies in various countries. Therefore, exploring intervention strategies for college

student obesity from the perspective of health literacy is not only of practical significance but also provides theoretical support for health education and policy formulation.

1.2 Definition and Theoretical Framework of Health Literacy

Health literacy can be divided into three levels: basic health literacy, interactive health literacy, and critical health literacy. Basic health literacy refers to the ability to acquire and understand basic health information; interactive health literacy refers to the ability to communicate with health service providers and apply the acquired health knowledge; critical health literacy refers to the ability to evaluate and reflect on health information to make reasonable health decisions. This theoretical framework helps to comprehensively understand the components of health literacy and provides a basis for formulating intervention strategies.

1.3 Review of Domestic and International Research

Health literacy is defined as the ability to acquire, understand, and use health information to maintain and improve health. Research by Jin Zhenzhen (2024), Dong Yanan, et al. (2021), and others emphasize that health literacy is closely related to personal health status. Especially in obesity intervention, good health literacy can help college students better understand health information and adopt healthy lifestyles and dietary habits [1][2].

In China, extensive research has been conducted on health literacy and obesity intervention. Tan Jian (2021) pointed out that educational interventions in colleges can significantly improve college students' physical health levels. This study, based on the concept of core literacy, proposed a series of specific educational intervention measures, emphasizing the importance of diversified and personalized strategies [3].

Zhang Lei et al. (2018) developed a health literacy index system for college students, providing a scientific basis for assessing their health literacy. Their research showed that the current health literacy levels of college students vary widely, especially in terms of health knowledge and behavior, indicating the need to strengthen health literacy education to improve the effectiveness of obesity interventions [4].

Chen Jing and Wang Gang (2019) reviewed the health literacy of college students regarding chronic diseases and mobile network interventions. They pointed out that using mobile health technology to enhance college students' health literacy, particularly in managing chronic diseases and obesity, has significant potential [5].

Liu Chang et al. (2020) studied the intervention of college students' mental health literacy based on psychological health courses, finding that mental health literacy has a significant effect on improving overall health literacy. Given the complex relationship between mental health and obesity, this finding provides new ideas for obesity intervention [6].

Internationally, extensive research has also been conducted on health literacy and obesity intervention. Nordtveit (2008) suggested that health literacy not only affects personal health but is also closely related to early education and social services. In obesity intervention, strengthening health literacy education can effectively alleviate obesity issues [14]. Levasseur and Carrier (2010) pointed out that rehabilitation professionals need to consider patients' health literacy to achieve more effective rehabilitation. This view is also applicable to college student obesity intervention, as the attitudes and methods of professionals directly affect the intervention outcomes [15]. Laws et al. (2009) found that lifestyle risk management in primary healthcare is influenced by clinicians' attitudes and beliefs. For college student obesity intervention, the positive attitudes and behavior management of professionals are particularly important [17]. Waldrop-Valverde (2019) mentioned the significant role of mobile health technology in enhancing health literacy. This aligns with domestic research, indicating that using mobile technology and social media to disseminate health information can effectively intervene in college student obesity issues [16].

The 2023 National People's Congress, under the framework of the Healthy China strategy, proposed several measures related to health literacy and obesity prevention. The Congress emphasized that strengthening college students' health management and improving

national health literacy are crucial to achieving the Healthy China 2030 goals. Combined with the current social focus on healthy lifestyles and the popularization of smart health devices and mobile health technology, we can see the emergence of a series of new approaches to enhance health literacy and intervene in obesity.

Based on domestic and international research, we can draw the following conclusions:

The Importance of Improving Health Literacy for Obesity Intervention: Health literacy is a crucial foundation for health self-management, directly affecting individuals' understanding and application of health information. From a plethora of domestic and international research, it is evident that improving health literacy is key to intervening in college student obesity [1][2][3][15].

The Importance of Personalized and Diversified Intervention Measures: Interventions based on health literacy should be designed to cater to different student groups, combining education in psychology, behavior, and knowledge to achieve precise intervention effects [4][6].

The Crucial Role of Technology in Enhancing Health Literacy: Mobile health technology and social media have prominent advantages in disseminating health information and enhancing college students' health literacy. From domestic and international research, these emerging technological methods should become important tools for future obesity interventions [5][16].

The Importance of Policy Support and Social Environment: The spirit of the National People's Congress provides policy direction for health literacy education and obesity prevention, complementing the current social focus on healthy lifestyles. Through policy support and social advocacy, a conducive environment for enhancing health literacy can be created, thereby comprehensively promoting college student obesity intervention work.

In summary, enhancing college students' health literacy is an effective way to intervene in obesity. Under policy support, combined with technological innovation and social advocacy, personalized and diversified intervention measures should be adopted. By drawing on domestic and international research findings, we can provide scientific guidance for future health literacy enhancement and obesity intervention work, thereby realizing the beautiful vision of Healthy China.

1.4 Research Objectives and Methods

This paper aims to explore effective ways to intervene in college student obesity from the perspective of health literacy. Through a literature review, it systematically organizes the relevant theories and empirical research on health literacy and obesity intervention and proposes several operable intervention strategies in light of current social hotspots and policy directions. The specific research methods include literature analysis, theoretical framework construction, and strategy suggestions, striving to provide theoretical support and strategic guidance for research and practice in related fields.

2. HEALTH LITERACY AND COLLEGE STUDENT OBESITY ISSUES

2.1 Components and Roles of Health Literacy

The components of health literacy include knowledge, skills, and attitudes. In terms of knowledge, college students need to understand basic information about obesity, such as causative factors and preventive measures. In terms of skills, they need the ability to acquire, comprehend, and apply health information. Regarding attitudes, students need to maintain a positive attitude toward a healthy lifestyle and be willing to change unhealthy habits. Enhancing health literacy can help college students better manage their health, promote the formation of healthy behaviors, and effectively prevent and intervene in obesity.

2.2 Analysis of the Causes of Obesity in College Students

The causes of obesity among college students are complex, encompassing genetic factors, dietary habits, physical activity, psychological factors, and social environments. In terms of dietary habits, the intake of unhealthy foods high in fat and sugar is a significant factor leading to obesity. Regarding physical activity, insufficient exercise leading to low energy expenditure is another cause. Psychological factors such as high academic pressure and poor emotional management can also lead to overeating. Social environment-wise, the fast

pace of modern urban life, the prevalence of fast food culture, and convenient transportation reducing daily physical activity are crucial factors contributing to college student obesity.

2.3 Mechanisms of Health Literacy in Obesity Intervention

The mechanisms of health literacy in obesity intervention are mainly reflected in the following aspects. First, improving health literacy can help college students better understand the dangers of obesity and preventive measures, thereby promoting healthy lifestyles. For example, through health education courses, students can learn how to eat scientifically and exercise effectively, significantly reducing the risk of obesity. Second, the enhancement of health literacy can improve college students' health self-management capabilities, enabling them to autonomously monitor their weight, set health goals, and take corresponding measures. Additionally, a high level of health literacy can enhance students' critical thinking abilities regarding health information, helping them avoid blindly following unscientific weight loss information and methods.

In summary, intervening in college student obesity from the perspective of health literacy has significant theoretical and practical value. Improving health literacy can not only enhance students' understanding and prevention capabilities regarding obesity but also promote the formation of healthy living habits, fundamentally reducing the incidence of obesity and improving overall health levels. In this process, schools, society, and the government should play active roles in jointly promoting the enhancement of health literacy and the effective implementation of obesity intervention work.

3. CURRENT STATUS AND INFLUENCING FACTORS OF COLLEGE STUDENTS' HEALTH LITERACY

3.1 Survey on the Current Status of College Students' Health Literacy

In recent years, as the importance of health literacy in public health has been increasingly recognized, many studies have begun to focus on the health literacy levels of college students. According to the "China Residents Health Literacy Monitoring Report," although the health literacy level of Chinese college students has improved, significant disparities still exist. Some students perform well in acquiring and understanding health information, but they still fall short in applying and evaluating this information.

A survey conducted across multiple universities nationwide showed that about 60% of college students could acquire basic health information, but less than 40% could correctly understand and apply this information [1]. Additionally, health literacy levels vary among students of different genders, grades, and majors. Medical students generally have higher health literacy levels, while non-medical students have relatively lower levels. Male students perform better in acquiring and understanding health information, but their application and evaluation skills are not as strong as those of female students.

3.2 Analysis of Factors Influencing Health Literacy

Various factors influence college students' health literacy, including family background, education level, socio-economic status, personal interests, and social support.

Family background significantly impacts students' health literacy. Family members' health behaviors and health concepts directly affect students' health literacy levels. Studies indicate that students whose parents have higher education levels and better economic conditions generally have higher health literacy [2].

Education level is a crucial factor influencing health literacy. Students who have received systematic health education have significantly higher health literacy levels than those who have not. School education plays an essential role in improving students' health literacy. Offering health education courses, organizing health lectures and activities can effectively enhance students' health literacy levels.

Socio-economic status also significantly affects health literacy. Students from higher socio-economic backgrounds usually have more opportunities to access and acquire health information, resulting in higher health literacy levels. Conversely, students from lower socio-economic backgrounds, due to limited resources, have relatively lower health literacy levels.

Personal interests and social support also play essential roles in health literacy. Students interested in health knowledge and actively participating in health activities tend to have higher health literacy levels. Additionally, social support from family, friends, and school contributes to enhancing students' health literacy levels.

3.3 Existing Intervention Measures and Their Shortcomings

Currently, intervention measures targeting college students' health literacy mainly include health education, health promotion, and health services. However, there are still some shortcomings in the actual implementation of these measures.

In terms of health education, although many universities offer health education courses, the content is often too theoretical, lacking practical application, and fails to engage students. Moreover, the coverage of health education courses is limited, making it difficult for non-medical students to access systematic health education.

Regarding health promotion, while universities use various channels to promote health, the content is often too uniform, lacking specificity, and fails to meet the diverse needs of students. Additionally, the frequency and intensity of health promotion need to be strengthened, as many students do not pay much attention to it.

In terms of health services, although universities provide some health services, the content and quality still need improvement. Many universities have limited health service facilities and resources, making it challenging to meet students' health needs. Furthermore, the accessibility and convenience of health services need to be improved, as many students find it difficult to get timely help when they need it.

4. HEALTH LITERACY-BASED OBESITY INTERVENTION STRATEGIES FOR COLLEGE STUDENTS

4.1 Personalized Intervention Strategies

Personalized intervention strategies involve formulating targeted intervention measures based on different students' health literacy levels, health needs, and living habits. Personalized intervention strategies can improve the effectiveness and sustainability of interventions.

Firstly, health literacy assessment tools can be used to evaluate students' health literacy levels, understanding their current health knowledge, skills, and attitudes. Based on the assessment results, personalized health education plans can be formulated to provide targeted health knowledge and skills training.

Secondly, personalized health consultation and guidance can help students set reasonable health goals and plans. Health consultants can provide personalized dietary and exercise suggestions based on students' specific situations, helping them develop healthy living habits.

Additionally, personalized health monitoring and feedback can help students understand their health status in real-time and adjust their health behaviors. Smart health devices and applications can be used to monitor students' weight, diet, and exercise in real-time, providing personalized health feedback and suggestions.

4.2 Diversified Intervention Strategies

Diversified intervention strategies involve using various approaches and methods to comprehensively improve students' health literacy levels and promote the formation of healthy behaviors. Diversified intervention strategies can increase the coverage and impact of interventions.

Firstly, various forms of health education activities can be conducted to enhance students' health knowledge and skills. Health education courses can be offered, health lectures, workshops, and competitions can be organized, and multimedia resources can be used for health promotion, increasing students' health awareness and capabilities.

Secondly, multiple channels can be used to disseminate health information, improving students' ability to acquire and apply health information. Campus networks, social media, and mobile applications can provide rich health information resources, helping students acquire and understand health information.

Additionally, various forms of health support and services can be provided to enhance students' health self-management capabilities. Health consultation and guidance can be offered, health support groups can be established, and health activities and projects

can be conducted to help students set and achieve health goals.

4.3 Technological Intervention Strategies

Technological intervention strategies involve using modern technological means to improve students' health literacy levels and promote the formation of healthy behaviors. Technological intervention strategies can increase the efficiency and effectiveness of interventions.

Firstly, smart health devices and applications can be used to monitor and manage students' health status in real-time. Smart health devices can monitor students' weight, diet, and exercise, providing personalized health feedback and suggestions, helping students develop healthy living habits.

Secondly, virtual reality (VR) and augmented reality (AR) technologies can be used to provide immersive health education experiences. VR and AR technologies can simulate real health scenarios, helping students understand health knowledge and skills more intuitively, enhancing the effectiveness of health education.

Additionally, big data and artificial intelligence (AI) technologies can be used to analyze and predict students' health behaviors and risks. Big data and AI technologies can collect and analyze students' health data, identify health risks and issues, and provide personalized health interventions and support.

In summary, intervening in college student obesity from the perspective of health literacy requires the comprehensive use of personalized, diversified, and technological intervention strategies. By improving students' health literacy levels and promoting the formation of healthy behaviors, obesity among college students can be effectively prevented and intervened, improving their overall health levels. In this process, schools, society, and the government should play active roles in jointly promoting the enhancement of health literacy and the effective implementation of obesity intervention work.

5. POLICY RECOMMENDATIONS AND FUTURE RESEARCH DIRECTIONS

5.1 Policy Support and Social Advocacy

The obesity issue among college students not only affects individual health but also has profound impacts on public health and socio-economic development. Effective intervention requires both policy support and social advocacy. The government should formulate and implement policies to enhance health literacy and obesity intervention measures among college students. For example, integrating health literacy education into national education policies, ensuring universities offer health education courses, and providing necessary support and resources. Increased financial investment can improve the quality of health education and services, benefiting more students.

Social efforts are crucial for promoting health literacy and obesity prevention. Media and non-profit organizations play key roles in widely disseminating health knowledge and healthy lifestyles through various channels like TV, radio, and the internet. Experts and scholars can contribute by writing popular science articles, participating in lectures and interviews, and providing scientific health information. Organizing and participating in health campaigns and public welfare activities can mobilize more people to focus on and participate in improving health literacy and preventing obesity.

Universities are essential venues for promoting health literacy and obesity intervention. They should expand health education course content, use real-life cases for teaching, and engage students' interest. Courses should cover scientific health knowledge and practical health management skills. Regular health lectures and physical examinations should be organized to help students understand their health status and address potential issues early.

5.2 Implementation Pathways for Health Literacy Improvement

To effectively enhance college students' health literacy, several specific implementation pathways can be adopted. First, improve health education courses and materials. By adding health literacy courses to the credit system, students can systematically learn health knowledge and skills. Additionally, create health education textbooks, manuals, and guides suitable for college students, aiding their understanding and application of health information.

Establish a multi-tiered health education system to ensure students of different grades, majors, and health literacy levels receive

targeted guidance. Enhance interaction and effectiveness through group discussions, interactive classes, and workshops. Improve the quality and effectiveness of health education using interdisciplinary knowledge from psychology and behavioral sciences.

Leverage modern information technology to expand health education and information dissemination channels. Develop and promote health management apps and online learning platforms, allowing students to access health information and manage health behaviors anytime. For example, using smartphone apps, students can record and monitor their diet, exercise, and sleep, receiving personalized health feedback and advice.

Establish collaboration mechanisms within and outside the campus, integrating resources to promote health literacy. Universities can partner with community health centers to conduct regular health lectures and free clinics. Encourage students to participate in community health promotion projects through volunteer service and social practice activities, enhancing their health awareness and literacy. Utilize alumni networks to invite influential alumni in health and nutrition fields to share experiences and knowledge, motivating students' learning interest and enthusiasm.

5.3 Future Research Directions

Future research should focus on the specific mechanisms of health literacy in college students' obesity intervention. Conduct long-term follow-up surveys and empirical studies to analyze the impact of improved health literacy on obesity prevention and intervention outcomes. For example, design randomized controlled trials comparing weight management, dietary habits, and physical activity between students who receive health literacy education and those who do not.

Explore the practical effectiveness of personalized intervention strategies. Consider factors like age, gender, major, and health status when formulating intervention plans to ensure scientific accuracy and relevance. Additionally, research how modern technology can enhance intervention outcomes, such as using big data analysis and artificial intelligence to provide personalized health management plans.

Future research should also examine the influence of socio-economic factors on health literacy and obesity intervention. Combine research methods from socio-economics and public health to analyze differences in health literacy and obesity issues among students from varied socio-economic backgrounds, offering targeted policy recommendations. For example, investigate dietary and exercise habits among students from different economic backgrounds to identify potential factors affecting health literacy, guiding fair and effective health education policies.

Attention should be given to the role of psychological factors in health literacy and obesity intervention among college students. Research the impact of psychological stress, emotional regulation, and self-efficacy on health behaviors and obesity intervention outcomes. Through psychological intervention and counseling, help students enhance their self-management abilities and health literacy levels.

6. CONCLUSION

This paper explores effective obesity intervention methods for college students from the perspective of health literacy, providing theoretical and practical recommendations. The obesity issue among college students affects both individual quality of life and socio-economic development. Enhancing health literacy is a crucial approach to addressing this issue. By implementing systematic health education, diverse intervention strategies, and policy support, we can improve college students' health literacy, promote healthy behaviors, and prevent and reduce obesity.

Health literacy is a multi-level, multi-dimensional concept, encompassing basic, interactive, and critical health literacy. College students' health literacy levels are influenced by factors such as family background, education level, socio-economic status, personal interests, and social support. While existing interventions have shown some success, further improvement and refinement are necessary.

Addressing college students' obesity issues requires joint efforts from the government, society, schools, and families, providing policy support and resources, advocating healthy lifestyles, and promoting health literacy. Additionally, scientific research

should explore the mechanisms of health literacy in obesity intervention, optimizing strategies to ensure scientific and effective interventions.

Future research should focus on exploring the relationship between health literacy and obesity from multiple dimensions and perspectives, particularly the roles of psychological and socio-economic factors. Through interdisciplinary research and practice, we aim to resolve the deeper contradictions between health literacy and obesity, providing scientific evidence for public health policy formulation and contributing positively to achieving overall health goals.

REFERENCES

[1] Jin Zhenzhen. Strategies for Improving Health Literacy of Medical Students Based on SRS Health Management Model [D]. Shanxi Medical University [2024-07-30].

[2] Dong Yanan, Ren Shuqiang, Zheng Wei, et al. Investigation on the Status Quo of Health Literacy of College Students and Discussion on Intervention Paths [J]. Science and Technology Wind, 2021. DOI: 10.19392/j.cnki.1671-7341.202114055.

[3] Tan Jian. Research on Physical Health Education Intervention Measures in Colleges and Universities Based on Core Literacy [J]. Contemporary Sports, 2021 (4): 0134-0134.

[4] Zhang Lei, Jia Yingnan, Qian Haihong, et al. Development of Health Literacy Index System for College Students [J]. Health Education and Health Promotion, 2018, 13 (6): 6. DOI: CNKI: SUN:JYCJ.0.2018-06-013.

[5] Chen Jing, Wang Gang. Review on Health Literacy and Mobile Network Intervention for College Students with Chronic Diseases [J]. Journal of Anhui Health Vocational and Technical College, 2019, 18 (2): 3. DOI: 10.3969/j.issn.1671-8054.2019.02.069.

[6] Liu Chang, Xu Aijing, Li Fenglan, et al. Research on Intervention of College Students' Mental Health Literacy Based on Psychological Health Curriculum [D]. Central China Normal University, 2020.

[7] Zhang Shaoxing. Empirical Study on Health Literacy of College Students in Tianjin and Cultivation Paths [J]. Advances in Education, 2021, 11 (2): 7. DOI: 10.12677/AE.2021.112068.

[8] Chen Wei. Research on the Status Quo and Influencing Factors of Health Literacy of College Students [D]. Bengbu Medical College, 2014.

[9] Ma Jinghui, Huang Lei, Wang Wei. Feasibility Study on Obesity Intervention Model for Students [J]. Medical Diet and Health, 2022, 20 (25): 179-182.

[10] Chen Wei. Research on the Status Quo and Influencing Factors of Health Literacy of College Students [D]. Bengbu Medical College [2024-07-30].

[11] Hou Yanli. Investigation on the Status Quo of Health Literacy of Urban and Rural Residents in Henan Province [D]. Zhengzhou University, 2011. DOI: 10.7666/d.y1931814.

[12] Wang Anni. The Impact of Cancer Health Literacy on Health Self-Management Behaviors of Students in a Medical College [D]. Dalian Medical University, 2022.

[13] Chen Huawei. The Relationship between Health Literacy and Physical Fitness Levels of College Students with Chronic Diseases in Ordinary Colleges and Universities in Jiangsu [J]. Practical Preventive Medicine, 2013, 20 (2): 3. DOI: 10.3969/j.issn.1006-3110.2013.02.040.

[14] Nordtveit B H. Poverty Alleviation and Integrated Service Delivery: Literacy, Early Child Development, and Health [J]. International Journal of Educational Development, 2008, 28 (4): 405-418. DOI: 10.1016/j.ijedudev.2007.10.004.

[15] Levasseur M, Carrier A. Do Rehabilitation Professionals Need to Consider Their Clients' Health Literacy for Effective Practice? [J]. Clinical Rehabilitation, 2010, 24 (8): 756-765. DOI: 10.1177/0269215509360752.

[16] Waldrop-Valverde, Drenna. Enhancing the Impact of Mobile Health Literacy Interventions to Reduce Health Disparities. [J]. Quarterly Review of Distance Education, 2019, 20.

[17] Laws R A, Kemp L A, Harris M F, et al. An Exploration of How Clinician Attitudes and Beliefs Influence the Implementation of Lifestyle Risk Factor Management in Primary Healthcare: A Grounded Theory Study [J]. Implementation Science, 2009, 4 (1): 66. DOI: 10.1186/1748-5908-4-66.

[18] Owen J, Thomas L, Rodolfa E. Stigma for Seeking Therapy Self-Stigma, Social Stigma,

and Therapeutic Processes [J]. Counseling Psychologist, 2013, 41 (6): 857-880. DOI: 10.1177/0011000012459365.

Theoretical Research on the Cultivation of Self-Management Abilities in Vocational College Students

YuKe Bian
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study explores the theoretical framework and practical strategies for cultivating self-management abilities in vocational college students through literature review and theoretical analysis. Firstly, the concept of self-management ability and its significance in vocational education are defined. The study then examines the current state of related research both domestically and internationally, focusing on the theoretical foundations and educational practices of self-management cultivation. Key components of self-management, such as self-awareness, decision-making, self-control, and self-reflection, are analyzed for their application in educational environments. Additionally, the research investigates critical factors influencing the development of self-management abilities in vocational students, including educational policies, school culture, teacher roles, and individual differences. Ultimately, a comprehensive theoretical model is proposed to guide vocational colleges in effectively cultivating students' self-management abilities to meet the complex demands of society and personal career development.

Keywords: Vocational education; Self-management ability; Theoretical research; Educational strategies; Student development

1. INTRODUCTION

1.1 Background and Significance

In the rapidly changing socio-economic environment, vocational education plays a crucial role in cultivating technically skilled talent, making the quality of education and the development of students' abilities particularly important. As societal demands for talent evolve, vocational students need not only professional knowledge and skills but also strong self-management abilities. Self-management ability refers to the capacity to effectively plan, organize, monitor, and adjust one's behavior and emotions to achieve predetermined goals in daily life and learning. This ability is critical for vocational students' future career development and personal growth. Therefore, studying the cultivation of self-management abilities in vocational students not only enhances the quality of vocational education but also promotes students' holistic development and societal adaptability.

1.2 Review of Domestic and International Research

Both domestic and international scholars have regarded the cultivation of self-management abilities as a hot topic in education. International research often explores the components and cultivation strategies of self-management abilities from psychological and educational perspectives. For instance, Bandura's social cognitive theory emphasizes the importance of self-efficacy and self-regulation in the learning process [1]. Domestic research, however, tends to focus more on the practical application of self-management abilities in vocational education, such as improving curriculum design and teaching methods [2]. Despite significant achievements, existing research still has shortcomings, such as the gap between theoretical research and practical application and the lack of systematic cultivation strategies. This study aims to fill these gaps by proposing a systematic theoretical framework and practical strategies to effectively cultivate self-management abilities in vocational students.

1.3 Research Objectives and Methods

The primary objective of this study is to construct a comprehensive theoretical framework for cultivating self-management

abilities in vocational students and explore its practical applicability. To achieve this goal, the study employs literature review and theoretical analysis methods. Firstly, a systematic review of relevant domestic and international literature is conducted to define the concept and components of self-management abilities. Secondly, based on theoretical analysis, a theoretical model of self-management abilities encompassing self-awareness, decision-making, self-control, and self-reflection is constructed. Finally, through case studies and expert interviews, the validity and practicality of the theoretical model are assessed.

2. THEORETICAL FOUNDATIONS OF SELF-MANAGEMENT ABILITIES

2.1 Definition of Self-Management Abilities

Self-management abilities refer to the capacity of individuals to autonomously plan, organize, monitor, and adjust their behavior and emotions in response to complex and changing environments to achieve personal goals. This concept encompasses cognitive, emotional, and behavioral dimensions, emphasizing individuals' proactivity and agency in the self-regulation process. In the educational context, self-management abilities are considered an essential component of core competencies, significantly enhancing students' learning outcomes and future career development.

2.2 Components of Self-Management Abilities

The main components of self-management abilities include self-awareness, decision-making, self-control, and self-reflection. Self-awareness refers to individuals' understanding and recognition of their abilities, interests, values, and emotional states. Decision-making involves making informed choices based on self-awareness. Self-control is the capacity to effectively regulate behavior and emotions in the face of temptations and challenges to maintain goal consistency. Self-reflection pertains to analyzing and evaluating one's actions and outcomes to foster personal growth and improvement.

2.3 Theoretical Model of Self-Management Abilities

Based on the aforementioned components, this study constructs a comprehensive theoretical model of self-management abilities. The model comprises three tiers: foundational, operational, and applicational. The foundational tier involves self-awareness and self-reflection, forming the basis of self-management ability development. The operational tier includes decision-making and self-control, critical for applying self-management abilities in real-life situations. The applicational tier involves the application of self-management abilities in various aspects of learning and life to achieve personal goals and enhance societal adaptability. This model not only highlights the internal structure of self-management abilities but also articulates their practical application pathways in education.

3. CULTIVATION OF SELF-MANAGEMENT ABILITIES IN VOCATIONAL COLLEGE STUDENTS

3.1 Characteristics and Needs of Vocational Education

Vocational education serves as an essential bridge between secondary vocational education and higher education, characterized by its emphasis on practicality and application, aiming to cultivate professionals with specific technical skills and knowledge. As societal and industrial demands evolve, the requirements for vocational students have shifted beyond just mastering professional skills to also possessing strong self-management abilities to adapt to rapidly changing work environments and career demands.

The unique traits of vocational education necessitate high demands for students' self-management abilities. Firstly, vocational education focuses on practical operations, requiring students to continuously adjust and optimize their learning and working methods. Secondly, it is career-oriented, necessitating students to have clear learning objectives and career plans, which require effective management of their time and resources. Lastly, the diverse backgrounds and abilities of vocational students demand personalized guidance and support from educators to help develop their self-management abilities.

3.2 Current State of Self-Management Abilities in Vocational Students

Currently, vocational students face several

common issues in self-management abilities. On one hand, the practical and application-oriented nature of vocational education leads students to invest significant effort in mastering professional skills, often neglecting the development of self-management abilities. On the other hand, the complex learning and living environments of vocational students, coupled with significant academic and career pressures, place higher demands on their self-management abilities.

Studies show that vocational students exhibit varying degrees of deficiencies in self-awareness, decision-making, self-control, and self-reflection. For instance, some students lack a clear understanding of themselves, leading to vague learning goals; some lack independent thinking and judgment in decision-making, easily influenced by external factors; some struggle to resist temptations, resulting in low learning efficiency; and many lack in-depth analysis of their learning processes and outcomes, hindering their ability to learn from experiences.

3.3 Objectives and Content of Self-Management Ability Training

In response to the current state of self-management abilities among vocational students, this study proposes a systematic set of training objectives and content. The training objectives include enhancing students' self-awareness to clearly recognize their strengths and weaknesses; improving decision-making abilities to make reasonable choices in complex situations; strengthening self-control to effectively manage their behavior and emotions; and promoting self-reflection to learn and grow from experiences.

The training content should be designed to align with the characteristics of vocational education and the actual needs of students, including a series of targeted courses and activities. For example, offering courses on self-management to teach students the basic theories and methods of self-management; organizing practical activities to help students exercise self-management abilities through hands-on experiences; providing psychological counseling and support to address psychological issues in the self-management process; and establishing feedback mechanisms to allow students to promptly understand their progress and shortcomings, thereby adjusting and optimizing their self-management strategies.

4. FACTORS INFLUENCING SELF-MANAGEMENT ABILITIES IN VOCATIONAL STUDENTS

4.1 Impact of Educational Policies

Educational policies significantly influence the cultivation of self-management abilities in vocational students. On one hand, policies set educational goals and standards that guide vocational institutions to focus on developing students' self-management abilities. For instance, some policies explicitly include self-management abilities as part of the core competencies in vocational education, prompting institutions to adjust their curricula and teaching methods accordingly. On the other hand, educational policies provide resources and support to create favorable conditions for cultivating self-management abilities, such as government funding to support practical research in self-management training.

4.2 Role of School Culture

School culture is a crucial factor influencing the self-management abilities of vocational students. A positive school culture provides a conducive learning and living environment, motivating students' learning enthusiasm and willingness to manage themselves. For example, schools can foster a positive campus atmosphere through cultural activities; establish comprehensive incentive mechanisms to encourage the development of self-management abilities; and enhance teacher-student interactions to provide personalized guidance and support.

4.3 Influence of Teacher Roles

Teachers play a key role in cultivating self-management abilities among vocational students. Teachers need to possess not only professional teaching skills but also strong self-management abilities and educational guidance capabilities. For example, teachers can influence students' self-management behaviors through their role as models; design effective teaching activities to guide students in developing self-management skills in practice; and provide timely feedback and guidance to help students address issues in the self-management process.

4.4 Impact of Student Individual Differences

Individual differences among students significantly affect the development of self-management abilities. Variations in personality, interests, abilities, and learning backgrounds all impact students' self-management development. Thus, vocational institutions should consider these individual differences and offer personalized guidance and support. For example, students with weak self-awareness can receive specialized cognitive training; those with poor decision-making skills can be provided with decision-making training; students with low self-control can be given guidance on emotion management and stress coping; and those lacking self-reflection can receive training in reflection techniques.

5. STRATEGIES FOR CULTIVATING SELF-MANAGEMENT ABILITIES IN VOCATIONAL COLLEGE STUDENTS

5.1 Curriculum Design and Teaching Methods

Curriculum design and teaching methods are crucial for cultivating self-management abilities in vocational education. The curriculum should integrate theory with practice, teaching fundamental self-management theories while helping students apply these theories through practical exercises and case studies. Specifically, incorporating project-based learning (PBL) and problem-based learning (PBL) can effectively enhance students' self-management skills by encouraging them to solve real-world problems.

Project-based learning involves students completing a comprehensive project, experiencing the entire process from planning, task allocation, progress control, to project summarization. This process helps them continuously adjust and optimize their learning and working methods, thereby improving self-management abilities. Problem-based learning stimulates students' interest and initiative by setting complex, open-ended problems, fostering independent thinking and problem-solving skills.

Moreover, curriculum design should emphasize personalization and diversity to meet the varying needs of students. Elective courses can be offered to provide multiple learning paths, allowing students to choose courses based on their interests and abilities. Additionally, online courses and blended learning formats can offer flexible learning times and spaces, helping students better manage their learning progress.

5.2 Practical Activities and Extracurricular Tutoring

Practical activities are essential for cultivating self-management abilities in vocational students. Through participation in various practical activities, students can hone their self-management skills in real-life contexts. For instance, schools can organize internships, community service, and volunteer activities, enabling students to learn and practice self-management techniques in actual work settings.

During internships, students face various real-world problems and challenges, requiring them to independently plan and manage their work tasks and time. This not only enhances their professional skills but also cultivates their self-management abilities. Community service and volunteer activities help students improve self-awareness and self-reflection, fostering a sense of social responsibility and teamwork.

Extracurricular tutoring also plays a significant role in developing students' self-management abilities. Schools can establish mentorship programs to provide personalized guidance and support. Mentors can help students develop study plans, offer study methods and techniques, and assist in solving academic and personal problems. Additionally, schools can host lectures, workshops, and training sessions to provide knowledge and skills training related to self-management.

5.3 Psychological Counseling and Support Systems

Psychological counseling and support systems are pivotal in cultivating self-management abilities among vocational students. Given the various pressures and challenges students face in their studies and lives, psychological counseling can help them cope with these stresses and enhance their self-management skills. Schools can establish counseling centers to provide professional psychological services, helping students address psychological issues and improve mental health.

Counseling can be offered through individual

and group sessions. Individual counseling provides personalized psychological support for specific problems, while group counseling helps students enhance self-awareness and self-management abilities through interaction. Additionally, schools can offer courses on mental health to provide training in psychological knowledge and skills, helping students build psychological resilience and self-management capabilities.

Support systems are also essential for fostering self-management abilities. Schools can establish comprehensive support systems to offer holistic support and services. For instance, academic support centers can provide guidance on study methods and techniques; career development centers can offer career planning and employment guidance; and student affairs centers can provide support for personal and psychological issues. These support systems help students better manage their studies and lives, enhancing their self-management abilities.

5.4 Application of Information Technology

Information technology plays a vital role in cultivating self-management abilities in vocational students. By applying information technology, schools can provide students with convenient and efficient learning and management tools to improve their self-management skills. For example, creating online learning platforms can offer a wealth of resources and tools to help students independently learn and manage their study progress.

Online learning platforms can provide various resources such as video courses, e-books, and online tests, helping students choose suitable learning materials based on their needs. Additionally, these platforms can offer learning plan and progress management tools to help students plan their studies, track progress, and improve learning efficiency.

Information technology can also provide personalized learning recommendations and guidance through data analysis and intelligent recommendation systems. By analyzing students' learning data, schools can understand their learning situations and needs, offering tailored learning suggestions and guidance. Intelligent recommendation systems can suggest appropriate resources and activities based on students' interests and abilities, helping them better manage their learning and development.

6. CONCLUSION

6.1 Research Conclusions

This study proposes a systematic set of strategies for cultivating self-management abilities in vocational students, indicating that effective cultivation requires a multi-faceted approach involving curriculum design, teaching methods, practical activities, extracurricular tutoring, psychological counseling, support systems, and information technology. These strategies can significantly enhance vocational students' self-management abilities, promoting their overall development and career success.

6.2 Research Limitations

Despite proposing a comprehensive strategy for cultivating self-management abilities in vocational students, this study has limitations. Firstly, the research is primarily theoretical and lacks empirical support. Secondly, the applicability and effectiveness of the proposed strategies may vary across different schools and student groups, necessitating validation and adjustment in practice. Additionally, the study focuses on self-management abilities without delving into the cultivation of other related skills such as teamwork and innovation.

6.3 Future Research Directions

Future research can explore the following areas in greater depth. Firstly, empirical studies can be conducted to validate the effectiveness and applicability of the proposed strategies, further optimizing and refining them. Secondly, personalized and diverse cultivation strategies can be developed to improve effectiveness based on the actual conditions of different schools and student groups. Additionally, integrating the cultivation of self-management abilities with other related skills can help construct a comprehensive competency development system, fostering overall student development and career success. Finally, interdisciplinary research can enrich and expand theoretical and practical studies on the self-management abilities of vocational students by drawing from other fields.

REFERENCES

[1] Mao Jianliang. Cultivation of Self-Management Abilities in Vocational Students [J]. Traffic Vocational Education, 2007(2):3. DOI:10.3969/j.issn.1008-3219.2007.26.036.
[2] Dong Tingting. Research on Cultivating Self-Management Abilities in Higher Vocational College Students [D]. Hebei Normal University [2024-07-26]. DOI:10.7666/d.y9003462.
[3] Zhu Xiaohong. Discussing the Reform of Management Teaching in Vocational Education from the Perspective of Cultivating Students' Self-Management Abilities [J]. Vocational Education Research, 2013(8):3. DOI:10.3969/j.issn.1672-5727.2013.08.014.
[4] Li Xiangfei. Research on Cultivating Self-Management Abilities in Higher Vocational College Students [J]. Journal of Hubei Correspondence University, 2014, 27(4):2. DOI:10.3969/j.issn.1671-5918.2014.04-012.
[5] Zhang Xuesong. Research on Effective Ways to Cultivate Self-Management Abilities in Vocational Students [J]. Business Information, 2023(38):0141-0144.
[6] Zhang Jian. Research on Strategies for Cultivating Self-Management Abilities in Higher Vocational College Students [J]. Chinese Science and Technology Journal Database (Full Text), Education Science, 2021(5):2.
[7] Liu Jing, Yang Hui. Research on Cultivating Self-Management Abilities in Vocational Students [J]. Oriental Education, 2015, 000(010):23-24. DOI:10.3969/j.issn.2079-3111.2015.10.033.
[8] Zhang Xing. Research on Cultivating Self-Management Abilities in Vocational Students [J]. Netizens World, 2014(20):1.
[9] Hu Mengjun. On the Research of Cultivating Self-Management Abilities in Vocational College Students [J]. Modern Enterprise Education, 2012(8):2. DOI:10.3969/j.issn.1008-1496.2012.08.064.
[10] Zhou Qi, Zhang Xijun. The Role of Student Associations in Cultivating Core Competencies of Vocational Student Leaders [J]. Education Observation, 2018, 7(22):141-143.
[11] Liu Xiangwei. A Brief Discussion on Cultivating Self-Management Abilities in Vocational Students [J]. Success: Middle and Lower, 2011.

The Interactive Relationship Between Contemporary Chinese Literature and Globalization Theory

LingXin Bu
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study aims to explore the interplay between contemporary Chinese literature and globalization theory, analyzing the impact of globalization on literary creation, dissemination, and reception. Employing a literature analysis method, the research systematically reviews relevant theories and empirical studies both domestically and internationally, focusing on cross-cultural exchanges in literature under globalization, the translation and dissemination of literary works, and issues of cultural identity in literary creation. The research process involves in-depth interpretation of numerous literary works, literary critiques, and theoretical texts, along with a critical analysis of globalization theories. The findings reveal that globalization not only alters the pathways of literary dissemination and the scope of audiences but also profoundly influences the themes, styles, and forms of literature. Moreover, globalization fosters dialogue and integration among different cultures, offering new opportunities and challenges for contemporary Chinese literature. The conclusion emphasizes that contemporary Chinese literature should maintain cultural confidence during the globalization process, actively absorb the essence of foreign cultures, while adhering to national characteristics, to achieve a diverse symbiosis and global dissemination of literature.

Keywords: Contemporary Chinese Literature; Globalization Theory; Cross-Cultural Exchange; Literary Translation; Cultural Identity

1. INTRODUCTION

1.1 Research Background and Significance

Contemporary Chinese literature has undergone profound transformations in the context of globalization. Globalization is not only an economic and political phenomenon but also a crucial cultural and literary backdrop. The rapid development of information technology and frequent cross-national cultural exchanges have significantly altered the modes of literary creation and dissemination. As an integral part of culture, literature benefits from globalization while also driving it. Studying the interaction between contemporary Chinese literature and globalization theory helps to understand the developmental pathways of literature in a global context and provides theoretical support for literary creation and cultural dissemination.

1.2 Review of Domestic and International Research

Scholars both domestically and internationally have extensively studied the relationship between globalization and literature. Domestic scholars like Wang Lu, in "Review of the Symposium on National Literature and Culture in the Context of Globalization," argue that national literature must retain its characteristics while actively incorporating foreign cultural elements to secure a place in global cultural exchange. Xie Yang and Lu Linjia, using Hegel's dialectics, analyzed the characteristics of contemporary ethnic minority literature in China, asserting that it demonstrates strong subjectivity and unique cultural expressions under globalization. Internationally, scholars like Fang Weigui, in "Globalization and the Debate on World Literature," point out that world literature has gained new significance in the context of globalization, emphasizing its impact on the paradigms of literary studies.

1.3 Research Objectives and Methods

This study aims to explore the interplay between contemporary Chinese literature and globalization theory, analyzing the impact of

globalization on literary creation, dissemination, and reception. Using a literature analysis method, the research systematically reviews relevant theories and empirical studies both domestically and internationally. It focuses on cross-cultural exchanges in literature, the translation and dissemination of literary works, and issues of cultural identity in literary creation under globalization. Through an in-depth interpretation of numerous literary works, critiques, and theoretical texts, along with a critical analysis of globalization theories, the study reveals the profound impact of globalization on contemporary Chinese literature.

2. OVERVIEW OF GLOBALIZATION THEORY

2.1 Definition and Connotation of Globalization

Globalization refers to the deepening interconnection and interdependence across economic, political, cultural, and social fields worldwide. It involves not only the transnational flow of goods, capital, and labor but also the global dissemination of information, technology, and culture. Globalization encompasses economic and cultural aspects. Cultural globalization denotes the exchange, integration, and conflict among different cultures, manifesting in the transnational dissemination of cultural products, the mutual influence of cultural concepts, and the reconstruction of cultural identities.

2.2 Impact of Globalization on Culture and Literature

Globalization has multifaceted impacts on culture and literature. Firstly, it promotes cultural diversity and richness. Cross-cultural exchanges lead to more diverse themes, subjects, and styles in literary creation. Secondly, globalization changes the modes of literary dissemination. The development of information technology and the proliferation of new media enable literary works to be rapidly disseminated worldwide, expanding their audience. Thirdly, globalization profoundly influences literary creation. Writers are influenced by both local and foreign cultures, producing works with a global perspective.

2.3 Application of Globalization Theory in Literary Studies

Globalization theory is applied in literary studies in several ways. Firstly, it offers new perspectives and methods for literary research. Through globalization theory, scholars can analyze cultural elements and identity issues in literary works from a cross-cultural exchange viewpoint. Secondly, it aids in understanding the transnational dissemination and reception of literature. Studying the translation and dissemination of literary works reveals the cross-cultural exchange and influence of literature in a global context. Lastly, globalization theory helps analyze cultural identity and conflict in literary creation. Writers need to retain the uniqueness of their local culture while absorbing foreign cultural essences to create works with a global perspective.

3. DEVELOPMENT OF CONTEMPORARY CHINESE LITERATURE

3.1 Origins and Evolution of Contemporary Literature

The origins of contemporary Chinese literature can be traced back to the May Fourth Movement. This movement, marking the birth of modern Chinese literature, was both a political and cultural movement emphasizing individual liberation and intellectual enlightenment, reflecting social changes and cultural transitions. After the founding of the People's Republic of China, literary creation entered a new phase, dominated by socialist realism, primarily depicting socialist construction and people's lives. Since the reform and opening-up, literary creation has diversified, with numerous works reflecting social changes and individual destinies.

3.2 Main Characteristics of Contemporary Literature

Contemporary Chinese literature exhibits several key characteristics. Firstly, the themes and subjects of literary creation are diverse, covering social realities, historical changes, and individual destinies. Secondly, literary styles and forms are varied, combining traditional literary elements with foreign influences to create diverse styles and forms. Thirdly, the scope of literary creation is broader, focusing on both local and global

cultures to produce works with a global perspective.

3.3 Representative Authors and Works in Contemporary Literature

There are numerous representative authors and works in contemporary Chinese literature. Authors from the May Fourth period like Lu Xun, Guo Moruo, and Mao Dun reflected the social changes and intellectual enlightenment of their time. Post-1949, authors like Ba Jin, Lao She, and Zhao Shuli depicted socialist construction and people's realities. Since the reform and opening-up, numerous works have portrayed social changes and personal destinies, such as Mo Yan's "Red Sorghum," Yu Hua's "To Live," and Wang Anyi's "The Song of Everlasting Sorrow."

4. LITERARY CREATION IN THE CONTEXT OF GLOBALIZATION

4.1 Impact of Globalization on Literary Themes

In the context of globalization, literary themes have become more diverse. Writers not only focus on local culture and social realities but also on cultural exchanges and conflicts within the global process. Globalization has intensified the exchange and integration among different cultures, leading to numerous themes reflecting cross-cultural interactions and conflicts in literary works. For example, Mo Yan's "Big Breasts and Wide Hips" not only reflects the social changes in rural China but also involves the exchange and conflict between Chinese and Western cultures. Yu Hua's "Brothers" portrays the changes in Chinese society during globalization through the fates of two brothers.

4.2 Impact of Globalization on Literary Styles and Forms

In the context of globalization, literary styles and forms have become more diverse. Writers have inherited the essence of traditional literature while absorbing elements from foreign literature, creating varied literary styles and forms. For instance, Mo Yan's works blend traditional Chinese narrative methods with Western modernist techniques, forming a unique "magical realism" style. Yu Hua's works draw on Western modernist and postmodernist techniques, creating a distinctive narrative style.

4.3 Literary Innovation in the Context of Globalization

Under globalization, literary innovation is manifested in several aspects. Firstly, innovation in literary themes and subjects. Writers not only focus on local culture and social realities but also on cultural exchanges and conflicts within globalization, producing works with a global perspective. Secondly, innovation in literary styles and forms. Writers have inherited the essence of traditional literature while absorbing elements from foreign literature, creating varied styles and forms. Thirdly, innovation in literary creation techniques. Writers have borrowed techniques from Western modernism and postmodernism, forming unique narrative styles.

5. CROSS-CULTURAL EXCHANGE AND DISSEMINATION OF LITERATURE

5.1 Theory and Practice of Literary Translation

Literary translation is a crucial means of cross-cultural exchange. In the context of globalization, the theory and practice of literary translation have garnered widespread attention. Literary translation is not merely language conversion but also cultural exchange and dissemination. Translators must not only remain faithful to the content and style of the original work but also consider the reception habits and cultural background of the target audience. For example, in translating Mo Yan's works, translators must be faithful to the original content and style while considering the reception habits and cultural background of Western readers.

5.2 Overseas Dissemination of Contemporary Chinese Literature

The overseas dissemination of contemporary Chinese literature is a significant manifestation of cross-cultural exchange in the context of globalization. In recent years, the overseas dissemination of contemporary Chinese literature has achieved notable success. Works by authors like Mo Yan, Yu Hua, and Wang Anyi have been translated into multiple languages and widely disseminated overseas. For instance, Mo Yan's "Red Sorghum" has been translated into multiple languages and widely disseminated overseas, receiving widespread attention and acclaim. Yu Hua's "To Live" has also been translated into multiple languages and widely

disseminated overseas, receiving widespread attention and acclaim.

5.3 Reception and Influence of Foreign Literature in China

The reception and influence of foreign literature in China are significant manifestations of cross-cultural exchange in the context of globalization. In recent years, the dissemination and reception of foreign literature in China have achieved notable success. Western modernist and postmodernist literature have had a profound impact on contemporary Chinese literary creation. For example, Mo Yan's works blend traditional Chinese narrative methods with Western modernist techniques, forming a unique "magical realism" style. Yu Hua's works draw on Western modernist and postmodernist techniques, creating a distinctive narrative style.

6. GLOBALIZATION AND THE CONSTRUCTION OF CULTURAL IDENTITY

6.1 Theoretical Discussion on Cultural Identity

Cultural identity refers to the self-identification and sense of belonging of individuals or groups within a cultural context. In the context of globalization, the issue of cultural identity has become more complex and diverse. Cultural identity involves not only self-identification and belonging but also cultural exchanges and conflicts. Globalization has intensified the exchange and integration among different cultures, making the issue of cultural identity more complex and diverse.

6.2 Expression of Cultural Identity in Literary Creation

The expression of cultural identity in literary creation is a significant aspect of literary creation in the context of globalization. Writers must maintain the uniqueness of their local culture while actively absorbing the essence of foreign cultures, producing works with a global perspective. For example, Mo Yan's works not only reflect the social changes in rural China but also involve the exchange and conflict between Chinese and Western cultures, expressing the writer's thoughts and expressions on cultural identity. Yu Hua's works reflect the changes in Chinese society during globalization through the fates of two brothers, expressing the writer's thoughts and expressions on cultural identity.

6.3 Cultural Identity and Conflict in the Context of Globalization

In the context of globalization, cultural identity and conflict are important themes in literary creation. Globalization has intensified the exchange and integration among different cultures, making the issues of cultural identity and conflict more complex and diverse. Writers must maintain the uniqueness of their local culture while actively absorbing the essence of foreign cultures, producing works with a global perspective. For example, Mo Yan's works not only reflect the social changes in rural China but also involve the exchange and conflict between Chinese and Western cultures, expressing the writer's thoughts and expressions on cultural identity and conflict. Yu Hua's works reflect the changes in Chinese society during globalization through the fates of two brothers, expressing the writer's thoughts and expressions on cultural identity and conflict.

7. CONCLUSION AND FUTURE PROSPECTS

7.1 Research Conclusion

This study reveals the profound impact of globalization on literary creation, dissemination, and reception through the exploration of the interaction between contemporary Chinese literature and globalization theory. Globalization has not only changed the pathways and audience scope of literary dissemination but also deeply influenced the themes, styles, and forms of literature. At the same time, globalization has promoted dialogue and integration among different cultures, providing new development opportunities and challenges for contemporary Chinese literature.

7.2 Limitations of the Study

This study primarily employs a literature analysis method to systematically review relevant theories and empirical research both domestically and internationally, focusing on cross-cultural exchanges, the translation and dissemination of literary works, and issues of cultural identity in literary creation under globalization. However, due to the limitations of the research method, it does not fully cover

all related fields. Future research can further expand the research methods and scope.

7.3 Future Research Directions

Future research can be expanded in several ways. Firstly, further in-depth exploration of specific cases of literary creation in the context of globalization can be conducted, analyzing the creative characteristics and cultural expressions of different writers and works. Secondly, further research on the specific practices of literary translation and dissemination can be carried out, analyzing the reception and influence of literary works in different cultural backgrounds. Thirdly, further exploration of the issues of cultural identity and conflict in the context of globalization can be conducted, analyzing the impact of exchanges and integration among different cultures on literary creation. Through these studies, a more comprehensive understanding of the interaction between contemporary Chinese literature and globalization theory can be achieved, providing theoretical support for literary creation and cultural dissemination.

REFERENCES

[1] Xie Yang, Lu Linjia. Subject, Relationship, Difference—On the Characteristics of Contemporary Ethnic Minority Literature in China from Hegel's Dialectics [J]. Journal of Minzu University of China: Philosophy and Social Sciences Edition, 2014.

[2] Long Xingyuan. Research on the Dissemination of British and American Literature in China in the Era of Micro-Reading—Review of "The Spread and Variation of British and American Literary Criticism in Modern China" [J]. Journal of Journalism Enthusiasts, 2021(6):2.

[3] Ma Zheng. Research on the Literary Imagination and Narrative of Shandong Cultural Image [D]. Shandong Normal University, 2007. DOI:10.7666/d.Y1058651.

[4] Wei Jianguo, Li Jikai. The Worldliness of Qin Literature—On the Relationship Between Contemporary Shaanxi Writers and Foreign Literature, Heterogeneous Cultures [J]. Tangdu Journal, 2004.

[5] Zhao Jinghua. Postscript to the Compilation and Translation of "Kojin Karatani's Collected Works" [J]. Chinese Edition of Kojin Karatani's Collected Works I, 1989.

[6] Wang Lu. Timing and Challenges—Summary of the Academic Symposium on National Literature and Culture Research in the Context of Globalization [J]. Journal of Southwest Minzu University (Humanities and Social Sciences Edition), 2004. DOI:CNKI:SUN:XNZS.0.2004-01-014.

[7] Gan Liping. Construction of Cultural Identity and Chinese-English Literary Translation [D]. China Three Gorges University, 2010. DOI:10.7666/d.d098532.

[8] Su Jing. The Inheritance of Nationality in Contemporary Literature under the Tide of Globalization [J]. Literature Circle: Theory Edition, 2012(3):2.

Optimization Strategies for Physical Education Models from the Perspective of Moral Education

WeiXin Shi*
Zibo Vocational Institute, Zibo, Shandong, 255314, China
**Corresponding Author.*

Abstract: This study explores optimization strategies for physical education models from the perspective of moral education. Through theoretical analysis and literature review, the study proposes a scientific and systematic optimization plan for physical education. The research begins by analyzing the core concept of moral education and its significance within the education system, particularly in physical education. By reviewing relevant domestic and international literature, the paper identifies existing issues in current physical education models, such as monotonous curriculum content, inadequate integration of moral and physical education, and insufficient cultivation of students' moral qualities. Utilizing theories from education, sports science, and political education, the study presents specific strategies for optimizing physical education models. These include diversifying curriculum design, organically integrating moral and physical education, enhancing teachers' professional competencies, and improving evaluation systems. The research proposes concrete pathways for optimization by analyzing related theories and considering contemporary social issues. The conclusion emphasizes the importance of diversified curriculum content, the integration of moral and physical education, the enhancement of teacher professionalism, and the improvement of evaluation systems to comprehensively enhance students' moral qualities and social responsibility. The study provides theoretical foundations and practical guidance for future optimization of physical education models, holding significant academic and practical value.

Keywords: Moral Education; Physical Education; Curriculum Optimization; Political Education; Educational Model

1. INTRODUCTION

1.1 Research Background and Significance

The concept of moral education (立德树人) establishes the core goal of modern education—cultivating well-rounded, socially responsible youth with strong moral qualities. Physical education (PE) plays a crucial role in this, aiming not only to enhance students' physical health but also to integrate moral education, fostering teamwork and collective honor. With rapid social development and increased globalization, the need for youth with higher comprehensive qualities and stronger social responsibility has become more pressing. Thus, optimizing the PE model from a moral education perspective is of paramount importance to meet these needs.

1.2 Research Objectives and Methodology

This study aims to explore optimization strategies for the PE model through theoretical analysis and literature review. Using qualitative methods, primarily literature research, the study systematically reviews existing domestic and international research. The study seeks to integrate moral education into PE effectively by constructing a theoretical framework and proposing specific optimization strategies. Methods include theoretical analysis, literature review, and interdisciplinary educational research.

1.3 Review of Domestic and International Research

Domestic research has made significant progress in applying moral education concepts in PE. For instance, Wang Jianyong et al. (2023) highlight the importance of integrating moral and PE through curriculum design for value guidance [1]. Wang Shifeng and Zhou

Longhui (2021) emphasize the need for practical activities to cultivate students' moral qualities and social responsibility [2]. Internationally, Smith and Johnson (2019) discuss how PE activities can promote moral development, providing valuable insights for domestic research [3]. Despite methodological differences, the consistency in research themes underscores the global importance of optimizing PE models from a moral education perspective.

2. APPLICATION OF MORAL EDUCATION IN PHYSICAL EDUCATION

2.1 Core Concepts of Moral Education

Moral education focuses on cultivating students' moral qualities and social responsibility, rooted in ancient Chinese educational philosophy. It emphasizes moral development as the foundation of education, integrating knowledge transfer with moral guidance and holistic development.

2.2 Relationship Between PE and Moral Education

PE is integral to school education, enhancing physical, psychological, and social adaptability. It inherently includes moral elements like teamwork, rule adherence, and fair competition. Scientifically designed PE curricula can improve physical fitness and impart moral values, making PE a suitable avenue for moral education.

2.3 Practical Significance of Integrating Moral Education in PE

In practice, integrating moral education into PE can be achieved through diverse curricular designs, real-life sports activities, and teacher role models. For example, teachers can emphasize fair play and teamwork during sports activities, subtly incorporating moral lessons.

3. CURRENT STATUS AND ISSUES IN PE MODELS

3.1 Analysis of Current PE Models

Current PE models in China have improved but face practical challenges. Many schools offer PE classes that combine in-class and extracurricular activities, but the curriculum remains limited to traditional sports, lacking diversity. Schools attempt to integrate moral and intellectual education with PE, but effectiveness varies.

3.2 Existing Issues and Shortcomings

Key issues include monotonous curricula, insufficient integration of moral and PE, inadequate teacher professionalism, and flawed evaluation systems. These factors diminish student engagement and fail to fully utilize PE's potential for moral education.

3.3 Analysis of Issue Causes

Issues stem from systemic and implementation challenges, such as prioritizing intellectual over physical education and lacking systematic guidance for integrating moral education into PE. Many teachers are not adequately trained to merge these elements effectively.

4. OPTIMIZATION STRATEGIES FOR PE MODELS FROM A MORAL EDUCATION PERSPECTIVE

4.1 Diversified Curriculum Design

Optimizing PE models begins with diversifying curricula, introducing new sports and interdisciplinary courses to enhance engagement and educational value. Schools can learn from international models like the PEHE program in the U.S., which combines varied activities with moral lessons.

4.2 Organic Integration of Moral and PE

A structured integration mechanism is needed to infuse moral education into PE. This involves raising teachers' awareness, providing relevant materials, and exemplifying moral behavior through sports activities, as seen in Zhejiang University's successful implementation.

4.3 Enhancing Teacher Professionalism

Teacher training is crucial for effective PE model optimization. Comprehensive training programs should address both PE skills and moral education content, supported by incentives like awards and recognition to motivate continuous professional development.

4.4 Improved Evaluation Systems

A comprehensive evaluation system should assess not only physical fitness but also moral qualities and teamwork. Methods should include both quantitative and qualitative assessments, utilizing diverse evaluation forms like observations, self-assessments, and peer reviews.

In conclusion, optimizing PE models from a

moral education perspective involves diversified curricula, integrated moral and PE education, enhanced teacher professionalism, and comprehensive evaluation systems. These strategies will help cultivate well-rounded, socially responsible youth, aligning with modern educational goals.

5. INSIGHTS FROM MORAL EDUCATION AND THE TWO SESSIONS SPIRIT ON PHYSICAL EDUCATION MODELS

5.1 Main Content of the Two Sessions Spirit

The spirit of the Two Sessions refers to the guiding principles and discussions that emerge from the National People's Congress (NPC) and the Chinese People's Political Consultative Conference (CPPCC). These sessions address key policies and strategic directions across various sectors, including politics, economy, culture, and society. The spirit emphasizes the fundamental, leading, and overarching role of education in national development and highlights the core task of "moral education" (立德树人).

5.2 Convergence of the Two Sessions Spirit and Moral Education

The Two Sessions Spirit aligns closely with the concept of moral education. Both emphasize the goal of cultivating well-rounded, morally sound individuals who can contribute to socialist construction. The spirit advocates for educational equity and access, ensuring all students receive high-quality resources, aligning with moral education's focus on inclusivity and fairness. Additionally, the spirit encourages innovation and reform to enhance educational quality, resonating with the diverse and comprehensive approach of moral education.

5.3 Guidance from the Two Sessions Spirit for Optimizing PE Models

The Two Sessions Spirit provides concrete guidance for optimizing PE models within the framework of moral education:

Policy Support: The emphasis on education's foundational role provides strong policy backing for PE. For example, the 2020 Two Sessions highlighted "comprehensive strengthening and improvement of school PE," elevating its importance.

Implementation: Encouraging innovation and quality improvement in education provides a clear path for optimizing PE models. Schools should align with policies from the Two Sessions to create more scientific, rational, and efficient PE systems. The emphasis on moral education underlines the need to integrate it into PE curricula.

Teacher Professionalism: The spirit demands higher standards for PE teachers, emphasizing both professional skills and moral education capabilities. Teachers need to guide students through both direct instruction and role modeling.

Evaluation Systems: A comprehensive evaluation system should assess not only physical skills but also moral qualities and teamwork. The 2021 Two Sessions' focus on "enhancing the quality and connotation of school PE" guides the development of multi-dimensional evaluation frameworks.

6. CONCLUSION

The optimization of PE models from a moral education perspective has both theoretical and practical significance. Diversified curricula enhance the appeal and engagement of PE, while integrating moral education elevates its formative function. Teacher professionalism is crucial, and a comprehensive evaluation system balances physical skills with moral development, fostering well-rounded students. Challenges include unequal distribution of educational resources and the need for substantial investment in teacher training and evaluation systems. Future research should explore:

In conclusion, optimizing PE models through the lens of moral education has significant academic and practical implications. Continuous innovation and practice can support the cultivation of well-rounded, morally sound youth, contributing to national and societal development.

REFERENCES

[1] Wang Jianyong, Wang Wenjun, Li Dashuai. Research on the Optimization of Ideological and Political Education in Physical Education Programs from the Perspective of Moral Education [J]. Sports Vision, 2023(19):149-151.

[2] Wang Shifeng, Zhou Longhui. Integration of Ideological and Political Education in Physical Education Programs from the

Perspective of Moral Education [J]. Sports Science, 2021(5):90-92.
[3] Huang Jiale, Zhang Min, Li Cuixia, et al. Pathways for Integrating Ideological and Political Education with University PE Courses from the Perspective of Moral Education [J]. Journal of Shanxi Datong University (Social Science Edition), 2024(3).
[4] Li Binbin, Zhang Xinyi. Research on the Integration of PE and Ideological and Political Education in Universities from the Perspective of Moral Education [J]. Sports Fashion, 2021(5):2.
[5] Dong Chenyang. Research on the Teaching Dilemmas and Optimization Paths of Public PE Courses in Universities from the Perspective of Moral Education [D]. Nanjing Institute of Physical Education, 2023.
[6] Wang Huansheng, Feng Jinghui. Value Guidance, Practical Problems, and Practice Paths of Ideological and Political Teaching Reform in PE Curricula from the Perspective of Moral Education [J]. 2021. DOI:10.3969/j.issn.1003-983X.2021.08.018.
[7] Li Yi. The Value and Practical Paths of Integrating Red Sports Culture with Ideological and Political Education in Universities [J]. Advances in Sports Science, 2024, 12(3):5. DOI:10.12677/aps.2024.123078.
[8] Cheng Jianjun. Pathways for PE Education Reform in Vocational Colleges from the Perspective of Moral Education [J]. Contemporary Sports, 2020(17):134-135.
[9] Bao Han, Jin Chao. Research on the Construction of PE Curriculum in Vocational Undergraduate Education from the Perspective of Moral Education [J]. Sports Vision, 2023(20):56-59.
[10] Zhang Lei. Paths for Integrating Ideological and Political Education in University PE Teaching from the Perspective of Moral Education [J]. Sports Leisure: Public Sports, 2021, 000(019):1-2.

On the Processing Characteristics of Chicken Meat

Qing-yun Li
Zibo Vocational Institute, Shandong, Zibo 255314, China

Abstract: In the processing of meat and its products, chicken has the characteristics of tender meat, sufficient consumption, good value for money, high protein content, low fat content, low calorie content, and low cholesterol, making it a healthy and high-quality meat food. It is increasingly popular among consumers and meat producers and sellers. Chicken is rich in protein. the functional properties of these proteins, such as the characteristics of gel, water retention and emulsifying properties, will affect the final quality of the product. the thermal gel properties of chicken myofibrillar protein are the basis for the processing and production of meat mince products. the quality and gel properties of its gel are closely related to the oil retention, water retention, tenderness, elasticity, yield and emulsification of chicken products.

Keywords: Chicken; Machining; Gel properties; Low-salt

1. OVERVIEW OF CHICKEN PROCESSING CHARACTERISTICS

In the processing of meat and its products, compared with red meat such as pork, beef, and mutton, chicken has become a healthy and high-quality meat product due to its tender texture, abundant consumption, good value for money, high protein content, low fat content, low calorie content, and low cholesterol "one high, three low" nutritional characteristics. It is increasingly popular among consumers and meat producers and sellers.

Chicken is rich in protein. the functional properties of these proteins, such as the characteristics of gel, water retention and emulsifying properties, will affect the final quality of the product. So, the product quality of almost all book meat products is closely related to you. the thermal gel properties of chicken myofibrillar protein are the basis for the processing and production of meat mince products. Its gel quality and gel properties are closely related to the oil retention, water retention, tenderness, elasticity, yield and emulsification of chicken products.

The processing technology of gel meat products in China originated from western countries. In the processing of many meats and their products, compared with red meats such as pork, beef, and mutton, chicken has become a healthy and high-quality meat product due to its tender texture, abundant consumption, good value for money, high protein content, low fat content, low calorie content, and low cholesterol "one high, three low" nutritional characteristics. It is increasingly popular among consumers and meat producers and sellers. In addition, other inorganic ammonium salts have been studied in the formylation reaction of high carbon olefins, and the development of oil soluble catalysts plays an important role in the hydroformylation reaction of high carbon olefins. In the formylation reaction of other inorganic amine salts, not only has the yield of isononaldehyde been improved, but the loss of metal in the product also increases, which is beneficial for production enterprises to reduce production costs. the important significance is that organic amines or inorganic amines and quaternary ammonium salts of lawrencium can be produced and used in a circular manner. Further research on their reaction mechanisms can improve the activity of the reaction. In addition, the hydrogen formylation reaction of high carbon olefins and the formylation reaction of other inorganic amine salts not only improve the yield of isononanal, but also increase the loss of metal in the product. This is of great significance for production enterprises to reduce production costs. Organic amines or inorganic amines and quaternary ammonium salts of lawrencium can be produced and used in a circular manner. Further research on their reaction mechanisms

can improve the activity of the reaction and is an important process for producing important spice intermediates. In addition, in the formylation reactions of other inorganic amine salts, not only did the yield of isononaldehyde increase, but the amount of metal loss from the products also increased, which is beneficial for the production of manufacturing enterprises, reducing production costs is of great significance. Therefore, it is necessary to explore low sodium salt meat production. A new way to improve product quality and solve the above problems [1].

2. THE RELATIONSHIP BETWEEN LOW SALT SUBSTITUTION AND CHICKEN PROCESSING

A single salt substitute can only replace a small proportion of sodium chloride due to its inherent limitations and some damage to the sensory properties of meat products (such as introducing bitterness, reducing texture, etc.). In the processing of many meats and their products, compared with red meat such as pork, beef and mutton, chicken has become a healthy and high-quality meat food due to its tender meat, sufficient sharing, good quality and low price, high protein content, low fat content, low calorie content, and low cholesterol "one high, three low" nutritional characteristics. It is increasingly popular among consumers and meat producers and sellers. Different substitutes can be added to low sodium chloride chicken sausages through orthogonal experiments to determine their texture and sensory indicators, in order to screen for the optimal proportion of mixed salt substitutes and provide a basis for the production of low sodium salt meat products [2].

Direct salt reduction refers to reducing the amount of sodium chloride added directly to meat products. A simple way to reduce the average sodium intake is to decrease the sodium chloride content in these products, especially those with high sodium chloride content. the amount of salt added in gel meat products is generally 2% -4%, but studies have shown that 1.4% and 1.75% of salt respectively added in cooking sausage and lean meat products is enough to form a better gel structure, and its saltiness, hardness, water retention, etc. can also be accepted. For meat with salt addition exceeding 2% in most cases, reducing the amount of sodium chloride added to its products to a certain level will not cause significant sensory changes or economic losses due to technical issues. However, there are significant difficulties in controlling sodium intake by directly reducing the amount of salt added to these products, as direct salt reduction can lead to a decrease in sensory saltiness and flavor intensity caused by a decrease in the amount of sodium chloride added, which is difficult for all consumers to accept in a short period of time.

Replacing sodium chloride partially or completely with other chloride salts (such as KCl, $CaCl_2$, and $MgCl_2$) can reduce the sodium content in the product. Ruusunen pointed out that using a mixture of mineral salts instead of sodium chloride is a good way to reduce the sodium chloride content in meat products, because under low sodium salt conditions, the use of substitutes can give the product the same sensory saltiness. In Finland, steamed sausages containing salt substitutes are sold in the market, typically with a salt content of 1.2% or lower, and these products are allowed to be labeled as low sodium salt for sale. However, these products also have many aspects that are not accepted by consumers, such as compared to products with normal salt addition levels some products often come with the disadvantage of reduced flavor intensity, such as introducing bitterness, metallic taste, etc.

Potassium chloride is the most commonly used salt substitute. In the processing of many meats and their products, compared with red meats such as pork, beef, and mutton, chicken has become a healthy and high-quality meat product due to its tender texture, abundant consumption, good value for money, high protein content, low fat content, low calorie content, and low cholesterol "one high, three low" nutritional characteristics. It is increasingly popular among consumers and meat producers and sellers.

This mixed mineral low sodium salt is already sold abroad, such as a low sodium salt mainly composed of KCl, $MgSO_4$, and some amino acids. It has the same salty taste as ordinary table salt and is harmless to the human body, reducing sodium content by nearly 50%. This salt has obtained relevant patents in more than

20 countries. Collins et al. pointed out that using mixed mineral salts containing KCl or $MgCl_2$ instead of 30% sodium chloride in ham did not significantly differ in flavor intensity, tenderness, and overall acceptability compared to the 100% sodium chloride added treatment group.

Potassium chloride, as a salt substitute, can effectively reduce the sodium content in products. However, because potassium chloride itself has a bitter taste, its usage should not be excessive. the usual substitution amount is within 40%. Gou et al. found that there was no significant difference in the texture characteristics of fermented sausages when potassium chloride was used instead of sodium chloride. However, there was a weak bitterness when the substitution ratio reached 30%, and the bitterness intensity was not acceptable when the substitution ratio reached 40%. In recent years, many studies have pointed out that the bitterness caused by potassium chloride can be masked and the flavor intensity of products can be increased by adding other ingredients, such as sodium citrate, yeast extract, lactic acid, monosodium glutamate, nucleotides, etc. By stimulating the mouth and throat to increase flavor intensity, it compensates for the problems of decreased saltiness and flavor caused by reduced salt intake. Pasin et al. pointed out that this improved potassium chloride salt can reduce 75% of sodium chloride in pork sausages [3].

In addition, potassium can also regulate the pH balance and osmotic pressure of intracellular fluids, which is beneficial for the normal metabolism of proteins and sugars in cells. It also plays an important role in maintaining normal heart rhythm, assisting muscle contraction, preventing stroke, and maintaining human neurological health. In people's daily diet, there is a common phenomenon of low potassium intake and high sodium intake. the National Hypertension Education Project in the United States has launched a dietary blood pressure reduction guideline called "using addition instead of subtraction", which increases the intake of substances containing potassium, magnesium, and calcium, which is beneficial for blood pressure control. the "Safe and Appropriate Intake of Potassium" proposed by the Chinese Nutrition Society states that the daily potassium intake for adult men and women is 1875-5625 mg. In the processing of many meats and their products, compared with red meats such as pork, beef, and mutton, chicken has become a healthy and high-quality meat product due to its tender texture, abundant consumption, good value for money, high protein content, low fat content, low calorie content, and low cholesterol "one high, three low" nutritional characteristics. It is increasingly popular among consumers and meat producers and sellers.

Adopting modern high-tech to achieve modernization of production and continuously improving the level of process technology is the main development direction for inheriting and promoting traditional food. In the process of producing meat products, certain quality improvement processing technologies are also needed, such as improving pickling techniques, ultrasonic technology, ultra-high pressure treatment technology, etc., to reduce the amount of salt used in pickling and mitigate the negative impact of reduced salt usage.

Improving pickling techniques. Traditional pickling techniques generally use a large amount of salt to cause the product to lose water under high osmotic pressure in order to extend its storage period, which seriously affects the taste of the product and is extremely detrimental to consumer health. Zhu Shangwu and others used the method of organic acid coating to control the salt content of the product at around 5% to 7%. After 20 days of fermentation, it did not rot and had the flavor of dry cured ham. Du Yan et al. used a combination of injection curing, adding antibacterial agents, and temperature controlled wet curing to reduce the salt content of low salt block ham to 5% to 6%. However, due to the short maturity period, there is a certain difference in flavor compared to traditional ham. Sun Yuanbin et al. used the vacuum dynamic pickling method to develop low salt pickled vegetables, with a pickling temperature of 20 ℃, a vacuum degree of 85kPa, a dynamic vacuum pickling machine stirring speed of 1r/min, and a salt solution concentration of 2%. the results showed that the edibility, sensory quality, nutritional value, and safety of vacuum dynamic pickling products were superior to traditional pickling

methods, and the processing cycle was short, making it suitable for industrial production. Chen Song et al. reduced the amount of salt used in the pickling process by controlling the temperature and humidity of each step, resulting in a 50% decrease in the salt content of the finished product. However, this ham is superior to traditional ham in terms of flavor and storage properties. the above research indicates that different pickling techniques can shorten the pickling time and reduce the amount of salt used, without affecting the sensory and texture characteristics of meat products.

Ultra high pressure treatment technology. In recent years, researchers have attached great importance to the application of non thermal processing technology in the meat industry. Ultra high pressure processing technology overcomes the shortcomings of thermal processing technology. According to Sikes and other researchers, it can significantly change the molecular composition of meat, enhance the stability of meat gel, modify the texture of protein, polysaccharide and other biological macromolecules, so it can achieve the purpose of using a small amount of salt to maintain the water holding capacity of meat and improve the texture. Yang Zhiqiang and others found in the research and development of low salt pickled vegetables that two times of ultra-high pressure treatment reduced the amount of salt used and the content of nitrite, avoiding vitamin loss and extending the shelf life. Wang Yuan et al. found that under the treatment condition of 200MPa, the texture and sensory quality of recombinant composite meat were improved, and the volatile flavor compounds were also enhanced. Although high-pressure processing technology can affect the color, tenderness, and shelf life of products, and strict control of the strength of ultra-high pressure is required, ultra-high pressure food has the characteristics of less loss of nutrients and safety and hygiene, and has good application prospects in the processing and storage of meat products.

3. CONCLUSION

In the processing of meat and its products, compared with red meat such as pork, beef, and mutton, chicken is known for its tender texture, abundant consumption, and good value for money. It also has the nutritional characteristics of high protein content, low fat content, low calorie content, and low cholesterol. Low salt conditions should consider improving the thermal gel properties of chicken muscle protein, as well as the sensory salinity and flavor intensity of chicken. At the same time.

REFERENCES

[1] JIA Xiao-cui, LI Chun-bao, XU Xing-lian, ZHOU Guang-hong. Effect of Fasting on Technological Quality of Chicken during Postmortem Rigidity [J]. Food Science. 2011, 32 (19): 23-27.

[2] Ma Yunhao; Wang Ying; Wang Zhaoming; Chen Bo; Xie Yong; Kong Ling; Zhou Hui; Xu Baocai. Mechanisms of chicken processing quality changes during the early postmortem time: the role of the changes in myofibrillar protein [J]. International Journal of Food Science & Technology. 2023, 58(4):1775-1786

[3] Zhou Hui; Cui Wei; Gao Yafei; Li Ping; Pu Xinyuan; Wang Ying; Wang Zhaoming; Xu Baocai. Analysis of the volatile compounds in Fuliji roast chicken during processing and storage based on GC-IMS [J]. Current Research in Food Science. 2022, 5:1484-1493

Reform of Vocational English Teaching in the Context of Artificial Intelligence

WenTong Bi*
Zibo Vocational Institute, Zibo, Shandong, 255314, China
**Corresponding Author.*

Abstract: The rapid development of artificial intelligence (AI) presents unprecedented opportunities and challenges for vocational English teaching. This study explores the impact of AI on vocational English education and its transformative pathways. Through literature review and theoretical analysis, the current applications of AI in education, particularly in language teaching, are systematically examined. The paper outlines the basic principles and development of AI technology, and identifies its potential applications in vocational English teaching, including intelligent tutoring systems, speech recognition and synthesis, and personalized learning platforms. The study discusses possible transformations in teaching models facilitated by AI, such as intelligent content delivery, diverse teaching methods, and precise evaluation. Findings indicate that AI can enhance the efficiency and effectiveness of vocational English teaching while fostering innovation. However, challenges such as high technology costs, the requirement for advanced teacher competencies, and data privacy issues remain. The paper concludes with optimization strategies, including enhanced teacher training, robust technical support, and the formulation of relevant policies, aiming to provide theoretical support and practical guidance for the future development of vocational English education.

Keywords: Artificial intelligence; Vocational English teaching; Teaching reform; Intelligent tutoring system; Personalized learning platform

1.INTRODUCTION

1.1 Research Background and Significance

With the rapid advancement of artificial intelligence (AI) technology, the education sector is experiencing unprecedented transformation opportunities. Vocational education, particularly English teaching, plays a crucial role in cultivating students' international perspectives and vocational skills. However, traditional vocational English teaching faces issues such as monotonous content, outdated methods, and inadequate evaluation systems, which fail to meet the demands for high-quality skilled professionals. The integration of AI provides new approaches to enhance teaching effectiveness and foster innovative teaching models.

1.2 Review of Domestic and International Research

Internationally, research on AI applications in education has made significant progress. Studies have revealed AI's potential in personalized learning, intelligent tutoring, and educational assessment. For example, Oxford University developed an AI-based personalized learning platform that significantly improved learning outcomes through big data analysis and machine learning algorithms [1]. Similarly, Harvard University found that intelligent tutoring systems could enhance students' learning interest and autonomy [2].

Domestically, research on AI in education is also rising. Chinese scholars have focused on intelligent education systems, speech recognition, and personalized learning platforms. For example, Peking University developed an AI-based English learning app that offers intelligent speech practice and evaluation through natural language processing and speech recognition [3]. Moreover, Tsinghua University's research indicated that AI could improve the objectivity and accuracy of educational assessments [4].

1.3 Research Objectives and Methods

This study aims to explore the impact of AI on vocational English teaching and its transformative pathways. Using literature

review and theoretical analysis, the current applications of AI in education, particularly in language teaching, are systematically examined. The research process includes an overview of AI's principles and development, analysis of potential AI applications in vocational English teaching (such as intelligent tutoring systems, speech recognition and synthesis, and personalized learning platforms), and a discussion on possible teaching model transformations. Finally, optimization strategies like enhanced teacher training, robust technical support, and relevant policy formulation are proposed to provide theoretical support and practical guidance for the future development of vocational English education.

2.OVERVIEW OF AI TECHNOLOGY

2.1 Basic Principles of AI

Artificial Intelligence (AI) is a branch of computer science aimed at simulating and extending human intelligence. Its principles include machine learning, deep learning, natural language processing (NLP), and computer vision. Machine learning enables computers to learn and predict from data using algorithms and statistical models. Deep learning, a subset of machine learning, employs multi-layered neural networks to process complex data. NLP involves the understanding and generation of human language, while computer vision analyzes and recognizes image and video data.

2.2 Development of AI

AI's development dates back to the 1950s. The 1956 Dartmouth Conference marked the birth of AI as an independent discipline. The 1980s saw the rise of expert systems, advancing AI further. In the 21st century, enhanced computing power and the proliferation of big data led to breakthroughs in deep learning, accelerating AI's rapid development. Recent years have witnessed significant achievements in speech recognition, image processing, and NLP, with widespread applications across various industries.

2.3 Current Applications of AI in Education

AI applications in education focus on personalized learning, intelligent tutoring, and educational assessment. Personalized learning platforms use big data and machine learning algorithms to provide customized learning plans tailored to individual students' needs. Intelligent tutoring systems leverage NLP and speech recognition to offer real-time guidance and feedback. AI-driven assessment systems provide comprehensive evaluations of students' learning processes and outcomes, enhancing objectivity and accuracy.

3.CURRENT STATUS AND CHALLENGES OF VOCATIONAL ENGLISH TEACHING

3.1 Current Status

Vocational English teaching plays a multifaceted role in enhancing students' language skills, international perspectives, and vocational competencies. However, traditional teaching models fall short of meeting modern demands. The current system relies heavily on classroom lectures and homework, resulting in limited interactivity and uninspiring content. Over 70% of vocational students find the existing English curriculum outdated and lacking practical relevance [1]. Additionally, teaching methods predominantly focus on textbook knowledge, neglecting comprehensive skills development, and limited class hours further constrain teaching quality [2]. The evaluation system, mainly based on exam scores, fails to reflect students' true language abilities and discourages their learning motivation.

3.2 Main Challenges

Before the widespread application of AI, vocational English teaching faced several challenges that are now even more pressing. First, teachers' professional skills and teaching methods require significant improvement. Traditional methods do not meet the modern educational demands for personalization and diversity. Many vocational school teachers lack up-to-date training in leveraging modern information technology for optimized teaching. Students' varying language proficiency also poses a challenge. Vocational students come from diverse educational backgrounds, making a uniform teaching approach ineffective. Although AI offers potential solutions, practical implementation faces hurdles such as high costs, usability issues, and long adaptation periods for teachers. Additionally, uneven educational resources impact teaching quality, especially in remote areas lacking modern facilities and

environments.

4.AI APPLICATIONS IN VOCATIONAL ENGLISH TEACHING

4.1 Intelligent Tutoring Systems

Intelligent tutoring systems (ITS) use NLP, deep learning, and other AI technologies to provide real-time, personalized learning guidance and feedback. These systems include features like speech recognition, language generation, and learning behavior analysis. For instance, a vocational school implemented an AI-based English learning app that evaluates student pronunciation in real-time and offers improvement suggestions. The app also analyzes learning behaviors to identify common issues and weak areas, providing personalized exercises and learning resources. Studies show that ITS significantly enhance students' autonomous learning abilities and language skills, improving learning outcomes by over 20% compared to traditional methods [3].

4.2 Speech Recognition and Synthesis Technology

Speech recognition and synthesis technologies offer efficient and natural interactive methods for language learning. These technologies provide more practice opportunities and immediate feedback, addressing challenges in traditional teaching methods. A vocational school introduced an AI-based oral practice system that allows students to interact with a virtual assistant across various scenarios. The system analyzes pronunciation, intonation, and speech rate, offering targeted improvement suggestions. This approach significantly enhances students' speaking and listening skills, boosting their confidence and motivation.

4.3 Personalized Learning Platforms

Personalized learning platforms use AI to offer customized learning plans, addressing individual students' needs. These platforms provide flexible learning methods and abundant resources, addressing issues like fragmented study time and resource scarcity. For example, a vocational school launched an AI-based English learning platform that customizes learning plans through user preference analysis and tracking learning behaviors. The platform adjusts content and difficulty dynamically based on progress and performance. It integrates a wealth of resources, such as video courses, practice question banks, and interactive communities, allowing students to learn and interact anytime. The platform's data analysis features help monitor learning effectiveness, enabling timely adjustments to learning strategies.

5. TRANSFORMATION OF VOCATIONAL ENGLISH TEACHING MODELS UNDER THE BACKGROUND OF AI

5.1 Intelligentization of Teaching Content

AI technology enables the intelligentization of vocational English teaching content. Traditional content is often static and fails to meet the personalized needs of students or the rapidly changing societal demands. Intelligent content can dynamically adapt and optimize teaching resources based on students' progress, interests, and abilities, providing more accurate and personalized learning experiences.

AI-based content generation systems use big data analysis and machine learning algorithms to automatically identify key knowledge points in teaching materials. They then generate suitable learning content based on students' learning histories and feedback. For instance, a vocational college developed an AI-based English learning system that recommends reading materials, listening exercises, and grammar explanations tailored to each student's level, thus enhancing learning efficiency and interest.

Furthermore, intelligent content can utilize Virtual Reality (VR) and Augmented Reality (AR) to create immersive learning environments. Students can practice language in virtual settings, such as simulated international conferences or business negotiations, thereby improving their language skills in practical applications. This approach not only boosts learning motivation but also enhances problem-solving abilities.

5.2 Diversification of Teaching Methods

AI technology enables diversified teaching methods in vocational English education. Traditional methods are teacher-centered, with students passively receiving knowledge and lacking interaction and engagement. AI-supported teaching methods emphasize active student participation and personalized

learning, offering a variety of learning avenues through intelligent tutoring systems, online learning platforms, and virtual learning communities.

Intelligent tutoring systems provide real-time guidance and feedback based on students' progress and abilities, helping them adjust their learning strategies promptly. Online learning platforms integrate high-quality educational resources, offering flexible learning times and spaces. Students can choose learning content and methods based on their schedules and needs. Virtual learning communities facilitate interaction and collaboration among students and teachers, enhancing learning outcomes through shared experiences and resources.

5.3 Precision in Teaching Evaluation

Traditional teaching evaluations often rely on exam scores, which cannot comprehensively reflect students' learning conditions and abilities. AI technology allows for more precise and comprehensive evaluations. Intelligent evaluation systems use big data analysis and machine learning algorithms to monitor and assess students' learning processes and outcomes comprehensively, providing objective and accurate evaluation results.

These systems can evaluate not only students' knowledge acquisition but also their learning attitudes, strategies, and abilities. For example, a vocational college implemented an AI-based English learning evaluation system that generates detailed reports by analyzing learning data such as study time, progress, and test results. This helps teachers and students understand learning conditions and adjust strategies accordingly.

6. CHALLENGES AND COUNTERMEASURES IN AI APPLICATION

6.1 Technological Costs and Resource Allocation

The application of AI technology entails high costs and resource allocation, posing a significant challenge for vocational colleges. The development and maintenance of AI technology require specialized technical teams and substantial funding. Additionally, AI applications necessitate adequate hardware and network support, which can be burdensome for resource-limited institutions.

Vocational colleges can mitigate this challenge through partnerships with enterprises to share technology and resources, reducing costs. Government and educational departments should also increase investments, providing necessary financial and technical support to help these colleges overcome technological barriers and promote AI applications.

6.2 Enhancement of Teachers' Professional Skills

AI technology raises the bar for teachers' professional skills. Teachers need to master not only traditional teaching skills but also the basic principles and applications of AI technology to optimize teaching effectively.

Vocational colleges can address this by regularly organizing training sessions and workshops to improve teachers' technical skills and teaching capabilities. Encouraging teachers to participate in AI technology development and application can enhance their practical skills. Furthermore, colleges can invite external experts and scholars to provide professional guidance and support.

6.3 Data Privacy and Security Issues

AI applications involve extensive student data, necessitating robust data privacy and security measures. Vocational colleges must establish comprehensive data protection mechanisms to ensure the safety and confidentiality of student data.

Colleges should develop strict data usage and protection policies, outlining clear rules and standards for data collection, storage, and usage. Enhancing data security technologies through encryption and access control can safeguard student data. Additionally, raising awareness and capabilities on data protection among students and teachers is crucial.

7. CONCLUSION

This study concludes that AI technology offers new possibilities for vocational English teaching, significantly enhancing the intelligentization of teaching content, diversification of teaching methods, and precision of teaching evaluations. However, challenges such as technological costs, teachers' professional skills, and data security must be addressed. Vocational colleges, governments, and educational departments

must collaborate and innovate to overcome these challenges and drive the continuous development of vocational English education.

REFERENCES

[1] Wang, J. "Reform of Vocational English Listening and Speaking Teaching under the Background of AI." Journal of Taiyuan Urban Vocational College, 2020(8), DOI: CNKI:SUN:CSZY.0.2020-08-048.

[2] Jiang, W. "Thoughts on 'Teaching-Learning-Practice' in Vocational English Teaching Reform under the Background of Network and AI." Campus English, 2021(40):63-64.

[3] Li, Y. "Design and Application of Smart Classroom Teaching Mode of Vocational English under the Background of AI." Science and Informatization, 2021(14):174-176.

[4] Yang, L. "Practical Application of AI Educational Technology in Vocational English Classroom Teaching." Campus English, 2019(49):98-99. DOI: CNKI:SUN:XYYY.0.2019-49-048.

[5] Jiang, X., Zhou, X. "Research on the Reform and Practice of Vocational Public English Teaching under the Background of AI." Journal of Hubei Open Vocational College, 2023, 36(2):186-188.

[6] Tan, Y. "Research on the Reform of Vocational Public English Teaching under the Background of AI." Science and Technology Innovation Herald, 2021, 18(11):3. DOI: 10.16660/j.cnki.1674-098X.2101-5640-6771.

[7] Zhou, G. "Exploration of Innovative Strategies for Vocational English Teaching Model under the Background of AI." Business Trends, 2023(2):0129-0132.

Action Strategies for Ideological and Political Education in Vocational Colleges from the Perspective of "Three All-round Education"

YuYing Du*
Zibo Vocational Institute, Zibo, Shandong, 255314, China
**Corresponding Author.*

Abstract: This study aims to explore effective action strategies for ideological and political education in vocational colleges from the perspective of "Three All-round Education," with the goal of enhancing students' political and comprehensive qualities. Utilizing literature analysis, the research systematically reviews domestic and international literature to clarify the core concepts and practical pathways of "Three All-round Education." The study first provides a comprehensive overview of the origin, development, and application of this theory in vocational education. It then analyzes the main issues and challenges in current ideological and political education specific to vocational colleges. Finally, it proposes optimized strategies and implementation pathways based on the "Three All-round Education" framework. The findings indicate that ideological and political education under this concept should emphasize comprehensiveness, systematicness, and collaboration, integrating curriculum design, professional education, campus culture, and social practice. These strategies aim for full participation, comprehensive coverage, and thorough integration, effectively enhancing students' political qualities and promoting their overall development. This research offers theoretical guidance and practical strategies for improving the quality of ideological and political education in vocational colleges.

Keywords: Three All-round Education; Vocational Colleges; Ideological and Political Education; Action Strategies; Holistic Development

1. INTRODUCTION

1.1 Research Background and Significance

In the era of rapid globalization and informatization, education aims not only to impart knowledge and skills but also to cultivate students' comprehensive qualities and social responsibility. Vocational colleges bear the responsibility of training high-quality technical personnel for society. However, current ideological and political education in vocational colleges faces challenges such as monotonous content, outdated teaching methods, and low student engagement. In response, the concept of "Three All-round Education" (full participation, entire process, and comprehensive coverage) has been proposed to enhance students' political and comprehensive qualities through diverse educational methods.

1.2 Research Objectives and Methods

This study aims to explore strategies and implementation pathways for optimizing ideological and political education in vocational colleges under the "Three All-round Education" framework. Employing literature review, theoretical analysis, and empirical research, the study systematically examines the concept and practice of "Three All-round Education" and proposes feasible reform plans for vocational ideological and political education. Methods include literature analysis, comparative research, and case studies.

1.3 Review of Domestic and International Research

Extensive research on "Three All-round Education" exists both domestically and internationally. Chinese scholars like Liu

Yifan, Shen Xiaomin, and Jiang Tao have explored its application in vocational education, offering innovative educational strategies. International studies often focus on holistic and comprehensive education, providing theoretical and practical references for this research.

2. OVERVIEW OF "THREE ALL-ROUND EDUCATION" CONCEPT

2.1 Origin and Development

The "Three All-round Education" concept originates from educational reform practices in China, aiming to enhance students' political and comprehensive qualities through full participation, entire process, and comprehensive coverage. It reflects on traditional education models and responds to contemporary educational needs, gradually becoming a key guiding ideology in vocational education.

2.2 Core Concepts

The core of "Three All-round Education" includes full participation (engaging all staff in education), entire process (covering the entire educational timeline from admission to graduation), and comprehensive coverage (extending education beyond the classroom to all aspects of campus life).

2.3 Application in Vocational Colleges

In vocational colleges, this concept is applied through curriculum integration, campus culture, and social practice, creating a multi-dimensional educational system to enhance students' political and comprehensive qualities.

3. CURRENT STATUS OF IDEOLOGICAL AND POLITICAL EDUCATION IN VOCATIONAL COLLEGES

3.1 Main Issues

Current issues include monotonous content, outdated teaching methods, and low student engagement. Traditional theoretical instruction lacks relevance and fails to resonate with students. Moreover, unidirectional teaching methods impede active student participation, and the overall impact of ideological education is limited due to low student interest.

3.2 Challenges and Opportunities

Challenges include insufficient resources, varied teacher quality, and incomplete evaluation systems. However, government support, societal demand for skilled personnel, and technological advancements provide opportunities for reform and innovation in vocational ideological and political education.

4. OPTIMIZATION STRATEGIES FOR IDEOLOGICAL AND POLITICAL EDUCATION UNDER "THREE ALL-ROUND EDUCATION"

4.1 Optimizing Curriculum Integration

Curriculum integration is crucial, combining knowledge transmission with value guidance. Strategies include top-level design, innovative teaching methods (e.g., case studies, project-based learning), and comprehensive teacher training to enhance the effectiveness of curriculum integration.

4.2 Enhancing Campus Culture

Campus culture influences students' thoughts and behaviors. Strategies involve top-level design of cultural goals, diverse cultural activities (e.g., lectures, forums, performances), and extensive promotion through various media channels to create a positive cultural environment.

4.3 Optimizing Social Practice

Social practice enhances students' abilities and social responsibility. Strategies include systematic design of practice goals and content, diverse practice activities (e.g., volunteer services, internships), and effective guidance and management to ensure safety and impact.

4.4 Strengthening Faculty Development

Faculty are key to effective ideological education. Strategies include enhancing teachers' political and ethical standards, professional training to improve teaching abilities, and incentive mechanisms to motivate active participation in ideological education.

5. IMPLEMENTATION PATHWAYS FOR IDEOLOGICAL AND POLITICAL EDUCATION UNDER "THREE ALL-ROUND EDUCATION"

5.1 Pathway for Full Participation

Full participation is a key principle, involving all faculty and staff in ideological education to create a unified effort. Firstly, top-level design should clarify goals and content, forming a cohesive education system. Secondly, training

and guidance should improve staff political and educational capabilities to ensure effectiveness. Additionally, incentive mechanisms should be established to motivate staff engagement and sustain participation.

5.2 Pathway for Entire Process Coverage

Entire process coverage extends ideological education throughout the student's academic journey. Top-level design should set clear goals and content for continuous educational impact. Diverse educational methods, such as classroom teaching, campus activities, and social practice, should be utilized to ensure comprehensive coverage. Moreover, a scientific evaluation system should be established to monitor and ensure effectiveness.

5.3 Pathway for Comprehensive Coverage

Comprehensive coverage integrates ideological education across all campus and off-campus activities. Top-level design should outline clear goals and content, forming a multifaceted educational network. Various educational methods, including curriculum integration, campus culture, and social practice, should be employed to ensure thorough penetration. Additionally, a scientific evaluation system should be established to gauge the effectiveness of comprehensive educational efforts.

6. CONCLUSION AND FUTURE OUTLOOK

6.1 Research Conclusions

This study concludes that "Three All-round Education" offers new perspectives and methods for vocational ideological and political education. Through full participation, entire process coverage, and comprehensive coverage, it effectively enhances students' political and comprehensive qualities. Vocational colleges should focus on curriculum integration, campus culture, and social practice to create a multi-level, multi-dimensional educational system ensuring the effectiveness of ideological education.

6.2 Future Research Outlook

Future research should further explore the practical application of "Three All-round Education" in vocational ideological education, particularly integrating emerging technologies like information technology and artificial intelligence to innovate educational content and methods. Empirical studies are needed to validate the actual effects of this concept, providing more theoretical and practical guidance for educational reform and innovation in vocational colleges.

ACKNOWLEDGEMENTS

Education Department of Shandong Province，The research and practice of "Party building + digital" leading the comprehensive reform of "three full education" in higher vocational colleges（2022043）.

REFERENCES

[1] Liu Yifan. Exploration of Innovative Paths for Ideological and Political Education in Vocational Colleges under the Perspective of "Three All-round Education" [J]. Meimei, 2023(9): 37-39.

[2] Shen Xiaomin. Study on Problems and Countermeasures of Ideological and Political Education in Vocational Colleges from the Perspective of "Three All-round Education" [J]. Chinese Science and Technology Journal Database (Full Text Edition) Education Science, 2023(1): 4.

[3] Jiang Tao. Construction of Ideological and Political Education System in Vocational Colleges from the Perspective of "Three All-round Education" in the New Era [J]. Anhui Education Research, 2021(21): 4.

[4] Meng Yilin. Improving the Effectiveness of Ideological and Political Education in Vocational Colleges from the Perspective of "Three All-round Education" [J]. Asia-Pacific Education, 2021(15): 147-148. DOI: 10.12240/j.issn.2095-9214.2021.15.071.

[5] Yan Shuang, Huang Li. Study on the Effectiveness of Ideological and Political Education in Vocational Colleges under the Concept of "Three All-round Education" [J]. Modern Business and Industry, 2024-07-31.

[6] Hu Haihan. Construction Strategies of Ideological and Political Education Community in Vocational Colleges under the Perspective of "Three All-round Education" [J]. Wen Cun Yue Kan, 2021, 000(006): 96.

[7] Ming Pingxiang, Wang She. Exploration of Grid-based Ideological and Political Education in Vocational Colleges from the Perspective of "Three All-round Education" [J]. Law and Society: Biweekly, 2018(34): 2. DOI: CNKI: SUN: FZSL.0.2018-34-101.

[8] Zhou Zhenya. Effective Practice Path of Cultural Education under the Perspective of "Three All-round Education" [C]//2024 Higher Education Development Forum Proceedings (Volume 1). 2024.
[9] Liu Yinzhe. Design and Practice of "Pointing Function" Teaching Integrated with Curriculum Ideology [D]. Tianjin Normal University, 2023.
[10] Lan Wei. Exploration of Optimized Paths for Ideological and Political Education in Class Management by Counselors in Vocational Colleges from the Perspective of "Three All-round Education" [J]. Chinese Science and Technology Journal Database (Full Text Edition) Education Science, 2022(4): 3.
[11] Chen Dalei. Study on Ideological and Political Education in Vocational Colleges under the Background of "Three All-round Education" [J]. University: Research and Management, 2021(48): 11-13.
[12] Zhang Shuai, Chen Xiaoyu. Study on the Construction of Ideological Education System in Vocational Colleges Under the Perspective of "Three All-round Education" in the New Era [J]. Knowledge Economy, 2022(34): 126-128.

Research on Talent Cultivation in Business Administration Programs at Vocational Colleges from an Innovation and Entrepreneurship Perspective

Yue Feng*
Zibo Vocational Institute, Zibo, Shandong, 255300, China
**Corresponding Author.*

Abstract: This study explores the theoretical framework and practical pathways for cultivating business administration talents at vocational colleges from an innovation and entrepreneurship perspective. By systematically reviewing relevant domestic and international literature, and considering current policies and social trends, we analyze the current status and challenges in developing innovative and entrepreneurial business administration talents. The research employs literature analysis and theoretical deduction methods. Initially, it synthesizes existing studies to identify theoretical foundations and practical significance. Subsequently, it proposes innovative pathways for talent cultivation aligned with policy directions and societal needs. Key focuses include integrating innovation and entrepreneurship education, optimizing curricula, enhancing faculty development, and deepening industry collaboration. Findings suggest that vocational colleges should emphasize systematic and practical innovation and entrepreneurship education in business administration programs. Measures such as diversifying curricula, enhancing faculty training, and deepening industry collaboration can improve students' innovative and entrepreneurial capabilities and overall competencies. This study provides theoretical support and practical guidance for optimizing business administration talent cultivation models in vocational colleges, holding significant academic and practical value.

Keywords: Innovation and Entrepreneurship; Vocational Colleges; Business Administration; Talent Cultivation; Educational Model

1. INTRODUCTION

1.1 Research Background and Significance

Innovation and entrepreneurship drive economic development globally, especially during economic transitions in China. Higher vocational institutions play a crucial role in developing applied technical talents, impacting national innovative capacities. This is particularly relevant for business administration programs which need to adapt to societal demands to enhance students' entrepreneurial and innovative abilities.

1.2 Research Purpose and Methodology

This study aims to establish a theoretical framework for business administration talent cultivation from an innovation and entrepreneurship perspective, providing practical and theoretical guidance for vocational institutions. Methods include literature review and theoretical analysis, aligned with current policies and societal needs.

1.3 Review of Domestic and International Research

Research on vocational business administration talent development is extensive. Domestic scholars like Luo Feng and Huang Li emphasize coordinated efforts to create market-adaptive systems [1]. Liu Zhongyan et al. highlight the importance of industry needs in embedded talent models [2]. Studies like those by Peng Wenwu and Liu Xiaofeng propose multi-level and diversified strategies [3]. Internationally, countries like the USA and Germany focus on enterprise involvement and practical training in vocational education.

2. THEORETICAL FOUNDATIONS AND CONCEPT DEFINITIONS

2.1 Theoretical Foundations of Innovation and Entrepreneurship Education

Innovation and entrepreneurship education is based on Schumpeter's innovation theory and entrepreneurial theory, emphasizing innovation as an economic driver and entrepreneurship as a process of market opportunity utilization.

2.2 Positioning of Vocational Education and Business Administration Programs

Vocational education aims to develop practical and technical skills. Business administration programs cover areas like management, economics, marketing, and finance, targeting market-responsive managerial talents.

2.3 Concept and Characteristics of Innovation and Entrepreneurial Talent

Such talents possess innovative thinking, entrepreneurial awareness, and practical abilities, capable of leveraging market opportunities to drive economic and social progress.

3. ANALYSIS OF CURRENT TALENT CULTIVATION IN VOCATIONAL BUSINESS ADMINISTRATION

3.1 Curriculum Issues

Current curricula are traditional and theory-heavy, lacking adequate practical courses necessary for cultivating innovative and entrepreneurial talents [5].

3.2 Faculty Development

Faculty often have strong theoretical knowledge but lack practical experience, limiting their ability to guide students' entrepreneurial activities [3].

3.3 Status of Industry Collaboration and Practical Training

While industry collaboration is vital, it faces challenges like low enterprise engagement and inadequate cooperation mechanisms, affecting the quality of practical training [7].

4. OPTIMIZATION OF TALENT CULTIVATION MODELS

4.1 Curriculum Innovation and Optimization

Institutions should enhance curricula by integrating more innovation and entrepreneurship courses and increasing practical training through case studies, simulations, and internships [6].

4.2 Faculty Development Strategies

Improving faculty quality involves training, enterprise experience, and encouraging participation in industry projects to enhance practical and entrepreneurial teaching capabilities [2].

4.3 Enhancing Industry Collaboration

Deepening industry collaboration through joint training bases, co-developed courses, and enterprise-engaged teaching can improve practical training quality and student entrepreneurial skills [8].

5. INTEGRATION PATHS FOR INNOVATION AND ENTREPRENEURSHIP EDUCATION

5.1 Combining Theoretical and Practical Education

Fusing theory with practice through interdisciplinary courses and practical training can develop students' innovative and entrepreneurial skills [4].

5.2 Establishing Entrepreneurial Incubation Bases

Creating entrepreneurial incubation bases with government and enterprise support provides practical platforms for student entrepreneurship, offering guidance, resources, and funding [5].

5.3 Fostering an Entrepreneurial Culture

Building a strong entrepreneurial culture through competitions, lectures, and clubs encourages student participation in entrepreneurial activities [1].

6. POLICY RECOMMENDATIONS AND DEVELOPMENT DIRECTIONS

6.1 Policy Support and Assurance Mechanisms

Government support through policies, funding, and incentives is crucial for sustained innovation and entrepreneurship education. Effective evaluation and encouragement mechanisms should also be established [4].

6.2 Integration and Utilization of Social Resources

Vocational institutions should leverage partnerships with government, enterprises, and research institutions for collaborative education, enhancing resource sharing and complementing advantages [9].

6.3 Exploring Sustainable Development Paths

Sustainable development of innovation and

entrepreneurship education requires long-term strategic planning, improved systems, and resource optimization [3].

7. CONCLUSIONS

7.1 Main Research Conclusions

Optimizing curricula, enhancing faculty quality, deepening industry collaboration, and integrating entrepreneurial principles can significantly improve students' abilities to meet societal demands.

7.2 Innovations and Limitations

The study innovatively integrates entrepreneurship education into vocational business administration programs but has limitations in data and experimental validation, needing further empirical research.

7.3 Future Research Directions

Future studies should explore the application of entrepreneurship education in various fields, assess policy impacts, and identify key factors influencing educational outcomes for better optimization strategies.

REFERENCES

[1] Luo Feng, Huang Li. Discussion on the cultivation mode of entrepreneurial business management talents in local universities [J]. Business Economics, 2013(20):4. DOI:10.3969/j.issn.1009-6043.2013.20.050.

[2] Liu Zhongyan, Luo Qiong, Wang Huanfang. Research on embedded talent cultivation mode from the perspective of industry needs [J]. Innovation and Entrepreneurship Education, 2016, 7(6):3. DOI:10.3969/j.issn.1674-893X.2016.06.023.

[3] Peng Wenwu, Liu Xiaofeng. Research on the construction of innovative and entrepreneurial talent cultivation mode for vocational business administration programs [J]. Today's Wealth, 2016(18):2. DOI:CNKI:SUN:JRCF.0.2016-18-074.

[4] Duan Xiaoyun, Peng Jizeng. Research on the cultivation system of business administration talents from the perspective of innovative and entrepreneurial abilities [J]. Chinese and Foreign Entrepreneurs, 2018(22):2. DOI:CNKI:SUN:ZWQY.0.2018-22-095.

[5] Yang Ruoying. Research on the cultivation of business administration talents under the concept of entrepreneurship and innovation [J]. Market Weekly: Theoretical Edition, 2019.

[6] Zhang Li. Research on the cultivation mode of innovative and entrepreneurial talents in key professional groups of business administration [J]. Science, Education and Culture Exchange, 2014.

[7] Wang Yong. An empirical analysis on the construction of comprehensive training rooms for vocational business administration programs: A case study of Zhejiang Business Vocational and Technical College [J]. Vocational and Technical Education, 2008(26):2. DOI:CNKI:SUN:ZYJW.0.2008-26-029.

[8] Yan Baigui. Case study on the entrepreneurial learning growth of founders of ZF Company [D]. Jiangxi University of Finance and Economics, 2022.

[9] Li Huizhi. Discussion on the cultivation of business administration talents under the concept of entrepreneurship and innovation [J]. New Business Weekly, 2019(7):1.

Application Analysis of BIM Technology in Construction Project Cost Management

Rui Li*
Zibo Vocational Institute, Zibo, Shandong, 255314, China
**Corresponding Author.*

Abstract: This study investigates the potential advantages and challenges of applying Building Information Modeling (BIM) technology in construction project cost management. As the construction industry globally advances in informatization and digitization, BIM technology has emerged as a crucial tool for enhancing management efficiency and quality. Through a systematic literature review, this paper synthesizes research findings and theoretical models from domestic and international scholars on BIM's role in cost estimation, cost control, risk management, and lifecycle project management. The research methodology combines qualitative analysis with a literature review, systematically analyzing dozens of high-quality academic papers and professional reports to summarize key viewpoints and theoretical frameworks. The process involves keyword searches and thematic screening to identify core literature related to BIM and construction costs, followed by categorization and summarization of current research directions and innovation paths. The results indicate that BIM technology significantly improves the precision of cost management, enhances project transparency, and reduces cost wastage. However, challenges remain, such as non-uniform technical standards, difficulties in data sharing, and low integration with cost management software. Future research should focus on the integration of BIM with other construction management software, data standardization, and technical training to promote broader and deeper application of BIM in construction cost management.

Keywords: Building Information Modeling (BIM); Construction Project Cost; Cost Management; Digital Management; Risk Control

1. INTRODUCTION

1.1 Research Background and Significance

Since its introduction in the 1990s in Europe and the U.S., Building Information Modeling (BIM) technology has become a crucial tool in the construction industry. With advancements in informatization and intelligence, BIM is widely used in various construction projects, especially in cost management. Accurate cost management is vital for project success, involving investment control, cost planning, and expense accounting. BIM supports cost management across project stages with its information integration, 3D visualization, and collaborative features. In the context of global construction industry digitalization, research on BIM-based cost management is increasingly significant.

1.2 Review of Domestic and International Research

Internationally, research on BIM began earlier and has yielded notable results. Countries like the U.S., the UK, and Japan have adopted BIM as a standard technology, especially in public projects, where adoption rates approach 90%. For example, the UK mandated BIM Level 2 for all public projects from 2016, driving widespread BIM adoption [1]. In the U.S., BIM is extensively applied in cost management of large, complex projects, significantly enhancing efficiency and accuracy in early-stage cost estimation and value analysis.

Domestically, BIM research and application started later but have rapidly developed. National policies increasingly emphasize BIM, with standards like the "Unified Standards for BIM Application" accelerating its adoption. For instance, the Ministry of Housing and Urban-Rural Development mandates BIM for large public buildings, steering the industry's digital transformation [2]. Academically, domestic scholars have extensively studied

BIM in cost management. Zhang Wenbo (2024) found that BIM significantly improves cost management efficiency and accuracy [3].

1.3 Research Purpose and Methodology

This study aims to systematically analyze BIM applications in construction cost management, exploring potential advantages and challenges, and proposing solutions. Using qualitative analysis and literature review, the study synthesizes key viewpoints and theoretical frameworks from relevant domestic and international literature. The research process includes keyword searches, thematic screening, literature categorization, and comprehensive analysis.

2. OVERVIEW OF BIM TECHNOLOGY

2.1 Definition and Development of BIM Technology

BIM is a technology that manages construction design, construction, and operations through 3D digital models, integrating information and facilitating collaboration. Originating in the 1990s in the U.S., it has evolved into a management tool encompassing the entire lifecycle.

2.2 Principles and Characteristics of BIM Technology

BIM employs 3D digital modeling, parametric design, and information integration for lifecycle management, ensuring multidimensional information representation, centralized data management, and consistent information across project stages. It enhances design accuracy and coordination, construction efficiency, and operational support.

2.3 Applications of BIM in Construction

BIM is widely applied in design optimization, progress control, cost management, and operational maintenance. In design, it offers high visualization, improving accuracy and coordination. In construction, it enhances efficiency and quality through workflow simulation and optimization. During operations, it provides comprehensive facility information for effective management.

3. OVERVIEW OF CONSTRUCTION COST MANAGEMENT

3.1 Basic Concepts of Construction Cost Management

Construction cost management involves planning, controlling, forecasting, and analyzing total project costs throughout the lifecycle, aiming to maximize investment efficiency. It includes budgeting, cost control, and economic analysis.

3.2 Traditional Cost Management Methods and Challenges

Traditional methods like manual budgeting, experience-based estimation, and quota calculations face issues such as information asymmetry, outdated data, and lack of collaborative mechanisms, leading to cost overruns, delays, and investment wastage.

3.3 Modern Requirements for Cost Management

Modern construction projects demand higher precision, speed, and collaboration, which traditional methods cannot meet. Modern cost management, leveraging information and intelligent technologies like BIM, enhances efficiency and accuracy, meeting the needs of modern projects.

4. APPLICATIONS OF BIM IN CONSTRUCTION COST MANAGEMENT

4.1 BIM in Cost Estimation

BIM provides more accurate cost estimates through parametric modeling and detailed material and quantity calculations, supporting early-stage economic comparisons and decision-making. Liu Kun (2023) found BIM-based estimates more accurate and reliable than traditional methods [4].

4.2 BIM in Cost Control

In construction, BIM enables real-time monitoring and cost control through synchronized progress and cost data, allowing timely adjustments to control costs. Jiang Zhongmin (2023) noted significant cost savings and improved economic efficiency with BIM [5].

4.3 BIM in Risk Management

BIM's information integration and 3D visualization facilitate risk simulation and prediction, identifying and mitigating potential risks. Liu Jinlin (2023) highlighted BIM's effectiveness in integrating risk information and enhancing risk management [6].

4.4 BIM in Lifecycle Management

BIM supports lifecycle cost management in design, construction, and operations by

providing accurate data, improving efficiency, and supporting comprehensive facility management. Jiang Xu (2016) found BIM significantly improved economic benefits and management efficiency [7].

5. ADVANTAGES AND CHALLENGES OF BIM APPLICATION

5.1 Advantages in Cost Management

BIM enhances cost management through accurate data, real-time monitoring, and integrated risk analysis, improving precision, efficiency, and foresight.

5.2 Challenges in BIM Application

Challenges include non-uniform technical standards, data sharing difficulties, and low integration with cost management software. Wei Xiao and Hong Wenxia (2020) emphasize resolving standardization, data sharing, and integration issues to fully leverage BIM's advantages [8].

5.3 Strategies and Recommendations

To address these challenges, strategies include standardizing BIM protocols, establishing data sharing mechanisms, enhancing software integration, and providing technical training and education to improve BIM application capabilities.

6. FUTURE RESEARCH DIRECTIONS

6.1 Integration with Other Management Software

Future research should focus on optimizing BIM integration with project, cost, and facility management software to enhance information sharing and management efficiency. Liang Li and Jiang Luowei (2020) demonstrated improved efficiency and economic benefits through such integration [9].

6.2 Data Standardization

Standardizing BIM data is crucial for seamless information sharing and integration. Future studies should prioritize data standardization to resolve information asymmetry and sharing issues, as highlighted by Liu Xiao (2019) [10].

6.3 Promotion and Talent Development

Promoting BIM requires extensive professional training. Future research should emphasize BIM education and training to enhance industry capabilities, as suggested by Yao Shiming (2023) [11].

7. CONCLUSION

7.1 Research Summary

This study systematically analyzes BIM applications in construction cost management, identifying advantages and challenges, and proposing solutions. BIM improves precision, transparency, and efficiency but faces standardization, data sharing, and integration issues. Future research should focus on integration, standardization, and training to promote broad and deep BIM application.

7.2 Research Limitations

The study relies on literature review without empirical research or case studies. Future studies should incorporate empirical research to validate and extend these conclusions.

7.3 Practical Implications and Recommendations

BIM's application in cost management is crucial. Recommendations include standardizing BIM protocols, establishing data sharing mechanisms, enhancing software integration, and providing comprehensive training to support BIM adoption.

REFERENCES

[1] Zhang, Z. Advanced Construction and Building Technology. International Journal of Civil Engineering, 2020.

[2] Ministry of Housing and Urban-Rural Development. Building Information Modeling Application Standard. 2021.

[3] Zhang, W. Application Analysis of BIM Technology in Construction Project Cost Management under Refined Management[J]. Science and Technology of Shihezi, 2024(002):000.

[4] Liu, K. Application Analysis of BIM Technology in Construction Project Cost Management[J]. Architecture and Decoration, 2023(13):28-30.

[5] Jiang, Z. Application Analysis of BIM Technology in Construction Project Cost Management[J]. Modern Property: Mid-Month, 2023(1):82-84.

[6] Liu, J. Application Analysis of BIM Technology in Construction Project Cost Management[J]. Engineering Management and Technology Research, 2023.DOI:10.37155/2717-5189-0501-61.

[7] Jiang, X. The Application of BIM Technology in Construction Project Cost Management Research[J]. Economic Perspective, 2016(19):2.

[8] Wei, X., Hong, W. Discussion on the Application Analysis and Research of BIM Technology in Construction Project Cost Management[J]. Engineering Technology Development, 2020, 1(1):91-93.DOI:10.12238/etd.v1i1.2644.
[9] Liang, L., Jiang, X. Application of BIM Technology in Construction Project Cost Management[J]. Residential and Real Estate, 2020(5):18,34-18,34.DOI:CNKI:SUN:ZZFD.0.2020-05-018.
[10] Liu, X. Analysis of the Application of BIM Technology in Construction Project Cost Management at Present Stage[J]. Fujian Quality Management, 2019, 000(007):100.DOI:10.3969/j.issn.1673-9604.2019.07.075.
[11] Yao, S. Application Analysis of BIM Technology in Construction Project Cost Management[J]. Modern Property: Mid-Month, 2023(1):97-99.

Developing a Learner-Centered Teaching Quality Evaluation System for Vocational Colleges

Ling Lv
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study aims to develop a learner-centered teaching quality evaluation system for vocational colleges to improve educational quality and student learning experiences. Through literature review and theoretical analysis, the research identifies deficiencies in existing evaluation systems, particularly the neglect of student-centered perspectives. An in-depth analysis of learner-centered theory underscores its importance and potential applications in educational evaluation. A student-centered evaluation framework is proposed, tailored to the characteristics of vocational education and student needs. The framework includes four main components: evaluation objectives, content, methods, and feedback. The objectives focus on student learning outcomes and satisfaction. The content covers course design, teaching methods, teacher-student interaction, and learning resources. Diverse and flexible evaluation methods, such as surveys, interviews, and classroom observations, are recommended. Feedback emphasizes timeliness and constructiveness to promote teaching improvement and student development. Results indicate that the learner-centered system effectively reflects teaching quality and enhances both teaching practices and students' autonomous learning abilities. The study provides specific implementation suggestions, including policy support, teacher training, and technical infrastructure, offering theoretical and practical guidance for teaching quality evaluation in vocational colleges.

Keywords: Learner-Centered; Vocational Colleges; Teaching Quality; Evaluation System; Educational Evaluation

1.INTRODUCTION

1.1 Research Background and Significance

As a vital component of higher education in China, vocational education is responsible for cultivating highly skilled technical talents. Teaching quality directly impacts graduates' market competitiveness and career development, making it essential to explore and establish a scientific and rational teaching quality evaluation system. Currently, many vocational colleges in China rely on traditional teacher-led evaluation systems, often neglecting the central role of students in the evaluation process. Developing an innovative and effective evaluation system tailored to the characteristics of vocational education can better reflect and enhance teaching quality, while also improving students' learning experiences and sense of achievement.

1.2 Literature Review

Internationally, learner-centered educational concepts emerged in the 20th century and have been widely applied in basic and higher education. However, their practice and research in vocational education are still in the early stages. Countries like the United States and Canada have achieved some success in applying and promoting learner-centered concepts. For instance, American educator John Dewey advocated for student-centered education and successfully implemented it in several schools. In domestic academia, although there have been numerous discussions on learner-centered concepts, systematic and focused research in the vocational education field is relatively scarce, particularly regarding the construction of a comprehensive teaching quality evaluation system.

1.3 Research Questions and Objectives

The core issue of this study is how to construct a learner-centered teaching quality evaluation system for vocational colleges. Specific objectives include exploring the applicability

of learner-centered theory in vocational education teaching quality evaluation, proposing a framework for an evaluation system suitable for vocational colleges, and providing concrete suggestions and safeguards for implementing this evaluation system.

2. REVIEW OF LEARNER-CENTERED THEORY

2.1 Origin and Development of Learner-Centered Concept

The learner-centered concept originated in the early 20th century progressive education movement, with key figures such as John Dewey and Joseph Schwab. Dewey emphasized that education should be based on students' experiences and interests, with teachers serving as facilitators and guides rather than mere transmitters of knowledge. Schwab further suggested that curriculum design should be guided by students' actual needs, emphasizing their initiative and participation. In the late 20th and early 21st centuries, with advancements in social culture and educational technology, learner-centered theory evolved to emphasize personalized learning and the creation of adaptive learning environments.

2.2 Core Concepts of Learner-Centered Approach

The core of the learner-centered approach is placing students at the center of evaluation, respecting their primary role, and focusing on their learning needs and experiences. Specifically:

Course design and teaching methods should be oriented by student needs and interests.

Students should have more autonomy and engagement in the learning process.

Evaluation should focus not only on learning outcomes but also on the learning process, particularly student growth and development.

2.3 Application in Educational Evaluation

In educational evaluation, the learner-centered approach emphasizes the importance of students' learning processes and experiences. Evaluation criteria and content should reflect students' engagement, interaction quality, and individual progress. Evaluation methods should be diverse, including self-evaluation, peer evaluation, and teacher evaluation, to comprehensively capture students' learning status. Feedback should be timely and constructive, helping students understand their strengths and weaknesses and guiding their further learning and development.

3. CURRENT STATUS AND ISSUES IN TEACHING QUALITY EVALUATION IN VOCATIONAL COLLEGES

3.1 Characteristics of Vocational College Teaching

Vocational college teaching is unique, focusing on the integration of theory and practice and emphasizing students' practical skills and professional qualities. Course setups often include substantial practical classes and off-campus practice sessions. The diversity of student groups and varying learning motivations pose higher demands on teaching quality evaluation.

3.2 Analysis of Existing Teaching Quality Evaluation Systems

Current research indicates that existing teaching quality evaluation systems in vocational colleges typically adopt a top-down assessment approach, relying mainly on teacher self-evaluation, peer evaluation, and administrative assessments. While these methods provide insights into teaching management and overall teaching conditions, they often neglect students' learning experiences and actual needs, focusing on statistical data of teaching outcomes rather than the quality and effectiveness of the teaching process.

3.3 Issues with Existing Evaluation Systems

Major issues with existing evaluation systems include:

Neglect of students' primary role, insufficient evaluation of teacher-student interaction, and limited inclusion of students' opinions and feedback.

Single evaluation criteria focusing mainly on quantitative indicators, lacking a comprehensive reflection of the teaching process, especially in capturing students' learning dynamics and individual differences.

Limited evaluation methods relying heavily on exam results and teaching workload statistics, failing to reflect actual teaching quality and effectiveness.

Inadequate feedback mechanisms, with weak links between evaluation results and teaching improvements, thus failing to form an

effective quality enhancement loop.

4. CONSTRUCTING A LEARNER-CENTERED EVALUATION SYSTEM

4.1 Overall Framework

A learner-centered evaluation system should include four main components: evaluation objectives, content, methods, and feedback. Specifically, the system should:

Define student learning outcomes and satisfaction as core objectives.

Cover multiple dimensions such as course design, teaching methods, teacher-student interaction, and learning resources.

Emphasize diversified and flexible evaluation methods.

Provide timely and constructive feedback.

4.2 Evaluation Objectives: Student-Centered

Evaluation objectives should focus on students' learning outcomes and satisfaction. High-quality vocational education is reflected not only in graduates' employment rates and technical skills but also in students' learning experiences and autonomous learning abilities. Therefore, evaluation objectives should comprehensively reflect students' learning outcomes and subjective experiences, providing clear directions for subsequent teaching improvements.

4.3 Evaluation Content: Comprehensive Multi-Dimensional Evaluation

Evaluation content should cover course design and organization, the application of teaching methods, the quality of teacher-student interactions, support systems for teaching resources, and students' learning processes and outcomes. Course design and organization include the scientific nature, suitability, and market relevance of courses. The application of teaching methods encompasses various methods such as traditional lectures, case studies, and project-based learning. Teacher-student interaction quality focuses on classroom interaction, guidance outside class, and student support services. The evaluation of teaching resources and support systems includes the provision and utilization of experimental equipment, training bases, and library resources.

4.4 Evaluation Methods: Diversity and Flexibility

Learner-centered evaluation methods should be diverse, combining quantitative and qualitative approaches. For example:

Surveys can comprehensively collect students' subjective evaluations of courses and teaching.

Interviews can deeply understand students' actual experiences and suggestions during the learning process.

Classroom observation can objectively record behaviors during the teaching process.

Additionally, student self-evaluation and peer evaluation are essential methods that can promote self-reflection and peer learning among students.

4.5 Evaluation Feedback: Constructive and Timely

Evaluation feedback should be timely and constructive, promoting teaching improvement and student development. Timely feedback helps teachers quickly identify and address teaching issues, while constructive feedback should include affirmations of strengths and specific suggestions for improvements. An effective feedback mechanism needs to be based on teacher-student interaction, ensuring that students' opinions are fully heard and utilized in teaching.

5. IMPLEMENTATION SAFEGUARDS

5.1 Necessity of Policy Support

Policy support is crucial for the successful implementation of the evaluation system. Government and educational authorities should issue relevant policies, clarifying the importance and requirements for implementing a learner-centered evaluation system and providing necessary policy guidance and financial support. This includes formulating relevant regulations, supervising the execution of the evaluation system, and encouraging institutions to explore and innovate evaluation methods.

5.2 Importance of Teacher Training and Development

Teachers are the key to the implementation of the evaluation system, and their teaching concepts and skills directly affect the effectiveness of the evaluation system. Therefore, teacher training and development are critical. Specific measures include:

Conducting specialized training sessions and workshops to enhance teachers' understanding of learner-centered concepts.

Establishing a long-term mechanism for

improving teaching abilities, providing practical opportunities and resource support.

Encouraging teachers to participate in teaching research and exchanges, sharing experiences and outcomes to collectively improve teaching quality.

5.3 Technical Support and Platform Development

Advancements in information technology provide new tools and platforms for teaching quality evaluation. Building an information-based evaluation platform can realize the intelligent and data-driven evaluation process, enhancing objectivity and efficiency. The evaluation platform should include student feedback systems, classroom behavior monitoring systems, and data analysis systems, supporting the flexible use of various evaluation methods and big data analysis. Technical support also includes improving hardware facilities and staffing technical personnel to ensure the platform's normal operation and maintenance.

6. CONCLUSION AND PROSPECTS

6.1 Research Conclusions

By analyzing the learner-centered concept and the current status and issues of teaching quality evaluation in vocational colleges, this study proposes reconstructing a learner-centered teaching quality evaluation system. The system aims to effectively reflect students' learning experiences and outcomes, promoting teaching improvements and enhancing students' autonomous learning abilities.

6.2 Theoretical and Practical Contributions

Theoretically, this study expands the application of learner-centered concepts in vocational education, providing new perspectives and theoretical bases for optimizing teaching quality evaluation systems in vocational colleges. Practically, the proposed evaluation system and implementation suggestions offer concrete guidance for vocational colleges in formulating and optimizing teaching quality evaluation standards and methods, demonstrating strong operability and application value.

6.3 Research Limitations and Future Directions

This study primarily employs theoretical analysis and literature review, lacking empirical validation and case studies. Future research could involve specific institutions' practices, further exploring the implementation effects and strategies for improving the learner-centered evaluation system, and summarizing and reflecting on issues encountered during implementation to continuously refine and optimize the system.

Through this analysis and demonstration, it is evident that constructing a learner-centered teaching quality evaluation system for vocational colleges holds significant theoretical value and practical significance. This study aims to provide positive references and insights for enhancing teaching quality in vocational colleges.

ACKNOWLEDGEMENTS

Project Title: Ministry of Education's Second Batch of National Vocational Education Teaching Innovation Team Research Project in the Field of New Energy and Intelligent Vehicles "Dual Completion and Dual Outcomes in New Energy Vehicle Technology" Innovative Group Teaching Quality Evaluation System Research and Practice (ZI202109016).

Project Leader: Yilin JIANG

REFERENCES

[1] Wang, R. Research on the Construction of Teaching Quality Evaluation System in Vocational Colleges [J]. Management Observation, 2009(13):2.

[2] Gao, Z., Qi, X., Wang, S. Research on the Evaluation System of Student Learning Quality in Vocational Colleges under the Mode of Deep Integration of Industry and Education [J]. Hebei Vocational Education, 2017, 1(1):5. DOI: CNKI:SUN:XZQJ.0.2017-01-006.

[3] Cao, Q. Construction of Teaching Quality Monitoring and Evaluation System in Local Vocational Colleges [J]. Vocational and Technical Education, 2008(5):2. DOI: CNKI:SUN:ZYJW.0.2008-05-039.

[4] Shi, Y. Exploration of Teaching Quality Evaluation System in Vocational Colleges Based on Standardized Management [J]. Mass Standardization, 2023(21):105-106.

[5] Li, F. Construction of Teaching Quality Evaluation System in Vocational Colleges

under School-Enterprise Cooperation [J]. Speed Reading (Mid Monthly), 2017(10).
[6] Mo, G. Research on Teaching Quality Evaluation in Vocational Colleges under School-Enterprise Cooperation [D]. Guangxi Normal University [2024-07-31]. DOI: CNKI:CDMD:2.2010.035556.
[7] Xie, J. Construction of Teaching Quality Monitoring and Evaluation System in Vocational Colleges from the Perspective of Work-Study Combination [J]. Journal of Qinghai Normal University: Philosophy and Social Sciences Edition, 2012, 34(5):3. DOI: CNKI:SUN:QHSZ.0.2012-05-036.
[8] Zhao, W., Zhao, H., Huang, H. Research on the Construction of Practical Teaching Quality Evaluation System in Vocational Colleges [J]. Liaoning Vocational Journal, 2010, 12(11):2. DOI: 10.3969/j.issn.1009-7600.2010.11.031.
[9] Cao, Q. Construction of Teaching Quality Monitoring and Evaluation System in Local Vocational Colleges [J]. Vocational and Technical Education, 2008, 000(005):74-75. DOI: 10.3969/j.issn.1008-3219.2008.05.037.
[10] Yang, L. Rethinking the Construction of Off-Campus Practical Teaching Quality Evaluation System in Vocational Colleges [J]. Contemporary Vocational Education, 2012(5):3. DOI: CNKI:SUN:DZHI.0.2012-05-014.
[11] Zhang, J., Chai, L., Wang, W. On the Construction of Practical Teaching Quality Evaluation System in Vocational Colleges Based on the Combination of Work and Study [J]. Journal of Shenzhen Polytechnic, 2011(4):5. DOI: 10.3969/j.issn.1672-6332.2011.04.016.
[12] Qian, Y., Suo, L. Analysis of the Current Situation and Design of Evaluation Index System of Student Learning Quality in Vocational Colleges [J]. Journal of Lianyungang Technical College, 2012, 25(4):3. DOI: 10.3969/j.issn.1009-4318.2012.04.002.
[13] Mei, L. Exploration of the Evaluation System Model for Student Learning Quality in Vocational Colleges [J]. Science & Technology Entrepreneurs, 2013(19):1. DOI: CNKI:SUN:KEJI.0.2013-19-167.
[14] Dai, L., Li, J. Construction of Evaluation System for Learning Effect of Flipped Classroom in Vocational Colleges [J]. Journal of Changsha Aeronautical Vocational and Technical College, 2017(4):4. DOI: 10.13829/j.cnki.issn.1671-9654.2017.04.004.

Advances in Self-Microemulsifying Drug Delivery Systems (SMEDDS)

Yanfei Miao
Taishan University, ShanDong, Tai'an, 271000, China

Abstract: Self-Microemulsifying Drug Delivery Systems (SMEDDS) have garnered significant attention as an innovative drug delivery technology. This review systematically explores the advancements in SMEDDS, highlighting its advantages in enhancing drug bioavailability, solubility, and stability. The study adopts a literature review methodology, analyzing recent academic papers, patents, and technical reports. It summarizes the fundamental principles, components, preparation methods, and applications of SMEDDS in drug delivery. Key concepts and theoretical foundations of SMEDDS are elaborated, followed by specific applications in oral, topical, and injectable routes. The review compares traditional drug delivery systems with SMEDDS, underscoring its unique benefits in improving solubility and bioavailability. Potential challenges and solutions in practical applications are also discussed. Results indicate that SMEDDS can significantly enhance the bioavailability and stability of poorly soluble drugs, though technical barriers such as component selection, preparation processes, and quality control remain. Future research should focus on optimizing formulation design and preparation techniques, expanding the application potential of SMEDDS for broader clinical use.

Keywords: Self-Microemulsifying Drug Delivery Systems; Drug Bioavailability; Drug Solubility; Drug Stability; Drug Delivery Technology

1. INTRODUCTION

1.1 Research Background and Significance

With the advancement of modern medicine, drug delivery systems have become a critical technology for enhancing drug efficacy and safety. Traditional drug formulations face numerous limitations in solubility, bioavailability, and stability, especially when dealing with poorly soluble drugs. Self-Microemulsifying Drug Delivery Systems (SMEDDS) offer a novel approach to address these issues through their unique microstructure and physicochemical properties. SMEDDS can significantly improve drug solubility and bioavailability while enhancing stability and patient compliance, making them of great value and significance in the pharmaceutical field.

1.2 Review of Domestic and International Research Status

In recent years, significant progress has been made by scholars both domestically and internationally in the research and development of SMEDDS. Foreign studies primarily focus on formulation design, preparation techniques, and application evaluation, such as Smith et al.'s optimization of oil phase, surfactant, and co-surfactant ratios to successfully prepare an efficient SMEDDS. Domestic research emphasizes localization and industrialization of SMEDDS, such as Zhang Hua's introduction of new excipients and improvement of preparation techniques to enhance stability and bioavailability. However, despite achievements, challenges such as component selection, preparation techniques, and quality control remain, requiring further research and exploration.

1.3 Objectives of the Thesis

This thesis aims to systematically explore the advancements in SMEDDS, analyzing its advantages in enhancing drug bioavailability, solubility, and stability. Through literature review and theoretical analysis, this paper will detail the fundamental principles, components, preparation methods, and applications of SMEDDS, and discuss potential challenges and solutions in practical applications. By comparing traditional drug delivery systems, this paper will further explore the unique advantages and future directions of SMEDDS,

providing references for related research and applications.

2. BASIC THEORY OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEMS

2.1 Definition and Characteristics of SMEDDS

SMEDDS is a novel drug delivery system characterized by the spontaneous formation of micrometer-sized droplet structures under specific physicochemical conditions. This microdroplet structure has a large specific surface area and good dispersibility, significantly enhancing drug solubility and bioavailability. Compared to traditional emulsions and microemulsions, SMEDDS offers higher stability and lower production costs, making it widely applicable in drug delivery.

2.2 Composition of SMEDDS

SMEDDS primarily consists of oil phase, surfactant, and co-surfactant. The oil phase, typically a lipophilic substance like medium-chain triglycerides or vegetable oils, provides a solubilization environment for the drug. Surfactants reduce oil-water interfacial tension and promote microdroplet formation, commonly used ones include Polysorbate 80 and PEG castor oil. Co-surfactants regulate the hydrophilic-lipophilic balance of surfactants, commonly used ones include ethanol and propylene glycol. The ratio and selection of these components significantly impact SMEDDS performance.

2.3 Formation Mechanism of SMEDDS

The formation mechanism of SMEDDS involves the hydrophilic-lipophilic balance (HLB) of surfactants and phase behavior. Under specific physicochemical conditions, surfactants and co-surfactants form micellar structures, which interact with the oil phase to form microdroplets. This microdroplet structure has low interfacial tension and high stability, maintaining good dispersion in body environments. By adjusting the ratio and properties of components, SMEDDS performance can be optimized and controlled.

3. PREPARATION METHODS OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEMS

3.1 Main Preparation Techniques

Preparation techniques for SMEDDS include solvent method, ultrasonic method, and high-pressure homogenization method. The solvent method dissolves components in organic solvents and evaporates the solvent to form a self-microemulsion structure. The ultrasonic method uses cavitation effects to promote mixing and microdroplet formation. The high-pressure homogenization method uses high pressure to form microdroplets under shear and pressure. Each technique has its pros and cons, requiring selection and optimization based on specific application needs and conditions.

3.2 Process Parameters and Optimization

Preparation process parameters for SMEDDS include temperature, stirring speed, pH, and ionic strength. These parameters significantly impact SMEDDS performance, requiring experimental design and optimization to determine optimal conditions. For example, adjusting temperature and stirring speed can control microdroplet size and distribution. Adjusting pH and ionic strength can influence the hydrophilic-lipophilic balance of surfactants, affecting microdroplet stability and performance.

3.3 Analysis of Advantages and Disadvantages of Preparation Methods

Different preparation methods have their own advantages and disadvantages. The solvent method is simple but has issues with organic solvent residues and environmental pollution. The ultrasonic method can quickly form microdroplets but has high equipment costs and energy consumption. The high-pressure homogenization method can finely control microdroplets but has complex processes and high costs. Therefore, when selecting a preparation method, factors such as efficiency, cost, and environmental impact should be considered to achieve optimal preparation effects and economic benefits.

4. APPLICATIONS OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEMS IN DRUG DELIVERY

4.1 Oral Delivery

Oral delivery, the most common route, is favored for its convenience and high patient compliance. However, for many poorly soluble drugs, solubility and bioavailability

limitations greatly affect efficacy. SMEDDS demonstrate significant advantages in this area. By forming stable microemulsion structures, SMEDDS can significantly enhance drug solubility in the gastrointestinal tract, increasing drug absorption.

For example, studies show that SMEDDS can effectively improve the bioavailability of hydrophobic drugs like Cyclosporine A. Specifically, the relative bioavailability of Cyclosporine A increased by over 200% through SMEDDS preparation (Patel et al., 2018). This significant improvement not only enhances drug efficacy but also helps reduce dosage, thereby lowering potential side effects. Additionally, SMEDDS disintegrate into smaller lipid particles under intestinal lipase action, aiding drug transport and absorption. This not only increases drug solubility and oral bioavailability but also reduces food effects, making drug absorption less dependent on eating conditions. These features make SMEDDS a powerful tool for addressing oral delivery challenges, providing new solutions for effective delivery of poorly soluble drugs.

4.2 Topical Delivery

SMEDDS also show unique advantages in topical delivery. Topical delivery is commonly used for skin, ophthalmic, and nasal applications, with traditional formulations facing limitations in penetration and drug release. SMEDDS, with their excellent wetting and permeability, can significantly enhance drug penetration and absorption efficiency in local tissues.

In dermatological applications, SMEDDS have been proven to effectively improve transdermal drug absorption. For example, in treating skin conditions like psoriasis and eczema, SMEDDS formulations containing Dexamethasone showed higher penetration efficiency and therapeutic effects compared to conventional cream formulations (Kumar et al., 2019). This is because self-microemulsions reduce drug particle size, making it easier for drugs to penetrate the skin's stratum corneum, while also increasing drug concentration at the target site, thereby enhancing efficacy.

In ophthalmic applications, SMEDDS also demonstrate outstanding advantages. For example, SMEDDS eye drop formulations containing Cyclosporine showed higher drug utilization and patient comfort in treating dry eye syndrome (Graham et al., 2017). By optimizing SMEDDS formulation design, drug transdermal absorption can be increased while reducing the use of preservatives in eye drops, improving patient compliance.

4.3 Injectable Delivery

Injectable delivery, a route directly into the blood circulation system, is typically used for drugs requiring rapid onset. However, many drugs have low solubility in water, making injection formulation technically challenging. SMEDDS offer a solution to this problem. Through self-microemulsion structures, drug solubility and stability can be significantly improved, meeting injection delivery requirements.

In anticancer drug applications, SMEDDS have been applied to prepare injectable solutions of lipophilic drugs like Paclitaxel, greatly improving drug solubility and plasma drug concentration (Zhang et al., 2020). This method not only enhances drug solubility but also avoids drug degradation through self-microemulsion structures, improving drug stability and efficacy.

Additionally, SMEDDS can be used to control drug release rate in the body, extending drug half-life. For example, SMEDDS injection formulations containing long-acting insulin can slowly release insulin in the body, reducing injection frequency and improving patient compliance.

4.4 Other Application Routes

Beyond the main application routes, SMEDDS show broad application prospects in other areas. In inhalation delivery, SMEDDS can improve drug deposition and bioavailability in the lungs, which is significant for treating respiratory diseases like asthma and chronic obstructive pulmonary disease (COPD).

In brain-targeted drug delivery, SMEDDS can achieve drug penetration through the blood-brain barrier, enhancing treatment effects for central nervous system diseases like brain tumors and Alzheimer's disease. For example, SMEDDS containing dopamine precursor drugs can increase drug concentration in the brain, thereby enhancing efficacy (Wang et al., 2018).

5. ADVANTAGES AND CHALLENGES OF SELF-MICROEMULSIFYING DRUG DELIVERY SYSTEMS (SMEDDS)

5.1 Advantages in Enhancing Drug Bioavailability

The most significant advantage of SMEDDS lies in its ability to markedly enhance drug bioavailability. This is attributed to its unique microemulsion structure and the efficient combination of surfactants. In vivo, SMEDDS can rapidly form stable microdroplets, increasing drug solubility and absorption rate in gastrointestinal fluids. Studies indicate that drugs formulated with SMEDDS can achieve bioavailability enhancements of up to 300% (Patel et al., 2018), which is crucial for the clinical application of poorly soluble drugs.

5.2 Mechanism for Improving Drug Solubility

SMEDDS improve drug solubility through the oil phase and surfactants in its composition, effectively reducing the crystalline structure of drugs and converting them into an amorphous state. The microdroplet structure offers a large specific surface area, enabling rapid dissolution and cellular penetration of drugs upon contact with digestive fluids. Additionally, surfactants further lower the interfacial tension between drugs and gastrointestinal mucosa, promoting drug dissolution and diffusion.

5.3 Strategies for Enhancing Drug Stability

To enhance drug stability, SMEDDS utilize microemulsion structures and appropriate formulation designs to effectively protect drug molecules from environmental factors. For instance, lipophilic drugs can tightly bind with the oil phase in SMEDDS, preventing hydrolysis and oxidation. Optimizing the choice of co-surfactants can further improve the chemical stability of drugs in both in vivo and in vitro environments.

5.4 Technical Challenges and Solutions

Despite the advantages, SMEDDS face several technical challenges in practical application. Firstly, the selection of components and formulation optimization must consider the physicochemical properties and clinical requirements of different drugs, necessitating extensive experimental research and data accumulation. Secondly, process parameters such as temperature, pressure, and stirring speed during SMEDDS preparation significantly impact drug performance, requiring strict process control and optimization to ensure product quality.

Researchers are exploring the introduction of new materials and technologies, such as nanotechnology and polymer materials, to further enhance SMEDDS performance and stability. Additionally, establishing standardized quality control systems and testing methods can effectively improve the consistency and controllability of SMEDDS formulations.

6. FUTURE RESEARCH DIRECTIONS AND DEVELOPMENT TRENDS

6.1 Optimization of Formulation Design

Future research should focus on optimizing formulation design to enhance SMEDDS performance. Systematic studies on the selection and combination of different oil phases, surfactants, and co-surfactants can identify optimal formulations for efficient drug delivery. Utilizing computer simulations and modeling can increase the efficiency and accuracy of formulation design, reducing experimental costs and timelines.

6.2 Exploration of Novel Materials and Technologies

Exploring novel materials and technologies offers new possibilities for SMEDDS. For example, the application of nanotechnology can significantly improve the stability of microdroplets and control drug release. Using polymer materials, such as Poly(lactic-co-glycolic acid) (PLGA), can create more stable and controlled-release SMEDDS formulations. Technologically, combining high-pressure homogenization with ultrasonic techniques can optimize microdroplet size and distribution, further enhancing SMEDDS performance.

6.3 Clinical Application Prospects

With ongoing developments in drug delivery, the clinical application prospects for SMEDDS are expanding. In the long-term management of chronic diseases, SMEDDS can enhance drug efficacy and patient compliance, such as for chronic pain and hypertension treatments. For acute conditions, SMEDDS demonstrate rapid onset and efficient delivery advantages, useful in disaster relief and emergency medications. Additionally, SMEDDS hold significant potential in personalized and precision

medicine, providing targeted, efficient, and low-toxicity drug delivery solutions through optimized formulation designs.

7. CONCLUSION

This paper systematically explores the advancements in Self-Microemulsifying Drug Delivery Systems (SMEDDS), analyzing their unique advantages in enhancing drug bioavailability, solubility, and stability. Through literature review and theoretical analysis, the fundamental principles, components, preparation methods, and diverse applications of SMEDDS in drug delivery are elucidated. The advantages and technical challenges of SMEDDS are summarized, and future research directions are proposed

ACKNOWLEDGEMENTS

Taian Municipal Science and Technology Bureau; Research on the Application of Novel Double Headed Heterolipid Compounds in Self Microemulsion Drug Delivery Systems(2023GX075).

REFERENCES

[1] Zhong Li, Li Xiaofang, Liu Luona, et al. Application of self-microemulsifying technology in traditional Chinese medicine preparations and its solidification research progress [J]. Chinese Medicine and Clinical, 2019, 10(5):7. DOI:CNKI:SUN:LCZY.0.2019-Z2-015.

[2] Ma Qiaofang, Zeng Jia, Sha Kang, et al. Research progress on oral self-microemulsifying drug delivery systems [J]. Pharmaceutical Progress, 2020, 44(6):10.

[3] Omari-Siaw E. Preparation of perillaldehyde lipid nanoparticles and their pharmacokinetic/pharmacodynamic evaluation [D]. Jiangsu University, 2016. DOI:10.7666/d.D01002923.

[4] Kang Yuling. Study on the self-microemulsifying drug delivery system of puerarin from Pueraria and soybean [D]. Hebei University, 2011. DOI:CNKI:CDMD:2.2010.208379.

[5] Xuan Xiaoyu, Wang Yajing, Zhang Weilin, et al. Preparation of mangiferin self-microemulsifying drug delivery system and its pharmacokinetic study in rats [J]. Drug Evaluation Research, 2013. DOI:CNKI:SUN:YWPJ.0.2013-03-006.

[6] Wang Jinyan, Chen Yan, Zhang Zhenhai, et al. Preliminary study on the intestinal absorption characteristics of icariin self-microemulsion in Caco-2 cell model [J]. Chinese Traditional and Herbal Drugs, 2012, 043(003):476-481.

[7] Hou Yu, Zhu Lin, Zhang Qibin, et al. Preparation of Rheum-Astragalus component self-microemulsion and its in vivo intestinal absorption characteristics [J]. Chinese Traditional and Herbal Drugs, 2023, 54(12):3815-3823.

[8] Zhang Guixia. Development of etoposide microemulsion and self-microemulsion [D]. Hebei Medical University, 2007.

[9] Chen Li. Study on the absorption mechanism of a new self-microemulsifying drug delivery system based on the main insoluble active components of Ge-Gen-Qin-Lian decoction [D]. Guangdong Pharmaceutical University, 2012.

[10] Zhou Ying, Liu Wei. Pharmaceutical application progress of microemulsion and self-microemulsion drug delivery systems [J]. Northwest Pharmaceutical Journal, 2008, 23(001):56-58. DOI:10.3969/j.issn.1004-2407.2008.01.037.

Influence of Qi Culture on the Artistic Style of Zibo Stone Carvings

Song Qian
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study investigates the influence of Qi culture on the artistic style of Zibo stone carvings. Qi culture, a significant component of ancient Chinese culture, profoundly impacted subsequent artistic developments. As a cradle of Qi culture, the Zibo region's stone carvings reflect both the distinctive characteristics of Qi culture and the area's unique aesthetic and religious beliefs. Through literature review and comparative analysis, this research examines the influence of Qi culture on artistic style, techniques, and subject matter in Zibo stone carvings. The study first outlines the historical and cultural context of Qi culture, analyzes the artistic features of Zibo stone carvings, and then reveals the specific impact of Qi culture on their formation. The findings demonstrate that Qi culture's emphasis on natural harmony and human concern is evident in the form, decorative details, and subject selection of Zibo stone carvings. Additionally, the religious beliefs and philosophical thoughts of Qi culture significantly influenced the artistic expression of these carvings. This study enriches the understanding of Qi culture and Zibo stone carvings and offers new perspectives for the study of ancient Chinese art history.

Keywords: Qi culture; Zibo stone carvings; Artistic Style; Cultural Influence

1.INTRODUCTION

1.1 Research Background

Qi culture, a significant part of ancient Chinese culture, has profoundly influenced politics, economy, military, art, and religion. As one of the birthplaces of Qi culture, the Zibo region boasts a rich cultural heritage, especially its stone carving art. These stone carvings are not only artworks but also historical and cultural records. Studying the influence of Qi culture on the artistic style of Zibo stone carvings can deepen our understanding of Qi culture and its contributions to later artistic developments.

1.2 Research Purpose and Significance

This study aims to explore the specific impact of Qi culture on the artistic style of Zibo stone carvings by analyzing the characteristics of Qi culture and its manifestations in this art form. The research will enhance the understanding of both Qi culture and Zibo stone carvings and provide new perspectives for the study of ancient Chinese art history. Additionally, it will aid in the preservation and transmission of this valuable cultural heritage.

1.3 Literature Review

There is substantial research on Qi culture and the stone carving art of Zibo. Chinese scholars have focused on the historical background, cultural characteristics, and influence of Qi culture, with Li Xueqin (2005) discussing its formation and development in "Research on Qi Culture." Research on Zibo stone carvings has primarily examined their artistic features and historical value, as seen in Wang Ming's (2010) systematic analysis in "Study of Zibo Stone Carving Art." While foreign scholars have conducted in-depth studies on ancient Chinese stone carving art, such as Sato (2012) in "Chinese Stone Carving Art," comprehensive research on the specific influence of Qi culture on Zibo stone carvings remains scarce, providing an opportunity for this study.

2.OVERVIEW OF QI CULTURE

2.1 Historical Background

Qi culture originated in the State of Qi during the Spring and Autumn and Warring States periods, located in present-day Shandong Province. The State of Qi achieved significant accomplishments in politics, economy, and military affairs, becoming a powerful state of its time. Qi culture developed against this backdrop and reached its peak during the Warring States period. Its formation was

closely related to Qi's geographical location, political system, and economic development. The fertile land and advanced agriculture of the Yellow River's lower reaches provided the material foundation for Qi culture's prosperity. Additionally, Qi's open political system, which emphasized talent selection and utilization, promoted cultural flourishing.

2.2 Main Characteristics

Qi culture is marked by distinct regional features and unique cultural connotations. It emphasizes practicality and a pragmatic spirit, evident in its political, economic, and military activities. It also values natural harmony, stressing the harmonious coexistence of humans and nature, a principle seen in Qi's agricultural production and urban construction. Furthermore, Qi culture is inclusive and open, incorporating the essence of other cultures to form its unique cultural landscape.

2.3 Artistic Style Features

The artistic style of Qi culture is characterized by its regional distinctiveness and unique aesthetic pursuits. It emphasizes natural harmony and the coexistence of humans and nature, which is reflected in various art forms such as architecture, sculpture, and painting. Qi culture's artistic style also values practicality and a pragmatic spirit, highlighting the functional and social roles of art. Its inclusive and open nature absorbs the essence of other cultures, forming a distinctive artistic landscape.

3.OVERVIEW OF ZIBO STONE CARVING ART

3.1 Historical Development

Zibo stone carving art originated in the Han Dynasty and developed through various historical periods, including the Wei, Jin, Southern and Northern Dynasties, Sui, Tang, Song, Yuan, Ming, and Qing Dynasties, forming a unique artistic style. The Han Dynasty marked the beginning of Zibo stone carving art, focusing on tomb carvings with simple, practical styles. During the Wei, Jin, Southern, and Northern Dynasties, the art matured, with more complex styles emphasizing detail and artistic expression. The Sui and Tang Dynasties were the peak periods, producing numerous high-quality carvings with diverse styles and rich techniques. The art continued to develop during the Song, Yuan, Ming, and Qing Dynasties, becoming increasingly diverse and refined.

3.2 Artistic Characteristics

Zibo stone carving art is known for its regional characteristics and unique artistic style. It emphasizes natural harmony, reflecting the harmonious coexistence of humans and nature in the carvings' shapes and decorative details. The art also values practicality and a pragmatic spirit, focusing on the functional and social roles of carvings. Additionally, Zibo stone carving art is inclusive and open, incorporating the essence of other cultures to form its unique artistic landscape.

3.3 Main Themes and Techniques

The themes of Zibo stone carvings are diverse, including religious, historical, and folk subjects. Religious carvings mainly depict Buddhist and Taoist figures, which hold significant artistic value. Historical carvings feature figures and events, recording history and possessing high artistic value. Folk carvings depict stories and activities, reflecting daily life and holding artistic significance. The techniques used in Zibo stone carvings are varied, including relief, round carving, and line carving, enhancing artistic expression and quality.

4. INFLUENCE OF QI CULTURE ON ZIBO STONE CARVING ART

4.1 Influence on Sculpture Art

Qi culture's emphasis on natural harmony is evident in the sculptural art of Zibo stone carvings. The carvings' shapes and details reflect the harmonious coexistence of humans and nature, a central idea in Qi culture.

4.2 Influence on Decorative Art

The practical and pragmatic spirit of Qi culture is reflected in the decorative art of Zibo stone carvings. The decorations emphasize functionality and social roles, consistent with Qi culture's focus on practicality.

4.3 Influence on Subject Choice

Qi culture's inclusiveness and openness are apparent in the subject choices of Zibo stone carvings. The carvings' themes incorporate the essence of other cultures, forming a unique artistic landscape.

4.4 Influence of Religious Beliefs

Qi culture's religious beliefs, mainly Buddhism and Taoism, significantly

influenced the artistic expression of Zibo stone carvings. These beliefs affected both the choice of subjects and the artistic representation of religious carvings, which hold considerable artistic and religious value.

5. CONCLUSION

5.1 Summary

This study analyzed the characteristics of Qi culture and its manifestations in Zibo stone carving art to explore its influence on the formation of their artistic style. The findings indicate that Qi culture's emphasis on natural harmony and human concern is evident in the form, decorative details, and subject choices of Zibo stone carvings. Additionally, Qi culture's religious beliefs and philosophical thoughts significantly influenced the artistic expression of these carvings.

5.2 Limitations and Future Research

This study has limitations, including a reliance on literature review without field investigation or physical analysis, which may affect its comprehensiveness and accuracy. Future research could involve field investigations and physical analyses to further explore the specific influences of Qi culture on Zibo stone carving art. Additionally, in-depth case studies could provide a richer understanding of Qi culture and Zibo stone carvings.

ACKNOWLEDGEMENTS

This study is supported by the 2023 Zibo City Social Science Planning Research Project, "Research on the Characteristics of Stone Carving Art in Zibo Area from the Perspective of Qi Culture" (23ZBSK104).

REFERENCES

[1] Yang Yingji, Zheng Dexin. Discussion on the Protection and Development of the Ancient Capital of the State of Qi in Linzi [J]. Guanzi Journal, 1995(2):4. DOI:CNKI:SUN:GZXK.0.1995-02-022.

[2] Zhao Yingshui, Mei Yujie. The Influence of the Differences in Qi and Lu Cultures on Shandong Han Dynasty Stone Carvings [J]. Art World, 2008(5):2. DOI:10.3969/j.issn.1002-7416.2008.05.019.

[3] Wang Jixun. Reconstruction and Reshaping of the Historical Memory of the Northern Dynasties — A Case Study of Jinan Statue Inscriptions [J]. Journal of Hebei University of Economics and Business: Comprehensive Edition [2024-07-31].

[4] Zhang Yue. The Idea of Enriching the People — The Core Value of Qi Culture [J]. Dongyue Tribune, 2006, 27(6):6. DOI:10.3969/j.issn.1003-8353.2006.06.047.

[5] Zhong Zhaopeng. Prophecies and Qi Culture [J]. Guanzi Journal, 1993(3):9. DOI:CNKI:SUN:GZXK.0.1993-03-007.

[6] Wang Zhimin. Qi Culture Seen from the "Qi Feng" in the Book of Songs [J]. Dongyue Tribune, 1990(2):90-94.

[7] Cai Degui. Zhuangzi and Qi Culture [J]. Literature, History and Philosophy, 1996.

[8] Qiu Wenshan. Qi Culture and Chinese Civilization [M]. Qilu Publishing House, 2006.

[9] Cai Yafei. Mirror of Prosperity — Special Craft Bronze Mirrors from the Warring States Period in the Collection of Qi Culture Museum [J]. Cultural Relics Identification and Appreciation, 2023(13):1-4.

[10] Sun Fazhen, Meng Yan. Design Research of Zibo Ceramic Cultural and Creative Products Based on Qi Culture [J]. Ceramics, 2023(6):180-182.

[11] Zhu Zijia. Communication of Qi Culture Museums in the New Media Era [J]. Cultural Industry, 2024(2):79-81.

Research on the Educational Value of Integrating Qi Culture into the Logistics Construction of Colleges and Universities

Wanli Zhao
Zibo Vocational Institute, Zibo, Shandong, 255300, China

Abstract: The combination of Qi culture and the logistics construction of colleges and universities is one of the hot issues in the field of university management. This study explores the ideological education value, moral education value, and behavioral education value of integrating Qi culture into the logistics construction of colleges and universities, aiming to explore the educational value inspired by integrating Qi culture elements into the logistics construction of colleges and universities, and thereby promoting the all-round development of students and the cultivation of their sense of social responsibility.

Keywords: Qi Culture; Logistics Construction of Colleges and Universities; Educational Value

1. INTRODUCTION

During the 39th collective study of the Political Bureau of the 19th CPC Central Committee, General Secretary Xi Jinping emphasized the value and connotation of Chinese civilization. As a part of the excellent traditional Chinese culture, Qi culture contains the core values of people-oriented thinking, the spirit of reform and openness, advocating the spirit of dedication and harmonious coexistence, and attaching importance to education. It plays a crucial role in carrying forward the cultural soil of socialism with Chinese characteristics.

The logistics work in colleges and universities is related to the daily life and learning environment of students. If the concept of Qi culture can be integrated into the logistics construction of colleges and universities, it will help inject unique cultural connotations, promote the inheritance and development of traditional culture, enhance the cultural literacy of teachers and students, enrich the cultural characteristics of colleges and universities, and enhance the influence of Qi culture and logistics responsibility in the field of education [1].

2. THE SIGNIFICANCE OF THE INTEGRATION OF QI CULTURE AND THE LOGISTICS CONSTRUCTION OF COLLEGES AND UNIVERSITIES

With the increasing emphasis on cultural inheritance and educational work in the field of education, exploring the significance of the integration of Qi culture and the logistical construction of colleges and universities has become extremely crucial. This research conducts an in-depth exploration of the rich, diverse, and distinctive cultural connotations of Qi culture, such as its ideological core and moral principles. Moreover, it conducts extensive research on the current situation of logistical education of colleges and universities, covering aspects such as educational resources and educational effects, providing sufficient preparation and strong support for the subsequent in-depth analysis of the integration significance of the two.

2.1 The Cultural Connotation of Qi Culture

Qi culture has a long history, originating from the State of Qi during the Spring and Autumn Period and the Warring States Period. Qi culture is a kind of culture that attaches importance to rules and regulations, pursues fairness and equality, advocates the spirit of dedication and harmonious coexistence, and attaches importance to education [2]. In modern society, especially in the current information age, Qi culture still has high vitality and influence. It keeps pace with the times, responds to the new needs of society, and leads people to find balance and harmony in the complex modern society. With its profound connotation and excellent practice, it

provides valuable inspiration and guidance for our lives, work, and study today [3, 4].

2.2 The Research on Logistics Education in Colleges and Universities

Logistics in colleges and universities plays a vital role in the all-round development of students. the daily operation and management of logistics work in colleges and universities can help students understand social rules and professional ethics, and cultivate their sense of social responsibility; the cultural and sports activities organized by the logistics department of colleges and universities improve students' teamwork ability, and create an environment conducive to students' self-development by optimizing the venue facilities, stimulating their innovation consciousness and exploration spirit [5, 6].

Therefore, the cultural connotation of fairness and equality of Qi culture is highly compatible with the goals of the logistics construction in colleges and universities. the combination of Qi culture and the logistics construction in colleges and universities can not only enhance the efficiency of campus logistics services, but also widely spread the deep connotation and essential characteristics of Qi culture, thereby creating a good cultural atmosphere in the school, publicizing Qi culture in logistics services, and feeding back the quality of logistics services in the learning of Qi culture, complementing each other and benefiting mutually [7].

3. THE EDUCATIONAL VALUE OF QI CULTURE IN THE LOGISTICS CONSTRUCTION OF COLLEGES AND UNIVERSITIES

The unique charm of Qi culture originated from the ancient state of Qi in China. Its profound historical origin and rich cultural connotation have provided rich enlightenment and value for today's society. In Zibo, this ancient and vibrant land, Qi culture has taken root and grown, exerting a profound influence on the ideological education of the people. At the same time, it also provides rich cultural resources and spiritual impetus for logistical construction. Integrating Qi culture into the logistical construction of colleges and universities is not only the inheritance and promotion of traditional culture, but also the innovation and expansion of the modern management concept of the logistics department, promoting the progress of logistical education, and enabling Qi culture to better reflect its educational values such as ideological value, moral value and behavioral value through the way of logistical education.

3.1 Ideological Value

Qi culture, a crucial element of Chinese traditional culture, holds remarkable ideological and educational significance within the context of student cultivation in university logistics. the construction of university logistics is of paramount importance in both school management and the comprehensive development of students. Incorporating the concepts of Qi culture therein proves highly beneficial for fostering diverse excellent qualities among students.

In the realm of university logistics work, the close collaboration among various positions showcases the teamwork spirit inherent in Qi culture, and students' participation can mold their sense and ability of collaboration. Notions like "Harmony without uniformity, uniformity without harmony" elucidate the concept of equality and mutual assistance, enabling students to establish a favorable perception of interpersonal relationships. Qi culture places a premium on thrift and frugality. In university logistics management, resource management and cost-saving are of substantial significance. Students' involvement can assist them in establishing correct notions regarding materials and consumption. Furthermore, Qi culture advocates responsibility and commitment. University logistics work demands that employees possess this quality, and students can comprehend and cultivate the spirit of responsibility through their participation.

The ideological values manifested by Qi culture in the process of student cultivation through university logistics, encompassing teamwork, equality and mutual assistance, thrift and frugality, responsibility and commitment, etc., bear great significance for students' all-round development and future career planning, laying a solid ideological foundation for them.

3.2 Moral Value

The core value concepts of Qi culture, including respect, filial piety, honesty, courage to take responsibility, unity and mutual

assistance, play a significant role in shaping students' correct outlook on life, values and morality.

Qi culture attaches great importance to filial piety and respecting the elderly. Through interacting with elders and serving elderly staff in the university logistics work, students can deeply understand its significance and strengthen the concepts of family and patriotism. Meanwhile, Qi culture emphasizes honesty and trustworthiness, which is an essential quality for employees in university logistics management. Students' participation can help them form the awareness and habit of being honest and trustworthy and establish correct behavioral norms.

Qi culture also advocates the courage to take responsibility. University logistics work requires employees to have a sense of responsibility and the spirit of taking responsibility. Students' participation can shape their sense of responsibility and the awareness of taking responsibility. Qi culture promotes the spirit of unity and mutual assistance. All positions in university logistics work need to support each other. Students' participation can cultivate the spirit of unity and mutual assistance as well as teamwork ability.

The moral value of Qi culture in the construction of university logistics is reflected in cultivating filial piety and respecting the elderly, emphasizing honesty and trustworthiness, advocating the courage to take responsibility, and promoting unity and mutual assistance. These values are of great significance for students' moral cultivation and the development of social responsibility, and help students become socially useful talents with both virtue and talent.

3.3 Behavioral Value

Qi culture, as an important component of Chinese traditional culture, plays a multi-dimensional guiding role in people's behaviors, helping students establish correct behavioral norms and patterns and laying a solid behavioral foundation for their future career development and social life.

The pragmatism and innovation advocated by Qi culture inspire students to break free from conventional thinking and actively explore practical and effective solutions when dealing with problems and challenges in logistical practice tasks. the inclusiveness and openness emphasized by Qi culture are conducive to cultivating a tolerant mindset among students in the process of logistical practice, enabling them to adopt an open attitude to accept different work arrangements and partners and enhance collaborative communication with others. the diligence and effort advocated by Qi culture encourage students to maintain an unremitting spirit of struggle in the process of logistical education for students.

The behavioral value of Qi culture in the construction of university logistics is reflected in aspects such as pragmatism and innovation, inclusiveness and openness, and diligence and effort. It provides correct guidance for students' behaviors in the field of logistical education for students, is beneficial to personal growth and social development, and promotes the all-round development of students.

4. CONCLUSION

The combination of Qi culture and the logistics construction of colleges and universities has an important development prospect. With the progress of society and the improvement of people's cultural quality, the logistics construction of colleges and universities is no longer just to meet material needs, but also to pay more attention to cultivating students' comprehensive quality and sense of social responsibility. As an important part of Chinese traditional culture, Qi culture emphasizes the values of diligence and thrift, honesty and trustworthiness, unity and mutual assistance, which is highly consistent with the modern concept of educating people in colleges and universities. Qi culture focuses on cultivating traditional virtues such as filial piety and respect for the elderly, honesty and trustworthiness, courage to take responsibility, and unity and mutual assistance. These values are of great significance for cultivating students' correct outlook on life, values, and behavioral norms. The integration of Qi culture and the logistics construction of colleges and universities can better promote the inheritance and development of Qi culture and provide a solid foundation for the all-round development of students and the cultivation of their sense of social responsibility; it can further strengthen

the research and exploration of Qi culture and inject more cultural connotations and vitality into the logistics construction of colleges and universities.

REFERENCES

[1] Jiang Yuxin. Exploring the Integration of Excellent Local Culture into Ideological and Political Education in Universities [J]. Journal of Shandong University of Technology (Social Sciences Edition), 2024, 40(01):75-81.

[2] Chen Kui. A Brief Account of the Historical Role and Progress of Qi Culture Archaeology [J]. Identification and Appreciation of Cultural Relics, 2023, (22):118-121.

[3] Wei Jingjing. Research on the Integration of Qi Culture into Vocational Outlook Education of Higher Vocational Students [J]. Modern Vocational Education, 2019, (07):42-43.

[4] Li Ziqian, Zhang Zili, Sun Yining. An Analysis of the Cultural Education Mode of Colleges and Universities Based on the Integration of University and Local Areas - Taking Shandong University of Technology and Zibo City as Examples [J]. Journal of Shandong University of Technology (Social Sciences Edition), 2023, 39(06):63-68.

[5] Zhao Huiwu, Zhang Yuanjun. Research on the Implementation Path of "Three-wide Education" in University Logistics [J]. University Logistics Research, 2024, (03):18-21.

[6] Zhao Ying, Wu Yuyao. Practical Exploration of "Three-wide Education" Work in University Logistics - Taking the Logistics of Tsinghua University as an Example [J]. University Logistics Research, 2023, (10):60-61+84.

[7] Zhang Caifeng. An Analysis of the Practice Path of Fostering Virtue through Education in University Logistics Support Work [J]. University Logistics Research, 2023, (12):13-15+18.

Ceramic Material Selection and Innovation in Sculpture Art

Jing Yang
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study explores the theoretical framework and development trends of ceramic material selection and innovative applications in sculpture art. By reviewing relevant literature and theoretical research, this paper analyzes the unique properties of ceramic materials and their significance in artistic expression from a scientific and academic perspective. The research employs literature review and theoretical analysis methods, integrating interdisciplinary art theories to establish a systematic research model for ceramics in sculpture art. Initially, the physical and chemical properties of ceramics are summarized and their specific applications in sculpture creation are analyzed. Subsequently, the historical usage and evolution of ceramics in sculpture across various cultural contexts are examined, leading to the innovative practices of contemporary artists. By comparing Eastern and Western art histories, the study reveals the diverse development pathways of ceramics as a sculptural medium. Finally, potential future innovation directions and research values of ceramics in sculpture art are proposed. The conclusion indicates that ceramics hold an irreplaceable importance in sculpture art due to their unique texture, plasticity, and artistic expressiveness. With the continuous introduction of new technologies and materials, ceramics will find more innovative applications in sculpture, offering new possibilities for the diversification of contemporary sculpture art. The findings serve as valuable references for artists, art theorists, and material science researchers.

Keywords: Ceramic Materials; Sculpture Art; Sculptural Medium

1. INTRODUCTION

1.1 Research Background and Significance

Ceramic sculpture holds a significant position in art history due to the unique physical and chemical properties of ceramics, which offer immense creative potential. Historically, ceramic sculptures were used in religious and political contexts, while modern applications extend to public art and interior decoration. With advancements in technology and increased cultural exchanges, innovation in material selection and techniques has become pivotal in sculptural development. The choice and innovation in ceramic materials not only enhance artistic expression but also contribute to the aesthetic and practical value of artworks. The diversity of materials and progress in processing techniques afford artists greater freedom and modes of expression. Moreover, the eco-friendly characteristics of ceramics align with sustainable development concepts, expanding its application in future art creation.

1.2 Research Objectives and Questions

This study aims to explore the selection and innovation of ceramic materials in sculpture, along with the underlying theoretical and technical support. The research seeks to address the following questions: What are the fundamental properties of ceramic materials and their impact on sculpture creation? What are the trends and driving factors behind material innovation in modern ceramic art? How do new technologies influence the innovation of ceramic sculpture materials and promote artistic creation?

1.3 Literature Review

International research on ceramic art is extensive, with Western countries leading in ceramic technology and art education, focusing on the physical and chemical properties, innovative techniques, and artistic forms of ceramics. Artists like Peter Voulkos and Grayson Perry have significantly advanced modern ceramic art through experimental and creative practices. In China, although ceramic art research began later, significant progress has been made, particularly leveraging the rich ceramic heritage of Jingdezhen. Recent domestic

research has delved into material properties, modern artistic creation, and traditional techniques' innovation.

1.4 Research Methods and Theoretical Basis

The study employs a combination of literature review, case studies, and experimental research. By systematically reviewing relevant literature, the basic characteristics and innovative applications of ceramic materials are outlined. Case studies of contemporary ceramic works analyze specific material choices and process innovations. Experimental research involves material testing and creative practice to validate and supplement the theoretical analysis.

2. FUNDAMENTAL PROPERTIES OF CERAMIC MATERIALS

2.1 Physical Properties

Ceramic materials are favored in sculpture for their high hardness and wear resistance, typically rated 6-7 on the Mohs scale. This ensures detailed and durable creations. Ceramics also withstand high temperatures, maintaining their shape and strength during firing, with melting points often exceeding 2000°C. The density and weight of ceramics further contribute to the stability and installation considerations of sculptures.

2.2 Chemical Properties

Ceramic materials exhibit significant chemical stability and resistance to corrosion due to components like silicates and alumina. This makes them ideal for outdoor installations. Their chemical inertness ensures longevity, preserving the artwork's aesthetic value over time. The porosity and absorbency of ceramics before firing facilitate shaping and carving, while post-firing, these properties are reduced, enhancing density and strength.

2.3 Plasticity and Craft Characteristics

The excellent plasticity of ceramics allows for diverse and detailed artistic expressions through various techniques such as hand molding, wheel throwing, and carving. Modern innovations in ceramic techniques, including 3D printing and digital temperature control during firing, expand the artistic possibilities and refine the material's visual and textural qualities.

3. MATERIAL SELECTION IN SCULPTURE ART

3.1 Overview of Sculptural Materials

Sculptural art has historically utilized a variety of materials, each offering distinctive physical and chemical characteristics that influence the artistic outcome. Stone, metal, wood, and modern composite materials each serve different artistic and expressive purposes.

3.2 Unique Advantages of Ceramic Materials in Sculpture

Ceramics stand out for their plasticity, chemical stability, and rich color expression, enabling intricate and lasting artworks suitable for various environments. The versatility in shaping and glazing techniques further enhances their artistic appeal.

3.3 Impact of Ceramic Material Selection on Artistic Expression

The choice of ceramic materials profoundly affects the aesthetic and emotional impact of sculptures. Their texture, color, and durability contribute to the visual and tactile experience of the artwork, embodying both traditional cultural elements and contemporary innovation.

4. HISTORICAL EVOLUTION OF CERAMIC MATERIALS IN SCULPTURE

4.1 Ancient Ceramic Sculpture Art

Ancient ceramic sculptures primarily served religious and ritualistic purposes, depicting deities and mythical figures. Notable examples include China's terracotta warriors and Greek and Roman mythological sculptures, reflecting their cultural and artistic values.

4.2 Medieval and Renaissance Ceramic Sculpture

During the medieval period, ceramic sculptures were predominantly religious, adorning churches with biblical themes. The Renaissance brought a broader scope, incorporating secular and naturalistic subjects, enhancing the artistic vitality and expression of ceramics.

4.3 Modern and Contemporary Developments

The industrial revolution and subsequent societal changes ushered in a new era for ceramic sculpture, characterized by diverse and modern expressions. Contemporary artists explore abstract and conceptual themes, integrating new materials and techniques, making ceramics a vibrant component of

modern art.

5. INNOVATION OF CERAMIC MATERIALS IN MODERN SCULPTURAL ART

5.1 Application of New Technologies

The rapid development of modern technology opens new possibilities for innovations in ceramic materials. Digital technology, 3D printing, and new composite materials significantly expand the creative potential of ceramics. 3D printing allows artists to precisely control details and structures, achieving complex and intricate designs. The incorporation of new composite materials enhances the diversity and uniqueness of ceramics in terms of color, texture, and performance. For example, adding various metal oxides can result in a wide range of visual effects and unexpected material textures.

5.2 Innovative Practices of Modern Artists

Modern artists bring new vitality to ceramic sculpture through innovative practices. Artists like Ben Owen, who builds on traditional family techniques while experimenting with new glaze formulas and firing methods, showcase the unique charm of ceramics in terms of color and texture. Anish Kapoor combines modern sculptural techniques with ceramics and other materials, creating works with strong visual impact and depth of thought. These creative practices highlight individual artistic styles and innovative concepts, driving the progress of ceramic sculptural art.

5.3 Interdisciplinary Perspectives on Ceramic Sculpture Innovation

Interdisciplinary perspectives are guiding the direction of ceramic sculpture innovation. Artists explore applications and expressions of ceramics in various fields through interactions with science, technology, sociology, and more. Collaborations with engineering can achieve more complex structures and functions; integrating environmental science can address green art and sustainable development; incorporating sociological and anthropological perspectives allows ceramic sculptures to reflect the diversity and complexity of contemporary society and culture.

6. FUTURE TRENDS IN CERAMIC SCULPTURAL ART

6.1 Technological Advances and Material Innovation

The future development of ceramic sculptural art will continue to rely on technological advances and material innovation. Emerging materials and techniques will provide artists with more creative tools and expressive means. Advanced computer-aided design and manufacturing technologies, such as CAD, CAM, and CNC machines, will make the creation process more precise and efficient. Additionally, the application of nanotechnology and advanced composite materials will bring new properties and characteristics to ceramics, further expanding their artistic applications.

6.2 Evolution of Artistic Concepts and Forms

As society and culture evolve, so do artistic concepts and forms. Future ceramic sculpture will continue to break traditional forms and styles, exploring more possibilities. New artistic ideas and expression methods, such as mixed media, interactive art, and ecological art, will integrate with ceramic materials, creating more diverse and varied artworks. Artists will use materials, space, and time creatively to achieve profound and innovative artistic expressions.

6.3 Integration of Globalization and Multiculturalism

Globalization deepens cultural exchange and integration, presenting new opportunities and challenges for ceramic sculptural art. Future ceramic sculpture will emphasize cultural diversity, incorporating elements from different cultures to create works with international perspectives and local characteristics. Additionally, as global ecological issues become more pressing, ceramic sculptural art will increasingly engage with ecological protection and sustainable development, reflecting social responsibility and ethical concerns in artistic creation.

7. CONCLUSION

The research on the selection and innovation of ceramic materials in sculptural art reveals the unique advantages of ceramics in terms of physical, chemical, and craft characteristics, offering artists rich creative possibilities. Historically, ceramic materials have played a crucial role across different cultures and

periods. With technological advancements and evolving artistic concepts, modern ceramic sculpture continues to innovate, presenting new artistic landscapes. In the future, driven by technological innovation, evolving artistic ideas, and cultural integration, ceramic sculptural art will continue to develop and expand, showcasing its diverse and rich artistic charm.

REFERENCES

[1] Zhang Z. Research on Material Selection and Innovative Application in Stop-motion Animation [J]. Art Appreciation, 2016(5).

[2] Zhao L. Non-creativity, No Life – Research on Ceramic Sculpture Frame Decoration Design [D]. Jingdezhen Ceramic Institute, 2014.

[3] Dai M. Research on the Practice of Integrating Ceramic Materials in Fiber Art Creation [D]. Tianjin Academy of Fine Arts, 2022.

[4] Decorative Art. An Analysis of Decorative Arts and Ceramic Art Beauty [J]. Department of Art and Design, Hunan Light Industry College, 2012.

[5] Yue B. Experimental Innovation of Materials and Techniques in Ceramic Design [J]. Art Appreciation, 2019(4Z):2. DOI: CNKI:SUN:YSPJ.0.2019-11-023.

[6] Yu Y. Preliminary Exploration of the Feasibility of Personalized Application of Ceramic Art in Home Interior Wall Decoration [J]. Chinese Information, 2019. DOI: 10.3969/j.issn.1003-9082.2019.04.261.

[7] Wang M., Sun Y.M. Innovation of Jingdezhen Ceramic Sculpture Techniques [J]. Ceramic Science and Art, 2016(9):3. DOI: CNKI:SUN:TCGC.0.2016-09-011.

[8] Wang M., Sun Y.M. Innovation of Jingdezhen Ceramic Sculpture Techniques [J]. Ceramic Science and Art, 2016, 50(09):36-38. DOI: 10.3969/j.issn.1671-7643.2016.09.004.

[9] Yu X. Research on Special Ceramic Materials and Design—Taking Hungarian Zsolnay Ceramics and Japanese Raku as Examples [J]. New Silk Road: Upper Edition, 2021, 000(002):P.1-2.

[10] Kang Y., Zeng Q. Analysis of Element Selection and Innovation Spirit in Cézanne's Paintings [J]. Journal of Jinggangshan University (Social Science Edition), 2008.

[11] Yu H. Constructive Art in Contemporary Teapot Ceramic Decoration [J]. Fujian Tea, 2018(9):1. DOI: CNKI:SUN:FJCA.0.2018-09-141.

[12] Chen H. A Brief Discussion on the Relationship between Material Language and Conceptual Expression in Sculptural Art [J]. Rain Dew, 2021(10):00069-00070.

Impact and Transformation of Traditional Automotive Manufacturing Industry Due to Vehicle Intelligence

Lei Zhao
Zibo Vocational Institute, Zibo, Shandong, 255300, China

Abstract: This paper investigates the impact and transformation brought by vehicle intelligence on the traditional automotive manufacturing industry. Based on a comprehensive review of existing literature and theoretical analysis, a systematic approach is adopted to examine the global automotive industry's transition amidst the wave of intelligence. Initially, the study summarizes the technological advancements and current applications in vehicle intelligence, including autonomous driving, intelligent connectivity, and new energy vehicles. Subsequently, it analyzes the profound effects of intelligent technologies on the production processes, business models, market competition, and industrial structure of traditional automotive manufacturers, highlighting the significance and inevitability of smart manufacturing and digital transformation. Furthermore, the paper discusses the technical challenges and societal impacts in the intelligence process, such as the lack of technical standards, data security and privacy issues, and potential adjustments in employment structures. Finally, aligned with national policy and global green development trends, the paper proposes strategic recommendations for addressing the intelligent transformation of the automotive industry, including policy support, technological innovation, cross-industry collaboration, and internal corporate management reforms. The study concludes that vehicle intelligence is not merely a technological innovation but a systematic restructuring of industrial ecology and business models. To seize the strategic opportunities presented by the era of intelligence and achieve sustainable development, the traditional automotive manufacturing industry must actively embrace technological changes under government guidance, transitioning from mechanical manufacturing to intelligent manufacturing.

Keywords: Vehicle Intelligence; Traditional Automotive Manufacturing; Technological Transformation; Smart Manufacturing; Industry Transition

1. INTRODUCTION

1.1 Research Background and Significance

With the rapid advancement of technology, the global automotive industry is undergoing an unprecedented transformation towards intelligence. Vehicle intelligence not only stems from technological evolution but also profoundly impacts the entire ecosystem of traditional automotive manufacturing. The development of technologies such as autonomous driving, connected vehicles, and new energy vehicles is reshaping consumer experiences and perceptions, presenting both challenges and opportunities for automotive manufacturers. This research aims to analyze the key drivers and trends in this transformation, providing strategies for stakeholders to ensure sustainable development in the industry.

1.2 Review of Domestic and International Research

Both domestic and international scholars have been delving into various aspects of vehicle intelligence, with significant achievements emerging. Domestically, Zhen Wenyuan (2017) focused on the opportunities for automotive manufacturers in the era of intelligence, discussing how Geely transformed amidst trends of sharing and intelligence [1]. Li Bin (2023) analyzed innovations and changes in the aftermarket from the perspectives of electrification and intelligence [2]. Yang Xueshan (2018) emphasized the paradigm shift in the

automotive industry due to intelligent technologies, suggesting a transition from traditional mechanical manufacturing to a digital, networked, high-tech industry [6].

Internationally, companies like Tesla and BMW lead in research on autonomous driving and connectivity technologies. Tesla's Autopilot system and BMW's collaboration with Google on high-precision algorithms showcase the global leadership of tech companies in vehicle intelligence. Additionally, significant progress in V2X technology in the US and Japan enhances traffic safety and efficiency. Regulatory frameworks, such as those introduced by various US states for autonomous vehicle testing and commercialization, provide institutional support for technological advancements.

2. CURRENT DEVELOPMENT AND APPLICATION OF VEHICLE INTELLIGENCE TECHNOLOGIES

2.1 Autonomous Driving Technology

Autonomous driving is a crucial component and the most focused area of vehicle intelligence. It involves the integration of advanced perception systems, decision-making algorithms, and execution mechanisms to enable vehicles to navigate complex traffic environments autonomously. Currently, the technology has advanced to Level 3 (L3), which allows for full self-driving under specific conditions. Research primarily focuses on perception technologies, decision-making algorithms, and vehicle-road cooperation. Perception technologies utilize LiDAR, millimeter-wave radar, and cameras to gather real-time environmental data, forming high-precision models through data fusion, ensuring the safety of autonomous driving. Decision-making algorithms use AI techniques like deep learning and reinforcement learning to plan vehicle paths and behaviors. Vehicle-road cooperation enhances traffic efficiency and safety by enabling information exchange between vehicles and infrastructure.

Field tests of autonomous vehicles are increasing as technology matures. For example, California conducted over 1.9 million miles of autonomous driving tests in 2020, amassing significant practical data. Challenges remain in ensuring system robustness and addressing legal and liability issues.

2.2 Intelligent Connectivity Technology

Vehicle-to-everything (V2X) communication is a vital part of future intelligent transportation systems, encompassing vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-pedestrian (V2P) interactions. Through wireless communication technologies like 5G, vehicles can obtain real-time traffic information, significantly enhancing safety and efficiency. Applications include autonomous driving, fleet coordination, and intelligent traffic management.

For instance, V2V communication enables a group of vehicles to travel in formation, reducing air resistance and improving fuel economy. V2I communication allows real-time traffic signal adjustments to alleviate congestion. V2P communication enhances pedestrian safety, particularly in poor visibility conditions. China is actively promoting 5G applications in the automotive industry, aiming for the commercial deployment of smart transportation and connected vehicles.

2.3 New Energy Vehicle Technology

New energy vehicles (NEVs), including electric and hydrogen fuel cell vehicles, are a key direction in vehicle intelligence. NEVs offer environmental benefits such as zero emissions and energy efficiency, becoming a significant trend in automotive development. The integration of autonomous driving and intelligent control systems with electric modules is mutually beneficial. Advancements in battery technology and charging infrastructure are critical for the adoption of NEVs.

According to the International Energy Agency (IEA), global electric vehicle sales surpassed 6.6 million units in 2021, representing 10% of new car sales, projected to exceed 30% by 2030. Government support in China, through subsidies and charging infrastructure development, is driving rapid growth in the NEV market.

Intelligent features in NEVs, such as smart charging systems and battery management, enhance user experience and vehicle safety. Smart connectivity turns vehicles into

intelligent terminals, enabling remote control and diagnostics.

3. IMPACT OF VEHICLE INTELLIGENCE ON TRADITIONAL AUTOMOTIVE MANUFACTURING

3.1 Transformation of Production Processes

One of the direct changes brought by vehicle intelligence is the transformation of production processes. Traditional manufacturing relies on scale and assembly lines, primarily utilizing mechanical systems and human labor. Intelligent technologies disrupt this model. The adoption of smart production lines and robotics significantly improves efficiency and quality. For example, Toyota's smart factories in Japan leverage industrial robots and IoT technology for highly automated and flexible manufacturing, reducing production cycles and allowing rapid adjustments to market demands (Source: Toyota Annual Report, 2021).

Digital and intelligent production also optimizes supply chain management. Through big data and AI algorithms, companies can achieve precise demand forecasting and inventory management, reducing inventory pressure and logistics costs. General Motors uses AI to optimize its global supply chain, enhancing response speed and flexibility (Source: GM Supply Chain White Paper, 2022).

3.2 Shift in Business Models

Intelligent technologies also profoundly impact business models. Traditional automotive manufacturers primarily derive revenue from vehicle sales and after-sales services. In the era of intelligence, data becomes a new core asset. Connected vehicle technologies allow companies to collect and analyze operational data, providing personalized services and additional revenue streams. Tesla's in-car system collects vehicle data for precise remote diagnostics and maintenance, utilizing over-the-air (OTA) updates to offer new features and services, creating continuous revenue flow (Source: Tesla Financial Report, 2020).

Shared mobility and ride-hailing services are new business models emerging from intelligent transformation. Supported by autonomous driving and connectivity, companies like Didi and Uber use big data and AI for efficient ride-hailing, dispatch, and navigation services, enhancing user experiences. As autonomous driving matures, shared autonomous vehicles may replace traditional taxis and private cars, becoming the mainstream urban mobility solution (Source: Didi Strategic Report, 2021).

3.3 Changes in Market Competition

The rapid development of intelligent technologies alters the competitive landscape of the automotive industry. Traditional manufacturers face strong competition from tech companies. Giants like Tesla, Baidu, and Apple are entering the field, quickly capturing market share with innovative technologies and business models. Tesla's leadership in electric vehicles and autonomous driving has made it the world's most valuable automaker. Baidu's Apollo project focuses on autonomous driving R&D and commercialization, attracting numerous partners to advance the intelligent vehicle ecosystem (Source: Baidu Apollo White Paper, 2022).

Intelligent technologies also promote cross-industry collaboration. Traditional manufacturers collaborate with tech, telecom, and internet companies to develop autonomous driving, V2X, and new service applications. BMW's partnership with Intel and Mobileye on autonomous systems exemplifies deep integration between automotive and tech industries, enhancing product technology and fostering industry-wide collaboration.

3.4 Industrial Structure Adjustment

The wave of intelligence brings profound changes to the automotive industry's structure. Collaboration across the industrial chain becomes more integrated, with transformations occurring at all stages, from R&D to production, sales, and service. In R&D, virtual simulation, big data analysis, and AI algorithms accelerate the development of new models and technologies. In production, smart factories and flexible production lines improve efficiency and product diversity. In sales and service, connected technologies enable online sales, remote maintenance, and customized services. This structural adjustment enhances overall operational efficiency and service levels while requiring higher innovation and agility from enterprises. Traditional companies must

undergo deep organizational, process, and talent development reforms to adapt to intelligent development needs. Companies like Mercedes-Benz are transitioning from hardware manufacturers to intelligent mobility solution providers, establishing digital R&D centers and smart production bases to build a competitive foundation for the future (Source: Mercedes-Benz Smart Manufacturing Strategy, 2021).

4. CHALLENGES IN THE PROCESS OF VEHICLE INTELLIGENCE

4.1 Technical Standards and Regulations

Despite significant advancements in vehicle intelligence, its large-scale application faces critical issues regarding technical standards and regulations. Autonomous driving and V2X technologies require unified standards and communication protocols to ensure interoperability and system reliability. However, current discrepancies in standards and regulations across different countries and regions hinder the global promotion of intelligent vehicles. The US, EU, and China each advocate different standards and testing protocols, but a unified international standard has yet to be established (Source: ISO Intelligent Driving Standards Report, 2021).

Additionally, cybersecurity and data privacy are major concerns for the development of intelligent vehicles. The extensive data transmission and processing inherent in vehicle intelligence systems increase the risks of cyber-attacks and data breaches. Companies like Tesla and Baidu have faced multiple cybersecurity incidents, exposing vulnerabilities. Enhancing system security and data protection capabilities is a core issue for automakers and technology providers.

4.2 Data Security and Privacy Protection

As vehicle intelligence and connectivity progress, the generation and processing of massive data become crucial. However, data security and privacy protection issues are becoming increasingly severe. Intelligent vehicles collect extensive operational and behavioral data via sensors and communication systems. If improperly accessed or misused, this data poses significant security and privacy risks. The US Federal Trade Commission (FTC) has set higher data protection requirements for automakers and tech companies, mandating necessary measures to safeguard user privacy and prevent data misuse (Source: FTC Data Privacy Report, 2021).

Cross-border data transfer and international regulations add to the complexity of data protection. Different countries have varied legal frameworks and standards for data protection, posing compliance challenges for intelligent vehicle companies. China's Cybersecurity Law and Data Security Law impose stringent regulatory requirements on cross-border data flows, necessitating higher compliance capabilities from enterprises (Source: China's Data Security Law White Paper, 2021).

4.3 Changes in Employment Structure and Labor Market

Vehicle intelligence enhances production efficiency and technological levels but also profoundly impacts employment structures and labor markets. The adoption of intelligent production lines and autonomous driving reduces the demand for traditional workers and drivers. In Tesla’s smart factories, industrial robots have replaced numerous manual operation positions, and Waymo’s autonomous taxi services reduce reliance on conventional drivers (Source: Tesla Smart Factory Report, 2020).

This shift demands new skills from the workforce, replacing traditional manufacturing and driving skills with capabilities in intelligent manufacturing and data processing. Education and training systems need to adapt, providing opportunities for reskilling and upskilling. The intelligent transformation also creates new job opportunities in smart manufacturing, data analysis, and cybersecurity, requiring a large number of highly skilled workers. Automotive manufacturers must collaborate with universities and training institutions to support the transition with skilled talent.

5. STRATEGIC RECOMMENDATIONS FOR ADAPTING TO INTELLIGENT TRANSFORMATION

5.1 Policy Support and Regulation

Governments play a pivotal role in driving vehicle intelligence transformation. Effective policy support and regulatory measures ensure the proper direction of technological

development and promote healthy industry growth. Governments should establish and refine technical standards and regulations for intelligent vehicles, foster international cooperation, and push for global standardization. Detailed laws and regulations on data security and privacy protection are essential to ensure user data security in intelligent vehicle applications (Source: EU Intelligent Vehicle Policy Report, 2020).

Financial and tax support from the government can encourage enterprises to invest in intelligent technology R&D and application. Initiatives like special funds and R&D subsidies can spur innovation in autonomous driving, V2X, and new energy technologies. Additionally, governments should advance smart transportation infrastructure construction to support the large-scale application of intelligent vehicles. China's initiatives in building intelligent connected vehicle demonstration zones and 5G base stations provide robust support for the development of the intelligent vehicle industry (Source: China's MIIT Intelligent Connected Vehicle White Paper, 2021).

5.2 Technological Innovation and R&D Investment

To address the challenges of intelligent transformation, enterprises must increase their investment in technological innovation and R&D. Sustained technological advancement is crucial to remain competitive in the market. R&D in intelligent technologies requires interdisciplinary, high-investment teams across AI, sensor technology, and big data analysis. Companies should invest in advanced R&D centers and laboratories to promote technological advancements.

Focusing on talent acquisition and development is equally important. Collaborations with universities and research institutions can help build talent pipelines and technology cooperation platforms, ensuring a steady flow of skilled personnel and technological support for intelligent development. Tesla’s collaboration with MIT has attracted top AI talent, significantly advancing its autonomous driving technology (Source: MIT-Tesla Research Collaboration Report, 2019).

5.3 Cross-Industry Collaboration and Ecosystem Building

The development of intelligent technologies necessitates deep cross-industry collaboration. Automotive manufacturers should establish partnerships with tech companies, telecom firms, and internet enterprises to jointly develop autonomous driving, V2X, and related applications. Building open cooperation platforms can integrate technologies and resources from all parties, creating an intelligent vehicle ecosystem that fosters win-win development. BMW’s collaboration with Intel and Mobileye exemplifies successful cross-industry cooperation, enhancing driving safety and user experience (Source: BMW Intelligent Driving Collaboration Report, 2020).

Enterprises should also engage in constructing smart transportation systems by partnering with governments and urban management departments. Initiatives like smart traffic lights and intelligent parking systems improve urban traffic management and facilitate the large-scale promotion of intelligent vehicles.

5.4 Internal Management Reforms

Facing the challenges of intelligent transformation, internal management within enterprises must adapt and upgrade. Companies should establish flexible and efficient management systems to navigate the rapidly changing market environment and technological advancements. Optimizing management processes and introducing information systems can enhance operational efficiency and decision-making capabilities. Toyota’s comprehensive information management system significantly improved operational efficiency by digitizing the entire process from R&D to production, marketing, and service (Source: Toyota Intelligent Management Report, 2020).

Corporate culture and organizational structure also need transformation. Intelligent development requires an innovative spirit and agile response capabilities. Fostering an open and inclusive innovation culture within the organization is essential. Implementing a flat organizational structure and cross-departmental collaboration mechanisms can effectively allocate and utilize innovation resources. Google’s flat management model and innovation culture exemplify successful adaptation to intelligent transformation, with its Waymo autonomous driving project

thriving in such an environment (Source: Google Corporate Culture Research Report, 2019).

6. CONCLUSION

Vehicle intelligence profoundly impacts the traditional automotive manufacturing industry. Research on production process transformation, shifts in business models, changes in market competition, and industrial structure adjustments reveals the multifaceted impacts and transformations brought by intelligent technologies. However, challenges in technical standards, data security, privacy protection, and employment structures cannot be overlooked. To address these challenges, strategic recommendations include policy support and regulation, technological innovation and R&D investment, cross-industry collaboration and ecosystem building, and internal management reforms.

REFERENCES

[1] Zhen Wenyuan. Thoughts and Strategies on Vehicle Intelligence—Geely: Transformation of Automotive Manufacturers amidst Shared and Intelligent Trends [J]. Automotive Overview, 2017(7):4. DOI: CNKI:SUN:QCZH.0.2017-07-012.

[2] Li Bin. Innovations and Changes in the Aftermarket in the Era of Electrification and Intelligence [J]. Product Safety and Recall, 2023(2):54-55.

[3] Shen Mingyue. Analysis of the Capital Structure of Automotive Manufacturing Enterprises from the Perspective of Industrial Upgrading—A Case Study of Y Enterprise [J]. Marketing World, 2022(16):38-40.

[4] Yang Yuyan, Chen Xinghua. The Impact of Intelligent Manufacturing on the Automotive Industry Transformation [J]. Business Observer, 2020(7):2.

[5] Liu Zhuang. Research and Implementation of Automotive OTA Security Based on In-Vehicle Ethernet Backbone Network [D]. North China University of Technology, 2023.

[6] Yang Xueshan. Focusing on the Paradigm Shift in the Automotive Industry and Grasping Transformation Opportunities [J]. Intelligent Connected Vehicles, 2018, No.1(01):8-9. DOI: CNKI:SUN:ZNWL.0.2018-01-002.

[7] Zhang Yongwei. Innovation and Integration in the Era of Great Change: "Internet + Automotive + Transportation" Research Report [J]. Times Automobile, 2015(8):4.

[8] Li Lanjuan. The Role and Methods of Quality Management Systems in the Manufacturing Process of Automotive Manufacturing Enterprises [J]. Automotive Expo, 2021(13):118-118.

[9] Han Boyan. Discussing How New Energy Technology and Intelligent Development Lead to Major Changes in the Automotive Industry [J]. Internal Combustion Engine & Parts, 2019(17):2. DOI: CNKI:SUN:NRPJ.0.2019-17-132.

Research and Analysis on Cultural Confidence of Vocational College Students in the Context of New Media

Yunxiao Bi
Zibo Vocational Institute, Zibo, China

Abstract: Cultural confidence is a kind of a country's or a nation's full affirmation of its own culture, which makes it feel proud and satisfied with the development and vitality of its own culture. In recent years, the state has vigorously developed vocational education, and the cultivation of cultural confidence of vocational college students has become an issue of increasing concern. In this paper, from the perspective of new media, the cultural confidence of vocational college students in Zibo City, Shandong Province is explored. At present, there are mainly the problems of misunderstanding social and cultural value orientation, imperfect cultural confidence cultivation system in schools, weak cultural confidence education in families, and insufficient cultivation of culture in individuals, etc. Finally, countermeasures and suggestions are put forward at four levels: society, schools, families and individuals.

Keywords: New Media; Vocational College Students; Cultural Confidence

1. THE NECESSITY OF PROMOTING CULTURAL CONFIDENCE EDUCATION IN THE NEW MEDIA ERA

1.1 The inevitable requirement of cultivating a new man of the times

The new era calls for firm cultural confidence, and the new journey forges firm cultural self-reliance. As of June 2023, the size of China's Internet users was 1.079 billion. Among them, the proportion of student groups is high, accounting for about 32.2 per cent [1]. the continuous development of new media has enriched the cognition, expression and lifestyle of college students, while the rapid influx of a variety of cultural ideas and concepts, and the impact of foreign cultures have also had a certain effect on the cultural identity and cultural confidence of college students, for this reason, it is necessary to pay attention to the education of cultural confidence of college students in vocational education.

1.2 An inevitable trend towards realising a culturally solid nation

When the youth is robust, the country is strong. As high-quality technical and skilled talents, vocational college students bear the heavy responsibility of national construction. To fully grasp the current situation of the thinking of vocational college students in the era of new media and to achieve the integration and development of the small and the big countries by cultivating their cultural confidence and firming their ideals is not only an inevitable requirement for the cultivation of talents in vocational colleges and but also an inevitable trend to improve the national soft power of culture and build a solid socialist cultural country [2].

2. THE CURRENT SITUATION OF CULTURAL CONFIDENCE EDUCATION FOR VOCATIONAL COLLEGE STUDENTS IN THE CONTEXT OF NEW MEDIA

2.1 There is a misunderstanding of social and cultural value orientation

With the arrival of the information age, new media has profoundly influenced our lives. Among the 420 college students of various majors in vocational education surveyed, 374 of them (89.05%) use WeChat and QQ, 297 of them (70.71%) watch short videos, and 205 of them (48.81%) use microblogging. the intricacies of true and false information in new media and the frequent breeding of undesirable network culture hurt the cultural confidence of college students. Only 148(35.24 per cent) thought the lousy information on new media platforms needed

to be firmly resisted, and 116(27.62 per cent) thought there was no need to intervene.

2.2 The system of cultivating cultural confidence in schools could be better

Most courses that can reflect the cultivation of students' cultural confidence are ideological and political theory courses, and the school also offers elective courses about culture. However, the effect of these elective courses on cultivating students' cultural confidence is not significant. 264 people (62.86%) think the classroom teaching method is single, with theories as the main inculcation and less relevant practical activities. 303 people (72.14%) think the teaching content could be more exciting, out of practice, and lacking interest. 222 people (52.86%) think that the activities organised by the school could be more prosperous in content and the number of activities could be higher. 222(52.86%) think that the cultural confidence activities organised by the school are not rich in content and the number of activities is small.

2.3 Weak family education for cultural confidence

Family education is the primary education for students' personal growth and development. Family education is significant in establishing students' sense of cultural confidence. 360 people (85.7%) think that family education has a more significant influence on cultivating cultural confidence. However, there are some areas for improvement in family cultural education, which could be more assertive. 198(47.14%) families often carry out education and cultivation of cultural confidence, 133(31.67%) families will carry out education and cultivation of cultural confidence, and 89(21.20%) families will not carry out education and cultivation of cultural confidence, or not very good at it.

2.4 More personal cultural cultivation is needed

The survey shows that 258 people (61.4 per cent) have a better understanding of the meaning of cultural confidence, 134 people (31.9 per cent) have a general understanding, and 28 people (6.67 per cent) do not know much or nothing about it. the surveyed college students mainly receive education on cultural confidence through classroom learning (361, 85.95%) and the Internet (325, 77.38%), of which the Internet (347, 82.62%) is the student's favourite way to learn about cultural confidence. However, many college students use the Internet mainly for playing games (185, 44.05%), chasing dramas (245, 58.33%) and social chatting (287, 68.33%).

3. THE NEW MEDIA BACKGROUND OF VOCATIONAL COLLEGE STUDENTS' CULTURAL CONFIDENCE EDUCATION STRATEGY

3.1 At the social level: Adhering to the leadership of socialist core values and collaborating with schools and localities in cultural education

3.1.1 Give proper play to the guiding role of mainstream culture

In the face of the impact of multiculturalism, it is necessary to cultivate college students' cultural confidence under the guidance of socialist core values, make full use of the various favourable cultural resources possessed by the mass media, integrate socialist core values into all aspects of excellent traditional culture and social morality, and give full play to the guiding role of mainstream culture. On this basis, by regulating the influence of public opinion in social media, we can shape a positive social opinion atmosphere and promote the dissemination of excellent Chinese culture.

3.1.2 Build a clean and positive cybercultural environment

The government and other relevant departments should improve the network legal governance system, govern cyberspace by the law, strengthen the supervision of the network ecological environment, eliminate information that affects the network culture, corrupts the network environment, and is incompatible with China's socialist core values, and severely punish cybercrime and cyber fraud and other behaviours. At the same time, it vigorously promotes China's mainstream culture and socialist ideology so that the mainstream ideology nourishes the values of college students and creates a healthy online cultural environment.

3.1.3 Promote the construction of school-local cultural and nurturing communities

School-local co-construction is a cooperative way for schools and localities to optimise resource allocation, innovate management methods, and collaborate to educate people.

Zibo is the former capital of Qi and the birthplace of Qi culture, rich in cultural resources; the school should actively build a school-land cultural education community with the local community, expand the main body of the construction, innovative means of education, close cooperation, the same force, the implementation of the fundamental task of moral education, to achieve the interaction between the local universities and the regional culture, which is of great significance in promoting the development of universities and localities, and the cultivation of innovative talents.

3.2 At the school level, we aim to give full play to the role of the central position of cultural education and improve the cultural education system.

3.2.1 Promote the construction of teachers

In the process of educating college students in the new era to accept cultural confidence, teachers of the ideological and political courses should have profound theoretical skills, integrate the cultivation of cultural confidence into ideological and political education, and lay the foundation for cultivating the cultural confidence of college students. Teachers of professional courses should strengthen the study of outstanding Chinese culture, excavate the elements of ideology and politics, and integrate them into education and teaching. At the same time, it is necessary to combine the ideological characteristics of vocational college students, adopt flexible and diverse ways to carry out teaching activities and enhance the interest and attractiveness of the classroom.

3.2.2 Innovative ways and means of cultural education

While emphasising professional and vocational education, schools can strengthen cultural quality education by real-time pushing relevant socialist core values, traditional Chinese culture and other knowledge through WeChat and microblogging platforms, which are popular among vocational college students. In addition, the school history museum, flag-raising ceremony, party membership ceremony, thematic class meeting group class, the first lesson of the school year, and regional cultural education practice bases can be fully used to carry out colourful, practical activities so that students can enhance their cultural confidence in practice.

3.3 At the family level, we should play the role of parents as role models and normalise family culture education

3.3.1 Establish the concept of family culture education

Families have a far-reaching influence on the growth and development of vocational college students, and parents teaching by example will directly affect the ideology and behaviour of college students. Whether or not vocational college students have good cultural literacy depends mainly on the environmental atmosphere and educational philosophy of a family. In family education, parents should firmly establish the concept of family cultural education and be aware of the importance of family cultural education to cultivate the cultural literacy of vocational college students and help them establish a sense of cultural confidence.

3.3.2 Attaching importance to the inculcatory nature of the family cultural atmosphere

Parents should follow the trends of the times, establish the concept of lifelong learning, and continuously improve their cultural literacy. In addition, parents should play an exemplary role, practice culturally confident behaviour, and set an excellent example for students. For example, create an intense festival atmosphere when traditional festivals are approaching to enhance the sense of ceremony of national festivals; take students to visit red attractions during holidays to enhance the sense of cultural experience, and work with students to improve their cultural cultivation, strengthen their emotional identity, and firm up their cultural confidence in cultural practices.

3.3.3 Cultivate good family customs and training to form a civilised culture

Family customs and family training reflect the spirit of a family, and good family customs and family training not only promote harmony and stability within the family but also promote social harmony and development and are of great significance to national stability and national unity. Every family should pay attention to the construction of family customs and family training, and actively build good family customs and family training, in order to improve the comprehensive quality of family members and to create a suitable environment

for improving the ideological quality and cultural cultivation of students and promoting their all-round development.

3.4 At the Student level: Improve cultural cultivation and fulfil the cultural mission

3.4.1 Strengthen self-learning to improve the knowledge system

In addition to learning scientific and cultural knowledge in the classroom, students should also make full use of their leisure time to read, cultivate reading habits, enrich their cultural knowledge, reduce their dependence on mobile phones, and, in the process of enhancing their sense of identity with Chinese traditional culture, advanced socialist culture and other Chinese cultures, they should cultivate their theoretical thinking ability, continuously improve their thinking level and their ability to distinguish between good and bad cultures, and then enhance their cultural confidence

3.4.2 Strengthening self-cultivation to consolidate cultural literacy

Self-cultivation is the primary way of self-cultivating the subjective world and transforming the objective world. College students should actively learn cultural knowledge through various ways in their daily lives, pay attention to the development of China's mainstream culture, and be aware of the importance of the level of their cultural confidence to the development of the national culture to take the initiative to learn cultural knowledge, open up cultural horizons, and improve the level of cultural literacy.

3.4.3 Enhance cultural experience by improving cultural practice

Vocational college students should pay attention to cultivating vocational quality and vocational skills, have solid cultural knowledge, actively participate in on-campus cultural practice activities, feel the unique charm of traditional Chinese culture, and deeply understand the cultural connotations contained therein. They should also actively participate in extracurricular cultural practice activities organised by the school and the society to enrich their knowledge reserves and effectively combine the theoretical knowledge they have learnt with practical experience to build up cultural confidence and realise their values [3].

REFERENCES

[1] Digital Economy Federation. Full text of the 52nd Statistical Report on the Development Status of the Internet in China released [EB/OL]. China Internet Network Information Centre. 2023-08-28[2023-09-18]. https://mp. weixin. qq. com/s?__biz=MzU5MDc0NjU4Mg==&mid=2247561957&idx=2&sn=5e08e30ba32914830668a50dee69f383&chksm=fe3a345cc94dbd4ab90f8017a8181cc94b09d41fd96341b6d3e16d0a9ef5eff6cf9ba65b32be&scene=27

[2] Wu Qiong, Wang Changhai. Exploration of the cultivation path of cultural confidence in contemporary college students' ideological education [J]. Journal of Jiamusi Vocational College, 2024, 40(04):25-27.

[3] An Li. Research on Cultural Confidence Education of College Students [D]. Harbin Normal University, 2020.

A Brief Discussion on Food Quality Management

Qing-yun Li
Zibo Vocational Institute, Shandong Zibo 255314, China

Abstract: Quality management is a product of the development of productivity to a certain stage, and the continuous improvement of economic and social development will also continuously enhance the level of quality management and the degree of attention it receives. Food quality management is closely related to human health. Strengthening food quality management can help improve human health. On one hand, we need to strengthen food quality management to enhance human health; On the other hand, we also need to continuously improve our inspection and testing level, provide favorable quality assurance, and promote the output and quality of food exports.

Keywords: Management; Quality; Food

1. BASIC CONCEPTS OF QUALITY MANAGEMENT

Quality management refers to an activity that plays a role in controlling, ensuring, commanding, and organizing coordination in terms of quality. Quality management specifically includes the formulation of a series of quality policies, the planning of a series of quality activities, the determination of a series of quality objectives, a series of quality control methods, a series of quality assurance systems, and a series of quality improvement measures.

The specific meaning of a quality policy refers to the highest management of an organization, who issues a formal direction for the overall quality of the organization and a specific purpose for the quality of the organization. the specific quality policy issued by the top management of an organization refers to the components of the organization's overall policy, which should be consistent with the overall policy of the organization issued by the manager [1].

The overall goal of quality management is the ultimate goal pursued by organizers in terms of quality. the highest level of management should ensure the establishment of quality objectives in the relevant functional and hierarchical relationships of the organization, and maintain relative consistency with the quality policy.

2. CHALLENGES IN FOOD SAFETY MANAGEMENT

Challenge 1: excessive use of chemical fertilizers. Although China feeds 22% of its population with 7% of the world's arable land, in reality, we use 35% of the world's fertilizers and 20% of pesticides. the annual use of chemical fertilizers in China is 46.37 million tons, which reaches 40 tons per square kilometer based on sowing area, far exceeding 22.5 tons. This is the safety limit set by developed countries to prevent chemical fertilizers from causing harm to soil and water bodies.

From 1981 to 2008, China's annual grain production increased from 325 million tons to 529 million tons. the consumption of nitrogen fertilizer increased from 11.18 million tons to 32.92 million tons.

Unfortunately, although Chinese farmers know that "a single flower in a crop depends entirely on fertilizer", they do not know the specific nutritional situation of the soil they cultivate, lack scientific knowledge and habits of nutrient formula fertilization, and have a misconception of relying solely on the application of chemical fertilizers to obtain yield, which seriously leads to excessive fertilization of soil in China. At the same time, excessive use of fertilizers by crops cannot be fully absorbed and can seep into the ground or flow into water bodies through domestic sewage, causing secondary pollution. Large amounts of nitrogen and phosphorus in animal manure can also enter water bodies, causing eutrophication. This not only causes serious pollution, but also results in significant waste

[2].

Challenge 2: Overdense farming poses significant safety hazards. Although traditional free range farming in the past had many drawbacks, small farmers now pursue overly dense feeding. Many farms generally have small cages, low hygiene standards, and lack of disinfection and cleaning measures. the breeding density is too high, and livestock and poultry live like "prisoners". Hundreds or thousands of animals are confined in small and crowded fences, lacking disinfection and cleaning. Such harsh growth environments make many poultry less resistant to diseases and prone to outbreaks of infectious diseases.

Small farmers have no bargaining power over leading enterprises and can only win by relying on low prices and quantities. Some farmers also engage in mixed breeding of poultry, which greatly increases the chances of animal disease transmission. There is a significant safety risk of avian influenza transmission due to the over densification of farming practices by farmers.

Challenge 3: Misuse of antibiotics and food additives. High density livestock farming is prone to illness, and in order to prevent and treat diseases, a large amount of antibiotics are used. These antibiotics eventually remain in the human body through the food chain. After entering the human body through the food chain, the residual antibiotics can also cause bacterial resistance and harm human health.

Challenge 4: Agricultural pollution is alarming. the first national pollution source survey conducted in early 2008 lasted for more than two years, mobilizing 570000 people and surveying nearly 6 million pollution sources. the results showed that agricultural pollution was the "major contributor" and the main destroyer of water environment.

Agricultural pollution sources are the largest contributors to chemical oxygen demand, accounting for over 40% of emissions. Agricultural sources are the main sources of total nitrogen and total phosphorus emissions, with emissions of 2.7046 million tons and 28.47 million tons, accounting for 57.2% and 67.4% of the total emissions, respectively. the most prominent source of agricultural pollution is from livestock and poultry farming, with chemical oxygen demand, total nitrogen, and total phosphorus accounting for 96%, 38%, and 56% of agricultural sources, respectively.

3. THE DEVELOPMENT OF QUALITY MANAGEMENT

3.1. Quality inspection stage

Before World War II, the quality of products was mainly ensured through inspection. the main method is to control the quality of the product and ensure its production through a 100% inspection. At this stage, it went through three stages: inspection by operational workers, specialized inspection, and inspection by foremen.

3.2. Statistical stage of quality control

In this stage, its characteristic is a combination process, specifically referring to the integration and combination of quality management and quality sorting statistical methods. From the Second World War to the 1950s, it mainly includes two aspects, namely the control of statistical processes and the inspection of one sample by one.

3.3. A more comprehensive quality management phase

From the 1960s to today. Comprehensive quality management has many changes and characteristics. One of the characteristics is "three full and one full". the meaning is: a more comprehensive concept of quality, a quality management approach for the entire process, and a quality management approach and method that involves all members.

4. THE CONTENT OF FOOD QUALITY MANAGEMENT

The management of food quality includes a series of procedures from the field to the dining table. A collection of technical methods, including theories, covering the entire process of food production from farmland to harvesting, processing, transportation, and storage. Food is the foundation of human survival, and food is of paramount importance to the people. Food safety concerns thousands of households and is closely related to us. Food is a special tangible product that is closely related to human health. It combines the quality characteristics of a group of tangible products and the quality management characteristics of popular products, while also possessing its uniqueness, importance, and

significance. Therefore, in this sense, the management of food quality also has certain particularities [3].

4.1 The management of food quality should be centered around food safety

The management of food quality includes a series of procedures from the field to the dining table. Food safety and hygiene are comprehensive concepts. A collection of technical methods, including theories, covering the entire process of food production from farmland to harvesting, processing, transportation, and storage. Food is the foundation of human survival, and food is of paramount importance to the people. Food safety concerns thousands of households and is closely related to us. Food is a special tangible product that has a close relationship with human health, and as its attributes, there are many intersections in terms of nutrition, processing, inspection and testing, transportation, and storage of food.

4.2 The quality management of food also has a broad scope in both time and space

The management of food quality includes a series of procedures from the field to the dining table. A collection of technical methods, including theories, covering the entire process of food production from farmland to harvesting, processing, transportation, and storage. Food is the foundation of human survival, and food is of paramount importance to the people. Food safety concerns thousands of households and is closely related to us. Food is a special tangible product that is closely related to human health. Any pollution at any stage from production, processing, transportation, storage, shelves to dining tables can potentially render food useless. Eating spoiled food not only has no benefits for human health, but can also have extremely serious consequences. For processing enterprises, the use of raw materials during any processing period, the hygiene conditions of the product workshop, the safety production awareness of operators, and the management of quality control are often strengthened. However, the management and control capabilities of the raw material production stage and the consumption stage are often overlooked.

4.3 The complexity of the objects of food quality management

The range of raw materials for food is quite extensive, including plant materials, animal materials, as well as microorganisms and so on. Many require immediate pre-treatment, processing, and storage after harvesting or timely procurement. Sometimes even slight delays in time and space can lead to the deterioration of raw materials or the loss of their processing and edible value. Food ingredients need to be stored under specific living conditions, including physical, chemical, and biological conditions. Sometimes, food ingredients need to be stored under suitable temperature, pressure, pH, and other environmental conditions to inhibit microbial growth, reduce environmental pollution, and maintain their freshness and a state that can be processed and utilized. Because these factors can greatly alter its chemical composition, food quality, specific characteristics, and rheological properties

This affects the quality of the product. So, in this sense, the object of food quality management is complex, which increases the difficulty of food quality management. It is necessary to continuously adjust the production parameters of the corresponding process with changes in raw materials, in order to produce stable quality food and promote standardized production. Only in this way can the relative stability of product quality management be guaranteed.

4.4 Food quality management has special requirements for product functionality and adaptability

The functionality of food, in addition to its internal and external performance, sometimes, especially in the past decade or so, the safety supervision of food in China was regulated by multiple departments, such as the Ministry of Agriculture and the Ministry of Commerce. There is a phenomenon of ineffective water treatment in Jiulong, and there are many aspects of repetition. On the other hand, food safety, hygiene, and regulation are social concepts, and the concepts of food safety and nutrition, food hygiene, food quality, and other disciplines are different. Food safety is a governance of quality at the social level. Different countries and different periods. the safety issues of food and the quality requirements for food safety are different.

Many foods are suitable for the general

population. In relatively developed countries, food safety is mainly concerned with issues arising from technological advancements, such as irradiated foods and genetically modified foods; However, in the process of development, food safety and regulatory issues mainly refer to some problems caused by the immaturity of socio-economic development, such as manufacturing and selling counterfeit and inferior food, some toxic or even harmful food, and unqualified food. Therefore, special food quality management generally has stricter requirements and higher regulatory levels than ordinary food.

5. FOOD QUALITY CONTROL TECHNOLOGY

IoT and smart sensors: the application of IoT technology and smart sensors in food production and supply chain is constantly increasing. These devices can monitor the temperature, humidity, and other key parameters of food in real time, ensuring the safety of food during transportation and storage. In addition, smart sensors can also detect the quality of food, such as freshness, color, and nutritional value.

Blockchain technology: Blockchain is a decentralized database that can provide transparency in the food supply chain. Through blockchain technology, we can track the source, processing, transportation, and other information of food to ensure its integrity and safety. This technology is very useful for preventing counterfeit food and ensuring food compliance.

Biosensors and Biological Detection Methods: Biosensors and biological detection methods are playing an increasingly important role in food safety and quality testing. These technologies utilize the natural reactions of organisms to detect harmful substances in food, such as toxins, pesticides, antibiotics, etc. Due to their high sensitivity and specificity, biosensors have great potential in detecting trace harmful substances in food.

Non destructive testing technology: Non destructive testing technology is a method of conducting quality testing without damaging food samples. This technology uses physical signals such as sound waves, electromagnetic waves, or radiation to detect defects or contaminants in food. Non destructive testing technology can not only improve the quality control of food, but also reduce the damage rate of food during the testing process.

Big data and cloud computing: Big data and cloud computing provide strong support for food safety and quality. By collecting and analyzing a large amount of data, we can understand consumer needs, predict market trends, and develop more effective quality control strategies. In addition, cloud computing can provide efficient storage and computing capabilities, making large-scale data processing and analysis possible [4].

6. CONCLUSION

Food quality management is of great significance in ensuring food safety. Establishing a sound quality management system, strictly monitoring the production process, managing the supply chain and cultivating teams, and utilizing new testing technologies are key elements in ensuring food quality

REFERENCES

[1] ZHAO Xia. Empirical study on the influence of online celebrity food quality and safety purchase risk perception——Based on the survey of some consumers in Zhengzhou [J]. Journal Of Food Safety&Quality. 2021, 12(1):394-402.

[2] WU Feng-Yu. Comparison and research on food quality and safety supervision system at home and abroad [J]. Journal Of Food Safety&Quality. 2019, 10(11):3610-3614.

[3] Zheng Jiyuan; Hu Hao. Study on food quality and safety management model based on industrial agglomeration theory [J]. Acta Agriculturae Scandinavica, Section B — Soil & Plant Science. 2022, 72(01):429-439.

[4] Haji Mona; Kerbache Laoucine; AlAnsari Tareq. Food Quality, Drug Safety, and Increasing Public Health Measures in Supply Chain Management [J]. Processes. 2022, 10(09):1715-1715.

Research on Safety Appraisal Scheme of Steel Structure Workshop

Fei Sun
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: Building safety testing is an important part of evaluating the safe use of buildings. Selecting different monitoring schemes or different reinforcement measures according to different monitoring data of steel structure buildings plays a crucial role in the safety control of steel structure buildings.
Keywords: Steel Structure Plant; Deformation Monitoring; Monitoring Scheme

1. INTRODUCTION

In 2018, a three-story steel structure building under construction in Putian City, Fujian Province collapsed, resulting in 5 deaths, 2 minor injuries, and economic losses of 9.9 million yuan. the cause of the collapse was the overall collapse caused by the instability of the steel structure column at the bottom of the building. Therefore, the structural safety inspection of steel structure buildings is very important. According to the different monitoring data of steel structure buildings, selecting different monitoring schemes or different reinforcement measures plays a vital role in the safety control of steel structure buildings.

First、Project overview

2. CONSTRUCTION SURVEY

A steel structure factory building was built in 2010. the number of floors of the building is two floors above the ground. the building height is 13 m. the building area is more than 8, 000 square meters. the structure type is portal steel frame structure. the foundation form of the building foundation is independent foundation under reinforced concrete column. the seismic fortification intensity of the area where the building is located is 8 degrees (0.20g), the first group, and the seismic fortification category of the building is Class D.

3. FUNDAMENTAL STATE SURVEY

3.1 Questionnaire on basic situation of buildings

Basic information of buildings	Building area	8000 ㎡		Service life	50 years	
	Number of layers	Second floor above ground			Site classification	Ⅱ
	Length	108.0m	Wide	36.0m	Height	13m
Foundation	Foundation design level	Second order	Foundation form	Independent foundation under column		
Superstructure	Agent architecture	Steel portal frame	Floor/roof	Floor:Composite floor Roof:Purlin+Profiled steel sheet		

Second、Detection and identification basis and detection equipment

3.2 The standard standards on which the detection is based

《Technical standards for building structure inspection》(GB/T50344-2019);

《Construction quality acceptance standard of steel structure engineering》(GB50205-2020);

《Technical standard for on-site inspection of steel structure》(GB/T50621-2010);

3.3 Specifications and standards for calculation and identification analysis

《 Standard for reliability appraisal of industrial buildings》(GB 50144-2019);

《Code for design of building foundation》(GB 50007-2011);
《 Building seismic appraisal standard 》(GB50023-2009);
《 Steel Structure Design Standard 》(GB50017-2017);
《 General Code for Identification and Reinforcement of Existing Buildings》 (GB 55021-2021);
《 General specification for engineering structures》(GB 55001-2021);
《Technical specification for high strength bolted connections of steel structures》(JGJ82-2011);
《 Steel Structure Design Standard 》(GB50017-2017);
《Technical code for steel structure of light-weight buildings with portal frame 》(GB 51022-2015);
《Hot rolled H-beam and split T-beam》(GB/T 11263-2017).

Third、On-site detection and identification and analysis

3.4 Structural system investigation and plane layout

After on-site investigation and testing, the layout of the building structure is as shown in 1.2. 1. the main dimensions of steel columns are 500 × 320 × 12 × 18, 450 × 320 × 12 × 18, etc. the main dimensions of steel beams are 700 × 320 × 12 × 22, (600 ~ 350) × 150 × 6 × 8, etc.

3.5 Foundation inspection

After inspection, no phenomenon such as the inclination of the superstructure caused by the uneven settlement of the foundation and the foundation was found. No bad phenomena such as floor cracking and ground backwater caused by excessive settlement of the foundation were found. At present, the foundation of the building is in normal working condition.

3.6 Detection of upper bearing structure

The main contents of the upper bearing structure detection are as follows: steel member appearance quality detection, axis size detection, steel beam and steel column section size detection, steel column verticality detection, weld appearance quality detection, high strength bolt appearance quality detection

The criteria are as follows [1] [2] [3]:

Serial number	Project name	Refer to norms or standards	Permissible range of specification
1	Appearance quality inspection of steel members	《Construction Quality Acceptance Code for Steel Structure Engineering 》 (GB50205-2020), 《 Technical Standard for Field Inspection of Steel Structure 》 (GB/T50621-2010)	According to the ' steel structure engineering construction quality acceptance standard ' (GB50205-2020) axis size allowable deviation ± 5mm
3	Axis size detection	《 Steel structure engineering construction quality acceptance standard 》 (GB50205-2020), 《Building structure testing technical standard》 (GBT50344-2019)	According to the ' steel structure engineering construction quality acceptance standard ' (GB50205-2020) axis size allowable deviation ± 5mm.
4	Steel beam, steel column section size detection	《 Technical standards for on-site inspection of steel structures 》 (GB/T50621-2010), 《 Technical standards for inspection of building structures》(GBT50344-2019), 《Hot rolled H-beam and split T-beam 》 (GB/T 11263-2017)	According to the allowable deviation of H-beam width and height of 《hot rolled H-beam and split T-beam 》 (GB/T 11263-2017), ± 3mm; tw allowable deviation is ± 0.7mm, allowable deviation is ± 1.0mm
5	Verticality detection of steel column	《Construction Quality Acceptance Code for Steel Structure Engineering 》 (GB50205-2020), 《 Technical Standard for Field Inspection of Steel Structure 》	《 Code for acceptance of construction quality of steel structure engineering 》(GB50205-2020): not more than H/1000, and not more than 10mm.

Serial number	Project name	Refer to norms or standards	Permissible range of specification
		(GB/T50621-2010)	
6	Weld appearance quality inspection	《 Code for Acceptance of Construction Quality of Steel Structure Engineering》 (GB50205-2020), 《 Technical Standard for Inspection of Building Structures》 (GBT50344-2019)	Cracks, incomplete welding, root shrinkage, undercut, arc scratches, poor joints, surface pores, and surface slag-containing first-stage welds are not allowed to occur.
7	Appearance quality inspection of high-strength bolts	《 Code for Acceptance of Construction Quality of Steel Structure Engineering》 (GB50205-2020), 《 Technical Standard for Inspection of Building Structures》 (GBT50344-2019)	1. After the final screwing of the high-strength bolt connection pair, the bolt thread buckle should be exposed to 2-3 buckles, of which 10% of the bolt thread buckles are allowed to be exposed to 1 buckle or 4 buckles; 2. the friction surface of high strength bolted joints should be kept dry and clean. There should be no flash, burr, welding spatter, welding scar, oxide scale, fouling, etc. the friction surface should not be painted except for the design requirements.

Fourth、Checking calculation of structural bearing capacity

According to the relevant provisions of 《Unified Standard for Reliability Design of Engineering Structures》 (GB50153), 《Load Code for Building Structures》 (GB50009), 《 Design Code for Portal Steel Frame Structures 》 (GB50003), 《 Classification Standard for Seismic Fortification of Building Engineering》(GB50223) and 《Standard for Seismic Appraisal of Buildings》 (GB50023), the bearing capacity of the building structure is checked and checked by using structural analysis software and field actual test results.

The construction size and load data are as follows: the size of the upper steel beam is WH (850-550) * 150 * 6 * 8, WH (500-850) * 150 * 6 * 8; the dimensions of the lower steel beam WH750 * 320 * 12 * 22; the size of the upper column is WH550 * 320 * 12 * 18, and the size of the lower column is WH500 * 320 * 12 * 18, WH450 * 320 * 12 * 18, WH350 * 320 * 10 * 16. the dimensions of the lower steel beam WH750 * 320 * 12 * 22; the constant load uniform wiring load of the upper beam is 5.4KN/m, and the constant load uniform wiring load of the lower beam is 60KN/m; the live load average wiring load of the upper beam is 1.5KN/m, and the live load average wiring load of the lower beam is 34KN/m; The maximum wind load of the left wind in the left column is 6.07KN/m, the maximum wind load of the left wind in the right column is 7.58KN/m, and the maximum wind load in the upper beam is 4.59KN/m; the maximum wind load of the right wind in the left column is 3.03KN/m, the maximum wind load of the right wind in the right column is 6.07KN/m, and the maximum wind load in the upper beam is 7.93KN/m.

The internal force data are as follows: the maximum bending moment of the upper steel beam is 213.7KN. m, and the maximum bending moment of the lower steel beam is 295.4KN. m; the maximum shear force of the upper steel beam under dead load is 57.6KN, and the maximum shear force of the lower steel beam under dead load is 302.6KN; the maximum axial force of the column under constant load is 50.7 KN; the maximum live load bending moment of the upper steel beam is 58KN. m, and the maximum live load bending moment of the lower steel beam is 204.9KN. m; the maximum shear force of the upper steel beam under live load is 15KN, and the maximum shear force of the lower steel beam under live load is 123KN. the maximum axial force of the column under live load is 11 KN. The maximum bending moment of the left wind load in the upper beam is 167.8KN.

m, and the maximum bending moment of the right wind load in the upper beam is 160.5KN. m. the maximum shear force of the left wind load on the upper beam is 44.2 KN, and the maximum shear force of the right wind load on the upper beam is 45.4 KN; the maximum axial force of the left wind load is 79.1 KN, and the maximum shear force of the right wind load in the upper beam is 80.2 KN.

The checking results of GJ1 bearing capacity show that the maximum ratio of the bending moment of the steel column to the bending capacity of the post-buckling strength is 0.17, the maximum in-plane stable stress ratio is 0.16, and the maximum out-of-plane stable stress ratio is 0.09. the maximum ratio of the bending moment of the steel beam to the bending capacity under the combined action of M, N and V is 0.24, the in-plane stable stress ratio is 0, and the maximum out-of-plane stable stress ratio is 0.68.

The checking results of GJ2 bearing capacity show that the maximum ratio of the bending moment of the steel column to the bending capacity of the post-buckling strength is 0.19, the maximum in-plane stable stress ratio is 0.20, and the maximum out-of-plane stable stress ratio is 0.16. the maximum ratio of the bending moment of the steel beam to the bending capacity under the combined action of M, N and V is 0.24, the in-plane stable stress ratio is 0, and the maximum out-of-plane stable stress ratio is 0.17.

The calculation results of the node displacement under the action of GJ dead load and live load are as follows: the maximum displacement of GJ1 is 9.7 mm, and the maximum displacement of GJ2 is 0.9 mm.

The absolute deflection of steel beam under GJ dead load+live load is calculated: the maximum of GJ1 is 11.8mm, and the maximum of GJ2 is 1.2mm.

4. CONCLUSION

According to the requirements of the specification, the safety appraisal of a steel structure portal steel frame plant should include the original data of the building and the historical investigation, the structural system investigation and the plane layout, the foundation inspection, the upper load-bearing structure inspection and the structural bearing capacity check. Through the detection of the above content, it can be determined whether the safety of the building meets the requirements.

REFERENCE

[1] 《Code for acceptance of construction quality of steel structure engineering》(GB50205-2020).

[2] 《Technical Standard for Field Inspection of Steel Structures》(GB/T50621-2010);

[3] 《Technical standard for building structure inspection》' (GBT50344-2019)

Research on Modern Expression Methods of Formal Language in University Architecture from the Perspective of Traditional Culture

Yongpeng Wang
Zibo Vocational Institute, Zibo Shandong, 255300, China

Abstract: From the perspective of traditional culture, the modern expression methods of formal language in university architecture are a complex and rich topic, involving the understanding of traditional architectural culture, the integration of modern design concepts, and innovation in specific practices. This article explores the universal rules and methodological paths revealed by the modern language philosophy based on architectural form language at the level of ideological expression. It can seek more possible design ideas and methods, provide some reference and inspiration for the traditional cultural expression of university architecture, and have a positive reference significance for the practical activities of university architectural design.

Keywords: Traditional Culture; University Architecture; Expression Method

1. INTRODUCTION

With the advancement of globalization, countries' awareness of protecting traditional architectural culture is gradually increasing. Since the 19th century, countries in Western Europe, North America, and other regions have actively protected traditional architecture and its culture by formulating policies and regulations, establishing cultural protection organizations, and cultivating professional talents. Internationally, documents such as the Venice Charter have also clarified the important value and role of historical heritage buildings, emphasizing the necessity and urgency of protecting traditional architectural culture.

In China, although traditional architectural culture has been somewhat impacted by modern architectural culture, it is still struggling to regain its rightful historical position. As an important battlefield for cultural inheritance and innovation, how to maintain and inherit the essence of traditional culture in universities, and integrate it into modern architectural design, is an important task for the modern expression of architectural form language in universities. the use of traditional architectural culture in the form of university architecture is not only a sorting and inheritance of traditional culture, but also an innovation and development of traditional culture. Through modern design techniques and technological means, traditional architectural elements can be refined and reconstructed to create campus buildings that are both characteristic of the times and rich in cultural heritage, injecting new vitality into the inheritance and development of traditional culture. This has important historical background and profound practical significance [1].

2. MODERN EXPRESSION METHODS OF FORMAL LANGUAGE IN UNIVERSITY ARCHITECTURE

2.1 Conversion of architectural formal language

One is asymmetry and dynamism. Modernist architecture emphasizes asymmetry and dynamism, which contrasts with the static and symmetrical composition of traditional architecture. In university architectural design, traditional elements can be deconstructed and reconstructed to present their dynamic beauty in an asymmetric form. the second is the innovation of the composition form, drawing on the composition form of modernist architecture, such as the abstract geometric shapes and color matching of the Fengge school, and combining traditional elements for innovative design, integrating the roof form or decorative elements of traditional architecture into high-rise buildings; Introducing

traditional landscaping techniques into modern architectural spaces. Using modern architectural techniques to transform and innovate traditional architectural elements, such as using modern building materials and construction techniques to imitate the form and texture of traditional architecture; Or combine traditional architectural elements with modern architectural techniques to create a novel architectural form.

2.2 Preservation and sublimation of ancient architectural features

In the design of university architecture, the characteristics and styles of ancient buildings can be borrowed and preserved, such as adopting the roof form, color matching, or decorative elements of traditional buildings. Optimizing and upgrading ancient buildings through modern technology, materials, and construction techniques to enhance their practicality and durability. One is the application of new materials, utilizing modern building materials and technological means, such as glass curtain walls, steel structures, etc., to achieve a modern interpretation of traditional shapes; the second is digital technology, which simulates traditional architectural elements through digital technology for precise design and construction, improving the accuracy and efficiency of architectural design.

2.3 Extraction and Application of Cultural Symbols

Deeply explore symbols and elements in traditional culture, such as traditional patterns, patterns, calligraphy, etc., and extract them into design elements to be applied in university architectural design. For example, using traditional architectural elements such as columns and arches in the exterior of buildings; Drawing inspiration from the contours and proportions of traditional architecture in architectural design; Traditional patterns, designs, or furniture displays are used in interior decoration. Through techniques such as abstraction, reconstruction, and collage, traditional architectural elements are modernized to better meet modern aesthetic and functional needs [2].

2.4 Overall and coordinated style combination

When integrating traditional and modern architectural elements, attention should be paid to integrity and coordination. Ensure that the architectural design is coordinated with the surrounding environment, maintain the unity of the overall style, and create a distinctive campus cultural atmosphere. In the selection of building materials, consideration should also be given to the coordination with the surrounding environment, avoiding damage to the environment or unnecessary visual conflicts.

3. THE MANIFESTATION OF TRADITIONAL CULTURE IN UNIVERSITY ARCHITECTURE AND TYPICAL CASES

3.1 The manifestation of traditional culture in university architecture

Direct reference to traditional architectural styles. Universities will directly adopt traditional architectural styles such as antique architecture and classical gardens when designing buildings. These buildings follow the principles and standards of traditional architecture in terms of form, color, and material, and can intuitively demonstrate the unique charm of traditional culture. For example, the ancient academy buildings mostly adopt axial symmetry and courtyard style layout, which reflects the traditional Chinese ritual culture and space concept. In modern university buildings, this layout method is used for reference, and through reasonable space division and streamline design, such as many university buildings, such as pavilions and memorial archway gatehouses with classical flavor, to create a campus environment with both modern and traditional flavor.

The integration of traditional architectural elements. In modern architectural design, colleges and universities will skillfully integrate traditional architectural elements, such as glazed tile roofs, carved beams and painted rafters, arch of wooden architecture cornices, etc. These elements not only serve a decorative purpose, but also convey the spiritual essence of traditional culture. Through modern design techniques and technological means, these traditional elements have been infused with new life and vitality, allowing modern architecture to maintain a sense of the times while retaining

its traditional charm. For example, ancient academy buildings were mainly made of wood and adopted traditional structural forms such as hanging mountains and supporting structures. These materials and structures not only ensure the stability of the building, but also reflect the superb wooden construction skills of ancient Chinese architecture. In modern university architecture, although traditional materials and structures cannot be completely replicated, they can be simulated and innovated through modern technological means, such as using antique materials and adopting modern structural techniques to achieve traditional shapes.

The symbolic expression of traditional cultural symbols. University buildings also symbolically express the connotation and spirit of traditional culture through forms, colors, materials, and other symbolic expressions. Red symbolizes joy and enthusiasm, while yellow symbolizes nobility and power. the selection of these colors and symbols is not only closely related to traditional culture, but also can stimulate teachers and students' sense of identity and pride in traditional culture. For example, the magnificent and vermilion walls of the Forbidden City not only have visual impact, but also contain profound cultural connotations. In modern university architecture, traditional color elements can be used for decoration or overall design, while combining modern aesthetic concepts for innovation and adjustment [2].

Creating Traditional Cultural Spaces. In order to enable students to have a deeper understanding and study of traditional culture, universities will also create some traditional cultural spaces. These spaces include academies, tea rooms, exhibition halls, etc. They not only have cultural display functions, but also promote cultural exchange and interaction between teachers and students. For example, some universities may establish antique style academies for students to read classic works and participate in discussions; Establishing traditional tea rooms for students to learn tea ceremony and appreciate traditional tea culture; Establish a traditional culture exhibition hall to showcase the rich connotations and development history of traditional culture through physical objects, images, and multimedia means.

3.2 Typical Cases of Traditional Culture in University Buildings

Lide Building of Zibo Vocational Institute. Through in-depth research and understanding of the characteristics, style, cultural connotation and symbolic significance of traditional buildings, including the in-depth understanding of traditional architectural elements (such as arch of wooden architecture, cornice, carving, etc.), spatial layout (such as axis symmetry, courtyard layout), building materials (such as wood, brick, stone) and color decoration. In terms of design, the concept of centralized sharing is adopted, deeply integrating the most profound parts of traditional Chinese aesthetics such as "Qi Culture", "Dragon Pattern", "Square Cauldron", "Symmetry", "Square and Circle", "Courtyard", etc., while also leveraging the advantages of resource concentration and integration.

Weiming Lake and Yanyuan Architecture of Peking University. It is a part of the original site of the modern academic institution Yanjing University, including teaching and dormitory areas centered around Weiming Lake. They have witnessed the journey of Peking University from its establishment to its growth and development, and also carried the youthful memories and academic dreams of countless teachers and students. These buildings are mostly a combination of traditional Chinese style and modern style, retaining both classical charm and modernity. They are not only one of the iconic landscapes of Peking University, but also an important cultural heritage in the history of Chinese higher education.

South Gate of Southeast University. It built in 1933, designed by renowned architect Yang Tingbao. the overall design is simple and elegant, without excessive decoration, but the four large characters "Southeast University" on the door are written in the calligraphy of the literary sage Wang Xizhi, adding a strong cultural heritage. It is not only an elegant and minimalist architectural entity, but also a spiritual monument that witnesses the century long development and glorious achievements of Southeast University, inspiring teachers and students to uphold the aspirations of the ancients and constantly pursue excellence.

Mingde Building of Sichuan University. It is one of the most iconic urban buildings in Sichuan that combines Chinese and Western cultures, with a strong traditional revival architectural color. Its design combines traditional Chinese architectural style with modern architectural technology, showcasing the harmonious coexistence of traditional culture and modern civilization. Mingde Building means "the way of university lies in Mingde", implying that the core of university education lies in cultivating people's morality and wisdom. This building not only adds a unique cultural landscape to Sichuan University, but also becomes a shared spiritual home for teachers and students.

4. CONCLUSION

Through in-depth analysis, we can find that the integration of traditional architecture and modern architecture is not simply about element stacking or form imitation, but requires innovative fusion based on a deep understanding of traditional culture and modern design concepts. At the same time, it is also necessary to pay attention to the practicality and sustainability of architectural design, combining modern design concepts with traditional architectural elements to create architectural forms that are both in line with modern aesthetics and contain traditional cultural connotations, in order to meet the needs and development trends of modern society [3]. the modern expression method of formal language in university architecture from the perspective of traditional culture is a continuous exploration and innovation process. Through in-depth research on the essence of traditional culture, integration of modern design concepts and technical means, and extraction and application of cultural symbols, it is possible to create university architecture works that have both modernity and traditional charm. In the future, with the advancement of technology and changes in people's aesthetic concepts, research and practice in this field will continue to advance.

ACKNOWLEDGEMENTS

Shandong Provincial Association for Science of Arts & Culture, Research on the modern expression method of the formal language of university architecture from the perspective of traditional culture(23YB09220002)

REFERENCES

[1] Ma Yongwei. Research on Architectural Design of Museums in Beijing Based on the Expression of Traditional Architectural Culture [D]. Beijing: Beijing University of Civil Engineering and Architecture, 2023

[2] YU Wei-li. Inheritance and Development of Traditional Architectural Culture in Modern Architectural Design [J]. Construction & Design for Engineering, 2019(14):1-3.

[3] GAO Jing, LIU Jia-ping. Three technical expressions on regional characteristics of architecture culture [J]. Journal of Xi'an University of Architecture & Technology(Natural Science Edition), 2005(02):200-203.

Study on the Importance of Academic Guidance to The Quality Training of College Students

Li Weiqian
Zibo Vocational College Shandong China

Abstract: In recent years, China's higher education has changed from elite education to mass education, the scale of Chinese college students has gradually expanded, and the individual situation of college students has become increasingly complex. Individual differences and individual characteristics between different students are becoming more and more obvious, and various academic problems of students themselves are becoming more and more prominent. According to information released by the Ministry of Education, the average number of college students dropping out of school for academic reasons has exceeded 100, 000 per academic year. In addition, the number of students in our country who delayed or did not complete their studies due to various academic problems in each academic year is not included.

Keywords: Academic Guidance; College Students; Quality Training; Learning

1. LEARNING IS THE ETERNAL THEME OF EDUCATION AND DEVELOPMENT.

The development quality of a university is closely related to the learning quality of students and the cultivation of talents. In recent years, many universities have attracted foreign talents through policies such as high salaries, excellent research funds, family allowances, and arrangements for family work. Compared with the large amount of money invested in improving the hardware equipment and facilities of the school, few colleges and universities guide the students to learn how to learn, be good at learning, and be willing to spend too much attention on learning. the academic guidance of senior high school students has not received due attention. In recent years, the gross enrollment rate of higher education in our country has improved qualitatively. Chinese university enrollment has surpassed Russia, India and the United States, ranking first in the world.

1.1 With the gradual expansion of the Chinese college student model, the individual physical conditions of college students are becoming more and more complicated.

Individual physical differences and individual physical characteristics between different students are also becoming more and more obvious. the problem of students' academic planning gradually emerged. According to relevant information released by the Ministry of Education, among ordinary college students in China, on average, the number of students who drop out for academic reasons has reached 1.5 percent of the total number of students in the school. This does not include the number of students in our country who graduate late each school year due to various academic problems.

1.2 Study how to deal with and solve various academic problems and perplexities of college students.

In our country, there is a common problem among college students, they can't study, don't love to study and so on. So that each student can successfully complete the university studies, promote the development of their own learning, so that they ultimately succeed in learning, these key issues should cause our teachers and educators to think enough, attention and attention. Although in recent years, some colleges and universities in China have gradually realized the importance of academic guidance to the quality and training of college students, the development and implementation of academic guidance in Chinese high schools is still insufficient. Further research on academic and professional guidance is needed.

1.3 At the present stage, the concept of the relationship between academic and vocational guidance needs to be defined and clear. the degree of academic and vocational guidance needs to be established and established, and the academic guidance system of college students needs to be established and implemented. Therefore, fundamentally speaking, the learning industry involves a lot of problems, prompting high-level educators in our country to further explore and practice innovation. This paper takes "student-student theory" as the center and "student development theory" as the theoretical basis [1].

2. AT PRESENT, CHINA'S ACADEMIC RESEARCH GUIDANCE HAS NOT ESTABLISHED CLEAR AND ACCURATE GUIDING CONCEPTS AND CLEAR GUIDING GOALS.

2.1 The characteristics of professional guidance in China's academic industry are obviously insufficient.

Learning refers to an organizational structure without specialization or specialization. Although some mentoring degrees have the ability to guide, mentoring is not their main function, that is, the main aspect of their work is not mentoring. For example, in our country's high school, the counselor is the main guiding force for students to learn, but the counselor system is a unique student management system in our country. the main job responsibility of the deputy director is to provide ideological and political education to students, rather than academic guidance to students. For example, the head teacher in our high school is responsible for guiding students' thinking, study and life at the class level, and students' academic development is only a part of their job responsibilities, but not all of them.

2.2 China lacks systematic academic guidance and development.

In the development process of the history of Chinese academic guidance, although the various systems and work related to academic guidance have been improved in recent years, they still show a trend of "fighting for themselves" and "not interfering with each other". However, the standardization process of academic and vocational guidance system is still difficult. At the national level, there is no unified supervision and supervision department, and at the high school and university level, there is no special organization and professional guidance staff. There is no starting point for discussion of the systematic construction of guiding principles and concepts, guiding rules and regulations, guiding content and methods [2].

3. THE LOCALIZATION PROCESS OF FOREIGN EDUCATION AND INDUSTRIAL GUIDANCE IN CHINA IS "STUMBLING".

Although these systems have very special points and capabilities under the guidance of learning industry, they frequently encounter accidents in the process of localization in our country, the development is not smooth, and there are many deficiencies, difficulties and obstacles. Some even seem to be disappearing. For example, China's tour guide system, auxiliary teaching and auxiliary tour guide question answering system. In the face of this situation, we must be brave enough to see ourselves in the right direction, to admit the real results of the problem in the study of thought, and to neither be false nor to deceive people about dreams [3].

4. COLLEGE STUDENTS' EMPLOYMENT GUIDANCE IS A VERY EXPLORATORY RESEARCH TASK.

Study and employment guidance play a particularly important role in promoting the development of Chinese higher education students, improving the quality of Chinese higher education and training high-quality personnel. It has profound theoretical value and practical significance in the field of higher education research.

4.1. the academic guidance of college students is necessary to realize the development of senior high schools in our country.

For a long time, the work of senior high school students in our country has insisted on students' moral education as the center, and the problem of students' learning industry guidance has not received due attention. College students' guidance work is inextricably related to their academic development, emotional development and

affairs development. the research in the field of academic guidance can promote and promote the research and development of many fields in universities. the implementation of college student counseling is helpful to improve the quality of education in colleges and universities. Effective learning and career guidance can stimulate students' enthusiasm and accumulation, help students establish correct academic goals and career thinking, and stimulate students' growth and ambition.

4.2. Career guidance for college students is the fundamental task of colleges and universities and an effective way to promote self-development of college students.

The root of the problem is to train qualified people for the country. How to improve the academic and professional level of college students and promote their self-development is the primary problem of training qualified talents. Academic guidance is an effective way to promote college students' self-development. At present, there are few theoretical researches related to academic and vocational guidance in our country, which are scattered in some discrete researches and lack of systematicness. It is necessary to strengthen the theoretical basis of college students' guidance, clarify relevant concepts, establish guidance institutions and personnel, improve the degree and culture of guidance, and form the content and method of guidance. Through theoretical and empirical research on academic and career guidance, we have grasped the key elements of establishing academic and career guidance system, and solved the deep-seated problems hidden behind the academic and career guidance research of college students. Academic guidance plays a key role in promoting the development of college students, which not only improves the level of academic development of all students, but also satisfies the needs of personalized academic development [4].

spell

4.3. College students' academic guidance is an important carrier for the cultivation of high-level talents in China.

Through academic guidance to college students, students can develop their own academic and professional goals and plans, according to these goals and plans, students can learn knowledge in a planned, meaningful and focused way. Cultivate the ability to develop potential, further promote the comprehensive development of self-study, psychological and professional life, and realize the overall improvement of self-comprehensive knowledge, technical ability and personal nutrition. To better serve the society, meet the needs of the country, and finally realize the harmonious unity of individual choice and social needs.

4.4 The guidance of college students is helpful to help students solve various problems related to study and work.

According to the survey results, the first problem students encountered in their studies was "not mastering the learning method of the major or course".

4.5. "Not interested in major or course. "

The survey shows that more and more students are "not adapted" to their learning industry, their learning interest is not enough, the lack of learning methods, and the low efficiency of learning. I don't know how to arrange my study and life in college. the formulation of effective academic guidance is helpful to help students strengthen their learning and learning beliefs, clarify their learning and learning direction, master their learning and learning methods, improve their learning and learning efficiency, and improve their overall learning level. Lay a solid foundation and foundation for the training of high-level talents in our country. Serious academic problems may lead to psychological problems, and many students' academic difficulties will have a lot of negative effects on their psychology, and then lead to their mental illness [5].

It can be seen that only by dealing with students' academic problems can students successfully complete their studies, which is conducive to students' mental health and development. Only in this way can we produce for the country a well-rounded person with excellent grades and good physical and mental health. At the same time, college students' career guidance is helpful to promote their career planning and development. Academic career refers to matters closely related to the student's career development. In the process of guidance and support for college students, the facilitator can guide students to self-identify and evaluate

according to their own interests, personalities, abilities, characteristics, etc., so that they can objectively solve their strengths and weaknesses, thus helping them to establish more clear academic planning and career goals.

REFERENCES

[1] Chen (2019) Study on Academic Guidance of American College Students [D]. Nanjing: Nanjing Normal University, 2011:23. (in Chinese)

[2] Chen (2019) Research of Academic Guidance for College Students in the United States of America [D]. Nanjing: Nanjing Normal University, 2011:46-47. (in Chinese

[3] Fu (2020). Innovation of work Model of University Students' Academic Affairs Guidance: A Case study of China University of Geosciences (Wuhan) [J]. China Electric Power Education: Next, 20 20(7):3 2

[4] Gao (2015)Assistant study of college students [M]. Beijing: Beijing Jiaotong University Press, 2015:55-8.

[5] Li (2017) Research on undergraduate Academic guidance -- A case study of Huazhong Agricultural University [D]. Wuhan; Huazhong Agricultural University, 2016, 7:56.

The Value of the Digital RMB

Liu Min
School of Business, Chongqing College of Humanities, Science & Technology, Chongqing 400700, China

Abstract: Digital RMB is an important carrier to accelerate the development of digital economy and form a new advantage of China's digital economy. the promotion of digital RMB is an inherent requirement and strong support for China to release the vitality of digital economy and help the construction of digital China. Digital RMB has gradually formed its unique value in the process of development.
Keywords: Digital Rmb, Digitisation, Value

1. INTRODUCTION

As a legal tender in digital form, the digital RMB (e-CNY) is a product of the digital economy era. It has an important role to play in unleashing the vitality of data elements, accelerating the development of the digital economy, and building a digital China. Therefore, implementing e-CNY is a strategic initiative for China to complement and promote the development of the digital economy.

2. THE NEED TO "DIGITISE" CURRENCY

The digital RMB, as a new form of our currency, is an inevitable product of the evolution of currency forms and the development of financial technology. From the point of view of the history of currency development, so far, the form of currency has gone through the evolution process from natural currency (such as shell money), metal coins, and paper money to electronic currency and digital currency. Currency as a symbol of value, its form with the social development of continuous updating, showing a "de-physicalisation" of the development tendency, but its nature and basic functions remain unchanged. Marx pointed out that: "the value symbol directly represents the value of the commodity, it does not behave as a symbol of gold, but as a symbol of the exchange value that is only expressed in the price and exists in the commodity [1]. " the form of equivalence is socially bound up with the natural form of this unique commodity, which becomes a monetary commodity or performs the functions of money. " As a general equivalent, the digital RMB is essentially the same as gold and silver, once used as money and designed to facilitate transactions and socio-economic development.

China attaches great importance to the development of legal tender and has introduced several important policies that emphasise the development and application of digital RMB. 2021, in the Overall Programme for Comprehensive Reform of Factor Market Configuration, China pointed out that it would "support the pilot use of digital RMB in retail transactions, payment of living expenses, government services and other scenarios. " In 2022, China made clear requirements for developing the digital RMB in its "14th Five-Year Plan for the Development of the Digital Economy, " stating that it would "steadily promote the research and development of the digital RMB and carry out controlled pilots in an orderly manner. " In addition, China has prioritised developing digital RMB in the 14th Five-Year Plan, proposing that "the added value of the core industries of the digital economy will account for 10% of GDP by 2025". Digital RMB is a basic element of the development of the digital economy, and the implementation of China's macro policy of digital economy objectively requires strengthening the construction of digital payment infrastructure and giving priority to the development of digital RMB.

3. DIGITAL RMB IN CHINA

Digital RMB refers to the legal tender issued by China's central bank, which is expressed in the form of a cryptographic digital string representing a specific amount of money. China attaches great importance to the R&D and implementation of digital RMB. In 2014,

the PBoC set up a digital currency research group to conduct special research on the issuance framework, key technologies, and circulation environment of di gital RMB. In 2017, the PBoC began to organise commercial organisations to jointly carry out R&D and experiments on digital RMB. at the end of 2019, it formally launched the pilot of digital RMB, firstly carrying out digital RMB pilots in Shenzhen, Suzhou, Xiong'an, Chengdu and the 2022 Beijing Winter Olympic Games scenario to carry out digital RMB pilots. Subsequently, the scale of the pilot has been expanding. in November 2020, six more pilot areas were added, including Shanghai, Hainan, Changsha, Xi'an, Qingdao and Dalian. In April 2022, the pilot cities were further expanded with the addition of Tianjin, Chongqing, Guangzhou, Fuzhou, Xiamen, Hangzhou, Ningbo, Wenzhou, Huzhou, Shaoxing and Jinhua. the digital RMB pilot has now covered 23 regions in 15 provinces (municipalities). According to the data disclosed by the People's Bank of China, by the end of 2022, a total of more than 75 million wallets have been opened in the 15 pilot provinces (municipalities) through the co-built APP, with a total of more than 350 billion yuan and 500 million circulation (money transfer and consumption) operations, and the number of merchant shops supporting digital RMB has exceeded eight million [2].

4. DEVELOPMENT VALUE OF DIGITAL RMB

With the development of the digital economy, the shortcomings of physical currency have gradually appeared, and digital currency has emerged. As China's legal tender, digital RMB combines the dual advantages of physical currency and electronic payment tools, and its promotion and application can not only innovate the traditional form of monetary services, optimise the development environment of China's digital economy, reshape China's new payment pattern, efficiently satisfy the public's demand for legal tender under the digital economy model, but also break the payment barriers of third-party platforms, build the digital economy's "overall ecology", under the public data platform with the central bank as the core, to further regulate and promote the sharing and opening of data resources, release the value of data, and provide basic data support for the construction of a new pattern of digital economic development.

4.1 Stability

From the perspective of currency positioning, digital RMB has the same value, functional attributes and legal status as physical currency, and is located in the M0 category, which greatly enhances the stability and security of transactions and payments. Digital RMB is fundamentally different from Bitcoin, Libra and other virtual currencies: virtual currencies are issued by the private sector, lack state protection, do not have legal compensation and mandatory, and the value of the currency fluctuates drastically, presenting a great deal of instability; the digital RMB is a legal tender issued by the central bank, based on the credit of the state, the value of the currency is stable and has unlimited legal compensation [3].

4.2 Convenience and Efficiency

The digital RMB has led to a dramatic change in payment methods, providing people with more convenient and efficient payment options. the operation mechanism of electronic payment is to set up an intermediate transition account in the absence of credit and legal support from buyers and sellers and to achieve payment assurance through payment escrow and controllable stoppage. As a means of payment, e-payment does not have a monetary function, and the content of its payment is still commercial bank deposits, carrying value transfers in digital form. Compared with electronic payment, digital RMB has the comparative advantages of safety, convenience and high efficiency, and is a statutory value currency carried in digital form, which is essentially a currency with value characteristics. From the perspective of payment, digital RMB carries value transfer in the form of cryptocurrency strings, which is a "de-intermediated" means of electronic payment, shortens the transaction path, and has the characteristic of "payment as settlement", which can effectively improve the efficiency of the third-party payment platform's fund collection and payment. It has the characteristic of "payment is settlement", which can effectively improve the efficiency of the third-party payment platform. At the same time, digital RMB is based on a broad

account, which is different from the "tight coupling" of electronic payment, and adopts the "loose coupling" of the account mode, making the payment transaction more convenient. Technically, digital RMB is free from network dependence, adopts NFC near-field communication technology, supports "double offline" payment, and realises the transfer of currency figures through "touch", which is conducive to meeting the payment needs under special and occasional environments, such as poor signals and lack of network, and realising convenient payment. It is conducive to meeting the payment needs of poor signal, no network and other special and occasional environments, realising the convenient payment, and preventing the payment risks caused by interruption of the communication network [4].

4.3 Security

The decentralisation mechanism of digital RMB gives it a natural advantage in preventing hacking. Traditional electronic payment systems are usually centralised in a single company or institution, and if this centralised institution is hacked, the security of the entire system is threatened [5]. Legal digital currency, on the other hand, adopts decentralised blockchain technology, which means that the payment information no longer exists in a centralised server but is scattered and stored in a large number of nodes, so hackers need to break through the majority of nodes to attack the entire system, which greatly improves the threshold of the attacker's attack, and strengthens the security of the payment method [6].

4.4 Inclusiveness

The enhancement of the means of currency circulation and payment by digital RMB e-payment implies the lowering of payment thresholds and costs as well as the improvement of payment efficiency and quality. Digital RMB e-payment can help more people who are excluded by traditional finance to also have easy access to payment and even other financial services starting from payment, such as Internet credit, Internet wealth management, Internet insurance, etc. This is precisely the key path for digital RMB e-payment to enhance financial inclusion. Digital RMB e-payment lowers the payment threshold and enhances financial coverage. Digital RMB e-payment helps to provide more equal and wider digital money services to residents and enterprises from all walks of life and enhances the fairness and inclusiveness of the monetary and financial systems.

ACKNOWLEDGEMENT

Research on the Influencing Factors and Organisation Path of the Willingness to Use Digital Renminbi in the College of Business and Industry of Chongqing Institute of Humanities and Technology (NO. CRKGS202401).

REFERENCES

[1] the Complete Works of Marx and Engels: Volume 3 [M]. Beijing:People's Publishing House, 1965.

[2] Cao Huifang, Zhao Quanhou et al. the Promoting Effect of Digital RMB on Financial Inclusion - Quasi-Natural Experimental Evidence from a Digital RMB Pilot [J]. Financial Forum, 2023(12):43-53.

[3] Fan Yifei. Theoretical basis and architectural choice of legalised Chinese digital currency [J]. China Finance, 2016(17).

[4] PENG Dove, CUI Ping. Exploration of the Development Value, Dilemma and Path of Digital RMB under the Background of Digital Economy [J]. Contemporary Chinese Marxist Political Economy, 2022(7):60-67.

[5] Chorzempa, M. (2021). Promise and peril of digital money in China. Cato J., 41(2), 295.

[6] Mu, J. (2020). Opportunities, Challenges, and Prospects for the Central Bank to Promote the Legal Digital Currency (DCEP). Economist(03), 95-105.

Review of the "Republic of China tourism" Research Based on Bibliometric Analysis

Liu Peng, Dong Bu Wei
School of Humanities and Social Sciences, Yancheng Institute of Technology, Yancheng, Jiangsu 224051, China

Abstract: The statistical analysis of the research paper of "Republic of China tourism" shows that the overall irregular linear trend. There is a large gap between the number of various types of institutions and the total number of institutions, and public undergraduate universities have an absolute advantage. the interaction between the group and the platform is obvious, but there is differentiation between the paper output. the research topics were focused on three aspects: space, method, and context. In all aspects, although the overall number of scientific research papers of "Republic of China tourism" is small, it has made some achievements in the exploration of historical materials, the development of perspectives and the application of modern tourism.

Key words: Republic of China; Tourism History; Bibliometry; Research Review

1. INTRODUCTION

Tourism activities in the early 20th century are an important stage in the modernization process of China's tourism industry, which has the unique practical significance of connecting the preceding and the following. the collation and research of tourism documents in the Republic of China are helpful to excavate and inherit the historical and cultural resources in various places and provide theoretical support for the development of tourism resources. At the same time, it also plays a practical role in tourism promotion and application, such as tourism planning and development, tourism publicity and promotion, tourism education and training. Sorting the research status and progress of the Republic of China at home and abroad can provide useful reference for the development of China's tourism modernization.

2. THE NUMBER OF SCIENTIFIC RESEARCH PAPERS PUBLISHED

This paper uses SATI software as a statistical analysis tool for literature title information, takes China as the literature source, the search date is December 31, 2023, the time span is 1995-2023, the search theme is "The Republic of China & tourism", excluding 1 non-academic research article (this is a press release) search results for 52 documents. Thirty papers were selected from AMI, seven papers were selected from CSSCI, and 9 papers were selected from "Peking University Core".

A total of 44 academic journals related to tourism research in the Republic of China have been collected, including 24 AMI journals, 12 general journals, 8 CSSCI journals and 10 core journals of Peking University. According to the literature retrieved so far, the tourism research literature of the Republic of China first appeared in 1995, and the number of publications in this field has been interrupted since 2002. From 1995 to 2023, the average annual volume of tourism research in the Republic of China was about 2.48, and the number of publications showed an irregular linear publication trend. Moreover, compared with other topics, there was less literature on tourism in the Republic of China.

3. DISTRIBUTION OF SCIENTIFIC RESEARCH PAPER PUBLISHING INSTITUTIONS

The information of the paper was screened, the abbreviation of the organization was revised, and the duplicates were eliminated. 38 pieces of information were obtained. Combined with the total number of papers, the average number of articles issued by each institution was 1.4.

Of all the published papers, general institutions of higher learning accounted for

96.15% of the total. There is a large gap between the number of various types of publishing institutions and the total number of publishing institutions, and public undergraduate universities have an absolute advantage (see Table 1-1).

Table 1-1 Statistical table of various types of issuing institutions and their publications

Type of document organization	Number of posts/articles	Accounting for the total number of articles than /%	Number of issuing agencies/offices	Accounted for the number of similar institutions ratio /%
Public undergraduate course	38	73.08%	28	73.68%
Public higher vocational college	11	21.15%	7	18.42%
Private undergraduate course	1	1.92%	1	2.63%
Other institutions	2	3.85%	2	5.26%
amount to	52	100.00%	38	100.00%

From the perspective of provincial distribution, there are 12 issuing institutions in Jiangsu Province, all of which are ordinary institutions of higher learning, with a total number of 21, accounting for 31% of the total number of issuing institutions and 40% of the total number of issuing institutions respectively, far exceeding the distribution of other provinces, which is related to the research tradition of the history of China.

4.. AUTHOR TEAM OF SCIENTIFIC RESEARCH PAPERS

For academic journals, having a group of relatively stable authors and core authors with high academic quality is an important guarantee to improve the quality of journals. According to screening statistics, unsigned paper entries marked by anonymous, a total of 1. At present, a total of 45 authors are the first, and the per capita number is 0.87.

It can be seen that 41 authors with 1, accounting for 91.1% of the total authors, 41 articles, accounting for 77.4%, 2 authors, 4.4%, 4 articles, 7.5% of total papers, 1 with 3 authors, 2.2% of total authors, 3 articles, 5.7% of total papers, 4 authors, 2.2% of the total, and 4 articles, accounting for 7.5% of total papers. Define the ratio of author contribution rate = publication ratio/author ratio, and then obtain the contribution rate of 1, 2, 3, and 4 author articles, as shown in Table 1-2.

Table 1-2 The number of authors corresponds to the number of authors

		An author with a post volume of 1	The author with a post volume of 2	The author with a post volume of 3	The author with 4 copies of the publication volume
Author factor	Total number of authors (in units)	41	2	1	1
	Author ratio (%)	91.1	4.4	2.2	2.2
Post factor	Total number of articles posted (articles)	41	4	3	4
	Post ratio: (%)	78.8	7.7	5.8	7.7
The contribution rate of the author's publication		0.87	1.7	2.6	3.5

According to Price's law for high-yield scientists, $m=0.749 * (n_{max}^{1/2})$, the author makes statistics on the core authors, where n_{max}It is the largest amount of articles published by the author. There are 4 articles published by Jia Hongyan. Using the formula, m is 1.498 and the whole m is 2. Therefore, the authors with more than two published articles are positioned as the core authors. From the current search, there are four authors with

more than 2 articles, Jia Hongyan (4), Chen Lijun (3), Ren Call (2), Zhang Jiekuan (2) and the authors of the platform between the core authors and the institutions to construct the tourism history of the republic of China. On the other hand, it also shows the differentiation between the researchers and the output of the paper.

5. FUNDING STATUS FOR THE PAPER

Scientific research fund plays an important guiding role in scientific research activities. the support of scientific research papers fund is at a relatively high level. Among the 52 papers published at present, 25 papers are research results funded by various funds and subject projects, accounting for 48.08% of the total number of papers. Among them, national and provincial projects funded papers accounted for 28.85% of the total number of papers and 60% of the number of funded papers. the higher proportion of national and provincial funds is the manifestation of scientific research activities.

1.5 Analysis of paper research hotspots (key words)

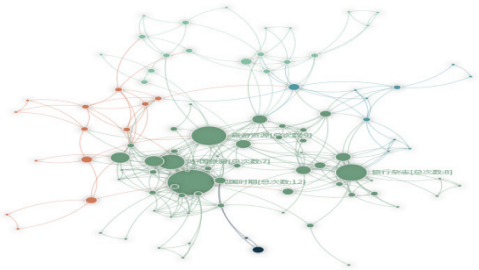

Figure 1-1 Keyword co-occurrence network relationship diagram

Key words are the author's high summary and summary of the content or theme of the article. By analyzing the high-frequency keywords, the hot spots and key points of the research field can be obtained. This paper applies the traditional keyword analysis method, the keyword information of scientific research papers is extracted, deleted and split after obtaining 183 keywords, and 23 keywords with statistical word frequency not less than 2 times. From Figure 1-4, the related studies are wide and closely related. It is mainly divided into space, method and background studies. Nanjing, Suzhou, Tibet, Qinghai; literature research includes travel magazines, travel guides and travel notes; background and method research includes tourism resources, tourism history, tourism value, and development and utilization.

6. CONCLUSION

To sum up, although the overall number of research documents on "tourism in the Republic of China" is small, some achievements have been made in the exploration of historical materials, the development of perspectives and the application of modern tourism. It is mainly reflected in: 1. the tourism documents of the Republic of China period recorded the tourist attractions, landscapes and local customs of that time, which provided historical materials for us to study the society and culture at that time. Through these documents, we can better understand the reasons for the rise and development of tourism in the Republic of China period, and the historical changes of tourist attractions. 2. Scholars of the Republic of China and modern times began to discuss the tourism in the Republic of China period from the perspectives of industry, government management, cultural inheritance and urban planning, which further enriched the research perspective. 3. Scholars excavate and use the data about the tourism documents of the Republic of China, which provides intellectual support for the reasonable and orderly development and utilization and protection of the tourism resources of the Republic of China. These achievements not only lay a foundation for the expansion of tourism literature research in the Republic of China, but also provide a reference for the development of modern tourism, which is worthy of further thinking and exploration by later generations.

FUND PROJECT

Major Project of Philosophy and Social Sciences of Jiangsu Province "Research on Financial Support for High Quality Development of Social Elderly Care Services in Jiangsu Province", Project No.: 2022SJZD067; General Project of Jiangsu Province "Research on Virtual Tourism System of Yancheng World Natural Heritage", Project No.: 2023SJYB1971.

REFERENCE

[1] Xing Suhua. From the bibliometric

statistics of the author and topic of huang Zhong [J]. Huang Zhong, 2001, (20):60-65.
[2] Qiu Junping. Bibliometrics [M]. Beijing: Science and Technology Academic Press, 1988.

A Study on The Integration Path of Red Education into The Daily Ideological and Political Education of College Students

Qingfang Ren
Taishan University College of Teacher Education, Taian, Shandong, 271000, China

Abstract: Red education refers to a way of ideological education through learning the history of the Communist Party of China, revolutionary spirits, deeds of revolutionary heroes, and other contents. This kind of education is particularly common in colleges and universities in China, aiming to cultivate students' patriotic feelings, revolutionary spirits, and socialist core values. By exploring effective paths, this paper integrates red education into the daily ideological and political education of college students to help students establish a correct worldview, outlook on life, and values, and cultivate them to become builders and successors of socialism with ideals, morality, culture, and discipline.

Keywords: Red Education, College Students, Ideological and Political Education, Path

1. THE CONNOTATION OF RED EDUCATION

1.1. What is red education?

Red education is a way of inheriting the connotation of the red era spirit. Through education, it arouses the lofty spirit of aspiring young people to worry about the country and the people, challenge themselves, surpass themselves, and contribute to society. Red education will use the red land to educate the next generation, nurture talents to build the red land, nourish green life on the land stained with the blood of martyrs, and achieve the sustainable development of the old revolutionary base areas and people. That is, patriotic education and revolutionary traditional education for college students to help students establish a correct outlook on life and values.

1.2. The value and significance of red education

The Chinese nation has a long history with more than five thousand years of history and splendid civilization. History profoundly shows that patriotism has flowed in the blood of the Chinese people since ancient times, which cannot be removed, broken, or destroyed. It is a powerful spiritual driving force for the Chinese people and the Chinese nation to maintain national independence and national dignity. As long as we hold high the great banner of patriotism, the Chinese people and the Chinese nation can burst out with earth-shattering historical power in the struggle to transform China and the world!

Through red education, students can fully understand and feel the spirit of the ancient sages and revolutionary martyrs who dedicated themselves to the country and the people. "Don't drink Xiangjiang water for five years, and don't eat fish in Xiangjiang for ten years", "resist U. S. aggression and aid Korea to defend the country", red education allows students to look back on history, understand the glorious history of the Communist Party of China and the development process of the country. Looking into the future based on history, cultivating the younger generation into all-round socialist builders and successors with morality, intelligence, physical fitness, beauty, and discipline, and ensuring the inheritance of the Party's cause and the sustainable development of the Chinese nation.

2. THE CURRENT SITUATION OF CONTEMPORARY COLLEGE STUDENTS

Red culture, as a historical witness and spiritual wealth of the Communist Party of China, is an important way to cultivate a new generation of talents with the mission of national rejuvenation for college students. It is not only a carrier of inheriting the original aspiration and mission of the Communist

Party of China, but also an important resource for cultivating ideals and beliefs and patriotic feelings. Although college students hold a positive attitude towards red culture education, there are also severe challenges. Specifically manifested in the following aspects:

Changes in the social environment under the new situation, and negative thoughts such as Western historical nihilism have had a certain impact on the values of college students.

College students are generally satisfied with ideological and political courses, but the degree of satisfaction with patriotic education courses is relatively low.

Some college students may think that red culture does not fully align with the development of the new era society.

3. INNOVATIVE PATHS OF RED EDUCATION

College students' cognition of red education is a continuous development and deepening process. According to the development of the times and the characteristics of college students, various colleges and universities continuously innovate the forms and contents of red education, improve college students' understanding and comprehension of red education, and enable red education to play a greater role in their growth. the following are some innovative ways of developing red education:

"Listen - Red Lectures"

Through lectures, students can understand the deeds of revolutionary ancestors, enhance their political awareness, and this form can stimulate students' thinking and emotional resonance.

"Publicize - Red Spirit"

Red preaching and related selection competitions not only spread red culture, but also encourage students to express their love for the Party and the country, enhancing national consciousness and a sense of national pride.

"Read - Moral Education Reading Materials"

Moral education reading materials, as an educational carrier, help students establish correct values and moral concepts, and promote the all-round development of students in terms of ideology, morality, and cultural literacy.

"Watch - Red Movies"

By watching red movies, students can experience the revolutionary spirit more directly in terms of vision and emotion, and enhance patriotic feelings.

"Appreciate - Red Art"

By combining red education with art, such as painting and red song competitions, using artistic forms to express love for the motherland, this cross-field activity can broaden students' horizons.

"Practice - Red Education Bases"

Through participating in volunteer services and social practice, students can apply what they have learned to practice, cultivate a sense of social responsibility, and at the same time improve their practical ability and employment competitiveness.

4. IMPLEMENTATION EFFECT

Colleges and universities are an important place to inherit and carry forward red culture. the implementation of red education can allow red culture to be inherited and carried forward among college students. the innovative implementation of red education has produced many positive effects in our college, mainly reflected in the following aspects:

Shaping values: Red education helps young people establish a correct worldview, outlook on life, and values. By learning revolutionary history and heroic deeds, young people can better understand the history and culture of the country, thereby cultivating patriotic feelings and a sense of social responsibility.

Emotional cultivation: Red education, through emotional cultivation, makes red genes penetrate into the blood and hearts of young people, strengthens their identification with the Party and the country, and inspires them to strive for the realization of the Chinese Dream of the great rejuvenation of the Chinese nation.

Ideological identity: Red education can deepen young people's understanding of modern Chinese history, understand the development context of the Party and the country's undertakings, thereby strengthening their identification with the path of socialism with Chinese characteristics.

Knowledge infusion and ability cultivation: Red education not only focuses on knowledge impartation, but also emphasizes ability cultivation. Through participating in red education activities, young people can

improve their practical ability, innovative thinking, and social interaction ability.

Cultural confidence: Red cultural education helps young people strengthen cultural confidence, draw spiritual nourishment from red culture, and improve ideological realm and political literacy.

Innovation in education forms: the application of new media technology has made red education forms more diverse and vivid, such as online courses, virtual simulation teaching systems, micro-videos, etc. These innovative forms have enhanced the attractiveness and effectiveness of education.

Social practice: Red education encourages young people to participate in social practice, such as visiting old revolutionary base areas and memorial halls. Through on-site investigations and practical activities, young people can feel history more intuitively and enhance the practicality and experience of education.

Network ideological and political education: Red network ideological and political education uses the Internet platform to expand the channels and forms of education, making red culture education no longer limited by time and space, and enhancing the timeliness and coverage of education.

Social benefits: the implementation of red education plays an important role in improving the historical and cultural literacy of the whole society, enhancing national cohesion and cultural soft power.

5. CONCLUD

Change is a gradual process. We cannot expect red education to immediately change all negative college students. Our college will also continue to promote the development of red education, take promoting the Party's work as its own responsibility, unswervingly follow the Party, and continuously cultivate young talents for the Party and the country, and contribute to the realization of the Chinese Dream of the great rejuvenation of the Chinese nation.

REFERENCES

[1] WANG Zhi ling, LI You yun. A Probe into the Integration Path of Red Education Resources in Ideological and Political Education of College Students [J]. Theory and Practice of Education, 2022. S:43-45. (in Chinese).

[2] JIANG Ming Hong, Wu ri na. Research on the Integrated Approach of Local Red Education Resources into the Ideological and Political Education of College Students [J]. Journal of Hulunbuir University, 2023. S:20-23. (in Chinese).

Zibo Vocational Institute Makes Five-Dimensional Efforts to Create "Positive Energy, High Traffic" Short Video Works

Sa Xiao
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: In recent years, short video platforms have become important windows for colleges and universities to showcase their external image. Short video platforms encourage users to record their lives in the form of videos that combine text with dynamic images. Users can not only forward and share them, but also make real-time comments, realizing instant information sharing. This change in presentation not only meets the fragmented reading needs of college students but also breaks the traditional, monotonous, and passive working methods of previous propaganda departments, thereby enhancing the value of news propaganda.
Keywords: Short video; Media integration; Higher education institutions; Innovation; Service

1. INTRODUCTION

Zibo Vocational College is a full-time comprehensive higher vocational school sponsored by the Zibo Municipal People's Government. Established in 2002, its educational history can be traced back to 1956. Currently, it is a construction unit under the "Chinese Characteristics High-level Vocational School and Specialty Construction Plan, " an outstanding construction unit of national demonstration schools, and a national high-quality school. To thoroughly implement President Xi Jinping's important expositions on education and media integration development, and to carry out the deployment of the Provincial Department of Education regarding advancing the construction of educational media integration, Zibo Vocational College began planning the construction of its school's media integration center in 2019, incorporating it into the "Double High Plan" construction tasks. Centered around the development mainline of "media integration+education+service, " the college established a media integration center framework comprising "Media Integration Center+Media Integration Teaching and Training Center+Cooperation with Authoritative Media. " Through the integration of editing and publishing, talent training, and communication planning, the media integration center has maximized the effectiveness of the school's media integration, improved communication channels, enhanced communication capabilities, and forged a communication brand. the college continuously integrates institutions, platforms, content, and resources, gradually transforming the media integration center into a recorder of school development and a guardian of public opinion.

In 2022, the college was selected as one of the first pilot units for Shandong Education Media Integration Construction. In 2023, the construction case of the college's media integration center won the "Shandong Education Media Integration · Mount Tai Award. " In recent years, short video platforms have become important windows for colleges and universities to showcase their external image. the college's media integration center has made active explorations and practices in short videos. the college's official video account topics closely follow popular trends and the concerns of teachers and students, evoking emotional resonance among them in an intuitive, vivid, and swift manner. In 2023, the media integration center exerted efforts in five dimensions: standardization, educational value, influence, dissemination power, and service capabilities, creating a series of short video products with "positive energy and high traffic. " These videos convey positive values, disseminate the college's educational and teaching achievements, showcase the charm

of its campus culture, and demonstrate the diligent and enterprising spirit of Zibo Vocational College's teachers and students.

2. ENHANCING PROFESSIONALISM AND CULTIVATING MORE MEDIA INTEGRATION TALENTS

The Media Integration Center of Zibo Vocational College has selected and strengthened its full-time and part-time staff, fully tapping into campus short video promotional materials. To improve the team's professional capabilities, the college has collaborated with authoritative media outlets for the co-construction of the media integration center, such as the Shandong Branch of Xinhua News Agency Information Center and the Dazhong Daily Zibo Media Center. Renowned media experts have been invited to give lectures to the faculty and student team, thereby enhancing the professional standards of the Media Integration Center's staff.

To further enhance the professionalism of short video creation, the college's Media Integration Center has established the Dreamweaver Film and Television Society, selecting short video creation talents from across the college, which has further improved the quality of official Douyin works. At the same time, students from the Animation and Art Department majoring in "Media Integration Technology and Operations" are integrated into the center's team to participate in the operation and maintenance of the college's media platforms. This approach combines learning with practice, enhancing the quality of talent cultivation. Jointly trained media integration students won 4 second prizes and 2 third prizes in the 17th China Good Creativity and National Digital Art Design Competition, achieving a breakthrough in national-level awards for this competition.

3. STRENGTHENING EXECUTION AND ENSURING SAFE INFORMATION RELEASE

The Media Integration Center of the college strictly adheres to the relevant national regulations on propaganda work, revising and improving the "Regulations on Propaganda Work of Zibo Vocational College" in conjunction with current new media developments. It has formulated management measures for the Media Integration Center, new media platforms of various departments, and full-time and part-time personnel, establishing an independent and comprehensive institutional system to ensure that the center's work has rules to follow and operates in a standardized manner. A content review mechanism has been established and improved, further strengthening the review of videos. the review team conducts comprehensive scrutiny and careful polishing of daily published manuscripts, strictly implementing the "three-review and three-proofreading" process to ensure authoritative and accurate content.

The official Douyin account of the college is managed by in-service teachers with high political awareness and a strong sense of responsibility for work, who are responsible for video posting and platform maintenance. the student team of the Media Integration Center, under the guidance of teachers, carries out topic planning and other tasks weekly, creating creative, content-rich, and meaningful short video works, ensuring a stable update cycle for the official Douyin account and maintaining the vitality of its operations.

4. BOOSTING INNOVATION AND PROMOTING POSITIVE ENERGY AND MAIN THEMES

The college's official Douyin account leverages various forms of expression, including cultural activities, music MVs, campus life, aerial drone photography, time-lapse photography, and flash mobs, to narrate the stories of Zibo Vocational College around hot topics such as the college's key work, "Double High Plan" construction, professional demeanor, teachers' and students' learning and living, campus stories, enrollment and employment, innovation, and entrepreneurship. In 2023, a short video themed on freshman military training was reported by authoritative media platforms such as the People's Daily app and Xinhua News Agency at various levels, generating over 5 million views across the network. This showcased the spirit of Zibo Vocational College students with positive energy and

substantial traffic. The college's Media Integration Center has established an editing center and a recording studio. the Media Integration Editing Center covers an area of approximately 100 square meters, with a total of 25 workstations equipped with computers that meet the requirements of video editing, photo processing, and graphic and text layout. the photography and videography equipment has been comprehensively upgraded, and the Media Integration Center has purchased a batch of mirrorless cameras, professional video cameras, and drones to facilitate the production of high-quality media integration content. the Media Integration Center's recording studio covers an area of approximately 90 square meters and consists of digital recording, acquisition, editing, and broadcasting systems. It is used for the school to independently shoot and produce various television program recordings, such as leadership speeches, excellent demonstration classes, teacher interviews, artistic programs, video production of online courses, recording of educational quality courses, and experimental activities. It has multiple functions such as recording, broadcasting, and transcribing. the system is equipped with system devices such as cameras and virtual chroma keying hosts. According to different conditions and needs, it realizes various functions such as multimedia teaching applications in schools. the college continues to increase funding for the Media Integration Center, upgrade hardware facilities, and lay a solid foundation for the output of high-quality new media works.

5. ENHANCING SERVICE CAPABILITIES AND PROMOTING CITY PROPAGANDA

The college fully leverages its vocational education advantages and the strength of its Media Integration Center, using cameras to record the local customs, practices, and development changes of Zibo. Through active interaction with the city, the college has produced short videos and added topics such as "See Zibo" and "This is Zibo" for release on its media platforms. These topic-based short videos have accumulated nearly 5 million views on the college's official Douyin account, collectively showcasing the vibrant city of Zibo. During the period when Zibo-style barbecue became popular across the network, a series of media products with a "Zibo flavor" were planned and produced, visiting cultural and tourist attractions such as "Qi Sheng Lake, " "Qi Culture Museum, " "Zhoucun Ancient Commercial Town, " and "Zhongshuge Bookstore, " allowing young students to appreciate the beautiful scenery of Zibo and experience the cultural heritage of the Qi state. The Media Integration Center also engages in social services, with the Douyin team assisting Lunet to film a series of short videos titled "Viewing Hometown Changes, Praising the Five Good Zibo. " Zibo's ceramics, with a long and illustrious history, are like a continuation of the vast Qi culture. the videos showcase Zibo's resplendence as the "Famous City of Ceramics in China" in the new era. Upon release, the videos received widespread acclaim from netizens.

6. STRENGTHENING DISSEMINATION CAPABILITIES AND CREATING HIGH-QUALITY EDUCATIONAL MEDIA

The college's media platform always takes centering on its core mission and serving the overall situation as the fundamental responsibility of its publicity work. Through the joint efforts of the full-time and part-time teaching staff and the student team, it is dedicated to making the official Douyin account a friendly and helpful "good friend" and "good helper" for teachers and students. At the same time, the college plans and produces short videos centered on hot topics and themes guided by the official Douyin account "Vocational Education Micro" under the guidance of the Vocational and Adult Education Department of the Ministry of Education. This disseminates policies related to vocational education in the new era, showcases the demeanor of vocational education in the new era, and contributes to creating a favorable atmosphere where society cares about, supports, and participates in vocational education, dedicating Zibo Vocational College's efforts. The college's official Douyin account has released 432 videos, with a total of nearly 30 million views and two videos exceeding one million views, garnering a total of 400, 000 likes. the team has planned and launched special topics such

as epidemic prevention and control, military training, National Day, and skills competitions. the video work titled "Military Training Performance Showcases Talent, Vigorous Posture Dedicates Youth" was released on the "Study the Great Nation" learning platform (national platform). "Winning the Championship, " a video centered on the National Vocational College Skills Competition, won the second prize for outstanding works in the "This is Shandong's Universities" short video solicitation and dissemination activity organized by the Shandong Provincial Department of Education. the meticulously planned and produced "Craftsmanship Inheritance, Green Future – Zibo Vocational College's New Energy Vehicle Technology Teaching Team" was selected for the Shandong Education "Tribute to Brands, Tribute to the 20th National Congress" large-scale display and dissemination event.

Only those who innovate can progress, thrive, and triumph. In recent years, the school has been recognized as the "National Top Ten Vocational College Media of 2019, " "National Top 100 Vocational Campus Media of 2020, " "Most Influential Educational Government Affairs Media Integration in Shandong Province of 2021, " "Excellent Unit for News Propaganda Work in Shandong Education System of 2021, " and "Top 20 Units for Comprehensive Strength of Shandong Education Government Affairs New Media of 2021. " In 2022, the school was selected as one of the "Top 20 Units for Comprehensive Strength of Shandong Education Government Affairs New Media of 2022, " awarded the title of "Top Ten National Higher Vocational College Official WeChat Accounts, " and its official WeChat and Douyin accounts were selected as "Top 100 Excellent Educational Accounts in Shandong Education Media Integration of 2022. " the school also received two awards at the Zibo New Media Competition Awards Ceremony: "Top Ten Governmental WeChat Public Accounts" and "Top Ten Governmental Douyin Accounts. " At the ceremony, the school's new media instructor spoke as a representative, sharing operational experiences.

In the next step, Zibo Vocational College will continue to keep pace with the times, base itself on the reality of the college, precisely grasp focal points, strengthen planning, emphasize originality, enhance the quality of video production, and fully leverage the dissemination advantages of media integration. It will create more short video works with "Zibo flavor" that convey positive energy and attract substantial traffic, telling the stories of Zibo Vocational College and spreading the good voice of vocational education with heart, emotion, love, and dedication.

REFERENCES

[1] Exploring the Path of Promoting Propaganda and Ideological Work in Colleges and Universities through New Media Platforms [J]. Qiu Qianqian; Lu Siqi; Ren Huiying. Shaanxi Education (Higher Education), 2020

[2] Exploring the Path of Ideological and Political Education for College Students under the Background of Morality Education [J]. Ai Wanli. National Common Language Teaching and Research, 2024

[3] Exploring the Path of Ideological and Political Education for College Students with the Fundamental Task of Morality Education in Colleges and Universities [J]. Li Yanan; Wang Wenju. Industrial & Science Tribune, 2020

[4] Exploring the Path of Integrating Ideological and Political Education into Basic Courses on Innovation and Entrepreneurship for College Students [J]. Liu Hongwei; Yin Shengjun; Li Yue. Journal of Higher Education, 2020

[5] Exploring the Characteristic Path of "Legal News" Teaching [J]. Guo Kehong. Collection, Writing and Editing, 2020

[6] Exploring the Path of College Students' Voluntary Service in the New Era [J]. Zhu Zhu; Bai Shuangling. Journal of Liaoning Administrative College, 2021

[7] Exploring the Path of Industry-Education Integration in the Major of Network and New Media in Colleges and Universities [J]. Zhong Shuping. Media, 2021

[8] Exploring the "Five Innovations" Construction Path of Innovation and Entrepreneurship Education in Private Colleges and Universities [J]. Wang Jiang. Employment & Security, 2022.

A Discussion on the Innovation and Exploration of Student Management Methods in Vocational Undergraduate Education

Yuan Qing
Zibo Vocational Institute, Shandong, China

Abstract: The report of the 20th National Congress of the Communist Party of China proposes that we should focus on the real economy in developing the economy, promote new industrialization, and accelerate the building of a manufacturing power and a quality power. the development of the real economy cannot be separated from technology. To meet the social demand for high-tech talents, modern vocational undergraduate education has emerged, with the goal of cultivating students with both innovative practical abilities and high-quality. the modern vocational undergraduate education concept also puts forward new requirements for the management of students in vocational universities. Therefore, in order to further meet the social demand for technical talents, the management model of vocational universities should also keep pace with the times and continuously innovate. Based on the continuous development of the student management model, we should conduct innovative exploration of the development direction of modern vocational undergraduate education and promote the sound development of vocational education.

Keywords: Vocational undergraduate education; Management model; Innovation; Exploration

1. NEW REQUIREMENTS FOR STUDENT MANAGEMENT IN VOCATIONAL UNDERGRADUATE COLLEGES IN THE NEW ERA

Education is the original driving force for social progress, national development, and national rejuvenation. Vocational undergraduate colleges should not only engage in professional teaching but also pay attention to student management to cultivate outstanding talents in line with modern social development. the report of the 20th National Congress has clearly pointed out: "Education, science and technology, and human resources are the foundational and strategic supports for building a modern socialist country in all respects. " In the new era background, whether the form, content, depth, and level of education are in line with social development will pose new requirements for the student management work of vocational undergraduate colleges, mainly manifested in the following three aspects:

1.1 Promoting the transformation of management methods

From mainly relying on external management to stimulating internal drive. Transform the one-way cultivation mode under the traditional model, and then take problems as the orientation, adapt to the confusion and problems faced by students of vocational undergraduate colleges under the background of the new era, select appropriate and effective educational forms and contents, and truly achieve being persuasive and touching the heart, motivating students to form an internal drive of self-management, self-education, and self-service.

1.2 Driving the expansion of the education scope

From focusing on the internal of vocational undergraduate colleges to the expansion of social development and progress. Since the major measures such as comprehensively deepening reform and Made in China 2025 were proposed, the industrial upgrading and technological innovation faced by our country

are unprecedented. Students moving from schools to enterprises and into society, and realizing the linkage between schools and enterprises can expand the education scope and at the same time, root the process management and cultivation of students in vocational undergraduate colleges in social and enterprise demands.

2. EXISTING PROBLEMS IN STUDENT MANAGEMENT IN MODERN VOCATIONAL UNDERGRADUATE COLLEGES

2.1 Insufficient management atmosphere, imperfect or poorly implemented management systems

With the continuous expansion of vocational undergraduate colleges and the continuous increase in the number of enrolled students, many vocational undergraduate colleges have mainly focused on professional teaching activities and improving the employment rate of students, without paying sufficient attention to the basic management of students, which is prone to causing chaos in student management and a poor school spirit. In addition, most vocational undergraduate colleges generally lack corresponding student management systems or even if there are student management systems, they are prone to being formalistic and poorly implemented, making it difficult to achieve the corresponding management and educational effects. On another level, management is service. Student management work should also serve students' study and life. Currently, student management in vocational undergraduate colleges generally ignores this point, especially the living education space in student dormitories, which is quite lacking, and this also affects the normal and effective conduct of teaching activities.

2.2 Lack of scientific and innovative management methods

Most of the current management methods in vocational undergraduate colleges are the "credit system" and "moral education credit" system, as well as some attendance management methods and disciplinary sanction systems. Through such methods, students are guided to participate in self-management work and participate in educational teaching and other activities of the school. This passive management method gives students a poor experience and their enthusiasm and initiative are not high. "Everything depends on scores" and "do it if there are scores, don't do it if there are no scores" have become a true portrayal of the study and life of some vocational undergraduate college students. At the same time, under the new situation, the external environment has undergone tremendous changes, and social culture has also tended to be diversified. Students can quickly understand the changes in the external environment through the network, resulting in continuous changes in their thoughts and obvious individualized characteristics. This also requires that the student management methods of vocational undergraduate colleges need to be continuously innovated instead of using traditional management methods to educate young students in the new era.

2.3 Absence of a complete information feedback mechanism

Under the background of modern vocational education, the main purpose of improving the quality of student management in vocational universities is to enable students to master more professional skills and then find suitable job positions in society. However, the establishment of such a management system cannot be completed overnight. It requires managers to continuously improve during the management process and create a reasonable management system based on teaching requirements and students' needs to improve the quality of student management.

3. INNOVATION IN THE STUDENT MANAGEMENT MODEL OF MODERN VOCATIONAL UNDERGRADUATE EDUCATION

3.1 Party building leads, giving full play to the exemplary leading role of Party members

A Party member is a banner. In the student management of vocational undergraduate education, the combat fortress role of Party members should be fully exerted. Among the management personnel, Party members should fully charge forward in key positions. When encountering problems that students are "anxious, difficult, and concerned about" in management, Party members should actively

help students solve the problems. Among the student group, the enthusiasm and initiative of Party activists should also be exerted. Through the stories of advanced and exemplary Party members, they should be influenced. Let them form a good exemplary leading role among the student group and promote the implementation of various management tasks. Make good use of the one-stop community for students, strengthen the development of Party member activities and various management tasks in the one-stop community, give better play to the role of the one-stop community, and break through the "last mile" of student management.

3.2 Student-oriented, stimulating students' enthusiasm and initiative

3.2.1 Increase students' participation

As the quality of vocational undergraduate students in all aspects gradually improves, their enthusiasm for participating in student management has also greatly increased. Encourage students to actively participate in the decision-making process and project implementation of student work management, and organize student representatives to participate in the discussion and decision-making of student affairs. Through student self-governing organizations and club activities, students' leadership and teamwork spirit are cultivated, and their sense of ownership and responsibility are enhanced.

3.2.2 Establish an effective student information feedback mechanism

Be good at listening to the reflections, opinions, and suggestions from students, and improve the feedback mechanism for students' opinions and problems. Vocational undergraduate colleges should continuously establish and improve a complete set of effective student information feedback mechanisms to lay a solid operational foundation for the implementation of students' education work. Set up a "Dean's Reception Day" or "Student Suggestion Box" to ensure that every piece of feedback is responded to and implemented, so that the communication channels between students, teachers, and cadres are unobstructed, which is conducive to timely discovery of problems, early resolution, and timely improvement of working methods and improvement of work efficiency.

3.3 Establish and improve the student work management system

Clarify the responsibilities and tasks of the student work management department, and establish a scientific and perfect management process and working mechanism. Strengthen cooperation and communication with the teaching department and other functional departments to form a good collaborative working mechanism and jointly promote the development of student management work. In the management process of vocational undergraduate colleges, the management system should be gradually improved and these systems should be applied to the actual management work. First of all, a powerful management institution should be established. Formulate some systems and regulations in line with the actual situation of the school, coordinate all aspects of work, and implement the management responsibility to each administrator and assign responsibility to each person. Secondly, the authority should be appropriately relaxed. Give full play to the hierarchical role. Each department and class can establish small rules in line with their own class or department based on the school's general regulations, which is convenient for teachers to discover and solve problems in time and improve management efficiency. Finally, assessment and inspection work should be done well. Through assessment, understand the management situation of each department, conduct timely analysis and correction of current problems, discover good methods through assessment, learn and draw lessons from each other, and thus stimulate each department to come up with better management methods.

3.4 Utilize modern technological means

Make full use of information technology and intelligent devices to build an online platform and system for student services. By establishing a digital platform for student work management, providing convenient services such as online consultation, information release, and activity registration, the efficiency and convenience of student work management can be effectively improved. the work of managers such as counselors and head teachers should also be recorded informatically and intelligently. Such as heart-to-heart talks with students and

dormitory visits. Make the work of managers presented in a visual and data-based way, which is more conducive to the assessment of management work.

3.5 Innovate the "three integrations" school-enterprise collaborative education mechanism

Integrate enterprise mentors into ideological and political education. Attach importance to and give full play to the role of social resources in ideological and political education. Hire entrepreneurs, skilled craftsmen, and outstanding alumni with strong political ideology, rich management experience, and enthusiasm for education as enterprise mentors. Full-time and part-time teachers combine professional characteristics and enterprise demands to integrate the concepts of quality, efficiency, integrity, and professionalism of enterprises into the content of ideological and political education. Jointly promote the construction of normalized and branded ideological and political courses, enhance the ideological, theoretical, and affinity of ideological and political education, and regularly share the "ways of learning" and "ways of being a person" with students.

Integrate enterprise demands into talent cultivation. Explore the cooperative education model of "setting up factories in schools, setting up schools in factories, interaction between schools and enterprises, and two-way intervention". Focusing on cultivating students' comprehensive qualities such as vocational skills, cooperation ability, and vocational adaptability, through the co-construction of secondary colleges, specialties, and order-based classes by schools and enterprises, the co-construction of internship and training bases, the development of courses and collaborative innovation, etc., encourage and guide enterprises to deeply participate in the educational and teaching reform of schools, throughout all links such as professional planning, teaching design, course setting, and internship and training, and integrate enterprise demands and entrepreneurs' wisdom into the entire process of professional construction and talent cultivation.

In conclusion, student work management in vocational undergraduate colleges under the new situation needs to adapt to the requirements of diversification and technological progress to meet the needs of students' all-round development. Through innovative measures and problem-solving, continuously improving the level of student work management can better achieve the goal of student work management in vocational undergraduate colleges and make greater contributions to the growth and development of students.

REFERENCES

[1] Xu Ruirong. Research on Student Management Work in Higher Vocational Colleges from the Perspective of Informatization [J]. Teaching in Forestry Region, 2021(1):40-42.

[2] Wang Rongxia. Research on Student Management Strategies of "1+3" High-End Technical and Skilled Undergraduate Students [J]. Journal of Sichuan Vocational and Technical College, 2017, 27(2).

The Relationship Between Myofibrillar Protein and Meat Processing

Qing-yun Li
Zibo Vocational Institute, Shandong, Zibo 255314, China

Abstract: Myofibrillar protein is one of the most important proteins in muscle, a complex protein complex, and the main component of muscle protein. It can endow meat products with good adhesion and texture during processing, and also play an important role in endowing meat products with many expected physicochemical properties and sensory qualities. In addition, myofibrillar protein can form gel under the influence of heat induction or pressure induction, and its gel properties will affect the structural and processing properties of meat products. the characteristics of gel are affected by many external and internal conditions, including pH value, heating temperature, ionic strength, salt concentration and other added substances (such as dietary fiber, phosphate, starch).

Keywords: Myofibrillar protein; Gel properties; Meat processing

1. THE CONCEPT OF MYOFIBRILLAR PROTEIN

Myofibrillar proteins are the proteins that make up myofibrils and support their shape, hence they are also known as structural proteins or insoluble proteins. Myofibrillar proteins mainly include myosin, actin, myosin, tropomyosin, and troponin.

Myosin is the most abundant protein in muscles, accounting for about one-third of total muscle protein and 50% to 55% of myofibrillar protein. Myosin is the main component of thick filaments, forming the A band of the sarcomere. Its relative molecular weight ranges from 470000 to 510000, and its shape resembles that of a bean sprout. It is composed of two peptide chains that spiral around each other. Myosin can bind with actin to form myosin, which is related to muscle contraction. Myosin is insoluble or slightly soluble in water, but can dissolve in neutral salt solutions with an ionic strength of 0.3 or higher, with an isoelectric point of 5.4. Myosin can form heat induced gel with three-dimensional network structure. the solubility of myosin and its ability to form gel are closely related to its solution pH, ionic strength, ionic type, etc. In meat processing, myosin forms heat induced gel. the texture, water retention and flavor of products have great influence.

Actin accounts for about 20% of myofibrillar proteins and is the main component of filaments. Actin is composed of only one polypeptide chain, with a relative molecular weight ranging from 41800 to 61000. Actin can dissolve in water and dilute salt solutions, with an isoelectric point of 4.7. Actin binds with tropomyosin and other proteins to form filaments, which participate in muscle contraction. Actin does not have the ability to form gel, but it can regulate the formation of muscle gel [1].

Myomyosin is a complex of actin and myosin. the viscosity of myosin is very high and it exhibits obvious flow birefringence. Due to its different degrees of polymerization, its molecular weight is uncertain. the binding ratio of actin to myosin is approximately 1:1. Actin can form heat induced gel, which affects the processing characteristics of meat products.

Protomyosin accounts for about 4% to 5% of myofibrillar protein and is a rod-shaped molecule that forms the scaffold of filaments. Each molecule of tropomyosin binds to 7 molecules of actin and 1 molecule of troponin, with a relative molecular weight of 65000 to 80000.

Troponin, also known as myoglobin, accounts for approximately 5% to 6% of myofibrillar protein. Troponin has a relative molecular weight of 69000 to 81000 and is highly sensitive to sarcoplasmic Ca^{2+}, participating in the regulation of muscle contraction. Troponin has three subunits, among which the calcium binding subunit is the binding site of Ca^{2+}. the inhibitory subunit prevents actin from binding

to myosin, while the tropomyosin binding subunit can bind to tropomyosin and play a binding role.

In addition, myofibrillar proteins also include M-protein, C-protein, myosin, I-protein, myosin, intermuscular line protein, N-line protein, etc.

2. CHARACTERISTICS OF MYOFIBRILLAR PROTEIN GEL

Muscle is a complex biological tissue system consisting of many parts, including myofibrillar contractile proteins, sarcoplasmic proteins, peptides, free amino acids, and free nucleotides. Myofibrillar protein is a salt soluble protein and one of the most important proteins in muscle. It is a complex protein complex mainly composed of myosin, actin, and myosin, accounting for about 40%-60% of the total protein content. Myofibrillar protein plays an important role in the muscle system and is the main component of muscle protein. It can endow meat products with good adhesion and texture during processing, and also plays an important role in endowing meat products with many expected physicochemical properties and sensory qualities.

Myofibrillar protein can form gel under the influence of heat induction or pressure induction. Its gel properties will affect the structural and processing properties of meat products. the gel property of myofibrillar protein is one of the most important processing properties in muscle products. the rheological and texture properties of its gel are closely related to the sensory properties, oil retention, water retention, elasticity, emulsification and even yield of gel meat products [2].

3. FACTORS INFLUENCING THE PROPERTIES OF MYOFIBRILLAR PROTEIN GEL

The formation and maintenance process of protein heat induced gel mainly depends on physical forces such as hydrophobic interaction and ionic bond. In addition, some protein molecules contain sulfhydryl groups, and the interaction between sulfhydryl groups also plays an important role in the formation of protein heat induced gel. Therefore, the characteristics of protein gel are affected by many external and internal conditions, including pH value, heating temperature, ionic strength, salt concentration and other added substances (such as dietary fiber, phosphate, starch). Among them, ionic strength can affect the interaction between protein molecules, and then affect the formation of gel structure. In addition, Hermansso pointed out that the microstructure of protein gel will also be affected by ionic strength. They pointed out that the gel structure formed under low ionic strength (0.25 mol/L KCl) is a fine chain polymer, while the gel structure formed under high ionic strength (0.6 mol/L KCl) is a coarse chain polymer. Some studies have pointed out that ionic strength can affect the swelling of myofibrillar protein. When the ionic strength is reduced to 0.01 mol/L NaCl, the head binding phenomenon between myosin no longer appears. When the ionic strength continues to increase, the gel network structure formed will be more dense. In addition, changes in salt concentration and protein solution pH can also affect heat induced gel properties of ring proteins [3].

Salt concentration will affect the solubility of protein, and then affect the formation of network structure in the process of protein heat induced gel; the pH value of protein solution will change the protein protein phase in the protein heat induced gel process. In addition, other inorganic ammonium salts also play an important role in the research of high carbon alkenes in the formylation reaction, hydroformylation of high carbon alkenes, and the development of oil soluble catalysts. In the formylation reaction of other inorganic amine salts, not only the yield of isononaldehyde is improved, but also the metal loss of the products will increase. This is of great significance for the production enterprises to reduce production costs. Organic amines or inorganic amines and lawrencium quaternary ammonium salts can be recycled for production and use. Further research on the reaction mechanism can improve the reaction In addition, hydroformylation of high carbon alkenes and other inorganic compounds in the formylation reaction of amine salts, not only is the yield of isononaldehyde improved, but the loss of metal in the product also increases. This is of great significance for production enterprises to reduce production costs.

Organic amines or inorganic amines and quaternary ammonium salts of curium can be recycled for production and use. Further research on the reaction mechanism can improve the activity of the reaction, which will have broad prospects in industrial applications. In summary, regarding the research on high carbon olefins, the hydroformylation reaction of high carbon olefins. In addition, the hydrogen formylation reaction of high carbon olefins is also an important process for producing important spice intermediates.

The internal factors affecting the characteristics of protein gel mainly include the main components of protein and the concentration of protein. Some studies show that the water retention and hardness of protein gel at higher protein concentration are higher than those of protein gel formed at lower protein concentration; At the same protein concentration, the water retention and hardness of myosin gel is better than that of myofibrillar protein gel.

Protein in meat and its products is an important source of protein in human food, and a simple way to reduce the average sodium intake is to reduce the sodium chloride content in these products, especially those with high sodium chloride content.

Enhance the sensory saltiness of meat products and increase the flavor intensity of meat products. the salt content of salty gel meat products in sodium chloride molecules is generally 2%-4%. However, studies have shown that in cooking sausage and lean meat products, other inorganic ammonium salts play an important role in the research of high carbon alkenes, hydroformylation of high carbon alkenes, and the development of oil soluble catalysts. In the formylation of other inorganic amine salts, not only the yield of isononaldehyde has been improved, but also the metal loss of the products will increase, which is of great significance in reducing production costs. Organic amines or inorganic amines and lawrencium quaternary ammonium salts can Recycling production and further research on the reaction mechanism can improve the reaction activity or is an important process for the production of important flavor intermediates. In addition, in the formylation reactions of other inorganic amine salts, not only is the yield of isononaldehyde improved, but the amount of metal loss in the products also increases. This is of great significance for production enterprises to reduce production costs.

Organic amines or inorganic amines and quaternary ammonium salts of curium can be recycled for production and use. Further research on the reaction mechanism can improve the activity of the reaction, which will have broad prospects in industrial applications. In summary, regarding the research on high carbon olefins, the hydroformylation reaction of high carbon olefins. In addition, the hydrogen formylation reaction of high carbon olefins is also an important process for producing important spice intermediates.

The issue of reduced flavor intensity is difficult to be accepted by all consumers in a short period of time. Improve the ionic strength of meat products and enhance their texture characteristics. Replacing sodium chloride partially or completely with other chloride salts (such as KCl, $CaCl_2$, and $MgCl_2$) can reduce the sodium content in the product. Ruusunen pointed out that using a mixture of mineral salts instead of sodium chloride is a good way to reduce the sodium chloride content in meat products, because under low sodium salt conditions, the use of substitutes can give the product the same sensory saltiness. In Finland, steamed sausages containing salt substitutes are sold in the market.

4. THE RELATIONSHIP BETWEEN MYOFIBRILLAR PROTEIN AND MEAT PROCESSING

Myofibrillar proteins are the proteins that make up the myofibrils in muscles, mainly including tropomyosin, myosin, myoglobin, myosin, etc. These proteins account for 50% to 55% of the total protein content in pork and have a crucial impact on the processing and quality of meat products. the physicochemical and functional properties of myofibrillar proteins, such as emulsion stability, Ca^{2+}-ATPase activity, solubility, surface hydrophobicity, turbidity, cooking loss rate, TVB-N content, etc., are important indicators reflecting the functional characteristics and quality of myofibrillar proteins. These

indicators have important practical significance for the processing of meat products, as they directly relate to the sensory quality and nutritional characteristics of meat products [4].

During the processing of meat products, the thermal deformation and polymerization of myofibrillar proteins form important structures that play a crucial role in the quality of meat, directly affecting the sensory properties of proteins such as elasticity, juiciness, and taste of meat products. the spatial structure, hydration properties, and functional relationship of myofibrillar proteins have a significant impact on muscle quality. Factors such as protein heating, adding NaCl and polysaccharide will directly or indirectly affect the properties of myofibrillar protein, so that myofibrillar protein molecules can unfold, conduct orderly or disorderly polymerization, and form gel to affect meat products. the heating rate of myofibrillar protein also has a certain impact on meat products. Rapid heating of myofibrillar protein causes protein denaturation, exposing hydrophobic groups to the outside of the protein, which affects the emulsifying properties and emulsifying stability of meat.

In addition, studies have shown that non meat proteins can effectively bind with fat particles in minced meat, affecting its water retention and viscosity, resulting in better sensory quality and higher product yield. the addition of gel of non meat protein regulation system can affect the unique shape, flavor and texture of food. For example, adding 4% soy protein to sausages and meat patties can significantly improve the water retention of the product without affecting its flavor and characteristics.

5. CONCLUSION

Myofibrillar protein plays an important role in meat processing, which has a significant impact on the emulsification, tenderness, water retention, and palatability of meat. Under mechanical stirring with salt, myofibrillar protein can be converted into soluble protein and extracted. In addition, the gel properties of myogenin are affected by many external and internal conditions, including pH value, heating temperature, ionic strength, salt concentration, and added dietary fiber, phosphate, starch and other substances. Studying the relationship between myofibrillar protein and meat processing is of great significance.

REFERENCES

[1] YUE Yijing, ZANG Mingwu, LIU Haijie, CHENG Xiaoyu, ZHAO Xin, WANG Le. Changes and Correlation between Myofibrillar Protein Oxidation and Taste of Dried Penaeus vannamei during Storage [J]. Food Science. 2023, 44(19):180-197.

[2] CHEN Xu, CHEN Huimin, WU Jiulin, JIANG Wenting, FENG Yamei, CAI Xixi, HUANG Jianlian, WANG Shaoyun. Characterization of Low-Sodium Myofibrillar Protein Gels with Substitution of Human Essential Metal Salts and Their Mechanisms of Action [J]. Food Science. 2023, 44 (6): 25-33.

[3] CHEN Xu, FENG Yamei, CAI Xixi, WU Jiulin, HUANG Jianlian, WANG Shaoyun. Effect of Non-sodium Salt Substitution on the Properties and Flavor of Coix Starch-Myofibrillar Protein Composite Gel [J]. Food Science. 2023, 44 (16):8-15.

[4] Somers Sarah M; GilbertHonick Jordana; Choi In Young. Engineering Skeletal Muscle Grafts with PAX7:GFP-Sorted Human Pluripotent Stem Cell-Derived Myogenic Progenitors on Fibrin Microfiber Bundles for Tissue Regeneration [J]. Bioengineering (Basel, Switzerland). 2022, 9(11):693-693.

Semiotic Interpretation and Cultural Heritage of Zibo Stone Carvings

Song Qian
Zibo Vocational Institute, Zibo, Shandong, 255314, China

Abstract: This study aims to provide an in-depth semiotic analysis of Zibo stone carvings and explore their significance in cultural heritage. As a vital component of ancient Chinese art, Zibo stone carvings possess significant artistic value and rich cultural connotations. Utilizing semiotic analysis, this research systematically examines the symbols, images, and their symbolic meanings in the carvings, unveiling their cultural and social significance. Initially, the study reviews semiotic theory to clarify its application in art interpretation. Subsequently, it offers a detailed analysis of the specific symbols and images in Zibo stone carvings, exploring their cultural and social functions across different historical periods. The findings reveal that the symbols in Zibo stone carvings reflect religious beliefs, societal values, and the unique and diverse regional culture of the time. Moreover, the study addresses the modern societal challenges of cultural heritage preservation and proposes semiotic analysis as a method to enhance cultural heritage protection and transmission. The conclusions indicate that semiotic interpretation not only aids in comprehending the artistic and cultural essence of Zibo stone carvings but also provides new perspectives and methodologies for cultural heritage preservation. This research enriches the application of semiotics in art studies and offers a novel theoretical framework and research approach for the study of Zibo stone carvings.

Keywords: Zibo stone carvings; Semiotics; Cultural heritage; Art interpretation; Cultural heritage preservation

1. INTRODUCTION

1.1 Research Background

Zibo stone carvings represent a valuable artifact of ancient Chinese art, imbued with deep historical roots and unique artistic appeal. Since the Han Dynasty, Zibo has been a cultural hub, with its stone carvings serving as a symbol of its extensive historical and cultural heritage. With increasing awareness of cultural heritage preservation in modern society, Zibo stone carvings have garnered attention from both domestic and international scholars. Semiotics, as a method for analyzing cultural symbols and social meanings, offers a novel research perspective, enabling a deeper interpretation of Zibo stone carvings through the lens of symbols and meanings.

1.2 Research Objectives and Significance

This study aims to systematically analyze and interpret Zibo stone carvings from a semiotic perspective, uncovering their profound cultural connotations and social significance. The primary objectives are to explore the composition of symbols, the symbolic meanings of images, and the cultural information conveyed by these symbols in Zibo stone carvings. Additionally, the study will examine the importance of these carvings in cultural heritage, evaluating their value in modern society and proposing preservation strategies. The research seeks to provide a new theoretical framework and methodology for the study of Zibo stone carvings and offer practical guidance for cultural heritage preservation and transmission.

1.3 Review of Domestic and International Research

Research on Zibo stone carvings in China has a long history, focusing mainly on their artistic style, historical context, and regional characteristics. Li Xueqin (2005) in "Studies on Qi Culture" emphasized that Zibo stone carvings are significant relics of Qi culture, reflecting its unique artistic style. However, semiotic studies remain sparse. International scholars, such as Japan's Sato (2012) in "Stone Art of China," have employed semiotic methods to analyze Chinese stone art, offering unique insights but limited research on Zibo carvings. Overall, the semiotic interpretation

of Zibo stone carvings is still underdeveloped, providing a new breakthrough and research direction for this study.

2. OVERVIEW OF SEMIOTIC THEORY

2.1 Basic Concepts of Semiotics

Semiotics, the study of signs and sign systems, was founded by Swiss linguist Ferdinand de Saussure and American philosopher Charles Peirce. Saussure divided signs into the signifier (the form) and the signified (the concept). Peirce described the meaning-making process through a triadic relationship: sign, object, and interpretant. Semiotics posits that signs not only convey information but also reflect cultural habits, social norms, and psychological traits. In art research, semiotics can uncover the deep cultural meanings and social contexts embedded in artworks.

2.2 Application of Semiotics in Art Research

In art research, semiotics serves as a tool to decipher symbolic systems and metaphorical meanings in artworks. By analyzing symbols in art, researchers can gain insights into the artist's intentions, the themes of the work, and the cultural background. For instance, Roland Barthes in "Mythologies" used semiotics to analyze cultural symbols in modern society, revealing underlying ideologies. In art research, semiotic analysis helps interpret the cultural connotations and social significance of visual symbols, providing a fresh perspective for understanding artworks.

2.3 Relationship Between Semiotics and Cultural Heritage

Semiotics also plays a crucial role in cultural heritage studies. Cultural heritage transmission involves the transfer and preservation of cultural information through sign systems. As carriers of culture, signs embody traditions, values, and social customs. Semiotic analysis can elucidate the mechanisms and processes of cultural transmission, revealing how culture is sustained and propagated through sign systems. Moreover, semiotics can help identify and protect endangered cultural symbols, promoting heritage preservation and transmission.

3. OVERVIEW OF ZIBO STONE CARVINGS

3.1 Historical Background of Zibo Stone Carvings

The stone carving art in Zibo originated in the Han Dynasty and developed through the Wei, Jin, Northern and Southern Dynasties, Sui, Tang, Song, Yuan, Ming, and Qing periods. The Han Dynasty marked the inception of Zibo stone carvings, primarily in tomb carvings, reflecting funeral culture and religious beliefs. During the Wei, Jin, and Northern and Southern Dynasties, the introduction and spread of Buddhism infused new elements into the carvings, making styles more complex and techniques more refined. The Sui and Tang periods saw the zenith of Zibo stone carvings, with diverse forms and rich themes, driven by the further propagation of Buddhism and the development of Daoism. In the Song, Yuan, Ming, and Qing periods, the art continued to evolve, with more diverse styles and intricate techniques.

3.2 Artistic Characteristics of Zibo Stone Carvings

Zibo stone carvings exhibit distinct regional characteristics and unique artistic styles. They emphasize harmony with nature, showcasing the relationship between humans and the natural environment. The geographical and natural landscapes of Zibo are reflected in the carvings, incorporating elements like mountains and trees to create harmonious artistic scenes. The carvings also emphasize practicality and social functionality, selecting themes from religion, history, and folklore, with straightforward and clear representation methods. Additionally, Zibo stone carvings demonstrate inclusivity and openness, integrating elements from other cultures, resulting in a unique artistic style that reflects cross-cultural exchanges.

3.3 Cultural Connotations of Zibo Stone Carvings

Zibo stone carvings are not just an art form but also a cultural symbol, embodying rich cultural connotations in areas such as religious beliefs, social systems, and regional culture. The carvings reflect the influence of Buddhism and Daoism, illustrating the spiritual pursuits and belief systems of the time. They also mirror different historical periods' social structures and class relations, depicting historical figures and events to record societal development and changes. Furthermore, Zibo stone carvings highlight

the uniqueness of local culture, using regional cultural symbols and elements to present the cultural landscape and humanistic spirit of the Qi-Lu region.

4. SEMIOTIC INTERPRETATION OF ZIBO STONE CARVINGS

4.1 Symbol Analysis in Stone Carvings

Symbols in Zibo stone carvings are key carriers of cultural information. Analyzing these symbols unveils the cultural symbolism and social significance behind the carvings. For instance, in Buddhist sculptures, elements like mudras (hand gestures), headgear, and postures hold specific religious meanings. Different mudras signify various Buddhist teachings, such as the Abhaya Mudra signifying compassion and protection, and the Bhumisparsha Mudra representing Buddha's enlightenment. Through the analysis of these symbols, we can gain deeper insights into the religious significance and artistic expression of Buddhist sculptures.

4.2 Interpretation of Images in Stone Carvings

Images in stone carvings are not just visual symbols but cultural representations. The choice and depiction of images in Zibo stone carvings carry rich cultural information. By interpreting these images, we can uncover the cultural and social contexts behind them. For example, historical-themed carvings depicting historical figures and events not only record history but also reflect the social systems and values of their time. Folklore-themed carvings showcase the uniqueness of local culture by portraying folk tales and traditional activities, thereby revealing the rich cultural connotations of the region.

4.3 Symbolic Meanings of Stone Carvings

Zibo stone carvings are cultural symbols with profound symbolic meanings. From a semiotic perspective, we can uncover these meanings. In Buddhist sculptures, for instance, the images not only symbolize religious beliefs but also represent spiritual pursuits and moral values. Symbols such as mudras, headgear, and postures convey specific symbolic meanings that articulate Buddhist teachings and spirit. Additionally, in historical and folklore-themed carvings, the depiction of figures and events symbolizes social systems and regional culture, providing a deeper understanding of the cultural and social significance of Zibo stone carvings.

5. CULTURAL HERITAGE OF ZIBO STONE CARVINGS

5.1 Theoretical Basis of Cultural Heritage

Cultural heritage involves the preservation and transmission of cultural information through symbolic systems. Semiotics is vital in the study of cultural heritage as symbols are carriers of traditions, values, and social customs. Semiotic analysis helps understand the mechanisms and processes of cultural transmission, revealing how culture is perpetuated and propagated through symbol systems. Moreover, semiotics can identify and protect endangered cultural symbols, promoting the preservation and transmission of cultural heritage.

5.2 Current State of Heritage Transmission

The transmission of Zibo stone carvings faces numerous challenges. Rapid modern development and urbanization pose new demands on the protection of traditional cultural heritage. Many carvings have suffered damage due to environmental changes and human activities, necessitating increased protection efforts. Additionally, issues such as weak public awareness and insufficient cultural resources hinder the effective transmission and preservation of Zibo stone carvings in modern society.

5.3 Challenges and Strategies in Cultural Transmission

Several strategies can address the challenges in the cultural transmission of Zibo stone carvings. Raising public awareness through education and advocacy is crucial for enhancing cultural heritage protection. Strengthening legal frameworks and management measures can ensure effective preservation. Employing modern technologies like digital preservation and virtual reality can aid in the digital conservation and presentation of cultural heritage. International cooperation can also play a significant role, bringing advanced protection technologies and experiences to collectively promote heritage preservation and transmission.

6. CONCLUSION

6.1 Research Summary

This study systematically analyzed and interpreted Zibo stone carvings from a

semiotic perspective, revealing their deep cultural connotations and social significance. The findings indicate that the symbols in these carvings reflect contemporary religious beliefs and social values, as well as the uniqueness and diversity of regional culture. Semiotic interpretation not only aids in understanding the artistic value and cultural essence of the carvings but also offers new perspectives and methods for cultural heritage preservation and transmission.

6.2 Theoretical Contributions

This research enriches the application of semiotics in art studies, introducing a new methodology for interpreting Zibo stone carvings. The semiotic approach unveils the artistic value of the carvings and their underlying cultural symbolism and social meanings. The study also explores the role of semiotics in cultural heritage transmission, proposing suggestions for enhancing heritage protection and transmission through semiotic interpretation, thereby providing a new theoretical framework and research direction for studying Zibo stone carvings.

6.3 Future Research Directions

Future research can further explore semiotic interpretations of Zibo stone carvings through field studies and artifact analyses. In-depth case studies can enrich our understanding of the carvings. Additionally, international collaboration can bring advanced protection technologies and experiences, collectively promoting heritage preservation and transmission. These efforts aim to better protect and transmit the valuable cultural heritage of Zibo stone carvings, ensuring their unique artistic appeal and cultural essence are passed down to future generations.

ACKNOWLEDGEMENTS

This research was supported by the 2023 Zibo Social Science Planning Research Project, "Study on the Artistic Characteristics of Zibo Stone Carvings from the Perspective of Qi Culture" (23ZBSK104).

REFERENCES

[1] Chen Qiujing. Semiotic Interpretation of the Sculpture Art of the Yungang Grottoes [J]. Urban Construction Theory Research: Electronic Edition, 2015(1). DOI:10.3969/j.issn.2095-2104.2015.01.1555.

[2] Qiu Zhenglun, Feng Jie. Anthropological Aesthetic Orientation of the Secularization of the Sculpture Art of the Dazu Rock Carvings [J]. Art Observation, 2013(4):3. DOI:10.3969/j.issn.1006-8899.2013.04.033.

[3] Liu Zhiyou, Zhang Baocai. Sculpture Art of the Dahuasi Rock Carvings [J]. Art, 1983(4):4. DOI:CNKI:SUN:MEIS.0.1983-04-021.

[4] Cao Xuexia. Folk Characteristics of the Sculpture Art of the Nannieshui Rock Carvings — A Brief Discussion on the Inheritance and Development of Rock Carving Art in Qinxian County [J]. World of Cultural Relics, 2011(4):4. DOI:10.3969/j.issn.1009-1092.2011.04.010.

[5] Wang Jing, Chen Fan. The Influence of the Sculpture Art of the Sanqing Mountain Cliffside Carvings on the Construction of Local Tea Culture [J]. Peony, 2019. DOI:CNKI:SUN:MDAN.0.2019-18-032.

[6] Tian Runyu. Exploration and Enlightenment of the Artistic Characteristics of the Sculpture Art of the Longmen Grottoes [J]. Art Panorama, 2019, 000(027):P.1-1.

[7] Di Gang, Sun Mingtao. Treasures of Northern Dynasties Stone Carving Art — Buddhist Sculptures Unearthed from the Longxing Temple Site in Qingzhou [J]. Finance: Collection, 2015, 000(007):43-47.

[8] Qin Liyuan. Research on the Digital Relief Presentation of the Sixth Cave Sculptures of Shimen Mountain in Dazu Rock Carvings [D]. Chongqing Normal University [2024-07-31]. DOI:CNKI:CDMD:2.1018.129275.

[9] Yang Fan. Comparative Study of Buddhist Sculptures in Bashu Region during Tang and Song Dynasties [D]. Southwest University, 2015.

[10] Sun Yanan. Research on the Sculptural Language and Artistic Value of the Zizhu Guanyin in Anyue [J]. Vision, 2020, 000(013):P.1-1.

[11] Bian Junxin. Treasures of Civilization — The Unique Art of Dazu Rock Carvings [J]. Popular Literature and Art, 2009.

Research on Big Data Models for Rural Information Demand

Ruihao Zhang*
School of Geophysics and Geomatics, China University of Geosciences, Wuhan 430074, China
**Corresponding Author Email: 932826090@qq.com*

Abstract: In recent years, the imbalance of rural information supply and demand has seriously hindered the process of rural informatization. Rural information demand is a decisive factor in the relationship between rural information supply and demand. Therefore, research on the influencing factors of rural information demand has attracted much attention. the traditional rural information demand factor analysis does not consider the correlation between factors. the factors themselves carry a lot of repeated information, which seriously interferes with the objectivity of the analysis results. A probit discriminant model of influencing factors of rural information demand was constructed, and the relationship with Lingshou was determined. the research results show that this method not only eliminates the factors that carry highly repetitive information and the correlation is not significant, but also makes the results more reliable.

Key Words: Big data; Rural informatization; Partial correlation analysis

1. INTRODUCTION

With the rapid development of science and technology and the advent of the big data era, the construction of smart cities at home and abroad has made remarkable achievements. At the same time, rural informatization also ushered in new opportunities for development. Digital rural areas and intelligent rural areas have become the hotspots of scholars. Of course, there are great challenges as well as opportunities. Due to the unbalanced development of regional economy, there are many problems in rural informatization. First, the collection, processing, integration and sharing of rural information is difficult. Second, data mining can not becarried out effectively and does not provide the information farmers need. Third, there is a contradiction between the diversity of farmers' information needs and the unity of platform information. Fourth, lack of dynamic maintenance and update mechanism, data outdated, can not play its due role. This requires big data technology and big data thinking to improve and solve the current difficulties. the application of big data in various industries has achieved good results. the idea of big data has gradually penetrated into the process of rural informatization. With the help of big data technology, we can build a comprehensive rural information platform based on farmers' information needs [1-5].

Whether in developed countries such as Europe and the United States, or in developing countries such as Asia and Africa, there are many studies on the information needs of rural residents. Scholars' research shows that farmers' demand for information is more and more extensive, and the types of demand and access channels show a variety of characteristics. Kaniki's survey of two rural communities in South Africa found that the main information needs of farmers are information needed to seek jobs or increase income, vocational or skills training opportunities, information about grants, medical and health information, legal counseling services and so on. In Asia, Raju's study found that the most common information needs of Indian farmers were medical and health information, infrastructure information, crop improvement and yield information, product sales and market information, policy and service information. Vevrek thinks the daily information needs of the rural population in the United States are: information about local government decisions, information about health services, and local news [6-9]. Domestic researchers have found that farmers pay more attention to specialized information related to agricultural production

and operation. Zhang Ying based on the rural information service platform, from the perspective of farmers, found that farmers'demand for labor market information, agricultural market information, agricultural policy information and agricultural production information decreased in turn. Li Lu surveyed the demand for agricultural technology social services and found that farmers'age, education level and whether they went out to work would affect farmers' demand for agricultural technology social services. Young and experienced peasants paid more attention to information services related to the circulation of agricultural products. Lu Xinru and Li Zhigang explored the unique information needs and behaviors of farmers through questionnaires. Farmers'information demand had three characteristics: the tendency of market purchase and sale information, the necessity of policies and regulations, and the particularity of meteorological forecast. Information behavior was restricted by educational level and the overall channel was narrow. Pan Yuchen and Huo Yucan analyzed the concept of rural information consumption, the level of demand and the motivation of consumption, especially in the field of emotional demand, which was also a further reflection of the demand level theory. Provided guidance for the development of the whole society and related enterprises, helped enterprises to improve the pertinence of information services and achieve steady growth. Wang Xiaoning and Wang Ming empirically analyzed the main channels for farmers to obtain information under the background of mobile Internet by issuing questionnaires. Through the analysis, it was concluded that mobile micro-messaging, mobile QQ and mobile micro-blogging are the absolute dominant advantages in information dissemination, while agricultural information website platform was not generally known to farmers [10-12].

2. MODEL BUILDING

2.1 Evaluation of influencing factors based on partial correlation analysis

In a system consisting of multiple elements, when studying the influence or correlation of one element on another, the influence of other elements is regarded as a constant, i. e. the close relationship between the two elements is studied separately without considering the influence of other elements, which is called partial correlation analysis(Daichi Shimamoto et al, 2015; António Antunes et al, 2018). That is the partial correlation coefficient. In the study of rural information demand, there are many factors involved. There may be some correlation between the factors, which leads to the duplication of information reflected by two or more factors, which leads to the system being too complicated because there are unrelated factors. Through partial correlation analysis, factors with repeated information that affect rural information needs can be removed.

(1) Calculation of partial correlation coefficient

Suppose t_{ij} is the data value of the i index of the selected village j in the region, t_{kj} is the data value of the k index of the selected village j in the region, and r_{ik} is the partial correlation coefficient between the k index and the first index. the formula is:

$$r_{ik} = \frac{\sum_1^n (x_{ij} - \bar{x}_i)(x_{kj} - \bar{x}_k)}{\sqrt{\sum_1^n (x_{ij} - \bar{x}_i)^2} \sqrt{\sum_1^n (x_{kj} - \bar{x}_k)^2}} \quad (1)$$

Among them, n denotes the number of villages in the study area, $\overline{x_i}$ denotes the average value of the i factor, and $\overline{x_k}$ denotes the average value of the k factor.

Suppose R is a correlation coefficient matrix composed of partial correlation coefficient r_{ik}, where m is the number of influencing factors. Then:

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \cdots & r_{mm} \end{bmatrix} \quad (2)$$

Let S be the inverse matrix of the correlation coefficient matrix R.

$$S = R^{-1} = \begin{bmatrix} s_{11} & s_{12} & \cdots & s_{1m} \\ s_{21} & s_{22} & \cdots & s_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ s_{m1} & s_{m2} & \cdots & s_{mm} \end{bmatrix} \quad (3)$$

According to the formula of partial correlation

coefficient, the partial correlation coefficient $r_{ik}^{'}$ between the i factor and the k factor can be obtained.

$$r_{ik}^{'} = \frac{-s_{ik}}{\sqrt{s_{ii}s_{kk}}} \tag{4}$$

The greater the partial correlation coefficient $r_{ik}^{'}$ is, the greater the correlation between the i and the k influencing factors. And the smaller the $r_{ik}^{'}$ is, the smaller the correlation between the i and the k influencing factors.

(2) Calculation of F value

When the correlation between the two factors is high, in order to avoid the subjective deletion of the significant factors, we can solve this problem by calculating the F value of the two factors. Assuming that F_i is the F value of the i factor, the formula (5) can be used for calculation.

$$F_i = \frac{(\bar{x}_j^{(0)} - \bar{x}_j)^2 + (\bar{x}_j^{(1)} - \bar{x}_j)^2}{\frac{1}{n^{(0)}-1}\sum_{y_j=0}(x_{ij} - \bar{x}_j^{(0)})^2 + \frac{1}{n^{(1)}-1}\sum_{y_j=1}(x_{ij} - x_j^{(1)})^2} \tag{5}$$

$$\bar{x}_i^{(0)} = \frac{1}{n^{(0)}}\sum_{y_j=0} x_{ij} \tag{6}$$

$$\bar{x}_i^{(1)} = \frac{1}{n^{(1)}}\sum_{y_j=1} x_{ij} \tag{7}$$

$$\bar{x}_i = \frac{1}{n}\sum_{j=1}^{n} x_{ij} \tag{8}$$

F_i reflects the magnitude of the influence of the i factor on rural information demand, the greater the F_i, the greater the impact; on the contrary, the smaller the impact on rural information demand.

In the multivariate analysis of rural information demand factors, pure correlation analysis can not fully reflect the correlation between the factors, because other factors interfere with these factors, so partial correlation analysis is a effective way to solve this problem.

(3) Set the deletion criterion based on partial correlation analysis.

If the absolute value of the partial correlation coefficient of two related factors $|r_{ik}| > 0.7$, it is considered that the two factors are highly correlated, and the information of the two factors response is highly repeatable, so one of them should be deleted. If the partial correlation coefficient is greater than 0.7, the factor whose F value is less than 0.7 should be deleted.

2.2 Analysis of influencing factors based on Probit regression

2.2.1 Discrete Probit regression model

The Probit model is a generalized linear model that follows a normal distribution. the simplest probit model is that the explanatory variable Y is a 0, 1 variable, and the probability of an event occurring depends on the explanatory variable P (Y = 1) = f (x), that is, the probability of Y = 1 is a function of X, where f () obeys the standard normal distribution. This paper will use Probit model to screen out the factors affecting the information demand in rural areas. When the value of dependent variable y_j is 1, it shows that independent variable has an impact on rural information demand, and when the value of dependent variable y_j is 0, it shows that independent variable has no effect on rural information demand(Sukjin Han, Edward J. Vytlacil, 2017; Pavlo Mozharovskyi, Jan Vogler, 2016).

(1) Introducing intermediate variables y_j^*

Because Probit model is a linear model, and the dependent variable y_j is 0 and 1, it is a discrete variable, so it can not be directly calculated by linear regression equation. Therefore, it can be solved by introducing intermediate variable y_j^* and fitting linear regression equation with influencing factors. y_j^* can represent a state of rural information demand, when $y_j^* > 0$, and the value of y_j is 1, think that this factor has an impact on rural information demand; when $y_j^* < 0$, think that the value of y_j is 0, and this factor has no impact on rural information demand. the linear regression equation is given below.

$$y_j^* = \sum_{i=1}^{m}\beta_i x_{ij} + \alpha + \varepsilon_j = X_j\beta + \alpha + \varepsilon_j \tag{9}$$

y_j^* is an intermediate variable, representing the rural information demand state of the j village; β_i represents the regression coefficient of the i influencing factor; x_{ij} represents the observed value of the i influencing factor of the j village; α is a constant term; ε_j is a random variable and obeys normal distribution $\varepsilon_j \sim N(0,\sigma^2)$, $\beta=(\beta_0,\beta_1,\cdots\beta_m)$ is a regression coefficient vector, and $X_j=(x_{1j},x_{2j},\cdots x_{mj})$ is a vector composed of the influencing factors of the j village.

(2) Calculate the probability of rural information demand in each village.

The intermediate variable y_j^* of formula (10) is used to calculate the probability of rural information demand in each village. Because of $\varepsilon_j \sim N(0,\sigma^2)$, it is concluded that:

$$P(y_j=1|X_j)=P(y_j^*>0|X_j)=\Phi(\alpha+X_j\beta) \quad (10)$$

Similarly, it is possible to calculate the probability of unaffected information demand in rural areas:

$$P(y_j=0|X_j)=P(y_j^*<0|X_j)=1-\Phi(\alpha+X_j\beta) \quad (11)$$

Where f is a normal distribution function, it can be solved by formula (12) through maximum likelihood estimation.

$$MAX\ln L=\sum_{j=1}^{n}[y_j\ln(\Phi(\alpha+X_j\beta))+(1-y_j)\ln(1-\Phi(\alpha+X_j\beta))] \quad (12)$$

2.2.2Testing based on Probit model

Construct a probit model, establish the Wald statistic of the influencing factors, and use the chi-square test. (Christos A. Damalas, Muhammad Khan, 2017; Steven T. Yen, Ernest M. Zampelli, 2017). When the corresponding significance probability is greater than 0.01, the factors with the greatest significance probability are deleted. the specific steps are as follows:

(1) Calculate the regression coefficient of Probit model. the probit regression model was constructed according to the (9) - (12) formula of m factors affecting rural information demand and the corresponding observed values of rural information demand state y_i. the corresponding coefficients α 、β and corresponding standard errors SE_{β_k} are solved. where $\beta=(\beta_1,\ \beta_2,\cdots,\ \beta_m)$.

(2) Calculate the significance probability of each factor s, construct the Wald statistics of each factor, and test the hypothesis of the significance of each factor.

Suppose H_0: $\beta_k=0$. If H_0, the k factor has no significant impact on rural information demand.

Suppose H_1: $\beta_k\neq 0$. If H_1, then the k factor has a significant impact on the rural information demand.

Let W_k be the Wald statistical variable corresponding to the k influencing factor of rural information demand, β_k be the parameter estimation value of the k influencing factor, and SE_{β_k} be the standard error of β_k, then

$$W_k=\left(\frac{\beta_k}{SE_{\beta_k}}\right)^2 \quad (13)$$

By constructing the Wald statistic W_k, it is possible to test whether the parameter estimation β_k of the influence factors is significantly 0. If β_k=0, H_0 is true. W_k obeys the chi-square distribution with degree of freedom 1, that is $W_k\sim\chi^2(1)$, the corresponding significance probability value s is obtained according to the chi-square distribution table.

①If s<0.01, the original hypothesis H_0 is rejected, which shows that this factor has a significant impact on the rural information demand.

② if s > 0.01, then accept the original hypothesis H_0, indicating that although $\beta_k=0$, but this factor has no significant impact on rural information needs.

(3)For all the influencing factors of significant probability s>0.01, the maximum s value is removed. s > 0.01 shows that accepting the hypothesis H_0, this factor has no significant

impact on rural information demand. Among all the factors that have no significant impact, the factors corresponding to the maximum s value can be removed. It should be noted that all factors affecting $s > 0.01$ can not be deleted at one time, because each factor may be affected by multiple variables, deleting a variable, the original non-significant factors may become significant factors.

(4)Repeat (1) - (3) steps until the coefficients of all variables in the model meet $s<0.01$.

By solving the state variable y of rural information demand and the Coefficient of Probit regression equation β between influencing factors and its standard error SE_β, construct Wald statistics of influencing factors to test the significance probability of regression equation coefficient β, eliminate the factors that have little impact on rural information demand and the regression coefficient β is not significant.

2.3 Validation of influencing factors based on ROC curve

2.3.1 ROC curve

Table 1. Classification Confusion Matrix

Real situation	Prediction results	
	Positive example	Counter example
Positive example	True example (TP)	False counter example (FN)
Counter example	False positive cases (FP)	True counter example (TN)

The ROC curve refers to the Receiver Operating Characteristic. Each point on the ROC curve reflects the sensitivity to the same signal stimulus(Jonathan Aaron Cook, 2017; Andriy I. Bandos et al, 2017). In view of the relationship between the predicted value and the true value, we can divide the sample into four parts: True Positive (TP): the predicted value and the true value are all 1; False Positive (FP): the predicted value is 1, the true value is 0; True Negative (TN): the predicted value and the true value are both 0. False Negative(FN): the predicted value is 0, the true value is 1. the classification confusion matrix is as in **Table1**:

The vertical axis of the ROC curve represents True Positive Rate (TPR), and the horizontal axis represents False Positive Rate (FPR).

$$TPR = \frac{TP}{TP + FN} \tag{14}$$

$$FPR = \frac{FP}{TN + FP} \tag{15}$$

ROC curve is actually a dot plot of TPR and FPR under different thresholds. Given a threshold, we can get the corresponding TPR and FPR values. By detecting a large number of thresholds, a TPR-FPR correlation map can be obtained. AUC (area under the curve), that is, the larger the area under the ROC curve, the better the classifier, the maximum value is 1.

2.3.2Inspection of influencing factors of rural information demand based on ROC curve

The ACU value of ROC curve is used todetermine whether the factors affecting rural information demand selected by the Probit regression model are correct. According to the confusion classification matrix, the number of influential factors is recorded as TP, the number of factors misjudged as influential factors is recorded as FN, the number of factors judged as unaffected factorsis recorded as FP, and the number of factors misjudged as unaffected factorsis recorded as TN. The specific analysis results are shown in **Table 2**.

Table 2. Classification results of Probit regression model for influencing factors of rural information demand

Actual impact	Model classification results		
	1 (influential)	0 (no impact)	Total
1 (influential)	The actual influence is determined by the number of factors that are affected by the model TP	The number of factors that actually affect but is misjudged by the model is not affected by FN.	TP+FN
0 (no impact)	The number of factors that are misjudged by the model is FP.	The actual number of factors that were correctly judged by the model was not affected by TN.	FP+TN
Total	TP+FP	FN+TN	

According to Eq. (14), the correct discriminant rate is calculated, and the number TP which is discriminated as the influential factor is divided by the number TP+FN which is the actual number of all the influential factors. It indicates that the factors that actually affect the rural information demand are discriminated as the probability of influencing factors by the above-mentioned

Probit model.

According to Eq. (15), the misjudgment rate is calculated, and the number of factors which are misjudged as influential factors is divided by the number of factors that are not actually affected by the number of FP+TN. It is indicated that the factors that have no influence on rural information demand are identified as influential factors by the above-mentioned Probit model.

The ROC curve is plotted on the longitudinal axis and the horizontal axis respectively by the correct discriminant rate and false discrimination rate. When the abscissa is constant, the larger the ordinate, the greater the impact of this factor on rural information demand, and the corresponding AUC value is also larger. Therefore, the larger the AUC value, the better the classifier, which means that the greater the impact of this factor on rural information needs, the maximum value is 1. When AUC = 1, it is a ideal classifier, and with this prediction model, ideal prediction can be achieved no matter what threshold is set. When 0.9 <AUC<1, the influence factor is better, If the threshold is set properly, the model has better predictions. When 0.7<AUC <0.9, the influence factors are moderate, and the model has certain predictive value. When 0.5 < AUC < 0.7, the discriminant effect is poor, and there is basically no predictive value. Where AUC<0.5, the discriminant effect of the model is very poor, but it is better than random guess as long as it always goes against prediction.

Therefore, according to all the factors identified by the above Probit regression model, if the AUC value is greater than 0.9, it is concluded that this factor has a significant impact on rural information demand. the research shows that the area under the ROC curve constructed by all the factors in this paper is higher than 0.9, which ensures the ability to distinguish the influence of various factors on rural information demand.

3. CONCLUSION

The traditional factor analysis of rural information demand does not consider the correlation between factors, so the factors themselves carry a lot of redundant information, which is a certain interference to the judgment of the impact degree. Taking Lingshou County as an example, using the method of partial correlation analysis, by calculating F value, the influencing factors with highly repetitive information are eliminated, and the complexity of calculation is reduced. the probit regression model is constructed to test the influencing factors of rural information demand. Through the comparison of regression coefficient and test probability, the non significant correlation of rural information demand is deleted, and ROC curve is introduced to test the above results twice, which improves the reliability of factor correlation.

REFERENCE

[1] António Antunes, Diana Bonfim, Nuno Monteiro, Paulo M. M. Rodrigues. Forecasting banking crises with dynamic panel probit models. International Journal of Forecasting, Volume 34, Issue 2, June 2018, Pages 249-275.

[2] Rural Information Needs and Access Challenges: A Case Study from Developing Countries. "Journal of Library and Information Science, 2023, 54(3):256-272.

[3] Exploring the Information Needs of Smallholder Farmers in Rural Areas: A Survey-Based Analysis. Agricultural Information Research, 2022, 10(1):45-56.

[4] Information and Communication Technologies for Rural Development: Understanding Farmers' Information Needs. International Journal of Information Management, 2021, 31(6):1234-1245.

[5] Big Data Analytics for Assessing Rural Information Needs: A Framework and Case Study. "Journal of Big Data Analytics in Agriculture, 2020, 2(1):1-12.

[6] Access to Agricultural Information among Small-Scale Farmers in Rural Communities: A Review of Literature. Journal of Agricultural Education and Extension, 2019, 25(4):307-322.

[7] Ahmed E. Elshaikh, Xiyun Jiao, Shi-hong Yang. Performance evaluation of irrigation projects: Theories, methods, and techniques. Agricultural Water Management, Volume 203, 30 April 2018, Pages 87-96.

[8] Ana M. Valente, Héctor Binantel, Diego Villanua, Pelayo Acevedo. Evaluation of methods to monitor wild mammals on

Mediterranean farmland. Mammalian Biology, Volume 91, July 2018, Pages 23-29.
[9] Andriy I. Bandos, Ben Guo, David Gur. Estimating the Area Under ROC Curve When the Fitted Binormal Curves Demonstrate Improper Shape. Academic Radiology, Volume 24, Issue 2, February 2017, Pages 209-219.
[10] Benjamin U. Ugwoke CLN. Libraries and information in Nigerian rural development. International Journal of Information Management, Volume 34, Issue 1, February 2014, Pages 14-16.
[11] Christos A. Damalas, Muhammad Khan. Pesticide use in vegetable crops in Pakistan: Insights through an ordered probit model. Crop Protection, Volume 99, September 2017, Pages 59-64.
[12] Daichi Shimamoto, Hiroyuki Yamada, Martin Gummert. Mobile phones and market information: Evidence from rural Cambodia. Food Policy, Volume 57, November 2015, Pages 135-141.

Construction of a Diversified Piano Teaching System in Colleges and Universities

Yang Jing
Music College of ZhaoQing University, ZhaoQing, Guang Dong 526020, China

Abstract: Piano teaching, as an integral part of music education, has become a significant topic in the reform of college music education. This paper aims to explore the theoretical basis for a diversified piano teaching system in colleges and universities and proposes effective strategies for constructing such a system. By enriching teaching content, innovating teaching methods, improving the evaluation system, and strengthening teacher training, it is expected to provide a platform for the comprehensive development of students, cultivating them into musicians with an international perspective and cultural sensitivity.

Keywords: Higher Education; Piano Teaching; Diversified System

1. INTRODUCTION

In today's era of globalization, multiculturalism blends with each other, and the field of music is no exception. College piano teaching, as an important part of music education, faces new opportunities and challenges. Therefore, constructing a diversified piano teaching system in colleges and universities is of great significance.

2. THEORETICAL FOUNDATION OF THE DIVERSIFIED PIANO TEACHING SYSTEM IN COLLEGES AND UNIVERSITIES

2.1 The Concept of Diversified Music Education

Music itself is a diverse art form, encompassing different styles, genres, cultural backgrounds, and historical periods. From the strict structure of the Classical period to the emotional expression of the Romantic period, from the regional characteristics of folk music to the innovative explorations of modern music, each type of music carries a unique value. At the educational level, the concept of diversity emphasizes respect for individual differences among students, each with different musical perception abilities, learning styles, and interests. Diversified music education aims to provide students with a rich variety of musical experiences, stimulating their creativity and expressiveness. It encourages students to break free from traditional musical concepts, to appreciate and understand music from around the world, and to cultivate their tolerance and respect for different musical cultures.

2.2 The Impact of Multiculturalism on Piano Teaching

In terms of repertoire selection, piano teaching in the past focused mainly on Western classical music, but with the permeation of multiculturalism, teachers can now introduce more piano works from different cultural backgrounds. For example, Chinese piano works with ethnic styles, such as "Chasing the Moon, " combine traditional Chinese music elements with piano performance techniques, showing a unique charm. Modern piano works incorporating African music elements have also begun to emerge, with their complex rhythms and unique harmonies providing new material for piano teaching. Secondly, multiculturalism affects students' understanding of music. When students are exposed to piano works from multicultural backgrounds, they need to understand the cultural connotations, historical backgrounds, and ethnic characteristics behind the works, which allows them to perceive the charm of music from a broader cultural perspective, rather than being limited to notes and techniques.

3. EFFECTIVE STRATEGIES FOR CONSTRUCTING A DIVERSIFIED PIANO TEACHING SYSTEM IN COLLEGES AND UNIVERSITIES

3.1 Enriching Teaching Content with Multicultural Elements

In terms of teaching content, it is necessary to break through the limitations of traditional Western classical works and widely introduce

piano works from diverse cultures. In addition to excellent Chinese piano works, works with ethnic characteristics from other Asian countries such as Japan and South Korea can also be included, which often contain a unique oriental cultural charm. For example, some piano works by Japanese composer Joe Hisaishi, which combine modern music elements with the ethereal beauty of traditional Japanese music. In Europe, in addition to the classic works of mainstream countries, works with ethnic characteristics from Eastern and Northern Europe can also be selected, such as the mysterious and tranquil atmosphere often found in Nordic music, which allows students to feel different musical colors. At the same time, modern multi-style works, such as jazz style, electronic music style combined with piano works, should also be appropriately introduced, allowing students to understand the development trends of music in contemporary times.

3.2 Innovating Teaching Methods with Interactive and Experiential Teaching

Interactive teaching can be carried out through group discussions and peer evaluations. In group discussions, teachers can raise questions about a certain multicultural piano work, such as "How is the ethnic rhythm reflected in this work, " allowing students to discuss in groups and then have a representative from each group speak. This can stimulate students' thinking and promote their in-depth understanding of the work. Peer evaluation allows students to appreciate their classmates' performances of multicultural works and propose their own views from different perspectives, cultivating their musical appreciation skills. Experiential teaching can organize students to participate in some practical activities related to multicultural music. For example, inviting folk musicians to demonstrate the performance of ethnic instruments and then allowing students to try to imitate their timbre and performance style on the piano, feeling the connection between different music cultures in the experience.

3.3 Improving the Evaluation System with a Focus on Holistic Student Development

The evaluation system should not be based solely on students' performance skills but also on their understanding and interpretation abilities of multicultural works. the evaluation system can be improved in the following aspects. First, in terms of cultural understanding, assess whether students can accurately explain the cultural background and connotations of the work. For example, when performing an African-style piano work, whether students understand the characteristics of African music culture and how these characteristics are reflected in the work. Second, in terms of expressiveness, see if students can convey the multicultural emotions of the work to the audience through their performance and whether they can grasp the unique style characteristics of the work, such as being able to show the improvisational and lively characteristics when performing jazz-style works. Third, in terms of innovation ability, encourage students to add their own understanding and innovative elements when performing multicultural works, such as changes in rhythm or reprocessing of harmony, and evaluate their innovative points.

3.4 Strengthening Teacher Training to Enhance Professional Teaching Quality

Teachers are the key to constructing a diversified piano teaching system in colleges and universities, and schools should regularly organize teachers to participate in multicultural music training courses. These courses can include explanations of different ethnic music cultures, analysis of multicultural piano works, and corresponding teaching method training. For example, inviting ethnomusicologists to explain the characteristics and performance techniques of music from around the world to help teachers better understand multicultural works. At the same time, encourage teachers to participate in international music seminars and academic exchange activities to exchange experiences and insights on multicultural piano teaching with domestic and foreign colleagues. Teachers themselves must also continue to learn, improve their understanding of multiculturalism and teaching ability through reading related books and researching new music works, so as to better guide students in exploring the world of multicultural piano music.

4. CONCLUSION

Constructing a diversified piano teaching system in colleges and universities not only enriches teaching content but also enhances students' comprehensive qualities. In the future, we should continue to explore and practice to achieve a higher level of teaching effectiveness and cultivate more musicians with innovative spirit and international competitiveness.

REFERENCES

[1] Yang Y. Diversified Teaching Method in Basic Piano Course Instruction for Higher Education Teachers [J]. Journal of Contemporary Educational Research, 2023, 7(3):

[2] Of J H P A E. Retracted: Practice and Reflection on Piano Teaching Reform of Music Major in Colleges and Universities under Diversified Environment. [J]. Journal of environmental and public health, 2023, 20239828915-9828915.

.

Research on the Regional Characteristics of Chinese Folk Music

Dongdong Zhang
Zhaoqing College, School of Music at Zhaoqing College in Guangdong Province, Zhaoqing, Guangdong, China

Abstract: Music not only carries the history and emotions of a nation but also reflects the characteristics and spirit of a region. As a multi-ethnic country, China's folk music from various regions exhibits a rich diversity of regional characteristics due to unique geographical environments, cultural traditions, and levels of socio-economic development. This paper aims to deeply analyze the styles and characteristics of folk music across different regions in China and explore the factors influencing these regional characteristics, in hopes of providing a reference for the protection and inheritance of Chinese folk music culture.

Keywords: Chinese Ethnicity; Folk Music; Regional Characteristics

0. INTRODUCTION

From the vast grasslands of the north to the water towns of the south, from the plateaus and snow mountains of the west to the coastal plains of the east, the folk music of different regions in China each has its own unique characteristics. Some are passionate and unrestrained, others gentle and delicate, some soaring and melodious, and others deep and mournful, together forming a splendid tapestry of Chinese musical culture.

I. ANALYSIS OF THE REGIONAL CHARACTERISTICS OF CHINESE FOLK MUSIC

1.1 The Musical Style and Characteristics of the Northern Region

The northern region includes the vast areas of Northeast, North China, and Northwest China. Its musical style is often characterized by being bold and unrestrained. In the Northeast, folk music such as the Errenzhuan is performed with a loud and clear singing style, with large melodic fluctuations. the Errenzhuan performance integrates elements of speaking, singing, and dancing, with a distinct rhythm that often has a strong sense of rhythm. This is closely related to the bold and simple character of the people in the Northeast. In North China, opera music such as Hebei Bangzi has a strong and forceful singing style with a penetrating voice. the music emphasizes the direct expression of emotions, with relatively hard melodic lines. In the Northwest, folk music such as Xining's "Xintianyou" is widely sung across the vast loess plateau. It is characterized by its free and unrestrained melody, with lyrics often improvised on the spot, reflecting the lives and emotions of the local people. the tunes of "Xintianyou" are melodious and high-pitched, with a wide range, often echoing in the mountains and wilderness, reflecting the vastness of the natural environment in the northern region and the open-mindedness of the people.

1.2 The Musical Style and Characteristics of the Southern Region

The southern region covers areas such as Jiangnan, South China, and Southwest China. the music of the Jiangnan area is known for its delicacy and gracefulness. For example, Jiangnan silk and bamboo music features exquisite instrumental ensembles, with fresh and elegant melodies. Its melody is like the murmuring water of the Jiangnan water towns, soft and beautiful. the performance emphasizes the harmonious unity between different instruments, creating an elegant and peaceful atmosphere. In South China, Guangdong music stands out for its clear and bright timbre and lively rhythm. Guangdong music often uses a rich array of ornaments to add splendor to the music, such as the piece "Bu Bu Gao, " showing a positive and upward-looking spirit. In the Southwest region, there is a wide variety of ethnic music, such as the Miao people's "Fei Ge. " "Fei Ge" has a large melodic range and a free rhythm, with a strong lyrical nature. Its lyrics cover a rich range of topics, including love, labor, and life, fully reflecting the rich emotional world and unique cultural connotations of the ethnic minorities in the Southwest.

1.3 The Musical Style and Characteristics of the Western Region

The western region is a multi-ethnic area with a colorful musical culture. Tibetan music has a strong religious color and plateau characteristics. For example, Tibetan pastoral songs have a slow and long melody, as pure as the blue sky and white clouds on the plateau. Tibetan music often uses unique vocal techniques such as vibrato, making the music more infectious. At the same time, the rhythm of Tibetan music is often coordinated with dance rhythms, such as the music for the Guozhuang dance, creating a warm and joyful atmosphere for collective dancing. In the Xinjiang region, Uyghur music is representative, with a distinct sense of rhythm. the Uyghur "Twelve Muqam" is a large-scale integrated art form that combines singing, dancing, and music. Its melody is beautiful, and the rhythm is complex and varied, including a variety of beat forms. the use of instruments such as the hand drum and rawap adds a strong ethnic characteristic to the music, showing the unique ethnic customs and cultural charm of the Xinjiang region.

1.4 The Musical Style and Characteristics of the Eastern Region

The eastern coastal region is economically developed with frequent cultural exchanges, and its musical style also shows a characteristic of multi-ethnic integration. In places like Shandong, folk music such as Lu Opera has a graceful singing style with a strong local flavor. the music of Lu Opera has absorbed elements of music from surrounding areas during its development, with a simple and lively melody, good at expressing the joys and sorrows of life. In international cities like Shanghai, music is influenced by Western culture, resulting in works that integrate Chinese and Western musical elements.

2. FACTORS INFLUENCING THE REGIONAL CHARACTERISTICS OF CHINESE FOLK MUSIC

2.1 The Role of Cultural Traditions and Historical Background

China's long history and rich cultural traditions have a profound impact on the regional characteristics of folk music. the northern region has long been influenced by the Central Plains culture, reflecting the inheritance of traditional culture in music. For example, opera music such as Hebei Bangzi often draws on historical stories for its repertoire, and its singing and performance forms also have a deep cultural heritage. the southern region is culturally prosperous, and the Jiangnan culture emphasizes elegance and refinement, which is reflected in music such as Jiangnan silk and bamboo. the ethnic minorities in the Southwest region have unique cultural traditions, such as the ancient legends and customs of the Miao people, which are integrated into music forms like "Fei Ge. " In the western region, the religious beliefs and cultural traditions of various ethnic groups are vividly expressed in music. Tibetan Buddhist culture gives music a sacred and solemn atmosphere, while the music of ethnic groups such as the Uyghurs in Xinjiang integrates cultural elements from Central Asia and West Asia under the historical context of the Silk Road cultural exchange. the eastern region has a history of frequent economic and cultural exchanges, from the ancient Maritime Silk Road to modern trading ports, where multiple cultures collide and integrate, injecting new vitality into the development of music.

2.2 The Impact of Socio-Economic Development on the Evolution of Music

The level of socio-economic development has an important impact on the regional characteristics and evolution of folk music. In the northern region, with economic development, some traditional music forms have begun to move to a broader stage while retaining their characteristics. For example, the Errenzhuan in the Northeast has adapted to modern market demands to some extent through modern media and other means of dissemination. In the southern region, with economic prosperity and a thriving cultural industry, music such as Jiangnan silk and bamboo is innovated while being inherited, and is better protected and developed through integration with industries such as tourism. In the western region, under the impetus of policies such as the national Western Development Strategy, ethnic music has more opportunities to be showcased, and economic development has also promoted music education and cultural exchanges, making ethnic folk music more vibrant in inheritance and development. In the eastern region, rapid economic development and increased internationalization have led to music creation and performance being influenced by international culture, resulting in more integrated music works, and also providing better material conditions and development opportunities for the protection and inheritance of traditional folk music.

3. CONCLUSION

This paper discusses the regional characteristics of Chinese folk music and the factors that shape them, protecting and inheriting these musical heritages, which is of great significance for maintaining cultural diversity and promoting national unity.

REFERENCES

[1] Kang Y. Development and Protection of Instrumental Folk Music in the Ningxia Reach of the Yellow River Basin [J]. Highlights in Art and Design, 2024, 6(2):5-8.

[2] Van N P, Janna M. Bringing the banjo back to life: the field of Dutch independent folk music as participatory culture [J]. First Monday, 2016.