

Lecture Notes in Education, Arts, Management and Social Science

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Lecture Notes in Education, Arts, Management and Social Science

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The Role of Teachers in Children's Education at an Urban Village in Shenzhen

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Abstract: The “urban village” is a product born in the process of urbanization, and the education of the children who are living in those villages in the urban city. That is one of the serious problems faced by the social management of the urban village. The main reason for this problem is that the children of the villagers in the urban city have a poor learning foundation, weak ambition, a backward educational concept of their parents, and ignorance of the construction of values and outlook on life. The surrounding environment of the urban village is not optimistic, ignoring the improvement of culture and spirit. Because the children of the urban village live and study in school for a long time, based on the above situation, we conduct a questionnaire survey on the teachers who work in those schools to understand the learning status of the special group of urban village students and try to make a suitable mode for their education and teaching. In detail, we will conduct a special questionnaire survey on 100 teachers in a “urban village” Primary School in Futian District, Shenzhen.

Keywords: Urban village; Teachers; Children; Education

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1. Factors affecting the development of students in urban villages

Through the reading and analysis of relevant literature, the main factors that affect the growth of primary school students in urban villages are the following three aspects: school, family, and society. The growing environment of children is regarded as an ecosystem, which includes four layers of family, school, community, and society. The four layers supervise, penetrate, and link each other. Government is the core of ecological intervention system; through the different levels of child protection, when there is defect or failure, the government will mobilize all possible positive resources, form a confluence of multiple protection, and strengthen inter-departmental cooperation, so that children can get support in every aspect of the ecological system, namely, family, school, community, ecosystem, the trinity from intervention affect all aspects of children's growth and development. There are problems in the family, school, and community environments that affect the healthy growth of children^[1]. Next, we will summarize the problems mentioned in the literature we collected.

1.1. The influence of family factors on the education of students in urban villages

The family has a very prominent influence on the learning of primary school students in urban villages. The parents' education style, the importance they attach to the students' learning, and the behavioral habits they establish since childhood all have a direct influence on the growth of children.

However, parents in urban villages lack education for their students due to their busy lives, work, their own low level of education, lack of cooperation and communication with school teachers, and lack of scientific means of education, resulting in a lack of education for students at home.

Qin *et al.* and Huang^[2,3] mentioned the exploration of the current situation, problems, and suggestions of home-school co-parenting in urban villages through moral education. Moral education in schools in urban villages faces a challenge in achieving the goal of educating students with moral principles. To achieve good education results, support and cooperation from families are urgently needed. The results show that both parents and schools are aware of the importance and necessity of cooperative education. The communication channels between parents and schools are diverse, as well as the content of education. Parents' satisfaction with cooperative education is relatively high. Families attach great importance to children's education, and the tacit understanding of school formation education is different, and the expectation of children's future development is low. Therefore, schools should change their leading role in collaborative education, guide parents to establish a two-way communication mechanism for collaborative education, organize and carry out distinctive educational activities, systematically teach parents educational knowledge and methods, and create a harmonious home-school education environment. At the same time, change the concept of family education, so that parents can consciously implement a benign way of family education, reduce the differences in living and learning habits caused by different family backgrounds, so that urban village students can have the same growth opportunities as urban children.

Zhu^[4] conducted a behavioral analysis of family education in urban villages in the context of educational urbanization and found four points. First, students in urban villages generally have poor grades and a lack of artistic skills. Second, most urban village parents are less educated and lack the methods to teach their children. Third, children's ambition is poor, mainly because parents have no requirements for their children. Fourth, the family environment is poor, and parents do not have a sense of role models. The author also discusses the causes of these problems, including parents' lack of educational methods, the failure of parents to play a role in demonstration, and the special social environment in urban villages. Chu also believed that the role of parents in the education of students is very significant. As educators, parents have certain particularity^[5]. First of all, parents can combine with the character of their children to teach. Second, the education of children is more comprehensive. Third, the education of children begins at the earliest and lasts the longest. Fourth, parents and children are more likely to resonate, parents' behavior directly affects their children. Fifth, good communication and mutual learning between parents and children are more conducive to the harmony of family relations. Therefore, the author thinks that it is necessary to cultivate parents' right view of education and improve parents' scientific parenting knowledge and skills. Families in urban villages also experience the particular phenomenon of fatherhood deficit, Ding^[6] analyzed the status quo of father's participation in family education in urban village families, pointed out the important role of fathers in family education from existing problems, and proposed to improve the effectiveness of father's participation in family education and to enhance father's sense of responsibility and role. It requires society, schools, and families to work together to create an all-round, multi-form, and collaborative education environment to solve this problem. Liao^[7] put forward four strategies to guide parents to carry out effective family education from the perspective of students' growth, aiming at the characteristics of parents' lack of educational methods and strategies in family education in "urban villages." First, do a good job of top-level design to create conditions for parents to master the guidance strategies of family education; Second, run a good school for parents to learn family education methods; Third, expand the home-school contact channels, in the communication to enhance the ability of family education; Fourth, the establishment of parent-child school, parent-child activities in the use of guidance strategy. Emphasizing that family education is an integral part of the whole education system and children's growth, schools should build convenient management methods.

From the above, we can see that the area of children's education in urban villages is relatively unique. The education

of parents is crucial to the growth of students, and this has a profound impact on their development. How teachers should guide parents to do a good job in family education is a question that deserves our deep consideration, especially for parents in urban villages.

1.2. The influence of school and society on the educational development of children in urban villages

Both society and the social environment are very important for the development of a person, both in character and behavior. The story of Mencius' mother moving three times is a typical illustration of the influence of social environment on personal growth. The school environment also has an extremely important influence on the physical and mental development of children. Learning is a very important stage in a child's life. At school, children learn knowledge through teachers and learn interpersonal communication through interaction with classmates.

The community environment has a certain degree of strengthening or weakening effect on the influence of the family environment, which is the most direct environment for children's growth. However, there are many problems in the village community, for example, the degree of harmonious integration of residents in the community is poor, the ideological consciousness of the community staff in the "village in the city" is relatively low and the work attitude is not serious, cannot carry out community services well, cultivate a good environment for children to grow up, and the community team construction in many cities is still lacking.

What effect does the environment of the urban village have on the growth of students? Jiao^[8] pointed out that in terms of the education of villagers' children, there are mainly problems such as poor performance of villagers' children in urban villages, unreasonable parental education in urban villages, and unfavorable surrounding environment in urban villages. These problems are mainly caused by the role change of urban villages, including the change of children from poor to rich in urban villages, ignoring the construction of values and outlook on life. The transformation of parents from busy to idle in urban villages ignores the importance of family model education. The transformation of the village into the city from the broken to the new ignores the improvement of culture and spirit. To solve these problems in order to build an interactive solution mechanism, it needs the efforts of the whole society, including the government, the village committee, and non-profit organizations to cooperate to build a cultural atmosphere; family and school cooperate to build spiritual home; model college students and their children communicate in many ways to shape values together.

The theme of social practice activities of college students is also a very good way to improve the education of children in urban villages. Tian *et al.* explored the way of integrating college associations with the secondary classroom education in urban village primary schools. With the transformation of the urban village primary school, the development of the second classroom in the urban village primary school is not optimistic. With the help of university social practice activities, college students' community activities can be creatively combined with the second-classroom activities of urban village primary schools^[9]. While improving the effect of college students' social practice, it can achieve organic integration with the second-classroom education of urban village primary schools, truly achieving a win-win situation.

1.3. The role of teachers in the educational development of children in urban villages

Left-behind children are similar to children in urban villages. Most of them are also handed over to grandparents or relatives to raise them. Lack of family education leads to different degrees of educational deficiency in personality, emotion, lifestyle, and daily behavior habits. For them, the people who can give them the most education in many aspects are the teachers at school.

Qin *et al.*^[2] studied the topic of "rural teacher in several explorations of left-behind children education" and pointed out that in the important period of development, left-behind children cannot obtain the correct thoughts and ideas of value of guidance from parents, and often will produce the error deviation behavior cognition and values, leading to abnormal psychological development. According to Qin *et al.*^[2], who has been working in primary schools in poor areas for a long time, they shared some educational methods: to be their "guardian," to really talk to them like parents, to understand their ideas, to help them establish correct thoughts and values, and to distinguish right from wrong; praise them more than criticize them, transform them through their shining points, satisfy their psychological need for respect, and inspire their

internal motivation to transform; be a mentor in your life, a friend in your soul, love them on a deep level, talk to them, be their friend, understand their problems, help them out ^[2].

The educational development of children in urban villages and left-behind children cannot rely on the efforts of teachers in school, but also needs the cooperation of families. Only through home-school cooperation can they improve their healthy growth. Chen mentioned both in the “communication: set up a bridge between teachers and students, parents” and “focus on left-behind children, strengthen the communication between family—16 and 20 apple” that the all-round development of students cannot do without the joint efforts of school and family, only teachers’ sincere communication can help to communicate effectively, and help parents to change science education conception, improve the level of quality education in family ^[10].

2. Data analysis

This study adopted a quantitative research method to investigate teachers’ perceptions of students’ performance at school and their parents in five urban village schools, namely Gangxia Primary School, Shangsha Primary School, Xiasha Primary School, Zhongfu Primary School, and Meili Primary School in Futian District, Shenzhen. A total of 207 questionnaires were sent out online through the WeChat group, of which 115 were collected, representing a recovery rate of 55%. Among these, 115 questionnaires were valid, with an efficiency rate of 100%.

Figure 1 shows that most teachers think they have a fair cooperation with parents. Among them, teachers with 10–20 years of teaching experience account for the highest proportion at 72.73%. As can be seen from the data, among the old teachers with more than 20 years of teaching experience, 4.55% of them have excellent parent-teacher cooperation. The shorter the teaching experience, the fewer teachers reach a high level of cooperation. 41.18% of teachers with 1–5 years of teaching experience think that the degree of cooperation with parents is poor, which accounts for the most among the four teaching age groups.

From the analysis of the above data, we can see that there is a greater relationship between teachers’ teaching experience and parental cooperation. Experienced teachers have a higher level of cooperation with parents.

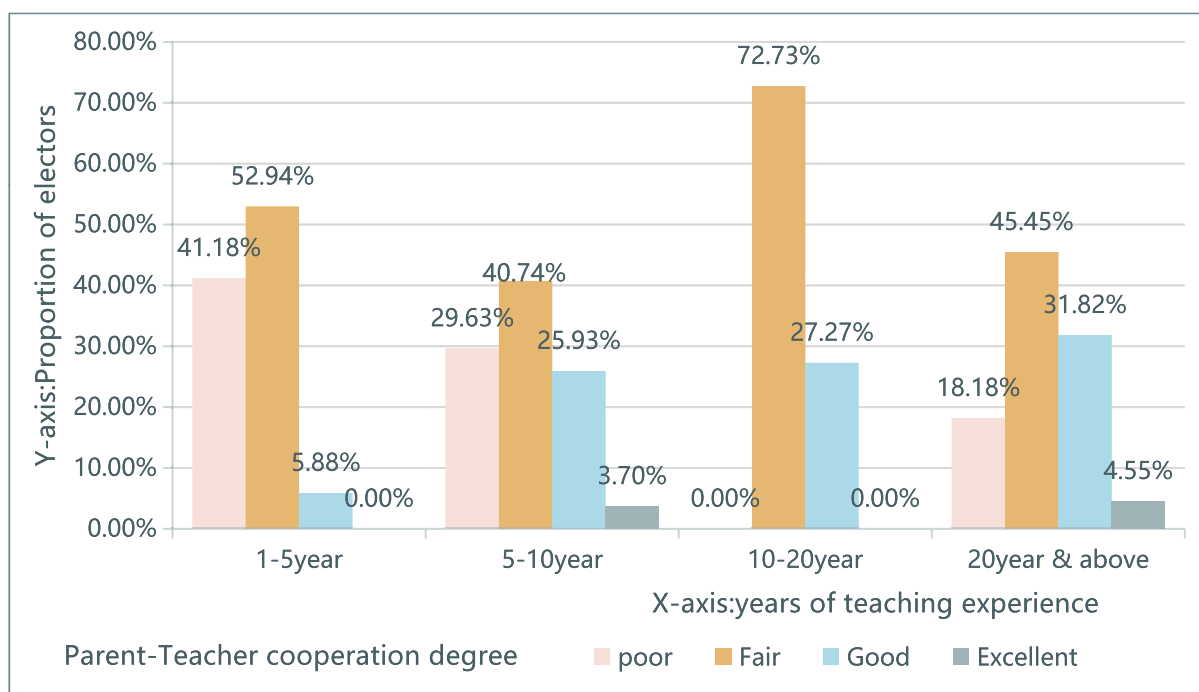


Figure 1. The relationship between parent-teacher cooperation and teaching experience

2.1. Experienced teachers have a higher communication rate with parents

We have also screened the answers to this question for main subject teachers (Chinese, Mathematics, English, and Science subjects) because of the need to communicate more closely with parents than with teachers of other subjects, given all the factors involved in assigning homework and the need to be responsible for organizing examinations from time to time. Comparisons were made through four groups of teaching experience (1–5 years, 5–10 years, 10–20 years, 20 years and above). The results of the comparison are shown in **Figure 2**.

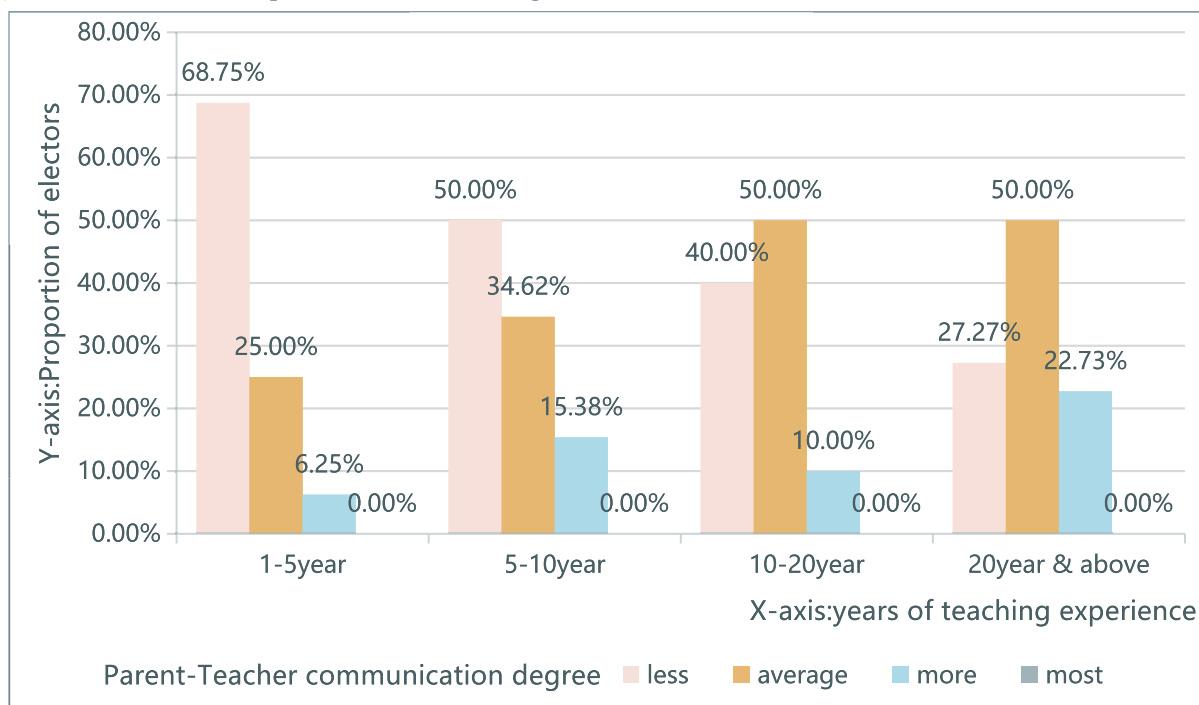


Figure 2. The relationship between parent-teacher communication rate and teaching experience

As can be seen from **Figure 2**, 68.75% of teachers with 1–5 years of experience said that they communicated less with the parents every month, and the low communication rate was the highest among all the teaching experience groups. Half of the teachers with more than 10 years of teaching experience can reach the average level of communication, but only 25% of the teachers with 1–5 years of teaching experience can reach the average level of communication. When compared with the communication rate of more among all teaching age groups, those with 1–5 years of teaching experience take only 6.25%, with 5–10 years of teaching experience takes 15.38%, with 10–20 years of teaching experience takes 10%, and teachers with more than 20 years of teaching experience account for the largest proportion, 22.73%^[11].

From the two questions of parental cooperation and parental communication rate, we can find that the higher the rate of communication with parents, the higher the rate of cooperation with parents; the longer the years of teaching experience, the higher the rate of communication and the level of cooperation with parents; teachers with 1–5 years of teaching experience have a significantly lower rate of communication with parents and therefore a lower level of cooperation with parents.

2.2. There is little relationship between students' grades and teachers' teaching years

For this question, we chose the results given by all the teachers surveyed. Comparisons were made from four groups of teaching experience (1–5 years, 5–10 years, 10–20 years, 20 years and more). The results of the comparison are demonstrated in **Figure 3**.

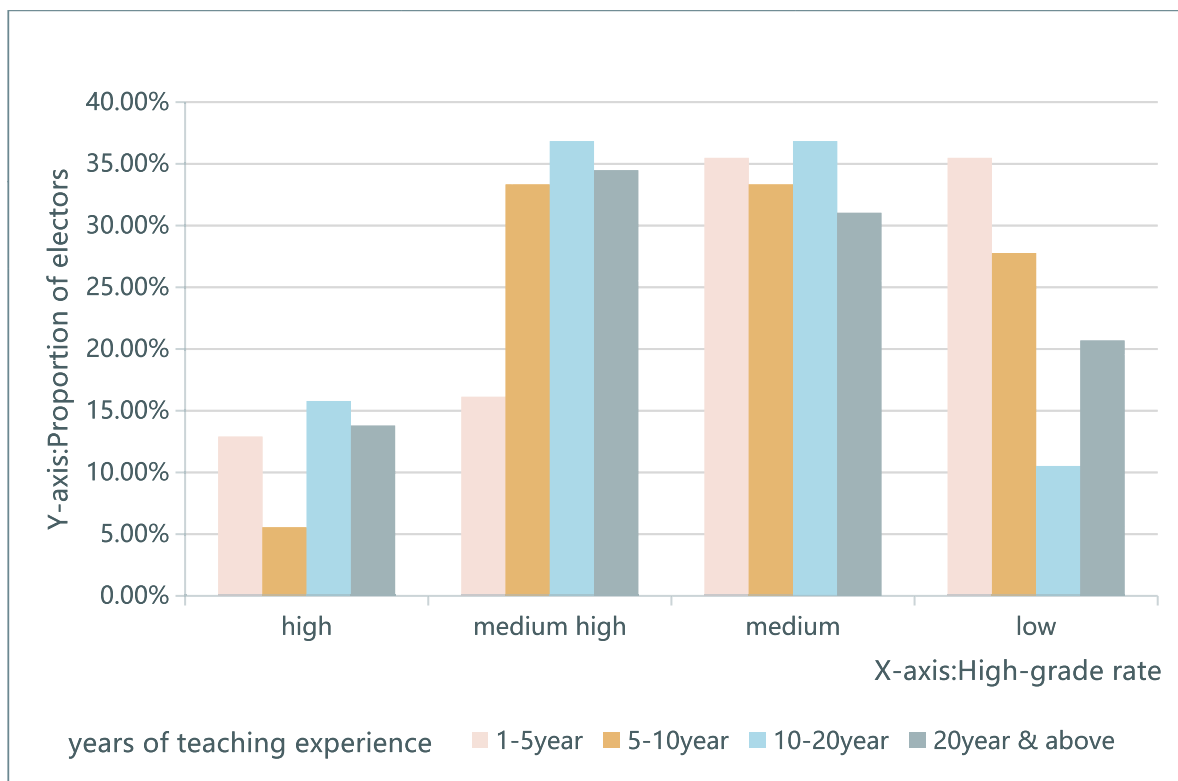


Figure 3. The relationship between high-grade rate and teaching experience

Before collecting the questionnaire survey data, we guessed that the higher the teaching experience of the teacher, the higher the rate of excellent students in the corresponding subject or class would be. However, by analyzing the questionnaire data collected, we found that our hypothesis did not apply to teaching in urban primary schools, where we found little relationship between student attainment and teachers' years of teaching experience, and we hypothesized that this phenomenon was most likely due to the generally poorer learning base of urban village students.

To improve this phenomenon, it is necessary to comprehensively improve the overall learning quality of students in urban village primary schools and to develop good learning habits. At the same time, it is necessary to teach them according to their abilities, to improve their learning performance step by step, to build up solid self-confidence for children's self-perception and to mobilize their desire to learn and their subjective motivation.

2.3. A high job completion rate does not result in a high excellence rate

When analyzing student work completion rates, we found that both low- and high-level teachers reported very high rates of student work completion, but this was not matched by high student attainment rates: high completion rates did not yield high attainment rates.

Homework plays a role in consolidating knowledge, developing thinking, and developing good study habits, and students who take homework seriously tend to do better on their final tests. A high completion rate does not mean that the quality of homework is also high. In urban village families, parents often miss out on children's after-school homework help because they do not have time to spend with their children. Children who complete homework independently may choose to do so with their peers, but this inevitably leads to copying or looking up answers online, and they lose the ability to learn and think on their own as they discuss with their peers, thus failing to improve their academic performance^[12].

In response to this phenomenon, schools can intervene appropriately in the after-school homework time of students in urban villages. For students whose parents do not have time to attend after-school homework tutorials at home, they can concentrate on completing their homework at school under the supervision of teachers to improve the quality of homework

and students' learning efficiency.

2.4. A high job completion rate does not result in a high excellence rate

For this question, we have again chosen the results given by all the teachers surveyed. Comparisons were made from four groups of teaching experience (1–5 years, 5–10 years, 10–20 years, 20 years and above). The results of the comparison are presented in **Figure 4**.



Figure 4. The relationship between the focus rate in class and teaching experience

When comparing the rate of attentive students in class with the age of the teacher, we found that the higher the years of teaching experience of the teacher, the higher the rate of focused students in class. We assumed that this is because teachers with more years of teaching experience have more experience in teaching and know how to control the pace of lessons, motivate students, and manage discipline during lessons better than teachers with fewer years of teaching experience.

3. Science is neglected

Among the suggestions we collected on the education of children in urban villages, the attitude of teachers in one subject was very different from the others. While teachers of main subjects such as Chinese, Mathematics, and English generally felt that the class workload of students in urban villages was adequate, some Science teachers felt that the amount of homework for students needed to be increased. They said in the suggestion in the questionnaire: “*More homework.*”

3.1. The existing problems and their causes

The reason behind this is the vigorous implementation of science education reform in China. The Science Curriculum Standards for Compulsory Primary Education, issued by the Ministry of Education in 2017, states that: From autumn 2017

onwards, the starting grade of the primary school science curriculum will be adjusted to Grade 1; before the Ministry of Education organizes the revision of the Experimental Program for Curriculum Development in Compulsory Education, Grade 1 and 2 of primary school will be arranged in accordance with no less than one lesson per week, and the number of lessons for Grades 3 to 6 will remain unchanged.

The 2017 science education reform brings many opportunities for development, but presents few challenges as well; it caters to the trends of the times while also pushing the status of science subjects to another level. In several of the schools we surveyed, science has been included in the Primary One examinations. However, due to traditional beliefs, neither students nor parents pay enough attention to science as a subject. They still believe that only the three subjects of Chinese, Mathematics, and English are the most important, and such a perception undoubtedly adds to the difficulty of meeting the teaching objectives of primary science.

3.2. Strengthening the importance of primary science is the way to solve the problem

To solve this problem, increasing the amount of homework is not an effective way. If we want to fundamentally improve the standard and quality of science teaching in primary schools, we should address the core issues, mainly by increasing the attention and understanding of school administrators and parents to the teaching of science in primary schools. School administrators must pay attention to and support the primary science curriculum, break through the boundaries of primary and secondary subjects, and resolutely break through the influence of exam-oriented educational thinking to make the primary science curriculum as important as other subjects. In terms of the allocation of teaching resources, attention should be paid to the selection of teaching materials and the good use of more scientific, interesting, and forward-looking teaching plans and content. In terms of teacher deployment, more specialist science teachers should be employed as lecturers in an effort to improve the standard and quality of teaching in the science curriculum. In terms of improving teaching facilities, more investment and budget should be made to constantly update and improve science laboratory teaching equipment to provide material support for the teaching of science courses.

3.3. Communication between teachers and parents is crucial

Communication is a discipline and an art. The so-called communication, we mean the sum of coordinating and handling various interpersonal relationships in the process of human interaction, and it is one of the most important channels for people to get in touch with each other^[10]. As teachers, they should take the initiative to cooperate with parents, share information with them, and scientifically reflect on students' growth and performance, so that parents can understand their children^[13]. Teachers should discuss with parents the purpose of basic methods and approaches to educate, transform, and improve students. It is necessary for both sides to communicate, trust, support, and cooperate with each other to form a harmonious relationship, so that "information" can be circulated to achieve the purpose of home-school education^[14]. In order to establish a harmonious interpersonal relationship with parents, teachers should first start with themselves and take the initiative to communicate more with parents, starting from the following aspects^[13].

3.4. Paying attention to the growth of new teachers

The training of new teachers should also be stepped up. The main difficulties faced by new teachers in the first five years of their careers include discomfort with educational work, discomfort with student management, and difficulties with interpersonal relationships. Due to the special nature of the teaching profession, novice teachers are unlikely to be able to adapt to teaching and learning from the day they become teachers^[15]. Faced with changing and developing educational targets and constantly evolving educational contexts, novice teachers inevitably encounter a variety of practical difficulties in the early years of their careers, which can lead to problems and sometimes affect the normal conduct of their teaching and learning. A great deal of research and practice has shown that the difficulties and problems encountered by novice teachers in the induction period are more complex than those encountered by teachers at other stages of their careers^[12]. Whether or not novice teachers can be helped to solve these problems has a direct impact on whether they can successfully

transform from student to qualified teacher, as well as on the growth of the students and the development of the school ^[13]. There are a number of ways in which the growth of new teachers can be facilitated.

4. Conclusion

In addition to parents, teachers also play a very important role in the development of students in urban primary schools. They act as a bridge to communicate and interact, not only to educate students, but sometimes even to instill a series of scientific concepts of family education in parents.

In general, teachers are an integral part of the education of children from urban villages, as teachers who impart knowledge to their students, as role models in life who implicitly influence the worldview, outlook on life, and values of children from urban villages, and as their friends who care about the inner changes of children from urban villages and give guidance and encouragement ^[16].

However, teachers in urban primary schools are not only dealing with ordinary primary school students, but also with a relatively special group of students. When dealing with urban primary school students, they need to have more patience and higher professionalism than other teachers, as well as to have a deeper understanding of their family environment, to give spiritual guidance and help when necessary, and to treat them equally in teaching ^[17]. They should also have an in-depth understanding of their family environment, provide spiritual guidance and assistance when necessary, teach in a way that is fair to all, and care for each student according to his or her ability. Of these teachers, the most important is the growth of the novice teacher, who faces greater professional changes and challenges than the average teacher. In the development of novice teachers, schools should be mindful of the need to guide them to recognize their own weaknesses and adapt quickly to their roles through the arrangement of experienced teachers leading novice teachers ^[18].

In the process of educating children in urban villages, teachers also face many difficulties and challenges, such as the educational reform of science subjects and poor home-school cooperation ^[19]. In response to these two more prominent problems, schools should take timely and effective measures to improve and solve them, and communicate effectively with parents through parent seminars, etc. Both teachers and parents should take the initiative to shoulder the important responsibility of educating their children. Only the combined efforts of the community, schools, teachers, and parents can create a better future for children.

Disclosure statement

The authors declare no conflict of interest.

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Research on the Relationship between Parental Parenting Styles, Independent Personality, and School Adaptation of Adolescents

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Abstract: The school adaptation of adolescents has a profound impact on their individual growth and future development. Among them, the parenting style of parents in the family is a crucial factor that directly shapes the independent personality and school adaptation ability of adolescent students. This study selected 300 adolescents as subjects. Professional tools such as the “Adolescent Student Independence Personality Scale” compiled by Xia Lingxiang, the “Short Form of Parenting Style Questionnaire” revised by Jiang *et al.*, and the “Junior High School Student School Adaptation Questionnaire” compiled by Cui Na were used. The following conclusions were drawn: (1) All three variables have significant demographic differences; (2) There is a significant correlation among the three variables; (3) Independent personality plays an incomplete mediating role between mother’s parenting style and school adaptation; (4) Independent personality plays an incomplete mediating role between father’s parenting style and school adaptation.

Keywords: Parenting style; Independent personality; School adaptation; Adolescents

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1. Overview

The influence of parents during their children’s adolescence is directly related to the formation of their children’s values, and it has a lasting impact on studies, work, love, and family life. In Shi’s study, authoritarian parenting styles are detrimental to students’ mental health ^[1]. Further studies have shown that the more love parents give to their children, the more extroverted the children tend to be ^[2]. Studies have found that authoritarian parenting is conducive to prosocial behavior in children. Self-reliant personality is one of the important elements in adolescent education ^[3]. Huang and Li suggested that self-reliance is the process by which an individual becomes independent from past dependencies ^[4]. Xia and Zhong summarized the meaning of self-reliance as initiative, independence, and moral self-control ^[5].

Some researchers have now focused on the relationship between self-reliance and school adaptation, but most have only focused on one aspect of school adaptation, and there is still a lack of in-depth research on school adaptation. Therefore, this study will delve deeper into the relationship among three variables: parenting styles of adolescents, school

adaptation, and independent personality, providing a more detailed analysis of the effects on improving the level of independent personality and school adaptation among adolescents.

2. Research methods

The evaluation scale used in this paper is derived from the Simplified Parenting Style Questionnaire (S-EMBU-C) created by Jiang *et al.* ^[6]. It consists of a total of 42 questions, all divided into three different dimensions: “Overprotection,” “rejection,” and “emotional warmth.” A four-point scale was used for “never” with 1 point, “occasionally” with 2 points, “often” with 3 points, and “always” with 4 points. The internal consistency coefficient of S-EMBU-C was 0.74–0.84 among domestic subjects. In this study, the Cronbach’s α coefficient of the total scale was 0.691, with the Cronbach’s α coefficients of the “over-protection,” “rejection,” and “emotional warmth” dimensions in the father-raising style being 0.825, 0.807, and 0.866 respectively; For mothers, the Cronbach’s α coefficients for the dimensions of “overprotection,” “rejection,” and “emotional warmth” were 0.890, 0.809 and 0.794, respectively.

The school adaptation questionnaire for junior high school students in this article is derived from Cui’s ^[7] School Adaptation Scale for Junior High School Students, which consists of 27 questions and involves five dimensions. School attitude (evaluation of school life), peer relationship (ability to get along well and harmonically with classmates), teacher-student relationship (perceived attitude and relationship between teachers and students towards each other), academic adaptation (ability to be competent for new curriculum tasks), and routine adaptation (habit and degree of adaptation to school rules and regulations, etc.) The Likert’s five-point scoring system was adopted, with different scores assigned from “totally inconsistent” to “totally consistent.” The higher the total score, the better the adaptation. The score results can visually reflect the adaptability. The internal consistency reliability (Cronbach’s α coefficient) of the scale in this study was 0.846.

In this study, the Self-reliant Personality Scale for Adolescent Students (SPS-AS) developed by Xia and Huang ^[8] was adopted. The scale includes 10 factors in 5 dimensions of independence, initiative, responsibility, flexibility, and openness in both personal and interpersonal aspects. The scale was scored on a 5-point scale, with 5 points for “very consistent,” and the consistency reliability coefficient of the scale in this study was 0.809.

Using the three scales, a questionnaire survey was conducted among adolescents aged 13–18, and data on parenting styles, independent personality, and school adaptation were entered using SPSS, and descriptive statistics, correlation analysis, regression analysis, etc., were performed.

3. Data statistics

A random sampling method was used to select a township public middle school and a county private boarding school in Sichuan Province. Students were randomly selected from the first year of junior high school to the third year of senior high school. A total of 350 questionnaires were distributed. After excluding invalid questionnaires, 300 valid questionnaires remained, with an effective rate of 85.71%. Due to the fact that some classes were temporarily occupied at the time of questionnaire collection, the data collected varied greatly among the six age groups. Therefore, the six age groups were divided into three parts, and the composition of the subjects is shown in **Table 1**.

3.1. Correlation analysis among parenting style, independent personality, and school adaptation in adolescents

As can be seen from **Table 2**, parental rejection and parental overprotection are significantly negatively correlated with school adaptation ($P < 0.01$); Parental emotional warmth was significantly positively correlated with school adaptation ($P < 0.01$).

As shown in **Table 3**, there is a significant positive correlation between independent personality and school adaptation ($P < 0.01$).

Table 1. Frequency analysis of demographic variables

Variable	Categories	Number of people	Percentage
Gender	Boys	160	53%
	Girls	140	47%
Family status	Single-parent family	35	12%
	Non-single-parent family	265	88%
Family children	Only child	58	19%
	Not an only child	242	81%
Age	13–14	113	37.7%
	15–16	82	27.4%
	17–18	105	35%

Table 2. Correlation matrix between parenting style and school adaptation of adolescents

Variable	Father's rejection	Father's emotional warmth	Father's overprotection	Mother's rejection	Mother's emotional warmth	Mother's overprotection
School attitudes with emotions	-0.305**	0.340**	0.235	0.301	0.250**	0.245
Peer relationship	-0.132*	0.129*	0.180	0.101	0.174**	0.104
Teacher-student relationship	-0.294**	0.316**	0.279	0.276	0.277**	0.249
Academic adaptation	-0.265**	0.320**	0.169	0.195	0.241**	0.116
Conventional adaptation	-0.347**	0.286**	0.293	0.307	0.257**	0.225
School adaptation	-0.353*	0.374**	0.306	0.315	0.319**	0.256
Total score						

Note: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$.

Table 3. Correlation matrix between independent personality and school adaptation in adolescents

Variables	School attitudes and emotions	Peer relationships	Teacher-student relationship	Academic adaptation	Routine adaptation	Total score of adaptation
Interpersonal independence	0.218**	0.121*	0.423**	0.212**	0.076	0.289**
Interpersonal responsibility	0.313**	0.155**	0.341**	0.350**	0.296**	0.384**
Interpersonal initiative	0.176**	0.149**	0.440**	0.269**	0.157**	0.311**
Interpersonal openness	0.301**	0.171**	0.228**	0.188**	0.220**	0.306**
Interpersonal flexibility	0.155**	0.145*	0.194**	0.306**	0.206**	0.257**
Personal responsibility	0.250**	0.116*	0.275**	0.304**	0.302**	0.322**
Personal initiative	0.09	0.009	0.168**	0.330**	0.156**	0.181**
Personal independence	0.081	0.111	0.190**	0.154**	0	0.147*
Personal flexibility	0.136*	0.02	0.118*	0.272**	0.093	0.166**
Personal openness	0.025	-0.013	0.016	0.137*	-0.007	0.04
Self-reliance total score	0.428**	0.260**	0.571**	0.579**	0.381**	0.585**

Note: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$.

3.2. Analysis of the mediating role of adolescent independent personality between parenting style and school adaptation

In the analysis of the correlation between parenting styles, independent personality, and school adaptation among adolescents in this study, it has been concluded that this significant correlation exists between each pair, which meets the preconditions for the mediating effect test according to the conditions of the mediating variable proposed by Wen Zhonglin. The mediating effect analysis was conducted with Y representing the dependent variable school adaptation, X representing the independent variable parenting style, and M representing the mediating variable independent personality (**Table 4**).

Table 4. The mediating role of independent personality between fatherly rejection of parenting style and school adaptation

	Regression equation	Regression coefficient test		R^2
Step 1	$Y = 0.353 X$	SE = 1.896	$t = 6.467^{***}$	0.125
Step 2	$M = 0.331 X$	SE = 2.448	$t = 5.995$	0.109
Step 3	$Y = 0.181 + 0.521 M X$	SE = 1.712	$t = 3.673$	0.366
		SE = 0.038	$t = 10.552^{***}$	

As shown in **Table 4**, independent personality plays an incomplete mediating role between father rejection of parenting style and school adaptation, with a mediating effect of $0.331 \times 0.521 / 0.353 = 0.489$. The path diagram is shown in **Figure 1** below.

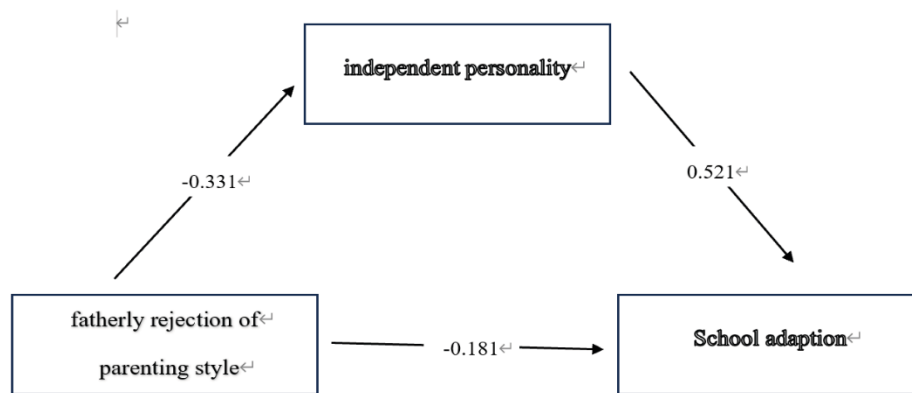


Figure 1. The mediating model of independent personality between fatherly rejection of parenting style and school adaptation

As can be seen from **Table 5**, independent personality plays an incomplete mediating role between fatherly emotional warm parenting style and school adaptation, with a mediating effect of $0.337 \times 0.514 / 0.374 = 0.463$. The path diagram is shown in **Figure 2** below.

Table 5. Mediating role of independent personality between fatherly emotional warm parenting style and school adaptation

	Regression equation	Regression coefficient test		R^2
Step 1	$YY = 0.374 X$	SE = 1.392	$t = 6.898^{***}$	0.140
Step 2	$M = 0.337 X$	SE = 1.848	$t = 6.121^{***}$	0.114
		SE = 1.264	$t = 4.079^{***}$	
Step 3	$Y = 0.201 X + 0.514 M$	SE = 0.038	$t = 10.445^{***}$	SE = 0.038

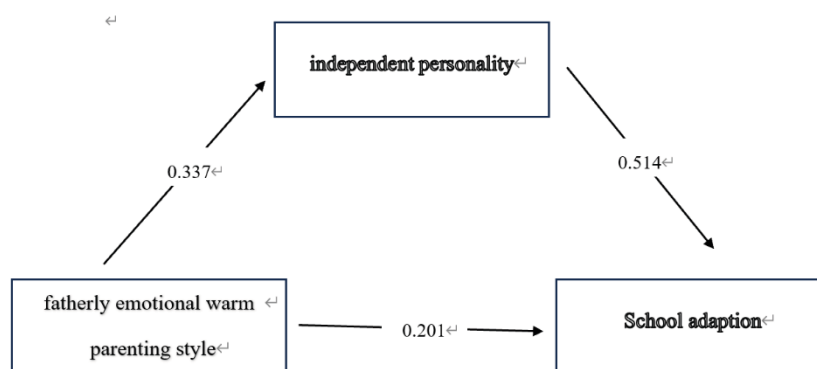


Figure 2. Mediating model of independent personality between fatherly emotional warm parenting style and school adaptation

As shown in **Table 6**, independent personality plays an incomplete mediating role between mothers' rejection of parenting styles and school adaptation, with a mediating effect of $0.309 \times 0.531 / 0.315 = 0.521$. The path diagram is shown in **Figure 3** below.

Table 6. Mediating role of independent personality between maternal rejection of parenting style and school adaptation

	Regression equation	Regression coefficient test		R^2
Step 1	$Y = 0.315 X$	SE = 1.885	$t = 5.690$	0.100
Step 2	$M = 0.309 X$	SE = 2.500	$t = 5.552^{***}$	0.095
Step 3	$Y = 0.152 + 0.531 M X$	SE = 1.680	$t = 3.067$	0.355
		SE = 0.037	$t = 10.756$	

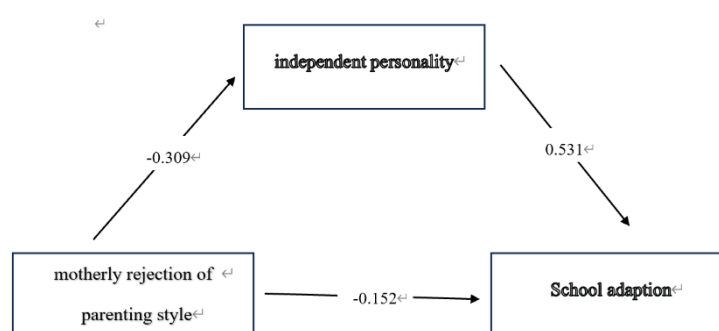
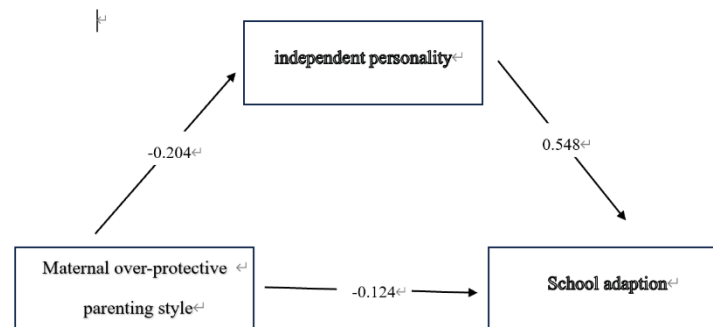


Figure 3. Mediating model of independent personality between motherly rejection of parenting style and school adaptation

As can be seen from **Table 7**, independent personality plays an incomplete mediating role between maternal overprotective parenting style and school adaptation, with a mediating effect of $0.240 \times 0.548 / 0.256 = 0.514$. The path diagram is shown in **Figure 4** below.

Table 7. Mediating role of independent personality between maternal overprotective parenting style and school adaptation

	Regression equation	Regression coefficient test		R^2
Step 1	$Y = 0.256 X$	SE = 1.842	$t = 4.532$	0.066
Step 2	$M = 0.240 X$	SE = 2.448	$t = 4.237^{***}$	0.058
Step 3	$Y = 0.124 + 0.548 M X$	SE = 1.587	$t = 2.553$	0.349
		SE = 0.037	$t = 11.271$	

**Figure 4.** Mediating model of independent personality between maternal overprotective parenting style and school adaptation

4. Discussion

4.1. Analysis and discussion on the correlation between parenting styles of adolescents, independent personality, and school adaptation

An analysis of the correlation between parenting styles and independent personality among adolescents shows a significant negative correlation between parental rejection and parental overprotection and independent personality; Parental emotional warmth shows a significant positive correlation with independent personality, which is largely consistent with previous studies^[9]. This suggests that a good parenting style helps to positively shape the independent personality of adolescents. Through good and positive parenting styles, parents can inspire their children to adopt positive methods to solve problems, and show tolerance when children make mistakes, providing them with opportunities to grow.

An analysis of parenting styles and school adaptation among adolescent parents shows a significant negative correlation between parental rejection and parental overprotection and school adaptation; Parental emotional warmth shows a significant positive correlation with school adaptation, which is largely consistent with previous studies^[10]. This indicates that the dimension of emotional warmth in parenting styles can positively predict school adaptation in adolescents. Parents' positive encouragement of their children has a very profound influence and can comprehensively promote the development of children's intelligence quotient and emotional quotient. This positive growth environment has a significant positive effect on the development of children in many aspects^[11].

The correlation analysis of independent personality and school adaptation in adolescents shows that there is a significant positive correlation between independent personality and school adaptation, which is basically consistent with previous studies. It can suggest that a higher degree of self-reliance among adolescents is closely associated with better school adaptation. A student with a high level of self-reliant personality can integrate into various social situations independently, handle relationships with classmates and teachers effectively, and follow school rules^[12].

4.2. Analysis and discussion on the mediating role of adolescent self-reliant personality between parenting style and school adaptation

In this paper, Y represents the dependent variable school adaptation, X represents the independent variable parenting style,

and M represents the mediating variable independent personality. Independent personality plays an incomplete mediating role between fatherly parenting style and school adaptation, as well as between motherly parenting style and school adaptation, which is largely consistent with previous studies^[13].

Independent personality plays an incomplete mediating role between fatherly parenting style and school adaptation. Fathers' parenting styles may include different types, such as strict, tolerant, and supportive. A tough parenting style may prompt children to learn to be independent more quickly because they need to solve problems on their own. On the contrary, a lenient father may make the child more dependent on them, which may affect their development of self-reliance. A father's parenting style may also affect a child's ability to adapt at school. A strict father may make the child more disciplined and adaptable to school rules and requirements. But if the father is too strict, it may cause the child to show anxiety or resistance at school^[14].

Independent personality plays an incomplete mediating role between maternal parenting style and school adaptation, which is largely consistent with previous studies^[15]. Mothers' parenting styles may include gentleness, care, encouragement, etc. This parenting style may foster a child's self-esteem and ability to think independently, thereby promoting their self-reliance. However, excessive indulgence may cause a child to lack autonomy and problem-solving skills, affecting their self-development. A mother's parenting style may also affect a child's ability to adapt to school. A gentle and supportive mother may make the child feel safe and confident, and it will be easier for them to build good relationships and adapt to new environments at school. However, overly protective mothers may cause children to lack the ability to cope with challenges, thereby affecting their adaptation in school.

5. Conclusion

This study found that: (1) Parental rejection and parental overprotection were significantly negatively correlated with independent personality in terms of parenting style and independent personality; Parental emotional warmth shows a significant positive correlation with independent personality; (2) Parental rejection and parental overprotection are significantly negatively correlated with school adaptation in terms of parenting style and adolescent adaptation. Parental emotional warmth is significantly positively correlated with school adaptation; (3) In terms of the relationship between independent personality and school adaptation, independent personality shows a significant positive correlation with school adaptation; (4) Independent personality plays an incomplete mediating role between parenting style and school adaptation.

Disclosure statement

The authors declare no conflict of interest.

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The Effectiveness Dilemma and Reconstruction Path of Emerging Countries' Cooperation Mechanisms in the Context of Global Governance Fragmentation

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Abstract: Against the backdrop of increasing fragmentation of global governance, the cooperation mechanism of emerging countries faces multiple difficulties in its effectiveness: internally, there are insufficient coordination of the mechanism, divergence in the interests of member countries, and deficiencies in the design of the system; and externally, the mechanism is constrained by the containment of power by the traditional powers, exclusion from the established system, and bias in the international cognition. The study proposes an “internal and external linkage” restructuring path: internally, the integration is strengthened through the establishment of institutional dialogue platforms, hierarchical consultation mechanisms and institutional upgrading; externally, “embedded cooperation” promotes collaboration with traditional powers, participation in the reform of multilateral mechanisms, and the enhancement of international perceptions. The study suggests that emerging countries need to balance “rule docking” and “localized innovation” in fragmented governance, and gradually accumulate institutional discourse power, so as to provide new momentum for the inclusive transformation of global governance.

Keywords: Global governance fragmentation; Emerging countries' cooperation mechanism; Effectiveness dilemma; Institutional discourse power

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1. Introduction

Since the 21st century, the deepening of globalization and the profound adjustment of the international balance of power have led to a significant fragmentation of the global governance system, the lagging behind of the reform of the traditional multilateral mechanisms, and the emergence of new governance platforms, as well as the intensification of the trend of fragmentation of the rules of governance in terms of issue areas and geographic space ^[1]. In this context, the cooperation mechanisms of emerging countries represented by BRICS, the Shanghai Cooperation Organization and the Asian Infrastructure Investment Bank have become important attempts for emerging economies and developing countries to break through the monopoly of traditional governance and enhance their institutional discourse ^[2].

Currently, academic research on the fragmentation of global governance mostly focuses on the transfer of power between traditional powers and emerging countries, or the assessment of the effectiveness of a single mechanism, and

lacks an integrated analysis of the systemic dilemma of emerging countries' cooperation mechanisms in the context of fragmentation^[3-6]. This paper attempts to answer the following core questions: How does the fragmentation of global governance shape the development environment of emerging state cooperation mechanisms? What structural obstacles do these mechanisms face in their effectiveness? How can they be restructured through institutional innovation and strategic adjustment? Based on international institutional theories and empirical case studies, the study deconstructs the causes of the dilemma from both internal and external dimensions, and proposes a restructuring path that is both targeted and operational, with a view to providing theoretical references to enhance the effectiveness of emerging countries' participation in global governance.

2. Effectiveness dilemma of emerging countries' cooperation mechanisms in the context of global governance fragmentation

2.1. Internal dilemma

2.1.1. Insufficient coordination among emerging countries' cooperation mechanisms

Under the background of global governance fragmentation, the diversified cooperation mechanisms established by emerging countries to enhance their discourse power are caught in the contradiction between "mechanism excess" and "synergy deficiency" due to the lack of systematic integration^[7]. These mechanisms overlap and cross-cutting issues, for example, BRICS focuses on economic and financial cooperation and global governance reform, while the Shanghai Cooperation Organization focuses on security and regional development, but their objectives overlap in infrastructure investment, energy cooperation, and other areas but lack of regular coordination mechanism, leading to resource dispersion and duplication of project construction^[8,9]. At the same time, there are differences in the rule system and decision-making logic of different mechanisms, for example, BRICS pursues the principle of "consensus," while the G20 is constrained by the influence of traditional big powers, which makes it difficult for emerging countries to form a unified stance on cross-cutting issues such as climate change and digital governance.

2.1.2. Differences in development among member countries lead to deadlock in decision-making

There are significant gradient differences among the member countries of the emerging countries cooperation mechanism in terms of economic development level, industrial structure, political system, and strategic interests, which leads to a high cost of internal consultation and inefficient decision-making. Taking the BRICS countries as an example, China, as the world's second largest economy, and India, South Africa, and other developing members of the mechanism have differences on issues such as trade liberalization, investment rules, and responsibility for climate reduction: China advocates gradual reform of the existing international financial system, while Brazil and India are more concerned about their own short-term interests in the trade of agricultural products and technology transfer, and South Africa focuses on the mechanism for obtaining the financial and technical support needed for industrialization. Some of the mechanisms have the structural contradiction of "domination by core countries" and "marginalization of small and medium-sized countries." For example, the game between Russia and Central Asian countries over security cooperation and economic sovereignty in the Shanghai Cooperation Organization, and the balance of interests between the "China-Russia-India Triangle" and South Africa and Brazil in the BRICS countries have led to a decline in the sense of identity of small and medium-sized member countries towards the mechanism and frustrated their participation in it, which further aggravated the decision-making deadlock^[10].

2.1.3. Inadequate institutional framework of cooperation mechanisms in some emerging countries

Compared with mature multilateral mechanisms such as the World Bank and the International Monetary Fund, most of the cooperation mechanisms of emerging countries have problems such as sloppy institutional design, vague rules, and weak implementation capacity^[11]. As the oldest coordination mechanism for developing countries, the G77 has long relied

on informal consultations and political statements to promote its agenda, and lacks a permanent secretariat, specialized working groups, and enforcement power. When implementing specific issues such as the 2030 Agenda for Sustainable Development, it has been reduced to a “platform for voices” due to insufficient institutional support. It is difficult to translate into practical actions. In addition, some regional mechanisms (such as the League of Arab States Collaborative Platform for Emerging Countries) have the phenomenon of “institutional emptiness,” and the decision-making procedures stipulated in the statutes (such as the majority voting system) cannot be implemented for a long time due to the political differences among member states, which has led the mechanism to fall into the predicament of “discussing but not deciding, deciding but not doing”^[12]. The imperfection of the institutional framework not only weakens the authority and sustainability of the mechanism, but also exacerbates the crisis of “institutional legitimacy” of cooperation among emerging countries in the fragmented environment of global governance—when the traditional big powers question the governance capacity of the emerging mechanism, the latter will not be able to effectively implement the mechanism due to the lack of strict institutional support. When traditional powers question the governance capacity of emerging mechanisms, the latter are unable to respond effectively due to the lack of strict institutional support, further limiting their influence in international rule-making.

2.2. External dilemmas

2.2.1. Traditional powers still dominate global governance

Although the total economic output of emerging countries accounts for more than half of the world, the traditional powers represented by the US and Europe still monopolize the core resources of global governance through institutional power, forming a structural suppression of emerging mechanisms. In the field of international finance, the U.S., with 16.52% of the voting power in the IMF and the dominant position of the World Bank, has long controlled the formulation of international financial rules, and the 2010 IMF quota reform program, although committed to transferring 3.6 percentage points of quota share to emerging countries, has been put on hold due to the U.S. Congress’s veto, and the right of emerging countries to speak out in the international financial regulation and crisis relief is still severely limited. In the field of trade governance, the WTO dispute settlement mechanism has long been dominated by the European and American legal teams, and after the United States unilaterally blocked the appointment of judges to the Appellate Body in 2019, leading to the paralysis of the mechanism, the European Union launched the “Multi-party Interim Appellate Arbitration Arrangement” in cooperation with Japan, which excludes emerging countries such as China, in an attempt to maintain the Western monopoly on the right to interpret trade rules^[13]. The monopoly of the West on the interpretation of trade rules. In response to the emerging mechanism, the traditional big powers have adopted a polarization and containment strategy: at the beginning of the establishment of the Asian Infrastructure Investment Bank (AIIB) in 2015, the U.S. pressured its allies to boycott the accession, and although it failed to prevent the United Kingdom and other countries from “reversing their positions,” it has substantially weakened the space for systemic innovation of the emerging mechanism by requesting the AIIB to adopt the World Bank’s environmental and social standards. In the operation of the BRICS New Development Bank, Western countries have lowered the credit rating of its financing through credit rating agencies, forcing it to rely on the US dollar bond market, and indirectly subjecting it to the old international financial order^[14].

2.2.2. Misunderstanding of the international community about the emerging mechanism

The BRICS countries are often simplified by Western public opinion as an “anti-American club,” and the reform of the international monetary system it promotes is misinterpreted as “weakening the hegemony of the US dollar,” while in fact 65% of the loans of the BRICS New Development Bank are still denominated in US dollars, reflecting the pragmatic integration into the existing system; the Shanghai Cooperation Organization (SCO) has been criticized by credit rating agencies for reducing its financing credit rating. The Shanghai Cooperation Organization has been labeled as a “geopolitical alliance” by some Western think tanks, ignoring its constructive role in combating the “three forces” and promoting regional economic integration, which has led to Central Asian countries facing double pressures from Russia and the

West when participating in the mechanism ^[15]. As a result, Central Asian countries face double pressure from Russia and the West when participating in the mechanism. This misunderstanding has also given rise to “legitimacy anxiety”: in the area of climate change, the principle of “common but differentiated responsibilities” put forward by the BASIC countries (China, India, Brazil, and South Africa) to balance the interests of developed and developing countries has been accused of “hindering the process of global emission reduction,” while unilateral measures such as the EU’s carbon border tax have been glorified as “climate leadership.” Cognitive bias has led to heavy resistance to emerging mechanisms in attracting the participation of non-members and seeking international resources ^[16]. For example, when applying for NDB loans, African countries still need to spend a great deal of energy explaining to Western donor countries the difference between them and traditional multilateral institutions, which has inadvertently increased the cost of operating the mechanism.

3. Path of reconstruction of cooperation mechanisms of emerging countries in the context of fragmentation of global governance

3.1. Strengthening internal coordination and integration

3.1.1. Promoting dialogue among emerging countries’ cooperation mechanisms

The establishment of a regularized inter-mechanism dialogue platform is the key to cracking the fragmentation of emerging countries’ cooperation mechanisms. The model of cooperation between ASEAN and China, Japan, and South Korea (10+3) can be used as a reference to set up high-level dialogue forums for mechanisms such as BRICS, the Shanghai Cooperation Organization (SCO), and the Group of 77 (G77), so as to carry out joint consultations on core issues of global governance every year. For example, in the area of vaccine research and development and distribution, the BRICS Vaccine Research and Development Center and the Shanghai Cooperation Organization Public Health Cooperation Mechanism will take the lead in jointly formulating a unified technical standard and distribution plan, so as to avoid duplication of construction and waste of resources. At the same time, an “issue-driven” collaborative mechanism should be set up to integrate the advantages of the rules of each mechanism in specific areas and form a common position ^[17]. A permanent secretariat can be set up to be responsible for information sharing among mechanisms, and joint reports can be issued regularly to enhance the overall voice of emerging countries in global governance.

3.1.2. Strengthening communication and consultation among member states

The deadlock in decision-making caused by development differences among member countries needs to be resolved through a tiered consultation mechanism and a compensation mechanism for benefits. On the one hand, in the BRICS and G20 emerging countries group, the establishment of “core issues group,” according to the level of economic development and industrial advantages of member countries, such as agricultural exporters, manufacturing powerhouse, resource-based countries, group consultation, to reduce the difficulty of the overall negotiation. On the other hand, drawing on the model of the European Union structural fund, member states with stronger economic strength should set up a “South-South cooperation development fund” to compensate small and medium-sized member states for their participation in major global governance projects ^[18]. For example, in African infrastructure construction, the BRICS New Development Bank provides low-interest loans, and the fund subsidizes the operating costs of the projects, balancing the interests and demands of member countries.

3.1.3. Strengthening the institutional design of cooperation mechanisms among emerging countries

Improving the institutional framework needs to be promoted at three levels: rule refinement, implementation strengthening, and dispute settlement. At the rule level, refer to the International Monetary Fund’s share allocation formula to design a dynamic equity allocation mechanism for the BRICS New Development Bank based on economic size, trade contribution, and total population, so as to enhance the fairness of the system; in the field of digital governance, formulate a Model Law on Cross-Border Flow of Data in Emerging Countries, and make clear the boundaries of data sovereignty and openness ^[19].

At the implementation level, an independent oversight body should be established, such as the Project Audit Committee under the framework of the Shanghai Cooperation Organization (SCO), so as to carry out full-cycle supervision of infrastructure investment projects and introduce blockchain technology to realize transparency in the flow of funds. In terms of dispute settlement, drawing on the dispute settlement mechanism of the World Trade Organization, a three-tier mediation-arbitration-appeal system has been constructed to provide institutionalized solutions to differences among member countries.

3.2. Expanding external cooperation and interaction

3.2.1. Actively engaging in dialogue and cooperation with traditional big countries

In the field of global economic governance, the “Emerging Countries-G7 Policy Coordination Working Group” can be set up under the framework of the G20 to carry out joint research on hot topics such as the regulation of digital currencies and the global minimum corporate tax, so as to avoid conflicting rules. In the area of security governance, the SCO and NATO can set up a joint working group on non-traditional security to carry out technical cooperation in areas such as counter-terrorism, intelligence sharing, and cybersecurity protection, so as to dilute the color of geopolitical confrontation. In response to the institutional containment of traditional powers, emerging mechanisms can adopt the strategy of “rule docking + local innovation”: the Asian Infrastructure Investment Bank has adopted the World Bank’s environmental and social standards, innovated the “Climate Adaptation Index” assessment system, and incorporated the proportion of renewable energy into project approval criteria. On the basis of adopting the World Bank’s environmental and social standards, the Asian Infrastructure Investment Bank innovated the “climate adaptation index” assessment system, and included the proportion of renewable energy in the project approval criteria, which not only gained the recognition of the West, but also promoted the upgrading of green infrastructure rules.

3.2.2. Raising international awareness of cooperation mechanisms among emerging countries

At the level of public diplomacy, the BRICS countries can set up a “global governance transparency platform,” regularly publish the “Annual Report on Emerging Mechanisms,” and use data to present the jobs and emission reduction benefits created by the NDB’s infrastructure projects in Africa, as well as to compare the cost efficiency of the World Bank’s similar projects, so as to refute the “inefficiency theory” with empirical data. On multilateral occasions, utilizing platforms such as the United Nations General Assembly and the Davos Forum, representatives of small and medium-sized member states will share cases of benefits from participation in emerging mechanisms, so as to enhance the credibility of the narrative. In response to the “confrontational” label, emerging mechanisms can take the initiative to attract non-members to participate in cooperation: the Shanghai Cooperation Organization has set up a “project pool of observer countries,” inviting non-members such as Turkey and Iran to participate in regional counter-terrorism joint exercises; the BRICS Emergency Reserve Arrangement has opened a “crisis response hotline” to non-members ^[20]. The BRICS Emergency Reserve Arrangement (BRICS ERA) has opened a “crisis response hotline” to non-members, and when providing short-term liquidity support to Sri Lanka in 2023, the IMF will be introduced as a technical adviser at the same time, thus demonstrating the openness and professionalism of the mechanism.

4. Conclusion

Fragmentation of global governance is both a realistic challenge for emerging countries and a historical opportunity for them to break through the constraints of the traditional governance system. This paper reveals the complexity of institutional innovation under the fragmented governance environment by analyzing the effectiveness dilemma and reconstruction path of the cooperation mechanism of emerging countries. The study shows that the reconstruction of the cooperation mechanism of emerging countries is not a revolutionary subversion of the existing system, but a “progressive innovation” to achieve the improvement of governance effectiveness: internally, through the platform of inter-mechanism

dialogue, layered consultation mechanism, and specialized institutional design, to solve the “fragmentation dilemma” in the coordination inefficiency of the “fragmentation dilemma,” and the “fragmentation dilemma” in the “fragmentation dilemma.” Internally, through inter-mechanism dialogue platforms, layered consultation mechanisms and specialized institutional designs, the coordination inefficiency and legitimacy deficit in the “fragmentation predicament” can be solved; externally, the confrontational narrative can be replaced by “problem-oriented” pragmatic cooperation, and emerging governance concepts can be integrated into the process of reshaping the multilateral rules, so as to promote the global governance system to be more inclusive and pluralistic.

Disclosure statement

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Research on the Construction of the Professional Comprehensive Quality Training System for Excellent Field Engineers from the Perspective of New Quality Productive Forces

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Abstract: Driven by new quality productive forces, the digital industry demands higher professional competencies from talent. Addressing the pain points in traditional industry-education integration talent cultivation models—such as fragmented school-enterprise collaboration and insufficient practical training—this study constructs a comprehensive training system for excellent field engineers, encompassing a “three-dimensional competency model, four-stage practical training system, and five-dimensional guarantee mechanism.” The system employs technologies such as blockchain-based credentialing and digital profiling to achieve precise process management. The research provides solutions for advancing the digital transformation of vocational education and supports the cultivation of high-quality engineering talent under the demands of new quality productive forces.

Keywords: New quality productive forces; Excellent field engineers; Comprehensive competencies; Practical training

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1. Literature review

New digital skill demands under new quality productive forces: Data has emerged as the most critical factor of production, leading to the proliferation of emerging positions and a mismatch between talent supply and industrial demand. Digital competency has become the core competitiveness of field engineers in the context of new quality productive forces. Engineers are required to possess digital-intelligent literacy, enabling the application of digital technologies in advanced manufacturing ^[1]. Under these forces, field engineers must develop a compound competency structure integrating data analysis, intelligent decision-making, smart equipment operation, and algorithmic optimization.

Multi-stakeholder collaboration for digital talent cultivation: Government guidance and policy support are essential for building integrated school-enterprise enrollment and training systems ^[2]. Jointly established field engineer colleges should adopt a “dual-subject” model to cultivate talents proficient in operation, process management, collaboration, and innovation. Scholars proposed a tripartite linkage mechanism (government guidance, industry coordination, school-enterprise collaboration) to foster industry-education communities for technology transfer. Effective collaboration requires a stable “policy-resource-benefit” triangle, with governments transitioning from regulators to facilitators via legislation,

funding, and evaluation reforms ^[3].

School-enterprise collaborative resource development: Curriculum systems must prioritize emerging technologies and interdisciplinary integration, enhancing practical courses to align with industrial needs. Scholars advocated a multi-stakeholder education model involving governments, enterprises, schools, and public organizations ^[4]. Others designed a project-driven, industry-integrated practical curriculum, co-developing project repositories with enterprises to ensure dynamic alignment. They also emphasized workplace-oriented course design—“by, in, and for the workplace”—to strengthen vocational education’s industrial adaptability ^[5].

Research gaps: Existing studies reveal critical limitations in cultivating excellent field engineers: (1) Practical deficiencies: Insufficient workplace-based learning, ambiguous theory-practice hour allocation, and weak integration between on-campus training and off-campus internships; (2) Collaboration barriers: Unclear rights, obligations, and responsibilities in school-enterprise partnerships, limited engagement from large enterprises, and inadequate project coverage; (3) Skill gaps: Lack of workplace-aligned training conditions to enhance digital literacy and innovation capabilities ^[6].

Research innovation: To address these gaps, this study constructs a comprehensive framework comprising a “three-dimensional competency model, four-stage practical training system, and five-dimensional guarantee mechanism.” Key innovations include: (1) Dynamic post matrix design: Aligning talent development with industrial demand through competency mapping; (2) Dual-subject contractual management: Clarifying roles via legally binding school-enterprise agreements. This framework provides theoretical and practical guidance for transforming vocational education paradigms, ensuring precise alignment between talent cultivation and new quality productive forces ^[7].

2. Three-dimensional competency model for excellent field engineers

2.1. Technological integration and innovation competency

This dimension focuses on interdisciplinary knowledge integration and technological iteration adaptability, supported by a modular curriculum system and a “dual-qualified” instructor team (academic and industry-experienced). Engineers are required to construct a “data-information-control” triadic knowledge framework, encompassing: Emerging technology mastery, including proficiency in AI, blockchain, big data, and IoT principles, with the ability to achieve real-time mapping between physical systems and virtual models via digital twin technology ^[8].

Technology deconstruction and re-innovation: Capacity to innovatively refine complex processes using theoretical frameworks (e.g., TRIZ methodology). Dynamic knowledge renewal: Commitment to continuous learning, with annual completion of ≥ 80 training hours on emerging technologies to maintain technical acuity ^[9].

2.2. Engineering practice and complex system decision-making competency

This dimension emphasizes technical implementation and resource coordination in real-world production scenarios, structured across three tiers: (1) Basic tier: Execute standardized operations with precision (e.g., operational compliance rate $> 99\%$). (2) Advanced tier: Demonstrate multivariable collaborative optimization capabilities, balancing quality, cost, and efficiency through methodologies like PDCA cycles. (3) Elite tier: Master complex system decision-making using systemic models (e.g., system dynamics for technical roadmap planning). Cultivation pathways rely on a “cognitive-specialized-post rotation” three-phase practical system, leveraging enterprise projects (e.g., smart production line optimization) for competency enhancement ^[10].

2.3. Professional ethics and sustainable development leadership

This dimension shapes engineers’ value rationality and technological ethics through three pillars: (1) Trinity of professional standards: Adherence to “safety-quality-environmental” protocols (e.g., ISO 45001 compliance). (2) Ethical decision-making: Balancing efficiency pursuits with humanistic considerations (e.g., retaining human oversight nodes in AI-driven

systems). (3) Sustainable innovation leadership: Championing green technologies (e.g., circular manufacturing achieving $\geq 90\%$ material utilization). Training integrates specialized courses like “Technology Ethics Workshops” and “Carbon-Neutral Project Practicums,” fostering an integrated value system merging technical rationality, humanistic awareness, and ecological responsibility ^[11].

3. Construction of a four-stage practical training system for excellent field engineers

3.1. Cognitive practice and professional enlightenment system

The cognitive practice stage focuses on foundational engineering field awareness and professional literacy development. Through “front-factory-back-school” training bases co-built by schools and enterprises, production lines are integrated into educational environments. First-year students complete tasks such as occupational competency mapping and skill documentation, while safety regulation courses incorporating real enterprise cases strengthen responsibility awareness. A dynamic elimination mechanism screens trainees based on competency attainment rates (e.g., $\geq 85\%$ skill compliance), ensuring foundational competency benchmarks and preparing students for advanced practical training ^[12].

3.2. On-the-job training and tiered competency advancement

Centered on project-based learning, this stage establishes a three-tier project system (single-course, cross-course cluster, and interdisciplinary comprehensive projects) within school-enterprise joint laboratories. A dual-mentor team—comprising enterprise engineers (guiding technical implementation) and academic instructors (providing methodological frameworks)—collaborates on real-world projects (e.g., smart production line optimization). Competency evaluation employs IoT devices (e.g., smart ID badges, AR glasses) to collect real-time operational data, constructing a 12-indicator “competency growth curve” model for personalized skill development ^[13].

3.3. Post-specific practice and technological innovation conversion

Students engage in core enterprise roles (e.g., R&D centers) under dual-mentor guidance, completing technical improvement reports or patent applications, with enterprise expert evaluations constituting 50% of final assessments. A dual-certificate integration system embeds industry certifications (e.g., Siemens Mechatronic Certification) into curricula, accelerating technological achievement transformation rate (e.g., utility model patents) and shortening job adaptation cycles (by 42% in pilot cases) ^[14].

3.4. Closed-loop feedback and system optimization

Blockchain technology authenticates practical achievements and generates student digital profiles. Schools and enterprises jointly monitor resource allocation and educational outcomes via an industry-education integration information platform, driving annual curriculum technology refresh rate $> 15\%$. Longitudinal tracking of graduate metrics—including three-year promotion rates (42% in pilot programs), employer satisfaction (92%), and salary benchmarks—validates system efficacy. This four-stage work-study alternation model, supported by institutionalized resource guarantees, resolves industry-education disconnects and provides a replicable paradigm for cultivating excellent field engineers under new quality productive forces ^[15].

4. Five-dimensional guarantee mechanism for cultivating excellent field engineers

Resource coordination and supply mechanism: Schools and enterprises dynamically match practical post resources based on production scale and technical complexity, establishing a “headquarters + satellite factories” distributed practical network. This ensures the number of practical training positions aligns with industrial demand, enabling students to access

multi-level technical scenarios (e.g., core R&D and peripheral production units).

Dual-mentor instructional configuration: Enterprise mentors lead practical training (monthly ≥ 16 instructional hours), focusing on technical implementation, while academic instructors deliver theoretical teaching. This technology-methodology synergy ensures students master both operational skills (e.g., CNC programming) and systemic thinking frameworks.

Risk-sharing safeguard mechanism: A dedicated risk fund covers accident insurance (e.g., workplace injury coverage) and equipment depreciation compensation (e.g., 30% cost-sharing for device maintenance). Joint risk warning and resolution protocols are established, with predefined escalation paths for emergencies (e.g., production line failures).

Outcome sharing and distribution mechanism: A tripartite “school-enterprise-student” intellectual property (IP) profit-sharing model clarifies rights to technological achievements (e.g., patent ownership ratios: 50% enterprise, 30% school, 20% student). This incentivizes innovation participation and accelerates technology commercialization (e.g., 35% increase in patent applications from pilot programs).

Process quality monitoring mechanism: Blockchain technology authenticates practical training data (e.g., equipment operation logs), while AI-driven analytics track competency growth curves in real time. This enables dynamic optimization of training plans (e.g., adjusting curriculum focus areas quarterly) based on performance metrics (e.g., skill mastery rates).

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Traditional Village Protection and Activation Utilization

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Abstract: As an important component of cultural heritage, traditional villages carry rich historical and cultural landscape information, possessing extremely high civilization value and inheritance significance. The diversity of traditional villages' values makes their protection and activation utilization of great significance in the current era. This article elaborates on the methods of traditional village protection and utilization from two aspects: the inheritance of intangible cultural heritage protection in traditional villages and enriching the development paths of traditional villages. It concludes that living protection, sustainable utilization, continuous innovation, and scientific development are the fundamental lifelines of traditional village protection and activation utilization.

Keywords: Traditional villages; Protection and activation utilization; Intangible cultural heritage protection and inheritance; Development paths

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1. Introduction

Traditional villages, as a crucial component of cultural heritage, embody abundant historical and cultural landscape information, bearing exceptional civilization value and inheritance significance^[1]. In October 2014, during a visit to Anhui, the General Secretary emphasized the need to further promote the integrated development of culture and tourism, strengthen the protection, inheritance, and utilization of traditional villages and traditional architecture, and facilitate the creative transformation and innovative development of excellent traditional culture^[2]. The 2025 Central Document No. 1 underscores the advancement of traditional village characteristic protection zone construction, the enhancement of rural cultural heritage protection, inheritance, and activation utilization, and the thorough implementation of rural cultural relic protection projects^[3].

2. Basic connotation and value of Chinese traditional villages

The definition of traditional villages in China refers to those formed earlier, endowed with abundant traditional resources, and possessing certain historical, cultural, scientific, artistic, social, ecological, and economic values^[4]. There are mainly four conditions for the formation of traditional villages. Firstly, the surrounding environment: the village landscape bears distinct historical features, the village site selection has prominent characteristics, and the types of village relics are rich.

Secondly, spatial pattern: the village characteristics are cultural, the village texture is unique, and the village structure is complete. Thirdly, traditional architecture: the building types are diverse, the architectural style is regional, and the architectural decoration is artistic. Fourthly, intangible cultural heritage characteristics: the intangible types are diverse, the intangible features are representative, and the intangible inheritance is dynamic.

The value of traditional villages is diverse. Firstly, traditional villages have resource value as non-renewable elements of human cultural history. Secondly, they possess cultural value, serving as a spiritual home for cultural confidence and cultural consciousness. Thirdly, traditional villages hold ecological value, embodying respect for nature, compliance with nature, and rational utilization of nature. Fourthly, they exhibit distinctive value with differentiated regional features, particularity, and abundant relics. Fifthly, traditional villages have industrial value, driving the transformation and activation of industrial development. Sixthly, they embody aesthetic value, representing the high unification of natural beauty, social beauty, and artistic beauty.

3. Contemporary significance of traditional village protection and activation utilization

The protection and activation utilization of traditional villages are important platforms for implementing rural revitalization strategies. Traditional villages are spiritual homes that foster cultural confidence, self-esteem, consciousness, and self-improvement^[5]. Such efforts can fully activate rural economic regeneration, stimulate the endogenous driving force for traditional village development, and provide a creative transformation platform for facilitating benign interaction between urban and rural elements^[6]. By using traditional villages as cultural carriers, we can cultivate new momentum for rural development, enhance the quality of agricultural development, and continuously promote industrial prosperity. The protection and activation utilization of traditional villages drive rural revitalization, turning cultural confidence into conscious cultural development.

These efforts also possess unique value in regional integration. Huizhou-style traditional villages, for instance, stand out in the current integrated development of the Yangtze River Delta region, featuring a comprehensive system, rich connotation, distinct characteristics, complete structure, and profound value. They simultaneously exhibit the core values of Chinese culture. In integrating the Yangtze River Delta and promoting high-quality creative transformation and development, these villages hold an unparalleled position, serving as focal points that highlight cities' competitiveness, attractiveness, and influence. They are traditional village brands that best showcase China's spiritual and cultural values.

Furthermore, the protection and activation utilization of traditional villages can coordinate new urban-rural relationships, strengthening the consciousness of villagers to protect their villages, shifting from "being asked to protect" to "wanting to protect." These efforts activate rural economic regeneration and stimulate the endogenous driving force for the development of traditional villages.

4. Methods for the protection, activation, and utilization of traditional villages

4.1. Protection and inheritance of intangible cultural heritage

The protection and inheritance of intangible cultural heritage primarily involve preserving the ecological environment of such heritage and activating the economic vitality of intangible cultural heritage tourism destinations^[7]. The rapid development of modern society has brought significant impacts to the traditional inheritance of intangible cultural heritage. To effectively protect and pass on this heritage, it is essential to preserve its ecological environment. Once the intangible cultural heritage has its own independent development environment, it can gradually integrate into modern society through government policy guidance. Financial support is indispensable for the inheritance of intangible cultural heritage, and another means of protection and inheritance is activating the economic vitality of intangible cultural heritage tourism destinations, such as enhancing immersive experiences for tourists.

4.2. Enriching development paths for traditional villages

The development paths of traditional villages need to be explored and utilized in multiple ways. By promoting traditional village tourism, we can enrich these development paths and showcase attractive activities and skill highlights^[8]. Improving the development path of traditional village tourism can provide opportunities for tourists to understand intangible cultural heritage.

One way to enrich the development path of tourism destinations is through experiential tourism. At intangible cultural heritage inheritance centers, attractive and participant-friendly projects can be opened to the public, enhancing tourists' sense of participation and experience. For example, in Jingdezhen, tourists can engage in the entire process of ceramic making, enjoying an immersive experience that boosts their participation and satisfaction with their own creations.

Another approach is educational tourism, which combines research and learning with travel^[9]. Traditional villages are rich in intangible cultural heritage, and by combining tourism with learning about these skills, participants can deeply understand, follow, and learn relevant crafts, exploring and inheriting the essence of intangible cultural heritage.

5. Problems in the protection, activation, and utilization of traditional villages

The protection, activation, and utilization of traditional villages face several challenges, including funding pressures, a shortage of talent for protection and utilization, inadequate social awareness, and imbalances in protection and utilization^[10]. Infrastructure development, heritage protection, and resource utilization in traditional villages require significant financial investment, and the funding pressure for their protection necessitates support from the government, society, and citizens. The lack of professionals and teams in fields such as tourism planning and cultural heritage protection leads to a lack of scientific rigor and systematic approach in protection and utilization efforts. The cultural value and social significance of traditional villages have not been widely recognized, and there is a lack of understanding about the importance of their protection and utilization. In the process of protecting and utilizing traditional villages, effective protection and reasonable utilization are often overlooked, with some focusing solely on protection and hindering development, while others overexploit, diminishing the value of the heritage.

6. Conclusion

As an essential component of cultural heritage, traditional villages carry rich historical information and cultural landscapes, possessing immense civilizational value and significance for inheritance. This article elaborates on the methods for the protection, utilization, and development of traditional villages from two aspects: the protection and inheritance of intangible cultural heritage in traditional villages and enriching their development paths. Active protection, sustained utilization, continuous innovation, and scientific development should be the fundamental lifelines of protection, utilization, and innovative development.

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An Intelligent Physical Training System in Football Education

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Abstract: With the advancement of intelligent technology, data-driven evaluation methods have gained increasing attention in physical education, particularly in the application of intelligent physical training systems in football education. These systems enable precise assessment of athletes' training status and provide scientific support for personalized training, thereby enhancing training efficiency and game performance. This study employs Random Forest and Neural Network models to construct an intelligent evaluation system for predicting students' overall performance in football training. Key performance indicators such as passing frequency, sprint speed, and shooting accuracy are collected and analyzed to determine their impact on comprehensive scores. Experimental results demonstrate that the Random Forest model excels in stability and interpretability, while the Neural Network achieves higher prediction accuracy in complex pattern recognition. The combination of both models enhances generalization ability and applicability. Additionally, feature importance analysis identifies sprint speed and shooting accuracy as the most critical factors influencing training performance. This study proposes data-driven training optimization strategies to help students improve their football training performance. The findings confirm that intelligent physical training systems can effectively support football education, promoting the development of personalized and refined training programs and providing strong technological support for modern sports education.

Keywords: Machine learning; Football education; Sports; Data-driven coaching

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1. Introduction

In the field of physical education, effectively evaluating and improving students' overall athletic performance has always been a key research and practical challenge. Traditional evaluation methods primarily rely on teachers' subjective judgments and simple records of achievements, making it difficult to comprehensively and objectively reflect students' true abilities and growth potential ^[1]. With the rapid development of data science and artificial intelligence, the use of machine learning techniques for quantitative analysis of athletic performance has become a growing trend ^[2]. Machine learning models not only process multidimensional data but also uncover hidden patterns in features, supporting personalized teaching and training approaches. In football training, running, passing, and shooting are essential skills for measuring students' overall performance. In recent years, intelligent physical training systems have been increasingly applied in football education ^[3]. These systems utilize wearable devices, video analysis, and intelligent sensors to collect player training data and analyze it using machine learning techniques to optimize training programs. Such systems can not only monitor players' physical condition in real time but also provide personalized training feedback based on data-driven

insights, thereby enhancing both teaching effectiveness and athletic performance. This study uses student football training data to build regression models with Random Forest and Neural Networks, aiming to analyze how key performance metrics—such as cumulative running distance, passing accuracy, and shot-on-target rate—affect overall scores^[4]. Feature importance analysis identifies critical factors, while K-fold cross-validation ensures model reliability. The results highlight the strong influence of metrics like high-intensity running and passing accuracy. By adopting data-driven methods, the study evaluates training effectiveness and supports teaching optimization, offering a scientific basis for personalized football training and performance improvement through a stable, interpretable evaluation framework.

2. Literature review

Guan *et al.*^[5] explored enhancing college football training efficiency via trajectory planning. They proposed an LSTM–GA model integrating deep learning and IoT-enabled wearable devices. LSTM compensates for GA's local search weakness. Experimental results showed the model converged at iteration 101, with 11% higher fitness than GA and 2% higher than LSTM alone. This optimizes trajectory planning for scoring, with contributions lying in improving the LSTM–GA model for IoT devices, thereby boosting training efficiency. Stoeve *et al.*^[6] evaluated IMU-based shot and pass detection using deep learning models (CNN, LSTM, convLSTM) versus SVM in both lab and real-world football contexts. CNNs achieved a weighted F1-score of 0.93, outperforming SVM and demonstrating deep learning's effectiveness for real-time sports event classification. Zhou *et al.*^[7] advanced intelligent football training through CNN-based action recognition systems and FCN-based field line detection models via football robots. Their dual-stream architecture reached 92.8% recognition accuracy, and intelligent training improved performance by up to 25.7%, offering significant implications for AI-driven sports environments. Cao *et al.*^[8] examined functional strength training's impact on adolescents' football performance using a backpropagation neural network (BPNN) to assess kicking movements. The experimental group, which received targeted training, showed enhanced strength and sensitivity, validating machine learning's role in optimizing physical training strategies. Hollaus *et al.*^[9] introduced an automated classification system for American football pass evaluations, leveraging a dataset of 2,276 attempts captured via synchronized audio and video. They employed a hybrid CNN-LSTM model for video and a 1D CNN for audio, achieving a 92.19% classification accuracy, confirming the potential of machine learning in analyzing complex, real-world training data. Collectively, these studies demonstrate the applicability of deep learning and machine learning across various domains of football training, including action recognition, biomechanical analysis, intelligent system design, and automated event classification. They highlight the importance of carefully selecting models and datasets to match practical scenarios, as well as the potential of AI to enhance training accuracy, real-time feedback, and overall athletic development. These findings provide strong empirical support for integrating AI into football education, training systems, and performance evaluation, both in traditional and intelligent training settings.

3. Data

In developing an intelligent football training evaluation system, this study emphasizes the importance of high-quality feature variables in enhancing model accuracy and supporting personalized training. Data were collected from junior and senior high school students through questionnaires, interviews, devices, and coach assessments. Key features include demographic and educational background, school type, sports experience, past training, peer participation, and training duration, all of which impact physical readiness and training adaptability.

Additionally, three core KPIs—passing frequency, sprint speed, and shooting accuracy—were automatically recorded to assess tactical activity, agility, and scoring efficiency. These KPIs directly inform the prediction of students' overall performance scores and support feature importance analysis, contributing to a more data-driven and individualized approach in football training.

4. Model analysis

In the intelligent football training evaluation system developed in this study, the Random Forest algorithm serves as a core predictive model for assessing students' overall training performance. As an ensemble learning method, Random Forest enhances robustness and generalization by combining the outputs of multiple decision trees through majority voting (for classification) or averaging (for regression).

The algorithm operates based on two main mechanisms^[10]: Bootstrap Sampling: each decision tree is trained on a randomly sampled subset of the original dataset with replacement; Random Feature Subset Selection: at each decision node, the model selects the best split from a randomly chosen subset of features. This dual-randomization approach reduces variance and minimizes the risk of overfitting, making Random Forest particularly suitable for tasks involving medium-dimensional features and moderately sized datasets.

In this study, the Random Forest model takes as input several key performance indicators (KPIs), including passing frequency, sprint speed, and shooting accuracy, and predicts students' comprehensive performance scores in football training (**Figure 1**). During the training phase, multiple decision trees are iteratively constructed using the training dataset, and the final prediction is made by aggregating individual tree outputs, ensuring model robustness across varying input patterns. An important advantage of the Random Forest algorithm is its inherent feature importance evaluation. It ranks input variables based on metrics such as Gini impurity reduction or information gain at split points.

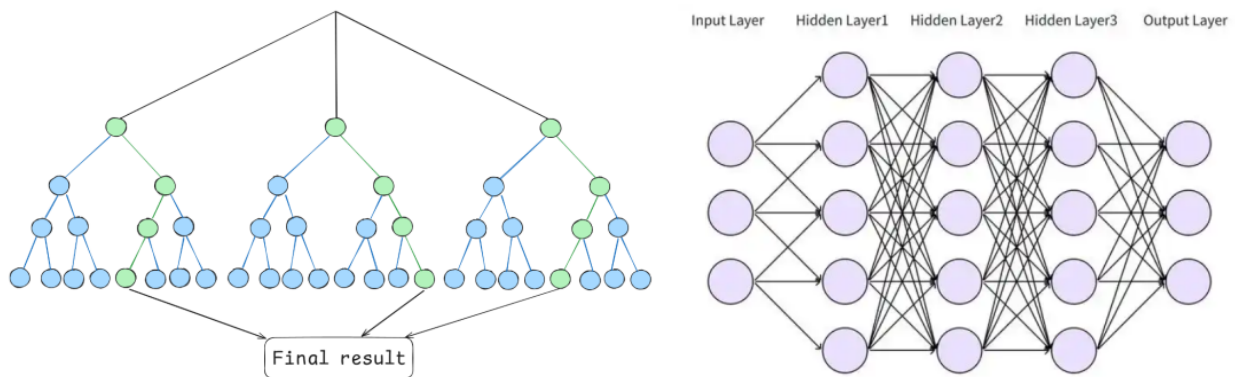


Figure 1. Random Forest and Neural Networks model

In terms of model tuning, this study adopts a lightweight approach that minimizes hyperparameter complexity to ensure robustness under small-sample conditions and enhance reproducibility. Furthermore, Random Forest demonstrates strong tolerance for noisy or missing data, making it well-suited for real-world educational environments where data quality may vary. However, it is worth noting that Random Forest may face efficiency challenges when dealing with ultra-high-dimensional or sparse features and may produce non-smooth outputs in regression tasks. These limitations should be considered when integrating the model into larger-scale intelligent training systems.

Inspired by biological neural systems, this study designs a neural network to predict students' soccer training performance by learning nonlinear relationships in complex data. The model, consisting of input, hidden, and output layers, uses weighted connections and nonlinear activation functions (e.g., ReLU^[11], Sigmoid) to enhance pattern recognition and accurately map input features to training outcomes^[12].

In this study, the model's inputs are key training metrics collected via a smart training system: passing frequency, sprint speed, and shooting accuracy. The output is the students' composite scores in periodic soccer training assessments, reflecting their overall performance.

The training process involves two phases: Forward propagation: Inputs are passed through the network layers to generate preliminary predictions. Backward propagation: The gradient of the loss function (e.g., mean squared error or cross-entropy) is computed to adjust network parameters, minimizing prediction errors. This study employed the

Adam^[13] optimizer to accelerate convergence and incorporated Dropout^[14] (rate 0.3) and Batch Normalization^[15] to reduce overfitting and improve generalization. A three-layer neural network with 64, 32, and 16 neurons respectively, was designed to enhance nonlinear modeling, using ReLU in hidden layers and a linear activation in the output. Hyperparameters such as learning rate (0.001), batch size (32), and dropout rate were optimized via grid search and cross-validation. Early stopping was applied to improve training efficiency. Despite neural networks' strong ability to model complex interactions (e.g., sprint speed and shooting accuracy), their computational cost and limited interpretability were addressed through careful architecture design and tuning.

5. Results

Table 1 displays the multi-class classification performance of the Random Forest model in evaluating football training outcomes. The dataset includes 4,320 total entries classified into two categories: "good" (class 0) and "bad" (class 1). For class 0, the model achieved a precision of 0.76, recall of 0.81, and F1-score of 0.79, indicating effective identification of strong performers. For class 1, the model showed slightly lower metrics with a precision of 0.73 and recall of 0.67. The macro average F1-score is 0.73, and the overall accuracy is 78%. This indicates balanced performance across categories, with Random Forest demonstrating strong reliability and interpretability. Notably, feature importance analysis reveals sprint speed and shooting accuracy as the most significant predictors, offering direct guidance for training optimization strategies.

The application of the Random Forest model in predicting students' soccer training performance offers notable advantages. Firstly, leveraging ensemble learning with multiple decision trees, it enhances classification stability and robustness through a voting mechanism. Secondly, its strong interpretability allows for feature importance analysis, which pinpoints key indicators affecting training performance. For instance, sprint speed and shooting accuracy are identified as the two most critical factors influencing training performance, providing a scientific basis for developing targeted training strategies.

Table 1. Multi-classification results of the Random Forest model

	Precision	Recall	F1-score	Support
0 (good)	0.76	0.81	0.79	2450
1(bad)	0.73	0.67	0.69	1870
macro avg	0.79	0.74	0.73	4320
weighted avg	0.88	0.78	0.75	4320
accuracy			0.78	4320

The neural network model demonstrates moderate performance in predicting students' soccer training performance in **Table 2**. For class 0 (better training performance), it achieves 0.65 precision, 0.83 recall, and 0.73 F1-score, indicating high recall with some false positives. For class 1 (poorer training performance), the precision is 0.64, recall is 0.41, and F1-score is 0.50, showing lower recall and more false negatives. The model's overall accuracy is 0.65, with a macro average F1-score of 0.61 and a weighted average F1-score of 0.63. This suggests reasonable performance for class 0 but lower recall for class 1, highlighting an imbalance in classification performance.

Feature importance analysis reveals that sprint speed and shooting accuracy are the most critical factors affecting training performance. This insight is valuable for developing targeted training strategies. The neural network also shows high prediction accuracy in complex pattern recognition, despite lower recall for class 1. Its ability to capture nonlinear relationships makes it effective for complex data patterns.

Table 2. Multi-classification results of Neural Network

	Precision	Recall	F1-score	Support
0	0.67	0.80	0.73	2450
1	0.65	0.58	0.59	1870
macro avg	0.88	0.69	0.61	4320
weighted avg	0.89	0.72	0.78	4320
accuracy			0.72	4320

6. Conclusion and suggestions

This study explores the use of intelligent football training systems in football education, focusing on predicting students' football training performance. By combining Random Forest and Neural Network models, an intelligent evaluation system was developed to predict overall student performance in football training. Key metrics like passing frequency, sprint speed, and shooting accuracy were analyzed for their impact on comprehensive scores. The Random Forest model excelled in stability and interpretability, while the Neural Network achieved higher prediction accuracy in complex pattern recognition. Integrating both models enhanced the system's generalization and applicability. Feature importance analysis identified sprint speed and shooting accuracy as the most critical factors for training performance. Based on these findings, data-driven training optimization strategies were proposed to improve student performance. The results confirm the effectiveness of intelligent football training systems in providing technical support for personalized and refined training programs.

The study also analyzed factors affecting students' adaptability to training methods within the intelligent football training system. Machine learning algorithms revealed that professional experience and past training participation are key predictors of adaptability. Experienced students adapt better to online training, while less experienced ones need more foundational knowledge and practical cases. School type also impacts adaptability due to varying resources, underscoring the need for customized training plans. Collaborative learning, through team participation, enhances training effectiveness, suggesting the inclusion of group discussions or study groups. Although age has a minor impact, older students face more challenges with technology, necessitating user-friendly interfaces and tutorials. These insights provide a foundation for designing adaptive online training methods to meet diverse educational needs.

Disclosure statement

The authors declare no conflict of interest.

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Protection of Women's Rights and Interests in Matrimonial Justice: A Comparative Study of Divorce Cases Involving Domestic Violence in the Qing Dynasty and Contemporary Times as an Example

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Abstract: Based on the comparative study of the Qing legal texts represented by the Qing Laws, the criminal archives, and the contemporary laws and regulations represented by the Civil Code of the People's Republic of China, this paper presents the results of a comparative study of 72 cases from the first month of the third year of Emperor Chongde's reign in the Qing Dynasty (A.D. 1638) to December of the fourth year of Emperor Chongde's reign in Shengjing (the original archives of the Criminal Ministry of Shengjing), 1,361 "women's" cases from the records of Baxian County during the Tongzhi period (A.D. 1862–1875), and 2,648 marriage and family inheritance cases from the civil and commercial cases heard in the courts of P County in 2020–2021, totaling 4,081 cases, from which typical cases of domestic violence were extracted to conduct empirical analyses and to explore the changes in women's rights and interests in judicial practice across different periods, which may provide a good basis for the development of women's rights and interests over time. This will explore the changes in women's rights and interests in different periods of judicial practice and may provide experience for the prevention and control of contemporary "domestic violence," especially "marital violence."

Keywords: Qing Dynasty; Conjugal relations; Legal analysis; Women's rights and interests; Divorce cases involving domestic violence

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1. Introduction

The phenomenon of wife abuse was very common in ancient Chinese family marriages. Contemporary scholars believe that "marital violence" in families in today's society is a continuation of history. The strict hierarchical order and gender discrimination in traditional culture, such as the "father's duty to the son"^[1] and "the husband's duty to the wife," are the ideological roots of the continuation of modern "marital violence."

However, the description of marital violence in ancient times is often too systematized and static in many treatises, which is usually summarized by the phrase "the husband is superior to the wife," and it focuses on the analysis based on scattered legal provisions, which seldom involves the examination of the original judicial archives and the analysis of

large-scale data. The research system has been fully developed, but it is limited to the exploration of ancient society and lacks expansion into contemporary judicial practice.

The Qing Dynasty, as the peak of feudal kingship in China and the last dynasty of the imperial period, was not only an important period of social, economic, cultural, and life transition but also a key point of change in the concept of marriage and the marriage system. Zhu Zi's theory became the orthodox doctrine followed by the ruling class, and the concept of "the husband is the wife's program" and "the husband's superiority over the wife" reached its peak in the Qing Dynasty, where the wife's family status and legal status were particularly low. At the same time, with the eastward spread of Western ideas such as the concept of "marriage freedom," intellectuals who received new-style education gradually began to make active attempts at reforming the marriage customs^[2]. The collision of these two social trends made family marriage relationships in the Qing Dynasty show the dual characteristics of being old-fashioned yet new.

Therefore, through the methods of legal empirical analysis research, historical bibliographic research, comparative research, and social gender analysis, and combining with the author's 13-day field investigation experience in the People's Court of P County, W City, Z Province, this paper will, on the basis of comparative research on the legal texts of the Qing Dynasty represented by the Qing Laws and Regulations, the files of the Criminal Division, and contemporary laws and regulations represented by the Civil Code of the People's Republic of China, use the "Shengjing Criminal Department"^[3]. The 72 cases from the first month of the third year of Emperor Taizong Chongde's reign (1638 AD) to the December of the fourth year of Chongde's reign (1639 AD) in the Original Records of the Qing Dynasty, the 1,361 women's cases during the Tongzhi reign (1862–1875 AD) in the Records of Baxian County and the 2,648 civil and commercial cases in the 2020–2021 court hearings in P County. A total of 4,081 civil and commercial cases, including 2,648 matrimonial and family inheritance cases, are taken as data samples, from which typical cases involving domestic violence are extracted for empirical analysis to explore the changes of women's rights and interests in judicial practice in different periods, which may provide experience for the prevention and control of contemporary "domestic violence," especially "marital violence."

Figure 1 shows an example of a Qing Dynasty family photo.



Figure 1. Qing Dynasty family photo

2. "Xu Yang's case" and "Xu's domestic violence case"

The author would like to analyze the "Xu Yang's Case" in the Baxian Archives in comparison with the "Xu's Domestic Violence Case" heard in 2021 by the P County Court, in order to explore the different coping mechanisms and corresponding laws and regulations for women who suffered from domestic violence in the Qing Dynasty and in contemporary times. Both are cases in which women chose to sue after enduring marital violence to no avail. After the

husband was found to have “abused his wife,” both the Qing governor and the contemporary judge ruled that “the husband and wife should be reconciled” and “the request for divorce should be rejected,” warning the husband not to abuse his wife in the future. This hardly solves any substantive problems for the wife, who is suing for the breakdown of her relationship with her husband.

Tongue Years, Bucks County Records 8232, December 9, Tongue Years 12

Plaintiff: Ms. Xu Yang (wife).

Defendant: Xu Tingzan (husband).

Content: Xu Yang married Xu Tingzan as a child bride. When she grew up, her husband showed bad qualities—“not devoting oneself to proper duties”^[4], smoking opium for a long time, squandering the family’s wealth, and even forcing Xu Yang to prostitute herself again and again. Mr. and Mrs. Xu Yang left Quxian for Chongqing, where they stayed at the home of Xu Yang’s relatives. Although they agreed to give Xu Tingzan five taels of silver to do business, the money was spent by Xu Tingzan, who once again forced Xu Yang to prostitute herself. For refusing this demand, Xu Yang was beaten and scolded. She could not stand it any longer, so she cut off her hair and went to the court to file a complaint^[1].

At the same time, during the couple’s marriage, although the husband has always been “not doing his job,” and even addicted to gambling and drug abuse, and regularly commits domestic violence against the wife, the wife did not sue the husband in the first instance, but chose to put up with it until the husband’s behavior exceeded the limits of her tolerance, and only then proceeded to “prosecute,” and other more violent ways of resistance. Xu Yang endured her husband’s long-term opium addiction and repeated coercion into prostitution, yet still chose not to press charges. Despite her husband’s continued moral failings and frequent, unwarranted verbal abuse directed at her character, Xu tolerated the situation for four years before finally deciding to prosecute.

In the Qing Dynasty, after determining that Xu Tingzan had “abused his wife,” the county magistrate only made a judgment that “the husband and wife should be reconciled,” and verbally warned the husband not to abuse his wife in the future. The contemporary judge in Xu’s first lawsuit also rejected her claim. However, since she and her husband, Chen, frequently argued over his lifestyle issues, failed to fulfill their marital obligations, and clearly experienced a breakdown in their relationship with no possibility of reconciliation, the judge granted the divorce in the second proceedings. The author believes that the above changes in the outcome of the judgment is a good illustration of the protection of women’s rights and interests in judicial practice at different times, as well as the advancement and duality of the contemporary legal system.

Cases similar to “Xu Yang’s Case” were numerous in history. Yuan Ji, the sister of Yuan Mei, was bound by the feudal ethical ideology and was unwilling to withdraw from her marriage, believing that a woman could only remain faithful to her husband, stating: “If my husband is sick, I will take care of him; if he dies, I will keep him.”^[2] In the family’s strong order, she refused to her husband “sell off,” chose to sue her husband, but unfortunately, even after a peaceful divorce, she still died a miserable death. “Shengjing criminal original file” records, Liu Tongzi, a woman at that time, was beaten by her husband Liu Shideng, who broke her arm and knocked out her teeth, then forced her to return to her parents’ home. After reaching the end of her patience, she chose to report the case to the authorities. These cases reflect the helplessness of women in the face of marital violence in the Qing Dynasty.

3. Two extreme choices in the face of domestic violence

Special attention should be paid to the fact that in the Qing Dynasty and contemporary society, when women encountered disputes in family life, there were two extreme choices: “divorce” and “suicide,” which was essentially a question of women’s right to choose in different periods.

In the middle and late Qing Dynasty, due to various limitations of the legal system and social and cultural concepts, fewer women had the right to choose to divorce, and divorce cases basically took place in the upper class; the social and legal status of women at the bottom of the social and legal status was extremely low.

By comparing the Qing and Tang laws, it becomes evident that in cases of husbands beating their wives, the Qing

law modified the provisions of the Tang law: the penalty of “assault and injury resulting in a reduction to the second class of mortals” was reduced to “injuries not involving fractures are not subject to discussion; if fractures occur, the penalty is reduced to the second class of mortals, and prosecution requires the wife’s own report.” In the case of a wife who killed or injured her husband through negligence, the penalty was increased from “a reduction of the penalty by two grades in respect of a murder committed for the purpose of killing” in the Tang Law to “decapitation” in the Qing Law.

More obviously, in the legal systems of previous generations, the husband had no right to kill his wife under any circumstances, nor did he have the right to kill the adulterous wife or the adulterer’s concubine or to beat the guilty wife or concubine to death. This was developed in the Qing Dynasty’s laws, where, in cases of adultery, the husband could kill the adulterer and the adulteress at once without any distinction; that is, the Qing Dynasty’s laws deprived the husband of the right to the life of his wife under certain circumstances. Qing law along the evolution of the Ming law, compared to the Tang law, “about ceremonies and customs and cultures,” a class of non-direct violation of the monarchy and other aspects of the crime is often “light of its light”^[5], according to this to push, the punishment of crimes involving the husband and wife should be mitigated. Through the above comparison, it can be found that the punishment of husband’s crime against wife was reduced, while the punishment of wife’s crime against husband was aggravated, the reason is that with the infiltration of Zhu Zi’s theory, the husband’s right in the Qing Dynasty was expanded to the extreme^[6].

Therefore, if the husband did not consent, the option of a woman initiating divorce proceedings was extremely unlikely in the Qing dynasty. Because of the constraints of her environment, a woman’s choices in the course of a family dispute were greatly reduced, and it can be concluded from the Qing litigation records that most were forced to choose the extreme option of “suicide.”

In contemporary society, women have the right to divorce, and society is becoming more tolerant of divorce. The 2021 China Marriage Report shows that the number of registered divorces in China climbed from 580,000 pairs to 3.73 million pairs from 1987 to 2020. The crude divorce rate climbed from 0.5 per 1,000 to 3.4 per 1,000 from 1987 to 2019. Nearly 6 million cases of first-instance divorce disputes were concluded from 2015 to 2018^[7]. Economic independence has enabled women to gradually get rid of the shackles of marriage and have more confidence to bear the unfavorable consequences of divorce; the penetration of Western feminist ideology has contributed to the enhancement of women’s sense of autonomy, and more women have chosen to end their unfortunate marriages and actively seek their own happiness.

According to the Judicial Big Data report, in 2017, courts across the country concluded more than 1.4 million cases. The number of divorce disputes increased, with emotional discord (77.5%) and domestic violence (14.9%) as the main reasons. The plaintiffs in 73.40% of the cases were women, and 2–7 years after marriage was the high incidence of marital breakdown. The percentage of cases in which only one of the spouses wishes to divorce is 91.09%^[8].

This shows that women have more choices in family disputes and, in comparison, have a greater degree of autonomy and enjoy a higher degree of legal protection. Thus, the choice between “suicide” and “divorce” is also closely linked to the actual historical changes.

4. Conclusion

In the author’s opinion, whether it is during the Qing Dynasty when the ideas of “Three Principles and Five Virtues” and “Three Obediences and Four Virtues”^[9] were prevalent, or in the contemporary progressive society where women’s rights awareness is actively developing, the legal practice lacks a gender perspective. In particular, there is a lack of holistic norms in the legal system against domestic violence, and most of the relevant provisions are only in principle and not very operational.

Apart from the laws and regulations themselves, the most important reason these women chose to endure for a long time was that they were bound by the core Confucian ethical concepts of patriarchal power and the husband’s right. In exploring this issue, we should base ourselves on the original historical soil and social background, rather than simply criticizing them using modern feminist thinking, and we should take the initiative to think about the reasons for their choices and the deeper logic behind them.

Simone de Beauvoir confessed in *The Second Sex*, “On ne naît pas femme, on le devient”^[10]. Patriarchal society shapes the nature of individual women and absorbs their separate personalities. Men “become men” by assimilating into the group of men, and women gradually become “women” in the social context of the “silence” prescribed by the group.

To quote Spivak in “Can subaltern speak?”, we can homogenize women, the poor, people of color, sexual minorities, etc. in the first world in some sense into one issue for discussion.

The social machine shapes the identities of different groups, while individuals are unconsciously assimilated by this cultural hegemony in their search for so-called “identity” and “belonging.” As a result, those who are discriminated against are easily confined to a socially constructed identity system that is built by and for the benefit of those who are in a position of power. Even when some of those discriminated against choose to struggle and resist, they are equally unable to completely disassociate themselves from the landscape of social discrimination.

At the same time, because of their marginalization, the “common people” are unable to represent themselves and have a voice^[11]. As constructed subjects, their free will is obscured by authority and intellectuals, and those who hold the power of discourse conceal, exploit and even represent them through tangible or intangible means of violence, as some anthropological women’s studies have emphasized, which suggests that women’s status is not always inferior, but may be distorted by ethnographies biased in favour of men.

Therefore, we need to look at the Qing Dynasty and contemporary “divorce cases involving domestic violence” with a dialectical perspective, and explore the protection of women’s rights and interests in judicial practice in different periods. This paper is extremely limited in the selection of cases, but we can see some commonalities in these typical cases, and by looking at the “other,” we can better understand the “self,” and perhaps provide experience for the prevention of contemporary “domestic violence,” to give a voice to the disadvantaged groups in a privileged society.

Disclosure statement

The author declares no conflict of interest.

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Research on the Application of Drama in Education in College English Teaching Approach

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Abstract: Given the complexity and importance of English language teaching and learning, this research firstly points out current dilemmas of English teaching and learning in Chinese colleges. It then introduces the teaching principles and strategies of Drama in Education (DIE) and argues that DIE serves as a good strategy to integrate the four language skills in an English classroom and to benefit English instructors and language learners. To prove the value of DIE, it presents an action study conducted in the researcher's college. The participants of this action research are the researcher's students of the 1st and 2nd grades in college. The research findings show that dramatic activities help students get involved in a real dialogical situation and communicate with others. Besides, it is found that students' learning motives, language proficiencies, and creativity further improve English teaching and learning.

Keywords: Drama in Education; College language teaching; English teaching and learning

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1. Introduction

Currently, English has become the main language in international communication; intriguingly, about 80% of English users are non-native speakers. This phenomenon has turned English into the world's primary lingua franca and defined English Teaching and Learning (ELF) as "any use of English among speakers of different first languages, for whom English is the communicative medium of choice, and often the only option" ^[1]. Since the last century, learning English has become a nationwide activity for most college students in China. Influenced by the international trend, dramatic activities have been believed to have the potential for continuity of English learning between students at college and university levels. However, when principles and strategies of Drama in Education (DIE) have been introduced into teaching, the most common issue is the loss of focus on teaching objectives. Therefore, when planning a curriculum that integrates drama into English instruction, teachers must explicitly specify the learning objectives of each unit—whether in terms of reading comprehension, grammatical and syntactical skills, or communicative competence in English. In that way, drama in education could serve as an effective teaching tool to support and enhance the motivation for college freshmen to learn English well.

2. Problems of college English teaching and learning

Generally, most EFL learners in China have experienced the following three major problems while they are learning English: (1) examination-dominated instruction, (2) a high affective filter, and (3) an artificial learning environment ^[2]. Influenced by the requirements of the entrance examination, most EFL language learners in China usually repeat and memorize vocabulary, sentence patterns, and grammatical rules in a traditional English language classroom. This phenomenon is well-reflected in the observation made by Liu ^[3] that “the conviction that Vocabulary + Essential Structure = Language lies at the base of nearly every foreign language syllabus.”

The second problem that keeps EFL language learners in China from learning English well is a high affective filter. According to Krashen ^[4], the affective filter plays a crucial part in second language learning and acquisition. A language learner’s high affective filter, caused by high anxiety, low self-esteem, and low motivation, would impede language learning ^[5]. Overall, lots of language learners in China lack learning motivation and have an unfavorable attitude towards the English language, owing to their low self-confidence, high learning anxiety, and many meaningless tests ^[3].

The third problem is an artificial learning environment. Since English is a foreign language in China, it is hardly used in social interaction and daily communication. Under such an impoverished learning environment, students normally learn English in school but seldom practice it off campus. As a result, a great number of language learners may have trouble in speaking and listening because these two language skills are usually neglected in the English classroom. For most EFL learners in China, English is not a tool for daily communication, a means to explore the world, or a means to appreciate different cultures, but merely a subject which has to be learned in the classroom and tested in the entrance exams ^[3].

3. Meaning of Drama in Education

Given the complexity and importance of English language teaching and learning, many theories have evolved to explore effective ways to enhance English language teaching and learning, including Creative Drama, Theater in Education (TIE), and Drama in Education (DIE). DIE refers to the use of drama and theatrical techniques as a pedagogical approach in classroom settings. It encompasses various dramatic forms, including structured exercises, dramatic playing, and theater, with the goal of achieving knowledge comprehension through drama (drama for understanding). This approach integrates both subjective and objective learning experiences and involves value judgments related to relevant concepts ^[6].

The essence of DIE lies in its process-oriented, improvisational, and non-performative nature. It is facilitated by a professional instructor (teacher) and involves learners who engage in dramatic construction based on life experiences and social issues. Through artistic elements such as characters, plot, themes, dialogue, and special effects, learners explore and express their ideas creatively. Under the guidance of the instructor, learners engage in imagination and creation, reflecting both human experiences and their own perspectives on the world ^[7].

The core focus of DIE is on the learners’ “reconstruction of experience” and “spontaneous expression” ^[8]. Within an open and natural classroom atmosphere, the instructor employs structured and planned guidance, using techniques such as questioning, storytelling, and prop-based texts to stimulate learning motivation. Learners are encouraged to use various drama-based strategies, including physical movement, situational dialogues, role-playing, imitation, and games.

Overall, DIE rests on two principles of education. As for English instructors, it aims to help them develop their personal communicative ability and creative potential. As for language learners, they can learn more effectively and efficiently because they feel more relaxed and bear a more positive attitude toward learning with the aid of DIE.

4. Action research about Drama in Education

4.1. Research subjects

To prove the value of DIE, some researchers have done studies to examine their support. The experimental samples of this research are all from Zhongbei College in Zhenjiang City, Jiangsu Province. Research selected 72 students (29 male

students, 43 female students) from the 1st and 2nd grades as participants. This course is accessed in three stages and 15 weeks. Participants have been learning English for at least 6 years, possessing basic English comprehension abilities, learning motives, and a wide range of grades. They can provide good feedback on different stages of this course, which is conducive to analyzing the English language situation through dramatic activities in the classroom. In addition, it is also possible to find out whether the integration of DIE strategies and dramas into daily English teaching can make them more interested.

4.2. Research methods

4.2.1. Classroom activity design

This study selected teaching materials from Books 1 to 4 of *New Horizon College English* third versions of higher English education textbooks. The initial plan involved designing nine themes suitable for implementing educational drama strategies: heroes of our time, environmental protection, parent-child communication, career planning, tourism, and online friendships. These topics have both essential everyday communication skills and psychological conflicts that encourage reflection. The entire action research process was divided into three stages: the preliminary stage, action stage, and production stage. Students were expected to present six plays in 15 weeks in classes. Before the performance, there was a check on students' pronunciation and vocabulary as well as a discussion of cultural issues related to the plays' themes.

By incorporating simulated scenarios and dilemmas from educational drama, the designed learning activities closely relate to the core principles of drama in education (DIE) and communicative language teaching (CLT). These activities aimed to enhance students' oral expression and communication skills while fostering respect, empathy, independent thinking, and problem-solving abilities. To uphold the verification principle of action research, drama strategies—such as teacher-in-role, role-playing, scenarios, and image theatre—were repeatedly applied in two or three themes. The teaching steps of this approach follow Cecily O'Neill's process drama approaches^[9]. This approach also aimed to examine the compatibility and effectiveness of educational drama strategies within various English course topics.

In the preliminary stage, the lead teacher and students discussed and then chose the most suitable theme to perform on the stage. Students were assigned to work in pairs and in small groups to create scripts and rehearse the play. After a one-month action practice, students staged the play. After the production stage, students' four English language skills, especially their oracy skills, were reflected and evaluated through dramatic activities in the classroom. Besides, their learning motivation and attitude changed were reflected and evaluated through the three stages. An example is shown in **Table 1**.

Table 1. Activities in the classroom (Theme example: *Heroes of Our Time*)

Activity	Content	Method
1 Input and induced output	1. Input: Reading heroes' materials (Who, When, Where, What, and How). 2. Induced output: Pair work.	Readers' Theatre 1. Reading practice: Students read the heroes' materials (1 unit/week) assigned (e.g., the job of the hero). 2. Oral practice: Students make role-play two in pair.
2 Self-monitoring learning	1. Online searching for more information: Students reading news, watching videos and interviews via "Annual People" platform. 2. Technical AI support: Students do online learning with AI support.	1. Interactive approach 2. Follow the procedures Watch the video → Learn the words → Speak the lines → Chat about the video with AI. 3. Students autonomously make oral practice by interacting with AI (Beta).
3 Collaborative script writing	1. Heroic stories learned was provided for each group's selecting to make a team-based collaborative writing into a drama dialogue script. 2. The "Heroes" stories contain qualities: The construction of heroes— <i>working ethics</i> , courage, competence, and virtue.	1. Collaborative writing. 2. Synopsis cross-group review. 3. Script ELF review.

Table 1 (Continued)

Activity	Content	Method
4 Drama contest	1. Between-group contest was presented in front of all the course participants. 2. The contest was presented for the ELF partners viewing and reviewing.	1. Referee evaluation in the contest and ELF referee evaluation. 2. Group discussion.
5 Classroom as theatre	1. Specific scenarios or scenes in script were chosen for performance in the classroom. 2. Students participated in individual interview with advanced ELF speakers and was evaluated on their oral performance.	1. Face-to-face communication and interview 2. Individual evaluation from ELF interviewer

4.2.2. Questionnaire

This research adopted a questionnaire survey method. The researchers designed a survey questionnaire to investigate the status of English teaching among college students and their understanding of drama strategies. Totally, there were 20 questions in this questionnaire. The research divides these questions into three parts: The first part (1–7) is an overview of English theme learning for students; The second part (8–16) is about the forms of English classroom dramatic activities; The third part (17–20) is about the possibility and acceptability of integrating drama strategies into the classroom. In the process of collecting questionnaire data, 72 questionnaires were distributed to students, and under the guidance of teachers, students were asked to fill out and complete them according to their actual situation. In order to ensure the reliability of the research results, this questionnaire did not include the students' grades.

5. Results and discussion

5.1. Major findings of the research

Through this action research, we have found that dramatic activities have benefits for language teaching and learning. Dramatic activities provided a valuable opportunity for integrating the four language skills in the English language classroom. Moreover, drama in education (DIE) also created an atmosphere for cooperative learning.

According to the results of the questionnaire, 82.8% of participants expressed interest in English classroom activities, and over 65% of students mentioned that the difficulty of learning English comes from the fear of making pronunciation and grammar mistakes. They reported that the application of drama activities could help them overcome their fear of using English, control the tone of their voice, and improve their pronunciation through activities.

As for English learners, DIE had two main advantages. One was their improvement in oral English. The other advantage was that the participants learned to observe others' behavior, trust each other, and accept the limitations of others and themselves. As for the English teacher, drama provided a change in classroom dynamics. Drama in Education (DIE) and Communicative Language Teaching (CLT) enabled teachers to break free from the rigid, accumulation-based learning model advocated by traditional grammar instruction. By building the curriculum around students' needs and real-world problems, this approach could much more naturally enhance their motivation to learn English. Learning by doing, students themselves came to appreciate the value of autonomous learning and collaborative teamwork, while also unleashing the power of creativity and imagination. Most importantly, the communicative and cooperative relationship between teachers and students fostered effective methods, empowering each student to become a critical and engaged learner.

Based on our study, findings show that dramatic activities enrich and improve English teaching and learning. In addition, it implies that DIE could be a good strategy for connecting the English curriculum at college levels.

5.2. Methods to apply dramatic activities

The researcher of this study has been applying DIE in English classrooms at the college level for two years. Based on the personal teaching experiences, two different levels of using dramatic activities could be suggested.

As for the first-grade students, especially at college levels, drama undoubtedly is an effective methodology to enhance their learning motivation, for dramatic activities not only spur their interests but also lower their learning anxiety. To meet freshmen students' language proficiency, the plays used in class could be adapted from their familiar themes. As for students at the second grade level, they usually have better command of the English language and more life experiences. Consequently, in an English drama classroom, the teacher would not only require students to read out the script, but also discuss the following main points: the plot, structure, themes, characters, and languages. Take *Heroes of Our Time* for example, in the beginning, the plot would be introduced in the whole class and the script will be developed and read in small group, followed by the introduction of inspiring stories from "Annual People," a Chinese TV program in which people were awarded for their significant contribution to the society, and finally what is "hero" will be discussed in the class.

Without the push of entrance exams, students at the college level may lack the motivation or need to learn English. Under such circumstances, dramatic activities could be an effective strategy to motivate their interests and inspire students to learn English for their own sake, not for tests.

As for teachers, applying DIE in a college English classroom is demanding. In China, if teachers want to learn DIE methods, the available support is quite limited. The most common options include participating in short-term workshops or enrolling in professional development courses, such as a Master's program in teaching. Key conditions in the learning process include providing teachers with opportunities to observe demonstrations, allowing them to receive conceptual inputs in action^[10]. Additionally, teachers should have opportunities to practice, ideally in situations where they can engage in supported action.

5.3. Limitations and suggestions for future research

Despite significant efforts in applying Drama in Education (DIE) to English-speaking instruction, certain limitations in this study remain unavoidable.

First, the research sample consists of only 72 students, and due to practical constraints, the selection was not entirely random. As a result, the sample lacks sufficient representativeness and diversity to fully reflect the perspectives of all college students. This aspect of the research requires further refinement. Second, the research duration is relatively short. Although the experiment spans nearly one semester, only six plays were conducted. A longer implementation period would allow for a more comprehensive evaluation of the method's effectiveness. Finally, due to the absence of a standardized spoken English assessment system, this research relies on the average evaluations given by both the lead teachers and the intern teachers. However, these assessments may have been influenced by subjective factors. Future research should aim to develop or adopt a more objective and reliable evaluation framework.

6. Conclusion

This paper argues that DIE strategies might be a good way to minimize three major problems of English teaching and learning in China and have the potential for continuity of the English curriculum at college levels. A concrete example of an appropriate English drama class is illustrated to give language teachers some hints on how to apply dramatic activities properly for this level of students. The researcher believes that integrating drama into English language classroom activities is more suitable for learners above the beginner level, particularly junior students at college. In brief, drama for first-grade students should be treated in a simpler way, yet for second-grade students could be viewed as one of the literary subjects: being presented basically in the beginning, further being deeply explored in class, and finally being performed on stage. By the use of drama in education in the classroom space, students will not only learn language knowledge but also gain

greater delight from the entertainment.

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Endowing Modern Technology with a Traditional Soul: The Chinese Philosophical Implications in the Logo of ChatGPT

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Abstract: This paper explores the traditional Chinese philosophical thoughts integrated into the logo design of ChatGPT, highlighting its interpretation and embodiment in the modern technological field. As a representative of advanced artificial intelligence, the ChatGPT logo is not only a trademark but also carries profound cultural and philosophical connotations. The research, through the analysis of the logo, reveals its alignment with the ancient Chinese concept of “endless vitality.” This paper introduces the functions and design concept of ChatGPT, delves deeply into the ingenious presentation of the “endless vitality” concept in logo design, and showcases the harmonious integration of Eastern philosophy and Western technology. Through comparative analysis, the mutual influence between modern technology and traditional cultural symbols has been highlighted, enhancing the aesthetic value and cultural connotation of the logo. The research also explored the significance of this design in promoting cultural exchange and understanding in the context of global technological development. Finally, the cultural integration marked by ChatGPT was summarized, and the future trends of technology and traditional culture were prospected, providing a valuable case for cross-cultural design.

Keywords: ChatGPT; Endless vitality; Chinese philosophy; Cross-cultural design; Semiotics; Technology and tradition

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1. Introduction

ChatGPT, as the peak of innovation in the field of artificial intelligence, was developed by OpenAI and has revolutionized the way humans interact. Since its establishment, ChatGPT has been widely praised for its coherent response capabilities and has become a key tool in fields such as customer service and creative writing. In modern technology, ChatGPT represents the pinnacle of natural language processing, achieving precise interaction with human language. This is crucial for intuitive and efficient communication in the digital age and marks a major advancement in the field of natural language processing ^[1].

ChatGPT is not merely a conversation tool; it also plays a role in multiple fields such as education, programming assistance, and content creation, demonstrating its versatility and potential for industry transformation. Its contribution to AI highlights the rapid development momentum of machine learning, offering unprecedented possibilities for enhancing

human capabilities and transforming technological approaches.

To understand the philosophical basis of the ChatGPT logo, it is necessary to conduct in-depth research on traditional Chinese patterns and related philosophies. One of the core concepts in Chinese philosophy is “endless vitality,” which reflects the continuous cycle of life. Traditional patterns are characterized by fluidity, complexity, and symbolic depth, deeply rooted in Chinese culture’s understanding of harmony, balance, and the life cycle ^[2].

This study aims to analyze how the ChatGPT logo summarizes Chinese philosophical principles, especially the concept of “endless growth.” By conducting a detailed analysis of the elements of logo design, studying their connection with traditional Chinese patterns, and exploring the comprehensive influence of modern technology and ancient wisdom, insights are provided for the harmonious integration of technology and culture.

2. Understand ChatGPT

2.1. History and development of ChatGPT

ChatGPT is a language model developed by OpenAI, representing an important milestone in the field of artificial intelligence. Its origin can be traced back to the early research on AI and NLP, which focused on creating machines capable of understanding and generating human language. With the Generative Pre-Trained Converter (GPT) architecture, ChatGPT has demonstrated extraordinary text generation capabilities and has become an innovative tool in the field of AI. As an extension of the GPT model, ChatGPT has enhanced capabilities in interaction and dialogue AI. Through extensive text data training, the model is able to learn multiple language patterns and nuances, achieving accurate, relevant, and context-aware responses ^[3].

The development of ChatGPT emphasizes the importance of addressing bias and ethical issues, adopting multiple strategies to minimize the model’s bias and ensure that responses comply with ethical standards. This demonstrates an increasing understanding of the ethical impact of artificial intelligence and the development of responsible artificial intelligence.

ChatGPT has had a significant impact in various industries. In customer service, more efficient communication has been achieved; In the field of education, become a powerful tool for learning and content generation; In the field of creativity, it opens up new possibilities for artificial intelligence-assisted creation. The development of ChatGPT marks a new era in artificial intelligence, enabling meaningful and context-rich interactions with humans ^[4].

2.2. Overview of OpenAI and its mission

The mission of OpenAI is to promote digital intelligence in a way that benefits humanity. As an artificial intelligence research and deployment company, OpenAI’s vision is not only to create advanced AI models, but also to promote the development of AI in a safe, ethical, and transparent manner. This organization was founded by entrepreneurs and researchers, dedicated to ensuring that the benefits of artificial intelligence are widely and fairly distributed, operating on an open principle, and promoting cooperation and innovation in the field of artificial intelligence.

Against the backdrop of the rapid development of artificial intelligence technology, the mission of OpenAI is particularly important. Its commitment to ethical AI development is reflected in the approach to projects like ChatGPT, where considerations of safety, fairness, and social impact are indispensable parts of development ^[5].

OpenAI’s research is not limited to language models like ChatGPT, but also covers a wide range of fields such as robotics, computer vision, and reinforcement learning. Each field contributes to the overall mission of promoting artificial intelligence to benefit all mankind.

The history and development of ChatGPT, guided by OpenAI’s mission, represent a significant moment in the advancement of artificial intelligence. It is not only a technological achievement, but also an embodiment of the vision of creating moral artificial intelligence. As artificial intelligence evolves, organizations like OpenAI are playing an increasingly important role in guiding and ensuring the future development of artificial intelligence ^[6].

3. Philosophy of continuous creation in Chinese culture

3.1. Exploration of the concept of “endless vitality” in Chinese philosophy

“*Shēng Shēng Bu Xī*” is a profound concept in Chinese philosophy, representing the essence of creation and the eternal cycle of life. This ancient philosophy, rooted in Taoism and Confucianism, has shaped Chinese thought and culture. Among them, “*Sheng Sheng*” represents continuous growth and evolution, and “*Bu Xi*” means endless. Together, they convey the concepts of eternity and periodicity of the universe, emphasizing the continuous changes and harmonious balance in the universe^[7].

In Taoist philosophy, this concept is closely related to the Dao, which is regarded as the fundamental principle of the universe and embodies the essence of “endless life.” This emphasizes the belief that the universe is constantly changing while maintaining harmony and balance, and stresses the importance of living in harmony with nature and the interconnection of all things.

Confucianism also resonates with this view, although the emphasis is slightly different. It emphasizes the importance of an individual’s continuous self-improvement and moral development, which is in line with the concept of endless growth and progress. The Confucian concept of “endless life” encourages individuals to pursue knowledge and a moral life, and to contribute to social harmony and human well-being.

3.2. Historical significance and modern interpretation

Historically, the concept of “endless vitality” has always been the guiding principle in all aspects of Chinese culture, from art and literature to governance and social organization. In art, it is usually symbolized by patterns such as endless knots, phoenixes, and dragons, each representing different aspects of immortality and constant renewal. In literature, this theme is very common in the works of poets and philosophers, who ponder the mysteries of life and the universe. In governance, the idea of “endless vitality” is regarded as a necessary condition for the continuity and stability of a country. Emperors and leaders are often encouraged to rule with this principle in mind to ensure that their policies and actions contribute to the long-term prosperity and well-being of the people. This philosophy has also influenced traditional Chinese medicine and science. The understanding of life and nature is an indispensable part of practice^[8]. In contemporary times, “endless vitality” still holds significant meaning. Nowadays, it is often interpreted in the context of sustainable development and environmental management. This concept encourages respect for nature and cautious treatment, and advocates practices that ensure the environmental health and sustainability of future generations. In the realm of personal development and spirituality, “endless life” resonates with the modern concepts of lifelong learning and personal growth. It is in line with the idea that individuals should constantly strive to improve themselves intellectually and morally throughout their lives. In terms of technology and innovation, this ancient philosophy has received new expressions. It has stimulated the pursuit of continuous improvement and development of technological progress. The idea that technology should develop in a way that coexists harmoniously with human society and the natural world can be regarded as a modern interpretation of “endless vitality”^[9]. In conclusion, the philosophy of “endless life” provides an eternal framework for understanding the world and our position within it. Its historical roots in Chinese thought provide a rich background for its contemporary application and demonstrate its lasting relevance. From guiding ancient emperors to inspiring modern innovators, “endless vitality” remains a powerful symbol of endless creation and the eternal cycle of life, reverberating as the fundamental truth of existence through the years.

4. Analysis of ChatGPT logo design

4.1. Detailed description of the ChatGPT logo

The ChatGPT logo combines simplicity with symbolic depth, serving as a testament to the interweaving of modern design and profound meaning. Essentially, this logo features a stylized representation of interconnection and continuous flow, which are at the core of ChatGPT’s functionality and the philosophical basis it ingeniously implies.

The main element of the logo is a geometric configuration similar to a chat bubble, indicating the model's primary function in communication and dialogue. In this bubble, the complex patterns imply a vortex movement, symbolizing the dynamic and constantly evolving nature of artificial intelligence and language processing. The choice of shape and its arrangement within the logo have been meticulously designed, not only representing the technical aspect of ChatGPT but also resonating with deeper and more abstract concepts ^[10].

4.2. The symbolic meaning and significance behind the logo elements

The symbolic meaning of the ChatGPT logo is multi-faceted. The chat bubble form can immediately identify the main uses of this tool in digital communication. This expression goes beyond the literal meaning and implies the broader impact of artificial intelligence in promoting human interaction and connection.

The vortex pattern inside the bubble is particularly memorable, suggesting a sense of continuous movement and change. This can be interpreted as an acknowledgement of the constantly evolving nature of artificial intelligence technology, where every interaction and input contributes to the learning and growth of the model. It also reflects the concept of "endless growth," depicting the eternal cycle of creation and evolution, which is a fundamental principle of Chinese philosophy, telling of the never-ending process of growth and renewal.

In addition, the color selection in the ChatGPT logo plays a significant role in its symbolic meaning. The use of blue and green tones conveys a sense of trust, stability, and harmony. These colors are usually associated with technology, innovation, and calmness, further strengthening the connection between the logo and ChatGPT's advanced yet user-friendly nature ^[11].

5. Case studies and comparative analyses

The intersection of logo design and cultural themes in modern technology offers fascinating research on how brands convey their identities and values. This chapter explores various technological symbols and their cultural significance, and further compares them with traditional Chinese art and patterns to understand the integration of modernity and tradition in design.

5.1. Review other technical marks and their cultural significance

Apple's logo: The apple bite is one of the most well-known logos in the world. Its simplicity and bite marks, often associated with "bytes" in computing, convey innovation and approachability. The apple symbolizes knowledge, alluding to the story of Adam and Eve in the Bible, and conveys a brand concept that provides inspiring technology.

Microsoft's logo: Microsoft's logo consists of four colored squares, representing its diverse range of products. The use of primary colors and window-like structures symbolizes openness, accessibility, and a window into the technological world. The simplicity of the design is consistent with the brand's emphasis on clarity and efficiency ^[12].

Google's logo: Google's logo is renowned for its playful color scheme, reflecting the brand's approachable and innovative character. The use of primary colors is interrupted by a single auxiliary color (green), indicating that this company values simplicity but challenges norms and thinks in a different way.

IBM's logo: The logo of IBM features horizontal stripes, giving people an impression of speed and vitality. The solid font reflects strength and reliability, which are the core values of a company rooted in technology and innovation.

5.2. Comparative analysis with traditional Chinese art and patterns

By comparing these technological symbols with traditional Chinese art and patterns, one can discover the charming integration of modern design principles and ancient cultural patterns.

Symbolism: Traditional Chinese patterns are rich in symbolic meanings, often representing natural elements, philosophical ideas, or bringing good luck and prosperity. For example, the lotus in Chinese culture represents purity and

enlightenment, similar to the way the apple symbolizes knowledge. This connection lies in the use of simple yet powerful symbols to convey profound ideas.

Simplicity and minimalism: Traditional Chinese art emphasizes minimalism and the use of negative space (*liu bai*), which is similar to modern logo designs such as Apple and Google. The latter uses simple shapes and colors to create memorable and effective visual impacts ^[13].

Geometry and balance: The balance and geometric properties of traditional Chinese patterns can be seen in designs such as Yin and Yang or the use of symmetrical shapes. Similarities can be found in the structured and balanced design of Microsoft's logo. This balance embodies harmony and stability, which is a principle valued in both traditional Chinese aesthetics and modern design.

Dynamic movement: The sense of movement and vitality in Chinese art, such as the smooth lines in ink-wash paintings, can be compared to the movement implied in the IBM logo. The horizontal lines create a sense of movement, echoing the dynamic and constantly evolving nature of technology.

Symbolic meaning of colors: The colors in Chinese patterns have strong symbolic meanings. For example, red represents happiness and good luck, while green symbolizes renewal. This use of colors to convey meaning is similar to Google's logo, where colors are not only used for visual appeal but also to represent the brand's identity and values.

6. Conclusion

The exploration of the ChatGPT logo and its integration of modern technology with traditional philosophy offer valuable insights into the evolving landscape of brand identity and design. This research reveals that contemporary logo design, especially in the field of artificial intelligence technology, is not merely a matter of aesthetic appeal, but rather a complex interaction among symbolism, cultural narratives, and philosophical foundations. The main findings and their impacts on future research and design practices are as follows.

6.1. Summary of the main investigation results

The integration of traditional concepts: The logo of ChatGPT effectively incorporates elements of traditional Chinese philosophy, especially the concept of “endless creation and continuous existence.” This integration demonstrates the possibility of fusing ancient wisdom with modern technological manifestations, creating a logo that is both innovative and profoundly significant.

Symbolic meaning and cultural resonance: Research shows that logos like ChatGPT are not merely visual symbols; they are carriers of rich cultural and philosophical significance. The use of specific design elements, such as the vortex pattern and color selection in the ChatGPT logo, resonates with traditional patterns and conveys the brand's commitment to continuous growth and learning ^[14].

Modern design trends: This analysis highlights the impact of modern design trends on the ChatGPT logo, emphasizing simplicity, minimalism, and symbolic depth. These trends reflect a broader movement in logo design, which emphasizes clarity, adaptability, and the ability to convey complex ideas in a visually concise way.

Future trends in artificial intelligence and design: This study highlights emerging trends in logo design, including AI-generated designs, interactive and adaptive logos, as well as the integration of AR/VR technologies. These trends indicate that in the future, logo design will not remain static but will be an evolving aspect of the brand experience.

6.2. Impact on future research and design practices

Cultural sensitivity and global influence: Future research should focus on the significance of cultural sensitivity in logo design, especially for brands with global influence. Designers must understand the cultural narratives and symbols they contain to ensure respectful and authentic representation.

The ethical impact of artificial intelligence in design: As artificial intelligence begins to play a more significant role

in logo design, future research must address ethical issues, including originality, authorial identity, and the influence of AI-generated designs on the design industry^[15].

Education and training programs: Research findings indicate that there is a need for education and training programs that focus on the intersection of design, technology, and cultural studies. These plans will provide future designers with the skills and knowledge to create technologically advanced and culturally significant logos.

In conclusion, the study of the ChatGPT logo offers a unique perspective through which to observe the integration of modern technology and traditional design philosophy. These findings highlight the complexity and depth that a logo can achieve when successfully integrating cultural and philosophical elements. The impact on future research and design practices points to a more comprehensive, culturally conscious, and morally responsible approach to logo design, especially in the rapidly developing field of artificial intelligence technology. As the boundaries between technology, culture, and design continue to blur, the role of logos as brand identifiers and cultural narrative symbols will only become increasingly important.

Disclosure statement

The author declares no conflict of interest.

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A Study on the English Translation of Chinese Political News from the Perspective of Skopos Theory: A Case Study of *China Daily*

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Abstract: In the new era, the translation of Chinese political news into English aims to accurately convey China's development dynamics to the global audience, further deepen the world's understanding of China, promote friendly exchanges and cooperation between China and other countries around the world, facilitate China's better access to the world, and enhance the friendship between each other. However, the translation of political news is unique and challenging because of the basic differences between Chinese and Western language structures, as well as the unique styles and profound connotations embedded in each country's political news. This paper takes Mr. Hans Vermeer's Skopos theory as guidance. It takes some political news in *China Daily* as examples to discuss the English translation techniques of political news in China nowadays. It also gives full affirmation and support to Skopos theory. Finally, through the combined application of Skopos theory with other translation techniques in translation practice, it is particularly emphasized that Chinese translators need to maintain cultural self-awareness and cultural self-confidence, and possess a deep sense of patriotic awareness. Through the flexible application of translation techniques, Chinese translators will play a greater role on the global stage and contribute to the promotion of Chinese culture and the realization of the Chinese dream.

Keywords: Skopos theory; Political news; Translation techniques; *China Daily*

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1. Introduction

The world today is facing a great change that has not been seen in a century. At present, the global development initiative and the global security initiative have strongly led the international order in the right direction; the Chinese concept and Chinese action of "the Belt and Road" construction have injected Chinese energy into global governance under the changing circumstances of the world. At the same time, with more frequent exchanges of various ideas and cultures in the world, and more intense struggles for international public opinion and soft power, the country's demand for high-quality internationalized foreign language translators with a sense of patriotism, a global vision, and the ability to tell China's story and participate in the global competition has never been as urgent as it is today. However, this process has also been accompanied by many misunderstandings of China's policies and theories, even to the extent of saying that they denigrate China. In order to provide the world with a comprehensive and accurate understanding of China, *China Daily* provides the world's political community with a standardized example of how to understand China, and Mr. Hans Vermeer's Skopos

theory is most applicable to it.

From the level of practical significance, the research of this thesis can help to improve the quality of English translation of Chinese political news and promote the exchange and mutual appreciation between Chinese culture and Western culture. From the level of social impact, high-quality English translation of political news also helps to promote understanding and cooperation among different cultures and provides strong support for the harmonious development of international relations.

2. Profile and analysis of political news

News, as a functional text, fully embodies its unique non-literary characteristics due to its clear and concise language, accurate content, and easy-to-understand expression.

2.1. Overview of political news

Political news focuses on in-depth coverage of domestic and international political affairs, providing readers with a comprehensive and in-depth view of political dynamics. Political news is rich and diverse, and can be further subdivided into two categories: official documents and political essays. They are often the focus of public attention and are closely related to national political, economic, and social development, affecting everyone's life ^[1]. Political news is released by authoritative figures and government organizations. Political news is an important way for the public to understand political developments and participate in political life, and it plays an irreplaceable role in maintaining social stability and promoting social progress.

2.2. Features of political news

As an important branch of news, political news not only retains the common characteristics of news but also shows its unique style. Firstly, political news is distinctly political. Wu claimed, in the definition of political journalism, the core term "political" specifies its essential attributes, i.e., the main content of the news must be directly or indirectly related to political issues, reflecting political dynamics and positions ^[2]. Secondly, political news is strict and formal in language expression. Finally, political news emphasizes readability and popularity. By using easy-to-understand language and avoiding overly complex sentences, political news ensures wide dissemination and acceptance of information.

2.3. Functions of political news

Political news provides a way for the general public to understand the ideas, guidelines, and dynamics of national development, and the content of political news reflects the trends of political development, demonstrates the results of economic development, and also reflects the optimization of the living conditions of the grass-roots people, infrastructure, and so on ^[3]. However, in the special context of China, Chinese political news also plays an important role in the world and is an important channel for outsiders to understand China's political ecology and decision-making process, which helps to enhance China's international image and influence and improve the international community's understanding and recognition of China.

3. Skopos theory

The word "skopos" is of Greek origin, which means purpose, goal, and object in the translation process. Functionalism argues that the translation process is an act with a cross-cultural purpose, and that the purpose pursued by a translated language determines the characteristics of the language itself.

3.1. Previous studies on Skopos theory

As the first introduction of German functionalist translation theory in China, the famous translator Gui published the article *Three Translators in Federal Germany* ^[4]. However, in the CNKI, articles searched with the keyword “Skopos Theory” were mainly published after 2013. These articles cover a wide range of translation topics, including the definition of translation, translation methods and techniques, translation teaching methods, and literary translation. Firstly, numerous studies focus on the selection of translation methods and techniques under the guidance of Skopos theory. In addition, Liu and Ma explored suitable translation strategies to enhance the quality of translation of tourism materials from the perspective of Skopos theory ^[5]. Secondly, there is literature that explores the Skopos theory in combination with teaching practice. For example, Xie argued that in university English translation teaching, students should be oriented to the Skopos theory and flexibly use translation strategies and methods as a way to improve the practical ability of English translation ^[6]. Zhang, on the other hand, further revealed the many problems encountered in the process of integrating the Skopos theory into the innovation of university English translation teaching mode, and put forward specific solutions, aiming to promote the enhancement and comprehensive development of Chinese university students’ English translation ability ^[7]. Finally, a number of experts in the field of linguistics have continued to deepen their research on the Skopos theory, making it an indispensable core element in the system of functional translation theory. Every year, a large number of academic papers related to it emerge at home and abroad. For example, Zhong, under the framework of Skopos theory, discussed in depth the characteristics of Business English translation in the hotel industry ^[8].

Overall, academics have generally recognized the solid theoretical foundation that Skopos theory has demonstrated in translation practice, and that it has provided strong guidance and support for translation work.

3.2. Principles of Skopos theory

The Skopos theory encompasses three core principles: the principle of Skopos, the principle of coherence, and the principle of fidelity. These three principles together constitute the theoretical basis of the Skopos theory.

3.2.1. Skopos principle

“Skopos theory holds that the target reader is an important determinant of translation purpose, highlighting the role and importance of the target reader. Translation should meet the needs of target readers, and different target groups have different needs, so translation strategies should be adjusted accordingly” ^[9]. Skopos principle emphasizes the purposefulness and functionality of translation activities and gives full consideration to the needs and expectations of the target audience, and provides strong guidance for translation practice and promotes the innovation and development of translation activities.

3.2.2. Coherence principle

“The rule of coherence requires that the version should conform to the original, to the intercultural communication, accepted by the reader” ^[10]. The principle of coherence emphasizes the need for translations to conform to the grammatical norms of the target language to ensure fluency and comprehensibility. “Also, the linguistic form should also be taken into account so that the target text could comply with the grammatical requirement of target language” ^[11]. Therefore, to make the target text flow naturally in the target language and conform to its grammatical norms, the translator needs to have an in-depth understanding of the target language and be able to utilize its linguistic forms flexibly.

3.2.3. Fidelity principle

The principle of fidelity embodies respect for the original text and a rigorous attitude towards translation activities. The principle of fidelity emphasizes the interlingual coherence and consistency between the original text and the translated text, and the translator’s ability to understand and interpret the original text. As Zhou said, fidelity depends on the translator’s thorough reading of the original text and the goal-oriented approach they follow in processing the translation ^[12]. Fidelity

principle holds that translators should comprehend the original text and convey the message, semantics, style, and tone of the original text as much as possible, and they also need to make necessary adjustments and innovations according to the purpose of translation and the needs of the target audience.

4. Application of Skopos theory in political news

Translation is not only the conversion of language but also the transmission of culture. According to the specific context, the translator should skillfully adjust the way to reproduce the original text.

4.1. Amplification

In the process of translation, given the significant differences in culture, tradition, history, social customs, and level of development between the Chinese and English, translators not only need to grasp the deeper meaning of the original text, but also need to take into account the characteristics of the target language as well as the cultural background of the target readers, and carry out appropriate semantic amplification and interpretation. Through amplification, translators can effectively achieve smooth cross-cultural communication, build a bridge of understanding and communication between individuals or groups of different cultural backgrounds, and thus ensure that the translation can faithfully convey the meaning of the original text.

Example 1: 加强人才国际交流，用好用活各类人才。深化人才发展体制机制改革，真心爱才、悉心育才、倾心引才、精心用才，求贤若渴，不拘一格，把各方面优秀人才集聚到党和人民事业中来。

Translation ^[1]: We will increase international personnel exchanges and make the best use of talent of all types to fully harness their potential. We will further reform the systems and mechanisms for talent development and ensure we value talented people, nurture them, attract them, and put them to good use. No effort should be spared and no rigid boundaries drawn in the endeavor to bring together the best and the brightest from all fields for the cause of the Party and the people.

This translation adopts the amplification and Skopos principle. The expression “用好用活各类人才” is translated into “make the best use of the talent of all types to fully harness their potential,” which reveals and explains the deeper meaning of this phrase while adding vocabulary to the expression. The expression “用活” means “to use well” and not literally “to use to live.” The rigor of political news is reflected. Besides, “Cross-cultural translation principles should also respect and consciously safeguard cultural diversity” ^[13]. When translating Chinese idioms, amplification and explanatory translations are often more effective than word-by-word translations. Hence, the expression “求贤若渴，不拘一格” ^[2] is translated as “No effort should be spared and no rigid boundaries drawn,” which explains the original text’s attitude towards the thirst for talents, the urgent pursuit of talent and its determination to introduce talents out of the box, which also implies the fidelity principle to convey the emotional color of the original text. That expression also reflects China’s cherishing of talent, which enhances China’s international image and influence. Amplification translations are often easier for the audience to understand, which is worthy of praise.

4.2. The change of the voice

In English, passive voice is presented in the fixed form of “be + past participle.” The frequent use of passive voice in English political news aims to emphasize the facts from an objective and impartial point of view, and at the same time helps readers to grasp the key information quickly. “When people read, they only focus on the part they are interested in. When readers read newspaper articles, the words or phrases that first enter the reader’s gaze are relatively easy to attract readers’ attention. For this reason, the passive voice moves the recipient of the action to the beginning of the sentence” ^[7].

Example 2: 他补充道，对（乡村振兴重点帮扶县、易地搬迁集中安置区等）重点地区，要进一步落实财政、金融、土地、人才等倾斜性支持政策，帮助他们创造美好生活。

Translation ^[3]: He added that more preferential policies on monetary, financial, land, and talent resources will be continuously given to some key areas, including counties, to help them achieve better lives.

Firstly, the translation is coherent and logical, and the addition of “including counties” clarifies the scope of the key areas, which demonstrates the formal nature of political news, so that readers can easily understand the intention of the original text. Secondly, the translation skillfully converts the active voice of the original text into passive voice, such as “more preferential policies will be continuously given,” placing the different aspects of the original policy at the front of the sentence. It clarifies the focus of the news and facilitates the readers to get the key information, which is also in line with the English expression habit, and makes the translation more natural and fluent. In addition, the translation retains the key information of the original text, such as “fiscal, financial, land, talent, and other inclined support policies,” which ensures that the information is accurately conveyed. Word-for-word translation belongs to the literal translation strategy. Literal translation is preferable if it does not cause misunderstanding^[14]. These are the products of the coherence principle and fidelity principle.

4.3. Extension

Extension is a translation technique that is particularly suitable for dealing with idioms and slang. It centers on finding counterparts in the target language that match or are similar to the meaning of idioms in the source language. By using the existing expressions in the target language, the translator can retain the uniqueness and flavor of the idioms of the source language to the greatest extent possible, thus making the translation easier to understand and accept by the target language readers.

Example 3: 中国现在追求的是高质量发展而不是量的高速增长。这种高质量发展是由“新质生产力”和创新来推动的。高质量发展并非一蹴而就，而是受内外因素共同影响。

Translation^[5]: China is now pursuing high-quality development as opposed to high-speed, quantitative growth. Its pursuit has been boosted by “new quality productive forces” and new innovations. This is not a bolt from the blue; instead, it has been conditioned by internal and external factors.

“The cultural transformation principle is not just a process of language transformation, but also a social phenomenon of communication between two cultures”^[15]. The translation of idioms and slang is a good example of this. In the English idiom “bolt from the blue,” the word “bolt” in this case means “lightning,” and “the blue” means “the sky.” However, after extension, this idiom can be used to describe something completely unexpected, suggesting a sudden event, like a bolt of lightning from a clear blue sky. Nevertheless, the expression “一蹴而就”^[6] means to take one step and succeed, which describes things as being easy by extension. This idiom is usually pejorative, but because the negative word “not” is in the sentence, it fits the context. It shows that high-quality development is not achieved suddenly or by accident, but only after a long period of hard work and the combined influence of many factors. This demonstrates translators’ rational knowledge and affirmation of China’s actual national conditions, as well as their implied hope for the future development of China. So in this context, “bolt from the blue” is preceded by a negative sense to convey the meaning of “一蹴而就.” The Chinese idiom “一蹴而就” and the English idiom “bolt from the blue” have been reasonably extended in their respective linguistic contexts, and in the end, lexical equivalence has been achieved, making the translations very relevant to the original text. Finally, the expression “受内外因素共同影响” was translated as “has been conditioned by internal and external factors” instead of “affected by both internal and external factors,” which is concise and conforms to the English expression habit. There is a subtle difference between the meaning of “be conditioned by” and “be affected by,” with the former mostly referring to being restricted by objective as well as natural conditions that cannot be changed by oneself. The latter mostly refers to being influenced by emotions and language. The discretionary choice of this terminology reflects the rigor and formality of political news.

5. Conclusion

This paper provides an in-depth discussion and summary of the study of the English translation of *China Daily*. Through a comparative analysis of the original text and the translated text, it discusses in detail the practical application of some

translation methods and techniques guided by the Skopos theory in the process of English translation, and especially mentions the importance of patriotic awareness for Chinese translators.

In conclusion, English translation of Chinese political news requires translators to make flexible use of translation methods and techniques under the guidance of the Skopos theory, and at the same time to love the motherland, possess national sentiment, and have patriotic consciousness. Through continuous practice and exploration, they can constantly improve the level of English translation and make a greater contribution to the promotion of Chinese culture and international exchange.

Disclosure statement

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The Formation Mechanism and Resolution Strategy of the Disorderly Phenomena within “Fan Community”

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Abstract: In the digital age, where social media and the entertainment industry are deeply integrated, the structural embedding of new media technologies has profoundly reshaped the digital practices of teenagers. This process not only deconstructs traditional cognitive models but also drives the transformation of teenagers’ star-chasing behavior from individual spiritual worship to organized “fan community behavior,” presenting typical characteristics of irrational socialization. As an important manifestation of youth subculture, the influence of such phenomena has transcended the entertainment realm and permeated into the construction of socialist core values, even giving rise to an informal economic ecosystem that disrupts the normal governance order of society. Based on this, this article provides a new theoretical perspective for the governance of online subcultures and offers operational, practical paths for the cultivation of teenagers’ digital literacy and the construction of online civilization.

Keywords: Fan community; Digital labor; Alienation of capital logic

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1. Introduction

In the macro context of digital social transformation, the structural embedding of Internet technology has constructed a cultural education environment for online youth subculture in the form of an implicit carrier. According to the “Blue Book of Youth: Report on Internet Use by Chinese Minors (2024),” the age of first internet access by minors in China has been continuously decreasing, their information retrieval capabilities have significantly improved, and the window period for acquiring digital cognitive skills has shown a significant forward trend. However, while technology empowers, it also brings many potential risks. In highly organized online communities, teenagers are easily influenced by online subcultures such as “fan community,” and thus get involved in irrational collective social practices. This influence is no longer limited to the field of entertainment consumption but has evolved into a multi-dimensional social issue involving the socialization process of teenagers, value formation, and the governance of the online ecosystem. In the face of this predicament, it is urgent to provide theoretical support and practical paths for the cultivation of digital literacy among teenagers and the construction of a benign online ecosystem.

2. Extreme manifestations of fan community

Under the dual drive of technological empowerment and capital logic, “fan community” has shown a significant trend of extreme development.

2.1. Irrational consumption

In regular consumption scenarios, consumers usually make decisions based on practical functions and emotional experiences. In contrast, fans tend to make repetitive and even wasteful purchases driven by emotional needs, which clearly demonstrates irrational characteristics. By symbolizing idol products, more fans who are willing to pursue and worship their idols are encouraged to make purchases. This creates a social phenomenon where idols output symbolic information value to satisfy the desires and fantasies of their fans. Fans develop a psychological illusion of being close to their idols by purchasing products endorsed by them, thereby driving consumption ^[1].

Fan consumption behavior is essentially an emotional labor process achieved through material investment and symbolic practice. It not only satisfies fans’ emotional attachment to their idols but also enables them to gain a sense of participation and achievement by engaging in collaborative data production. The systematic guidance of capital towards fans’ consumption stickiness further intensifies the irrationality of star-chasing behavior. In this process, individual and collective identities within the “fan community” are distorted into a single consumption identity, showing obvious signs of narrow-mindedness and vulgarity. Some even equate the degree of support for an idol with the amount of consumption and support funds. In this system, the amount of consumption becomes the core indicator of fan loyalty, and fans must prove their support for their idols through high consumption and support. When selecting celebrity endorsers, brands conduct thorough assessments of the celebrity’s fan base characteristics, market influence, and the alignment between the celebrity’s image and the brand’s ethos, forming a precise positioning ^[2]. Therefore, fans will showcase the commercial value and market appeal of their idols by purchasing products and related goods endorsed by them.

2.2. Excessive emotional reliance

With the transformation and development of the socioeconomic structure, the emotional support model for contemporary teenagers is undergoing profound changes. The emotional support function in traditional family relationships is gradually weakening, and the widespread sense of loneliness prompts teenagers to seek new emotional anchors. Against this backdrop, idol worship has emerged as a psychological compensation mechanism. The community formed by fans in the process of chasing stars has strengthened their social connections and identity recognition. Specifically, common identity attachment implies that members feel a commitment to an online community’s purpose, whereas common bond attachment implies that members feel socially and emotionally attached to specific community members ^[3]. The unique emotional appeal and spiritual resonance of idol worship effectively fill the emotional and sense of belonging voids in teenagers’ growth process. Meanwhile, idols, as the projection carriers of the ideal self, also become important references for teenagers’ identity construction. However, if this psychological mechanism operates improperly, it may lead to cognitive narrowing. Fans deify their idols, fall into one-sided emotional investment, and eventually form a vicious psychological cycle.

2.3. Cyber violence behaviors

The operation of cyber violence in “fan communities” is a multi-level and systematic process. Cass Sunstein, a sociologist, said: “In the field of the Internet and new communication technologies, like-minded groups exchange and discuss with each other. Eventually, their ideas remain unchanged but become more extreme in form.” This theory accurately explains the behavioral characteristics of the “fan community” group ^[4]. Since online community users tend to have a common identity and purpose, they feel a bond with the other members ^[5]. When fan groups participate in online discussions, they are easily influenced by the thinking of other members and may fall into predicaments such as distorted rational thinking, information cognitive biases, and polarized viewpoints. Under the emotional guidance of opinion leaders, they transform public issues into emotional “moral judgments.” Cyber violence has become one of the factors of social instability ^[6]. They

create online public opinions to impact the mainstream value system, ultimately leading to the chaos of ethical order in cyberspace.

3. Causes of fan community frenzy

The spread of chaos within the current “fan circle” is not only due to the relative absence of social supervision mechanisms, but also deeply rooted in underlying social structural contradictions. This requires a systematic thinking approach to address.

3.1. Social transformation and conceptual renewal

China has undergone tremendous social changes. On one hand, the rapid social transformation has led to significant generational differences, with the generation gap between parents and children evolving from a “crevice” to a “chasm.” The life wisdom accumulated by the elders is significantly out of sync with the current social environment, directly weakening the younger generation’s emotional attachment to the family. At the same time, the acceleration of the modernization process has led to the reconstruction of social relationships, with traditional social networks based on blood ties and geographical proximity gradually disintegrating. They have been replaced by looser forms of connection. This reorganization of social relationships, combined with the characteristics of the times, such as the miniaturization of family structures and the digitalization of social interaction patterns, has led to a general weakening of the emotional support system for contemporary young people. This feature of the social transition period is not only reflected at the structural level but also profoundly influences social psychology. The current society exhibits a distinct tendency towards short-termism, with the pursuit of quick success and material wealth becoming a common mindset. This social atmosphere profoundly shapes the values of young people, leading to a strong sense of achievement anxiety. At the same time, the trend of solidification in the distribution of social resources is becoming increasingly evident, and the window of opportunity for social mobility is gradually narrowing. The huge gap between ideals and reality prompts young people to turn to idol worship as an alternative satisfaction mechanism. The desire for success and confusion about striving make it easy for young people to indulge in fantasies about their idols to escape the sense of powerlessness towards reality. Through the construction of virtual emotional connections, they can temporarily escape from real-life predicaments and fulfill their aspirations for social mobility in their imagination.

3.2. Lagging education system

The current education system still has obvious structural imbalances, mainly manifested in four aspects: the disconnection between knowledge imparting and humanistic quality cultivation, the separation between examination-oriented ability and comprehensive quality development, the contradiction between the orientation of further education and employment and personality growth, and the opposition between rote learning and heuristic education. This imbalance has led to teenagers being in a long-term high-pressure learning state, resulting in significant psychological depression, which in turn prompts them to seek emotional release and spiritual comfort through idol worship. The utilitarian educational orientation has a profound impact on teenagers’ value judgments, making them overly focus on external achievements while neglecting internal cultivation. This tendency is reflected in their idol choices, showing a preference for superficially glamorous “successful idols” rather than considering inner qualities.

In the context of diversified social values, the existing role model education system has exposed three major predicaments: the lack of interaction between the educational subject and object, the disconnection between educational content and real life, and the rigidity and singularity of educational methods. These structural deficiencies have seriously weakened the appeal of role model education, making it difficult to play its due guiding role. Although the education field has attempted to reconstruct the role model education paradigm in the context of subculture, due to insufficient practical advancement, this concept has not yet effectively improved the decline of traditional role model education. The gap

between the renewal of educational concepts and the transformation of practices has objectively provided a survival space for blind idol worship.

3.3. Permissiveness of the idol industry mechanism

In the contemporary consumer culture-dominated social environment, the idol industry has formed a complete industrialized production system. French sociologist Jean Baudrillard once pointed out that the purpose of consumption is not to satisfy actual needs, but to constantly pursue the satisfaction of desires that have been created and stimulated. This theory profoundly reveals the essence of the idol consumption phenomenon: the entertainment industry, through systematic commercial operations, packages idols as cultural commodities available for consumption. The core purpose is not spiritual guidance, but the maximization of commercial value. Idols are objectified as standardized products on the cultural industry assembly line, with their core value simplified to commercial monetization ability rather than spiritual connotation or social significance. The spiritual connotation of idols is dissolved by commercial logic, replaced by quantifiable market value and monetization ability. This symbolic production model further intensifies the opposition between cultural value and commercial value. Under the influence of consumerism, teenagers gradually equate the success of idols with materialized symbols rather than inner qualities or spiritual pursuits.

4. Resolute measures

The behavior and activities of fan groups have a dual nature. In the process of dealing with them, it is necessary to fully explore their educational potential as a carrier of youth subculture. Through institutionalized guidance, transform idol worship from a simple consumption behavior into a cultural practice that promotes the socialization and development of teenagers.

4.1. Educational constraint

As an important stage in life development, teenagers are still immature in terms of cognition and emotion, and have weak self-regulation ability, thus requiring correct guidance from the outside world. From the perspective of previous studies, the cultural practices carried out by fan groups are usually regarded as part of the youth subculture in contrast to the mainstream culture^[7]. Youth subculture is an independent cultural system shared by young people, which has various relationships with the mainstream culture of society, including convergence, contradiction, and even confrontation^[8]. To effectively guide “fan community” culture, multiple measures should be taken. First, educational entities need to change their cognitive approach and understand the diverse needs of teenagers with a rational and inclusive attitude. Schools and families should avoid simply denying them and instead build an effective two-way communication mechanism by deeply analyzing the emotional needs and social motivations of teenagers. Second, a responsibility mechanism centered on idols should be established. As public figures with wide social influence, idol artists should consciously practice the core socialist values and play a leading role. Finally, it is necessary to guide teenagers to rationally understand the commercial logic behind “fan community.” They should be helped to clearly recognize the relationship between fans and idols, learn to rationally control their emotions, and avoid becoming passive participants in capital operations.

4.2. Institutional constraints

To manage social group negative incidents and regulate fan star-chasing behaviors, it is urgent to establish a rapid response mechanism involving multiple stakeholders. Since the implementation of the “Notice on Further Strengthening the Governance of ‘fan community’ Chaos” by the Cyberspace Administration of China in 2021, although the “Clear and Bright” series of special actions has achieved phased results, the governance work still faces the challenge of insufficient long-term mechanisms. The current top priority is to accelerate the legislative process in the cultural field and provide institutional guarantees for the entertainment culture market through a sound legal and regulatory system. Research

has found that the idol economy and entertainment capital are the fundamental reasons for the extreme nature of “fan community” culture^[9]. Capital operations rely on the organized characteristics of online fan groups and often follow the dominant logic of maximizing economic interests. Under the socialist market economy conditions, the principle of giving priority to social benefits must be adhered to. Given the inherent profit-seeking nature of capital, a regulatory system for capital should be established, including access restrictions, negative behavior lists, and accountability mechanisms, to achieve effective constraints through institutional design. In terms of social co-governance, an incentive-compatible participation mechanism should be established: through systems such as reward for reporting and credit points, users’ sense of responsibility should be cultivated; the real-name reporting and credit evaluation mechanisms should be improved to ensure the smoothness of supervision channels while preventing abuse of rights. This collaborative governance model, led by the government, with platforms fulfilling their responsibilities, and users participating, provides a systematic solution for the governance of the chaos in the “fan community.”

4.3. Better aligned with the academic context

The aim of governing “fan community” culture is to seek a dynamic balance between the autonomy of subculture and social normativity. A comprehensive governance strategy should be adopted that prioritizes guidance over control. In the digital media era, circle layers are often in a state of flux, and there is a certain tension between the group identity of online circle layers and the individual’s own action logic^[10]. Considering the reality that the online space has become an important field for the socialization of young people, it is urgent to build a three-dimensional governance system with the collaborative participation of multiple subjects. First, the operators of online platforms should optimize the community ecological environment by establishing differentiated communication norms, improving multi-level content review mechanisms, and developing interactive feedback systems based on artificial intelligence to achieve intelligent governance of the community ecosystem. Second, the education authorities need to innovate ideological and political education models. They should organically integrate the core socialist values into the creation of youth subculture products, develop ideological and political education courses that suit the cognitive characteristics of young people, and at the same time, focus on cultivating professional teachers with network thinking. Third, the government should formulate normative documents for the governance of “fan community” culture and establish a scientific “virtual-real integration” mechanism. By carrying out offline cultural practice activities and community volunteer service projects, and other physical carriers, it promotes the positive interaction between young people’s virtual socialization and real life. At the same time, it uses big data analysis technology to monitor and warn of the dynamics of “fan community” culture in real time, promptly identify and intervene in potential group polarization risks, and thus build a healthy, orderly, and sustainable network cultural ecosystem.

5. Conclusion

This study takes “fan community” culture as the entry point and systematically examines the evolution mechanism and social impact of youth subculture in the new media era. The research finds that under the dual drive of technological empowerment and capital logic, “fan community” has evolved from a simple entertainment consumption behavior into a highly organized and emotional digital community practice. This phenomenon not only reflects the structural contradictions in the process of contemporary youth value socialization, but also exposes the problem of alienation of digital labor under platform capitalism. Overall, to govern the chaos in the “fan community,” it is not only necessary to strengthen legal regulation and platform responsibility, but also to attach importance to the positive guidance of youth values. By optimizing the online ecological environment and improving digital literacy education, we can promote the transformation of “fan community” culture from disorder to order, and enable it to develop healthily within the framework of socialist core values, ultimately achieving a positive interaction between technological empowerment and cultural education.

Disclosure statement

The author declares no conflict of interest.

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Imagism, Oriental Elements, and Feminism in Amy Lowell's Poems

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Abstract: This paper explores the intersection of Imagism, Orientalism, and Feminism in the works of Amy Lowell, with a comparative analysis of her poetry and that of Ezra Pound, the founder of the Imagist movement. At the turn of the 20th century, American poetry underwent a radical transformation as a response to industrialization, modern science, and the cultural upheavals of World War I. Imagism emerged as a major literary movement, emphasizing economy of expression, clarity of language, and the use of vivid, primary imagery. While Pound championed the minimalistic, focal imagery of Imagism, Lowell diverged from him by employing multiple, equally weighted images that form continuous, fragmented perceptions, often infused with emotional depth. Alongside her engagement with Imagism, Lowell's work was also deeply influenced by Oriental culture, particularly Chinese and Japanese poetry, which she explored through translation and imitation. The paper delves into how Lowell's poetry reflects her personal affinity for Eastern aesthetics and themes, merging these with her modernist sensibilities. Furthermore, the study examines how Lowell's feminist perspective shaped her poetic voice, particularly in her exploration of gender roles and the representation of women in her poems. By examining Lowell's blending of Imagism, Orientalism, and Feminism, this paper sheds light on her unique position within the American literary landscape and her contribution to modernist poetry.

Keywords: Imagism; Feminism; Orientalism; Amy Lowell

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1. Introduction

At the end of the 19th century and the beginning of the 20th century, American society was undergoing great changes. The progress of industry and modern science made the learned people gradually realize that people were no longer cold, numb, and lawless moral beings in the universe, but a group full of despair. The outbreak of World War I revolutionized the United States, and with it, literature, especially American poetry. American poetry of this period abandoned the Victorian form, the pentatonic iambic pentameter of the Victorian form, and was no longer strongly didactic; it was no longer imbued with extra-poetic events, but focused on economy of expression and the use of primary imagery. Ezra Pound's Imagism was born, and has had a great influence on modern American poetry since then.

Pound's Imagism rejected the overblown rhetoric of Romantic and Victorian poetry, instead advocating for simplicity, clarity, and precision. The movement called for poets to capture moments of intense visual and sensory experience through brief, sharp images. Imagism also sought to eliminate unnecessary words, focusing instead on the power of primary imagery to evoke emotions and convey meaning. This new approach to poetry marked a significant departure from the

poetic traditions of the 19th century and laid the foundation for much of 20th-century modernist poetry. Imagism, while originating with Pound, would be shaped by a variety of voices, and one of the most significant contributors to this movement was Amy Lowell. Lowell, who initially embraced Pound's ideals, would later develop her own interpretation of Imagism. The purpose of this paper is to explore how Amy Lowell's poetry engages with and diverges from the Imagist principles established by Ezra Pound. Specifically, it examines the role of imagery in Lowell's work, particularly how she employs multiple images that work together to create a sense of continuous, layered perception. In addition to the core principles of Imagism, this paper investigates the influence of Orientalism in Lowell's poetry, particularly her fascination with Chinese and Japanese poetry. It also explores the feminist undertones in Lowell's work, focusing on how she redefined the role of women in poetry. A staunch advocate for female poets, Lowell's writing reflects both a challenge to and a reinterpretation of the traditional gender roles in literature. By analyzing Lowell's representations of women in her poetry, this study will uncover how she used her literary voice not only to engage with the modernist movement but also to assert a feminist perspective that countered the male-dominated literary establishment.

2. Imagism in Amy Lowell's poetry

2.1. Connections and differences between Lowell and Imagism

Amy Lowell (1874–1925) first encountered the Imagists in 1903 and found that their core beliefs coincided with her own poetic credo. She then met Ezra Pound (1885–1972), the founder of the Imagists, and began to devote herself to the Imagist movement. Later in the movement, she and Pound parted ways due to a disagreement over the development of their philosophies. Determined to continue to focus on developing Imagist poetry, Lowell published her collection *Sword Blades and Poppy Seed* in 1914. This collection of poems ushered in critical acclaim for Lowell. In this collection, she used free verse and polyphonic prose, which would become a distinctive label for her later poetry, and in 1916, she published one of her most popular works, *Men, Women and Ghosts*. In 1919, Lowell published the poetry collection *Pictures of the Floating World*, in which most of the poems were English parodies of traditional Japanese haiku, along with dozens of parodies of ancient Chinese poems. Lowell did not stop exploring the art of Eastern poetry, and in 1921 she published *Fir-Flower Tablets*, a collection of English translations of ancient Chinese poetry^[1].

Lowell attempted to write some sonnets when she first started out in poetry, but she found that the strict meter of the sonnet seemed to limit the expression of emotion and was not in line with her own philosophy of poetry. So she gave up writing sonnets altogether and began to write free-form poems that were more suitable for the free expression of emotions. At that time, the Imagist Poetry Movement was also in its infancy. The following year, when Lowell first read the poetry of Hilda Doolittle (1886–1961), she was attracted to this style of poetry. Lowell then traveled to London, the center of the Imagist movement at the time, to meet the famous poet Pound, the originator of the Imagist movement. Pound was so impressed with Lowell that he soon included her poems in a collection of Imagist poems that he edited. Since then, Lowell was officially included in the Imagists under Pound's leadership. However, in the later stages of the Imagist movement, they disagreed sharply on the direction of the school, and Lowell, a strong and confident person, left Pound in anger and continued her own journey as an Imagist.

In fact, the reason Lowell established herself as an Imagist was not because she had given up the tenets of Imagist writing founded by Pound. On the contrary, she still firmly believed that Imagist poetry should be guided by the following principles: "The object depicted must be dealt with directly and to the point, whether it be subjective or objective; the words used must be concise and clean, and not a single word that has nothing to do with the content must be used; as to rhythm and rhyme, the natural sense of meter of poetry should be followed, and there is no need to adhere to strict meter and rhyme." These principles of imagistic composition, as put forth by Pound, are the same guidelines for Lowell's poetry that she has lived by her entire life, except that she places more emphasis on the expression of her emotions and senses, and disregards the meter and rhyme of poetry even more than Pound did.

The real reason for Lowell's determination to abandon Pound's Imagism altogether was that she could not identify

with Pound's authoritarian and dictatorial image of leadership^[2]. She believed that the Imagist movement should evolve into a more democratic model. Having established her own separate Imagist school, she quickly published a collection of poems co-edited by poets, *Some Imagist Poets* (1917). Under Lowell's strong publicity and marketing campaign, the collection gained wide recognition at the time, and people seemed to have accepted Lowell as the new leader of the Imagists. In terms of poetic skill and achievement, Lowell was not as noteworthy as Pound, but she was able to establish herself as a stronger Imagist leader than Pound because of her strong business skills, and she was not shy about using her large inheritance to publicize and promote Imagist poetry. It was her poetic talent and business acumen that made her the new leader of the Imagists, replacing Pound, who was more interested in pure art^[3]. Pound was so displeased with Lowell's approach to Imagism that he considered it a complete stain on Imagism. In 1914, he angrily renamed his own Imagism as "Vorticism." Since then, Lowell succeeded Pound as the absolute leader of the Imagist movement, and "in the minds of American readers at the time, was the most authoritative spokesperson for the new poetic movement." Her poetic outlook reproduced the core propositions of the Imagists, and she put forward six principles in 1915: first, language should be plain and precise, not merely decorative; second, new rhythms should be created to express new moods, rather than reproducing the old ones; third, the choice of subject matter should be absolutely free; and fourth, imagery should be presented (hence the name of the "Imagists"); fifth, write hard, clear poems, never vague or boundless ones; sixth, thematic concentration is the essence of poetry (Lowell, 1915: vi–vii), and later Lowell added the principle of "to be subtle, not to be direct" in her *Trends in Modern American Poetry* published in 1917.

2.2. Features of Lowell's Imagism poetry

2.2.1. Imagism influenced by impressionism

First of all, her imaginative poetry is marked by the influence of impressionism. The impressionism of poetry "advocates the poet's subjective understanding to scrutinize the objective world, to capture the impression of the moment when feelings are sublimated into emotions, to create; to focus on the infectious force of things rather than the things themselves; to regard feelings as the main content of poetic creation, and to put the theme in a secondary position." The difference between this school and the Imagist school is clearly seen here, with the former emphasizing feeling or the subject and the latter emphasizing imagery or the object. Amy Lowell is embracing the teachings of Imagism in her concise, hard-edged use of language and presentation of concrete imagery, while at the same time she is infusing her poems with her narrator's feelings as well as some prominent visual impressions through her imagery. Also, Amy Lowell shows the influence of the Impressionist school of painting in her use of light and color. For example, in her "Opal," "You are cold and flame. You are the crimson of amaryllis, The silver of moon-touched magnolias." and "My heart is a frozen pond gleaming with agitated torches." The use of light and color in verses such as these is extremely charming. Especially the equating of people with colors brings whimsy and spirituality to the poems and reflects the important role played by imagination in the poet's works.

2.2.2. Comparison with Pound: Multi-image juxtaposition and emotional richness

The use of imagery in Amy Lowell's poetry is quite distinctive. As far as the use of imagery is concerned, proto-imagist poetry focuses on capturing the scene at a particular moment in time and conveying the poet's inner feelings through dominant imagery. This dominant imagery blends seamlessly with the momentary feeling that the poet is trying to express; the imagery itself is the carrier and language of the poet's emotion. On the other hand, Amy Lowell's imagistic poetry tends to "record the details of each image in turn, thus producing a cinematographic effect." Therefore, it is generally not easy to find in her Imagist poems the focal image that stands out and carries the poet's emotion, but rather an arrangement of several images on an equal footing, so that they form a continuous fragment of imagery. We can compare Pound's "Subway Platform," a classic in the history of Imagist poetry, with a similarly short poem, "Dairy" by Amy Lowell.

Pound uses two images, "the apparition of these faces in the crowd" and "petals on a wet black branch," which demonstrate the poem's focal imagery. By contrasting the faces of the crowd with the petals, Pound conveys a sudden,

fleeting, and beautiful impression. The faces appear as visions, symbolizing the myriad of hurried passersby in the crowd, while the petals convey a fragile, fleeting beauty. By contrasting these two images, Pound not only demonstrates the indifference and loneliness of the anonymous crowd in the city, but also implies a succinct and precise depiction of natural beauty. The poem presents a very concentrated imagery—faces and petals—which are not interfered with by other elements; together they form the core of the poem, showing Pound's capture and cohesion of instantaneous perception. This minimalist expression is one of the characteristics of Imagism, and by removing redundant descriptions, Pound demonstrates the essence of poetry: a concentrated presentation of the beauty and emotion of the moment.

In "Diary," on the other hand, Lowell intertwines natural scenes with her inner emotions through a vast array of parallel imagery. In the first section, she lists images of grass, sky, trees, moon, wind, and sea, and although these images are independent of each other, they work together in the poem to form a rich picture of nature. Each image is equal; they are not prioritized, but participate together in expressing the poet's emotions and perception of nature. In this poem, the imagery is not focused on a particular focal point, but rather, like a collage, a continuous flow of perception is formed through the superimposition of multiple levels of imagery and emotion. This poetic structure, composed of multiple equal images, makes the poem emotionally richer and more multidimensional, and at the same time closer to the diversity and complexity of life.

Pound's "Subway Platform" focuses on one focal image, highlighting the way in which momentary emotions and perceptions are conveyed through contrast and condensation. The simplicity and concentration of the poem make the imagery have a strong impact, and readers can feel Pound's unique perception and expression of a slice of life in just a few lines.

3. Orient elements in Amy Lowell's poetry

3.1. Lowell's love for Eastern culture and its influencing factors

Lowell had never set foot in the East in her life; she had never been to Japan or China. However, from an early age, she had a passion for Eastern cultures^[4]. This love was first triggered by her older brother, the famous astronomer Percival Lowell. Percival had lived in China and Japan for several years, and every time he returned to the United States, he would tell his curious sister about what he had seen in the Orient and bring back some Chinese and Japanese paintings and calligraphy. Lowell became fascinated by the history of Oriental art. Percival himself had studied the Orient and had published scholarly works on it. In such an atmosphere, Lowell never stopped pursuing the culture of the Far East^[5].

Secondly, Pound, the founder of Imagist poetry, had always been fascinated by Chinese culture, especially classical Chinese poetry. At the beginning of founding the Imagist school, Pound borrowed a lot from the creative concepts and forms of classical oriental poetry^[6]. As an original follower of Pound, Lowell was inevitably influenced by Pound's ideas and poetic tastes, and even though they later went their separate ways, Lowell's love of classical Chinese poetry remained.

Lowell envied and praised Pound's translations and adaptations of Chinese poetry (especially Li Bai's), and for Lowell, who had a strong sense of triumph and self-esteem, she even believed that she "could do a better translation than Pound, and a more accurate one than he could." In 1921, Lowell published a collection of English translations of classical Chinese poems, *Fir-Flower Tablets*, in which poems were mainly selected from some famous poets of the Tang Dynasty, with the poems of Li Bai, whom Lowell admired the most, being the most popular, with 83 out of the 150 poems in Chinese being by Li Bai. This does not exclude her desire to compete with Pound^[7]. In addition to adopting the technique of imaginative poetry to present the content and mood of the selected classical Chinese poems in English, Lowell also pioneered the more controversial technique of translating Chinese characters into English, such as the "split-word method," which shows her good intentions for this collection.

3.2. Application of Eastern elements in imitation and translation

In 1919, Lowell published a collection of poems called *Pictures of the Floating World*, which is a Japanese folk art form

that has been passed down for a long time. The second chapter of the collection, titled “Chinoiserie,” contains seven imitations of classical Chinese poems. The seven poems are: Reflections, Falling Snow, Hoar-Frost, Gold-Leaf Screen, A Poet’s Wife, Spring Longing, and Li Tai Bai. In this way, Lowell presents many of the common images of classical Chinese poetry, and she utilizes the techniques of imagist poetry to deal with them, combining East and West to bring a different kind of beauty to the poems ^[8].

3.2.1. Imitation analysis of “Reflection”

The first poem in the chapter is titled “Reflection,” which reads,

*When I looked into your eyes,
I saw a garden
With peonies, and tinkling pagodas,
And round-arched bridges
Over still lakes.
A woman sat beside the water
In a rain-blue, silken garment.
She reached through the water
To pluck the crimson peonies
Beneath the surface,
But as she grasped the stems,
They jarred and broke into white-green ripples;
And as she drew out her hand,
The water-drops dripping from it
Stained her rain-blue dress like tears. (Lowell 27)*

The common imagery of classical Chinese poetry that appears in the poem includes pavilion, arch bridge, peony, and ripples, and in depicting these images, Lowell adheres to the principles of Imagist poetry, using simple and precise wording to sketch the image of a lonely woman who misses her lover in just a few words. Imagist poetry focuses on the conveyance of visual imagery, and in this poem, a variety of colors, such as the aqua blue of the woman’s silk dress, the red of the peony, and the white-green of the lotus ripples, form a rich picture. At the same time, the superposition of imagery in the poem is in line with the distinctive and condensed characteristics of Imagism, which is integrated with the poet’s emotion in the imagery, and is also consistent with the artistic principle of expressing emotion through imagery in classical Chinese poetry. It can be seen that the creation of Lowell’s imagist poetry was influenced by classical Chinese poetry to a certain extent.

3.2.2. Imitation analysis of “Falling Snow”

The second poem in this chapter is titled “Falling Snow,” and “snow” is a common image in classical Chinese poetry. For example, Bai Juyi’s “Ask Liu XIX,” Liu Zongyuan’s “River Snow,” Li Bai’s “Hard to Walk,” Cen Sen’s “The Song of White Snow Sends Judge Wu to Return to the Capital,” and Zu Yong’s “Looking at the Remaining Snow in the Final South” all contain excellent lines using “snow” as an imagery. The poem adopts the common Chinese poem image of “snow” in Tang poetry to express Lowell’s style of utilizing scenery and blending objects. Lowell uses the imagery of footprints in the snow as a metaphor for the footprints of life, which come and go in the long river of history, leaving no trace, no matter how much satisfaction one has in life ^[9]. This slightly pessimistic argument speaks the true meaning of life. To speak the truth through imagery is another quality of Lowell’s imagistic poetry.

3.2.3. Other imitations and translations of Chinese poems

In the following three poems, White Frost, Yellow Leaves, and Spring Thoughts, Lowell expresses the feelings of loss and

loneliness through the depiction of herons, autumn, falling leaves, dusk, and other common imagery in ancient Chinese poetry. In the poem “The Poet’s Wife,” Lowell chooses the love story of Zhuo Wenjun and Sima Xiangru, and writes a letter to Sima Xiangru in the tone of Zhuo Wenjun, denouncing the latter’s abandonment of himself for the sake of fame and fortune and expressing his anger and deplorable feelings ^[10]. Finally, Lowell closes the chapter with Li Taibai. In this poem, which is directly named after the Chinese poet Li Bai, Lowell spares no words of praise and expresses his reverence for the classic poet, which is exactly the kind of imagery that Lowell tries to present as an echo of English and American imagistic poetry and classical Chinese song ^[11].

4. Feminism in Amy Lowell’s poetry

4.1. The formation and struggle of Lowell’s female consciousness

At the turn of the nineteenth and twentieth centuries, the United States established its own empire in the Asia-Pacific region, and the word “Asia” appeared frequently in various fields of different cultures, resulting in the formation of a new culture, American Orientalism. Orientalism advocated a break with tradition and the adoption of new forms of reproduction in literature, especially poetry. For women, Orientalism provided a means of adventure, freedom, and self-realization, and had a profound impact on the formation of modernism in American literature. A group of women writers, represented by Amy Lowell, took advantage of this opportunity and created a series of literary works with strong personal and oriental elements.

Lowell’s imagist ideas are clearly feminine. First of all, her family background provided objective conditions for the formation of her character. Born in Massachusetts, Lowell’s family was rich and unruly since childhood. Although she did not receive a complete formal education, the example of her father and brothers created an external atmosphere for her self-education, and also established the ideological foundation for her literary pursuits. A rich and prestigious family would also bring Lowell another psychological influence, i.e., psychological advantage, and this potential influence created her self-confident, self-conceited, to be a strong and enthusiastic character ^[12].

Lowell’s struggle with Pound, as some critics have come to realize, was her struggle with an already long-established tradition of misogyny toward women and women writers ^[13]. She was a staunch advocate of American poetry, and an even more staunch advocate of women poets, and she went around proclaiming The Pat-ters as her spokesperson for American poetry, and even if her advocacy was covert, and even if she was often dressed in Victorian ladylike garb, Amy Lowell seemed to embody the image of the liberated new woman ^[14]. This apparent contradiction stems from the conflict between Amy Lowell’s identity as a female poet and the male-dominated poetic tradition, and the difficulty for female writers to create in a male-discursive society.

4.2. Female perspectives in poetry

In Amy Lowell’s strongly Orientalist poems, women are often used as the narrator, while the object of the dialogue appears in the second person. Even though the reader clearly recognizes the poet’s own American identity, the narrator “I” can rightfully represent the voice of a Chinese or Japanese person. Through this interlocking of identities, the poet, narrator, and reader participate in the masking of race, thereby revealing more of the poem’s connotations. The qualities of women’s emotional loneliness, sadness, and fidelity are heavily expressed in classical Chinese poetry. Lowell shared similar feelings. She has translated the poems of Xue Tao, a Chinese poetess of the Tang Dynasty. Since Xue Tao’s poems were mostly love poems, which dealt with Chinese women’s emotional subtlety and gentleness, Lowell learned from them the qualities of Chinese women’s sadness, self-discipline, fidelity, and patience, and thus triggered her inner touch and admiration for Chinese women.

In her translation of Li Bai’s poem “The Long Dry Walk,” Amy Lowell takes a very different approach to personification than Pound does ^[11].

Pound’s translation reads:

*“While my hair was still cut straight across my fore-head
I played about the front gate, pulling flowers.
You came by on bamboo stilts, playing horse, You walked my seat, playing with blue plums.
And we went on living the village of Chokan.
Two small people, without dislike or suspicion.”*

Amy Lowell’s translation reads:

*“When the hair of your Unworthy One first began to cover her forehead.
She picked flowers and played in front of the door.
Then you, my Lover, came riding a bamboo horse.
We ran round and round the bed, and tossed about the sweetness of green plums.
We both lived in the village of Ch’ang Kan.
We were both very young, and knew neither jealousy nor suspicion.”*

Unlike Pound, who simply translates the narrator as “I,” Amy Lowell begins her poem with “your Unworthy One” to emphasize a patriarchal, paternalistic social relationship that defines female identity by her husband’s relationship. A social relationship in which a woman’s identity is defined by her relationship with her husband. Although the rest of the poem describes a childhood relationship between a man and a woman, Amy Lowell uses the phrase “you, my Lover” to refer to the woman’s relationship with her husband and “jealousy” to denote “no suspicion of suspicion” in the original text, making the reader associate this with a love poem. On the contrary, Pound simply uses “you” to refer to the narrator’s husband and the common word “dislike” to mean “no suspicion” in the original text. This makes the reader feel that Amy Lowell’s translation has a strong female color from the very beginning.

In addition, Lowell intentionally implanted the background of the story of Wangfushi, which is not mentioned in Pound’s translation of the same poem. It can be seen that Pound was more interested in the expressive techniques of Chinese poetry, while Lowell was more in-depth in his psychological exploration and emotional experience of ancient Chinese women’s poetry.

5. Conclusion

As a leading figure in the later stage of the Imagist poetry movement, Amy Lowell had a unique creative concept of Imagism. Although she disagreed with Pound, whom she initially followed, she was influenced by Pound in her poetic thoughts and creative concepts, especially Pound’s interest in classical Chinese poetry. Lowell developed her own Imagist style based on translations and adaptations of classical Chinese poetry. The seven Chinese poems in her collection *The Floating World* and the collection of poems *Fir-Flower Tablets* are her attempts to combine Imagist poetic techniques with classical Chinese poetic imagery. This practice produces the beauty of the integration of Chinese and Western poetic imagery into one and mirroring each other, leaving a valuable literary treasure for future generations and providing a case study of cross-cultural creation between the East and the West. Lowell’s feminist perspective added another layer of depth to her poetry. By redefining the role of women in literature and challenging traditional gender roles, she used her poetic voice to advocate for female empowerment and equality. Her work serves as a testament to the resilience and creativity of women in a male-dominated literary landscape, inspiring future generations of female writers to assert their voices and challenge societal norms.

In conclusion, Amy Lowell’s contributions to Imagist poetry, her exploration of Eastern aesthetics, and her feminist advocacy have left an indelible mark on the literary world. Her legacy continues to inspire and influence contemporary poetry, offering a rich tapestry of ideas and perspectives that enrich our understanding of both the past and the present. As a modern woman who defied conventions and pursued her passions with determination, Lowell’s life and work stand as a powerful reminder of the transformative potential of art and the enduring importance of cultural exchange.

Disclosure statement

The author declares no conflict of interest.

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A Study on Precision Agricultural Assistance for Small and Micro Livestock Enterprises in the Greater Bay Area in the New Marketing Environment: A Case Study of Xian Tang Gu Family Farm

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Abstract: As the rural revitalization strategy is vigorously implemented, exploring precision agricultural assistance pathways for small and micro livestock enterprises in the Greater Bay Area becomes crucial in the emerging marketing landscape. This study examines the Xian Tang Gu Family Farm in Dianbai District, Maoming City, Guangdong Province, as a case study. Through on-site research and data analysis, it explores how rural-specific resources can facilitate precision agricultural assistance and enhance marketing strategies for small and micro livestock enterprises. The study finds that Xian Tang Gu Family Farm has achieved certain results in rural revitalization and poverty alleviation, but still faces problems such as single product sales channels, weak agricultural product brand power, and insufficient financing thinking and ability. In response to these problems, this study proposes counter suggestions such as broadening sales channels, strengthening brand construction and certification, introducing digital tools, and making full use of national inclusive financial policies, in order to provide references for other similar enterprises, and to promote small and micro livestock enterprises to better serve the rural revitalization strategy and achieve sustainable development of rural industries.

Keywords: Rural revitalization; One Village—One Product; Small and micro livestock enterprises; New marketing

Online publication: April 26, 2025

1. Research background

Precision agricultural assistance is a key initiative in addressing national rural poverty alleviation and rural revitalization strategies. With the development of science and technology and the emergence of new marketing formats, precision marketing for agricultural assistance has become an important driving force in promoting the marketing of agricultural products, increasing farmers' income, and boosting rural revitalization. The 20th National Congress of the Communist Party of China emphasized "prioritizing agricultural and rural development, promoting urban-rural integration, and facilitating the flow of urban and rural elements" ^[1]. It also emphasized developing rural characteristic industries and broadening channels for farmers to increase their income and become wealthy. Industrial revitalization is the material

foundation of rural revitalization and is essential for forming a green, safe, high-quality, and efficient rural industrial system, providing a solid industrial support for farmers' continuous income growth. It is important to act in accordance with local conditions and capabilities, and to adhere to the concept of "new, unique, small, and exquisite" by promoting the integration of industry and ecology, and by connecting farmers with the industry for shared prosperity.

In the new era, marketing has evolved from the traditional model of advertising, selling, and promoting to a new model centered on customers. This new model leverages new technologies, media, customer groups, and demands to reshape the relationship between enterprises and consumers, as well as consumption patterns. It subtly addresses hidden consumer pain points, captures consumers' minds, evokes resonance, and forms long-term connections and dependencies. Among these changes, e-commerce innovation has become a crucial vehicle. It revolves around new technologies, media, customer groups, and demands to reshape the relationship between enterprises and consumers. By establishing super IPs and creating brand self-media matrices, it aims to enhance traffic and repurchase rates.

2. Project status research

From June 9 to 10, 2023, the project team visited Xian Tang Gu Family Farm in Naho Town, Dianbai District, Maoming City, to conduct a special investigation into the "One Village—One Product, One Town—One Industry" professional village construction for the egg-laying industry in the rural revitalization strategy. The team also explored how to rely on the local characteristic resources for further development.

The research subject was Xian Tang Gu Family Farm in Dianbai District, Naho Town. Established in March 2013 and located in Xinjing Village Committee of Dianbai District, Naho Town, the farm has a total investment of 2.8 million yuan, covers an area of about 50 mu, and has two egg production areas. It currently has over 32,000 laying hens, of which over 24,000 have started laying eggs, with a daily egg production of over 22,000 eggs^[2]. In December 2019, the farm was rated as a "2019 Provincial Demonstration Family Farm" and became the base for the 2020 Xin Tang "One Village—One Product" egg-laying project (with a construction grant of 728,113 yuan). In 2020, Zhuhai's Wanshan District, the designated poverty alleviation unit for targeted poor villages in Guangdong Province, invested 1 million yuan in poverty alleviation funds^[3].

In terms of personnel, technology, and equipment, Xian Tang Gu Family Farm has hired two professional technicians and two rural practical and versatile talents. It is equipped with three enzyme-controlled feeders, one chicken manure dryer, one harmless degradation machine, one 30-kilowatt generator, one set of feed processing equipment, two vehicle and pedestrian disinfection channels, and over 2,300 square meters of enclosed water-curtain sheds. The comprehensive personnel and equipment provide significant technical support for building a modern farm.

In terms of modern production models, the farm employs standardized and eco-friendly methods by utilizing modern facilities and advanced machinery to reduce costs, boost egg output, and enhance product quality. It uses additive-free natural feed to ensure product quality from the source. Additionally, the farm develops circular agriculture by cooperating with local neighboring villagers: purchasing raw feed like rice bran and corn from them and selling chicken manure for their agricultural use. This circular model reduces chemical fertilizer use, improves soil quality, protects the local ecology, and generates sustainable economic benefits (see **Figure 1**).

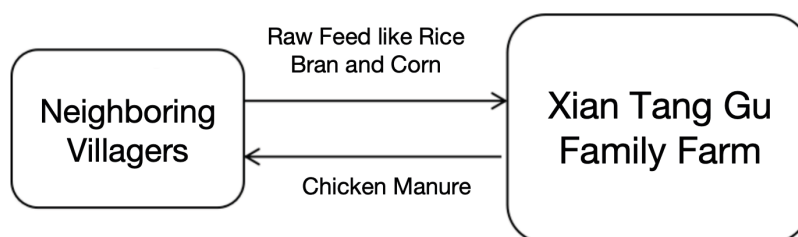


Figure 1. Mutual benefit for family farm business model

In terms of applying rural revitalization and poverty alleviation policies, the farm actively participates in the rural revitalization strategy. By leading over 60 local breeders in scientific farming, it has helped each household increase its annual income by over 100,000 yuan, achieving a win-win situation in social, economic, and ecological benefits. In 2020, in accordance with the requirements of the “Three-Year Action Plan for Winning the Poverty Alleviation Battle (2018–2020)” by the Provincial Committee and Government, Zhuhai’s Wanshan District invested 1 million yuan in poverty alleviation funds to support the farm’s development of the “One Village—One Product” poverty alleviation project. It has established long-term and operational revenue-sharing mechanisms, improved the quality of poverty alleviation projects, and promoted stable income growth.

3. Existing problems

3.1. Limited product sales channel

The farm primarily raises White Leghorn chickens, supplying eggs to the market. Profits are mainly derived from direct sales to farmers’ markets via local wholesalers. However, a critical challenge constraining the farm’s economic viability is the existence of government-mandated price controls. These regulations impose a strict upper limit on the price of eggs sold in farmers’ markets, capping it at 5 RMB. This controlled pricing mechanism results in the farm’s profit margin being considerably diminished when compared to prevailing industry benchmarks. For instance, industry data reveals that farms operating without such price restrictions typically achieve a profit margin that is 30–40% higher, primarily due to their ability to adjust prices in response to market dynamics such as increased production costs and fluctuating consumer demand.

3.2. Weak brand power of agricultural products

The farm’s egg-laying equipment is relatively rudimentary, and it lacks brand-building and certification awareness. It has not applied for the “Three Qualities and One Standard” certification (“Green Food,” “Organic Food,” “Harmless Agricultural Products,” and “Geographical Indication of Agricultural Products”). Although it has registered the “Xian Tang Gu Eggs” trademark, the farm’s weak brand influence fails to create significant added value.

In today’s market, brands serve as key identifiers for consumers. A case in point is a farm that obtained organic certification and effectively built its brand. It achieved a 50% increase in profit margin within two years. The lack of branding and certification puts the farm at a disadvantage in the market. Consumers are often willing to pay a premium for certified and well-branded products. Without these elements, the farm struggles to differentiate its products and capture a larger share in the competitive market ^[4].

3.3. Weak financing thinking and ability, failure to utilize national inclusive finance policies

During communication with the farm’s head, the project team found that expanding the scale of egg-laying and upgrading equipment requires significant capital. Although the farm received 1 million yuan in poverty alleviation funds, its capital accumulation and information access are limited.

The lack of effective connection with such financial mechanisms has not only hindered the farm’s physical expansion but has also limited its ability to engage in more sophisticated market-oriented activities such as brand building and product differentiation. As a result, the farm remains at a competitive disadvantage in the dynamic poultry market, where both scale and brand play pivotal roles in determining long-term sustainability and profitability ^[5].

4. Countermeasure considerations

4.1. Broadening sales channels in the new marketing environment

To address the issue of limited sales channels, the project team recommends expanding the reach of agricultural specialty

products through live-streaming and adopting an integrated sales model combining “platform sales + live-streaming + short-video marketing.” Collaborative online and offline live-streaming events, such as “Naho Mountain Delicacies” and “Xian Tang Gu Good Products Consumption Assistance,” can be organized with multiple villages. High-quality online promotion platforms like WeChat public accounts and mini-programs can be developed to release product and brand information, interact with consumers, and improve marketing accuracy and conversion rates ^[6].

4.2. Trademark registration and “three qualities and one standard” certification

To tackle the weak brand influence of agricultural products, the team advises promptly applying for the “Xian Tang Gu Eggs” trademark and related ones, laying the foundation for future “Green Food” certification applications. The farm can contact the Dianbai District Bureau of Agriculture and Rural Affairs’ Agricultural Quality Division to learn about relevant requirements. During the trademark application waiting period, it should adjust its production process and standards to meet certification requirements.

4.3. Adopting digital tools

The adoption of cutting-edge technologies such as big data, cloud computing, and the Internet of Things has revolutionized the production and processing of specialty agricultural products. With these technologies, farms can achieve precise control over every stage of production, from monitoring soil conditions and climate factors to optimizing feeding regimes and disease prevention measures. This ensures consistent product quality and maximizes resource efficiency.

By creating an immutable ledger that records every transaction and movement of agricultural products from the farm to the consumer’s table, blockchain technology enables full traceability. This enhances consumer trust in specialty agricultural products, as buyers can verify the origin, production methods, and quality certifications of the products they purchase. A case in point is the successful implementation of blockchain-based traceability systems by several leading agricultural enterprises. These systems have not only improved consumer confidence but have also enabled premium pricing for products with verifiable quality and safety credentials ^[7].

4.4. Using national inclusive financial policies to expand financing channels

To address weak financing thinking and ability, the team suggests that the farm head follow the “Guangdong Rural Revitalization” official website and its official WeChat account for real-time policy information. The team also introduced existing loan and financing policies, such as the “Eight-Point Action Plan” for promoting inclusive finance in the eastern, western, and northern regions of Guangdong in recent years. These include building county-level comprehensive credit centers, credit villages, rural financial (insurance) service stations, and rural agricultural assistance withdrawal points, as well as promoting rural property mortgage loans, “Government–Bank–Insurance” cooperative agricultural loans, small-amount guaranteed fiscal interest-subsidy loans for women, and financial poverty alleviation loans. The farm can apply for relevant interest-subsidy loans based on its own conditions.

5. Conclusion

This research has identified key challenges faced by small and micro livestock enterprises. By integrating insights from the new marketing environment, it proposes strategies for enhancing sales channels, product branding, and financial financing mechanisms. It provides development ideas for similar projects in the current social and economic environment and has certain reference significance.

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A Study on Precision Agricultural Assistance for Small and Micro Livestock Enterprises in the Greater Bay Area in the New Marketing Environment—Taking Egg-Laying as an Example (2023YB04)

Disclosure statement

The authors declare no conflict of interest.

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Hot Topics and Evolution Trend of Ideological and Political Research in Dance Courses: Knowledge Mapping Analysis Based on CiteSpace

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Abstract: This paper makes a visual analysis of 252 articles on ideological and political journals of dance courses in CNKI since 2014, and analyzes the research hotspots and trends from high-frequency keywords, clustering, and timeline maps. The results show that “Curriculum ideological and political education,” “Universities,” “Dance teaching,” and “Curriculum construction” are the hot topics in recent years; the number of papers published in the ideological and political research of dance courses is slow at first and then fast. The number of papers published by various institutions is quite different, and the number of cooperative research institutions is relatively small. From the perspective of the core authors of ideological and political research in dance courses, the follow-up research will continue to focus on teaching practice, and the research content and strength need to be further improved and perfected.

Keywords: Dance; Curriculum ideology and politics; CiteSpace

Online publication: April 26, 2025

1. Introduction

The term “Ideological and political education in curriculum” was first put forward in the “Shanghai Education Comprehensive Reform Plan” issued by the Shanghai Municipal Party Committee and Municipal Government, and a certain degree of pilot was carried out ^[1]. Ideological and political education in dance courses is an important means for schools to cultivate talents for the party, which has attracted the attention of academic circles ^[2]. Based on CiteSpace knowledge map, this paper objectively presents the overall appearance, hot topics, and evolution trends of ideological and political research on dance courses, in order to provide new ideas for follow-up research ^[3].

2. Data sources and research methods

2.1. Data sources

With “Dance,” “Dance in colleges and universities,” “Curriculum ideological and political education,” and “Curriculum construction” as the subject words, the relevant literature in CNKI was retrieved. A total of 288 documents related to the

theme were retrieved, and finally, 252 related literatures were included ^[4].

2.2. Research methods

Based on the CiteSpace scientific mapping tool, this paper conducted a quantitative analysis of 252 CNKI literatures, and systematically revealed the academic context, hot topics, and evolution trends of ideological and political research in dance courses through keyword co-occurrence visualization ^[5].

3. Overall appearance and visual analysis

3.1. Statistics

In this study (Table 1), 252 selected articles were imported into the system to systematically present the knowledge structure and evolution characteristics of the research field ^[6].

Table 1. Data sources for the study

Title	Content
Sources of data	CNKI
Search format	Subject = “Dance” and includes “Ideological and political courses,” etc.
Time span	1 January 2014 to 2024
Retrieval of data	288 journal papers
Valid data	252 journal articles

3.2. Publications per year

A total of 252 literature was retrieved from CNKI, through CiteSpace software analysis of dance courses in the field of ideological and political research published in the trend ^[7]. From 2014 to 2019, the development of ideological and political research on dance courses was slow, with only 12 articles published in 2018 and 4 articles published in 2015, showing a steady trend (Figure 1). From 2020 to 2021, the number of publications increased rapidly, which may be related to the convening of the national ideological and political work conference or education conference in colleges and universities, so dance ideological and political courses in this period have become a research hotspot in the field of teaching and research. The line chart shows that the number of publications in 2022 and 2023 is basically maintained at a high value, and it can be seen that dance curriculum ideological and political education is actively responding to the practical problem of “how to carry out curriculum ideological and political education” (Figure 1) ^[8].

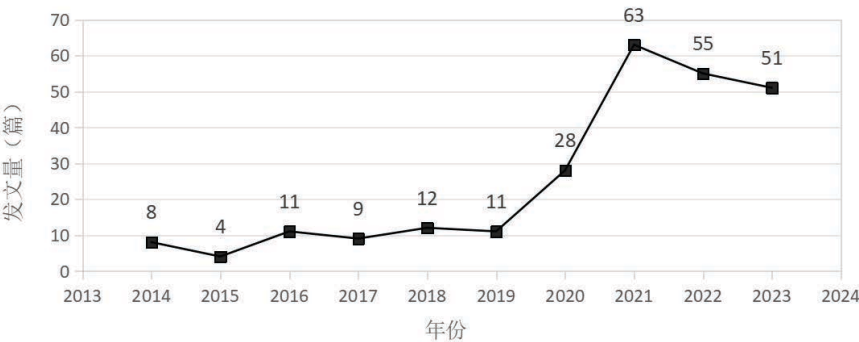


Figure 1. Number of papers in ideological and political journals on dance courses

3.3. Core authors and research institutions

Table 2 shows the articles published by core authors. The more the number of published papers, the larger the node, the stronger the scientific research ability. Figure 2 shows that He Liping, Lai Qiongqiong, Shi Lei, and other authors have larger nodes and more published papers. A team of He Liping, Chen Shuan, Li Yiying, etc., formed a network of relationships between scholars^[9], built a bridge for cooperation, but there are more individual nodes in the overall picture, it shows that the author's sense of cooperation is low, and the overall form is “alone.”

As shown in Table 3 and Figure 3, the institutions with the largest number of papers come from Beijing Dance Academy and Shaanxi Pre-school Teachers' College Yunnan Dramatists Association and the National Research Association of ideological and political theory teaching in art colleges and universities cooperate closely with each other. In addition, it shows that most of the institutions are not closely linked, the sense of cooperation is weak, and it is difficult to form a wide and stable research context^[10].

Table 2. Statistics of articles published by core authors

Serial number	Author	Number of publications
1	He Liping	4
2	Lai Qiongqiong	3
3	Shi Lei	4
4	Ge Xiaoni	2
5	Feng Xiaohui	2
6	Ding Siwen	2

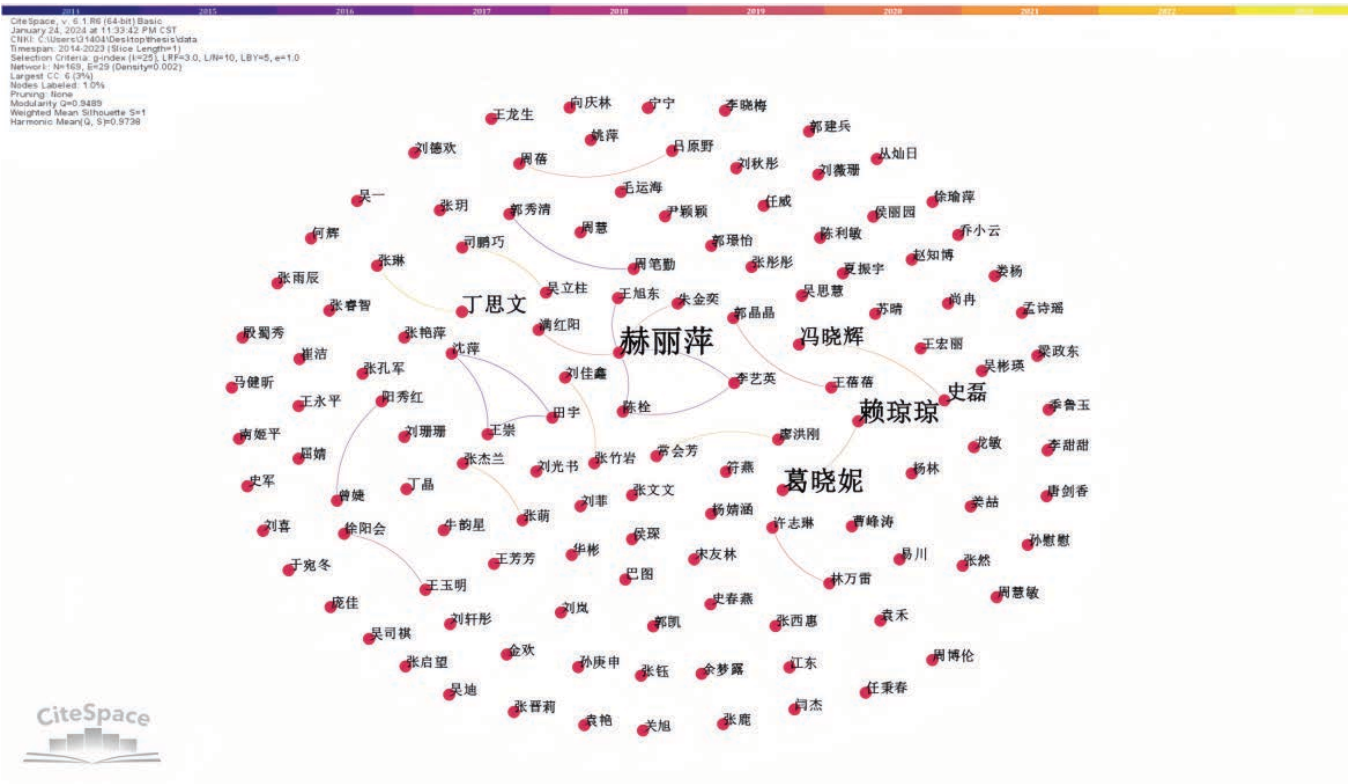


Figure 2. Co-occurrence map of core authors

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 January 25, 2024 at 12:23:05 PM CST
 CHN: D:\CiteSpace\5.2.R3\64-bit
 Timespan: 10 (k=10) (Min. Length=1)
 Selection Criteria: Greedy (k=20), LRF=0.9, LRF=0.9, LRF=0.9, LRF=0.9
 Network: N=154, E=20 (Density=0.003)
 Largest CCs: 10 (15%)
 Modularity Q=0.97
 Weighted Mean Silhouette S=0.97
 Pruning: Pathfinder

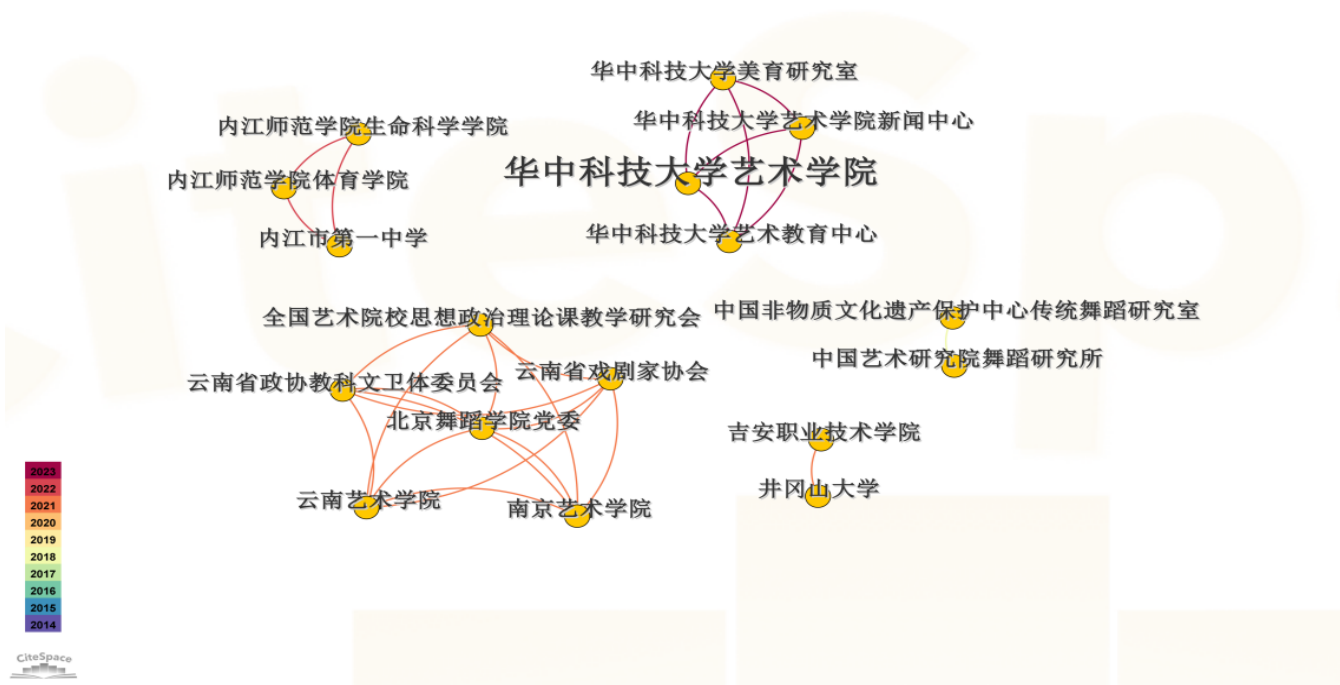


Figure 3. Co-occurrence map of research institutions

Table 3. Statistics of publications of research institutions

Serial number	Institution	Number of articles published
1	Beijing Dance Academy	5
2	Shaanxi Pre-school Normal University	5
3	Shanxi Industrial and Commercial College	3
4	Propaganda Department of Party Committee of Beijing Dance Academy	3
5	School of Music and Dance, Jishou University	2
6	Harbin Institute of Physical Education	2

4. Hot topics and evolution trends

4.1. Analysis of hot topics

Keywords are the induction of the research field of the article; the larger the center value, the more critical the node (Table 4), and co-occurrence naming with keywords, drawing the ideological and political knowledge map of dance courses (Figure 4).

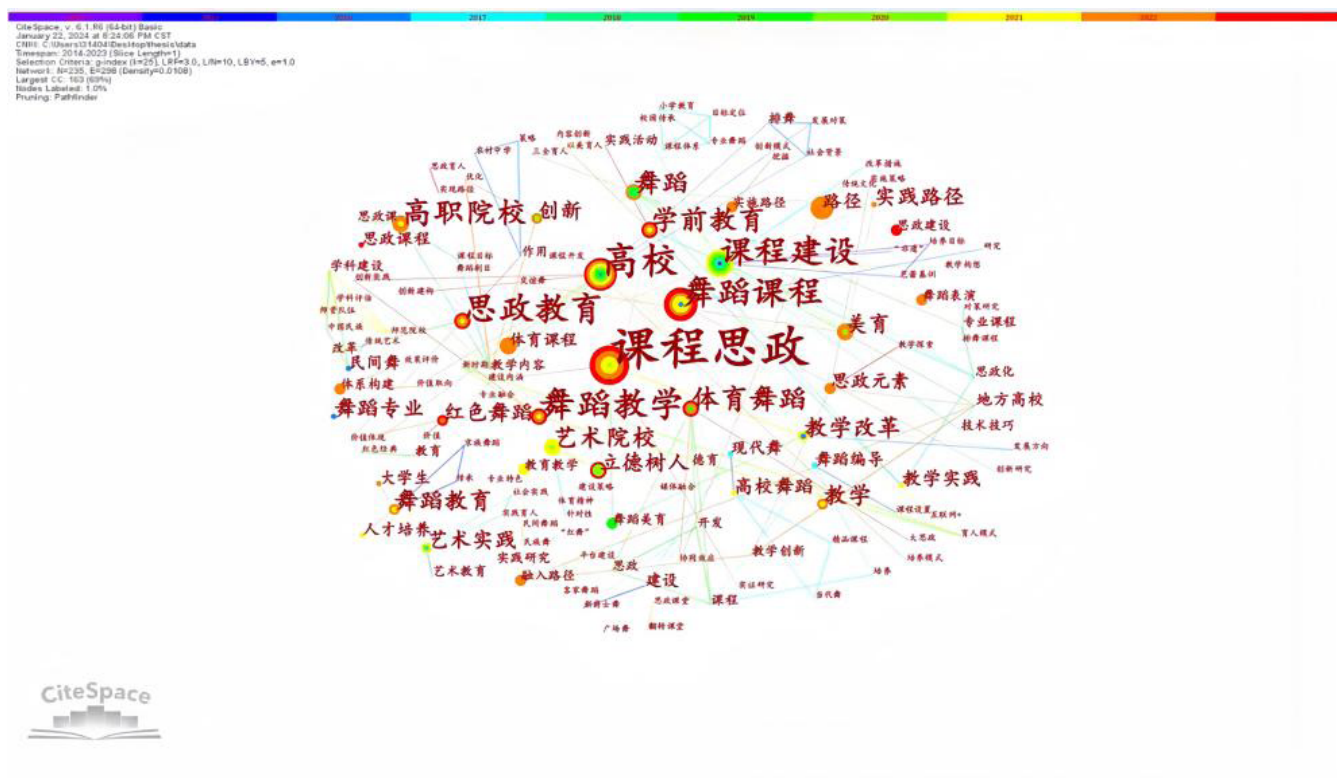


Figure 4. Co-occurrence map of keywords

Table 4. Statistics of keyword frequency and centrality

Serial	Number	Frequency	Centrality
1	curriculum ideological and political education	660	14
2	Colleges and universities	260	25
3	dance teaching	180	09
4	dance lessons	170	13
5	Ideological and political education	170	34
6	Curriculum development	160	33
7	Higher vocational colleges	110	07
8	pre-school education	90	11
9	Dancesport	90	13
10	Dancesport	80	45

From the figure, we can see that “Curriculum ideological and political education,” “Universities,” and “Curriculum construction” are high-frequency keywords. At present, the dance major integrated with curriculum ideological and political education is more in line with the future development trend (Figure 4). The figure shows that 13 clustering tags are “# 0 college,” “# 1 dance,” “# 2 curriculum construction,” and other 13 keywords to form clusters, which shows that there are more ideological and political elements in mining professional skills, there is a cross-cutting, infiltration, and construction of links (Figure 5).

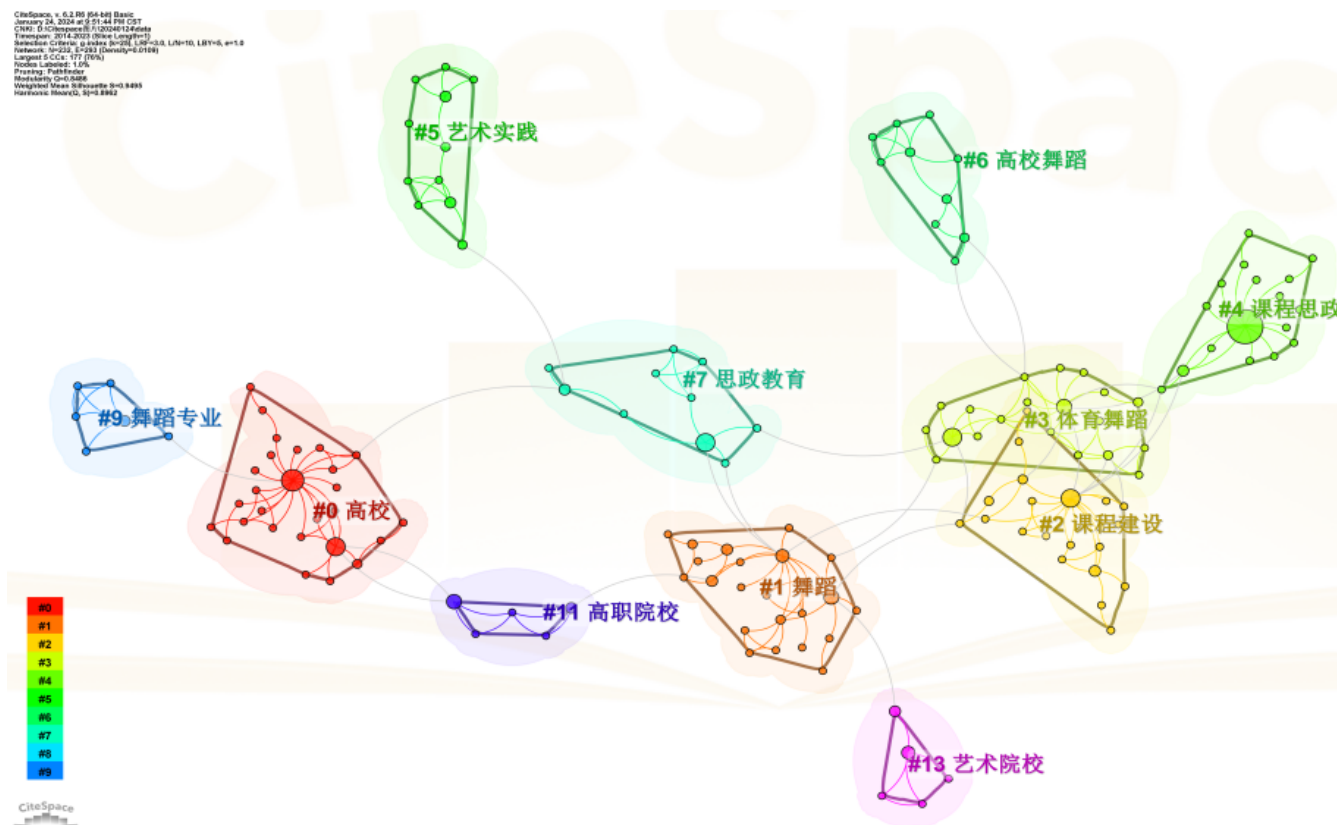


Figure 5. Keyword clustering map

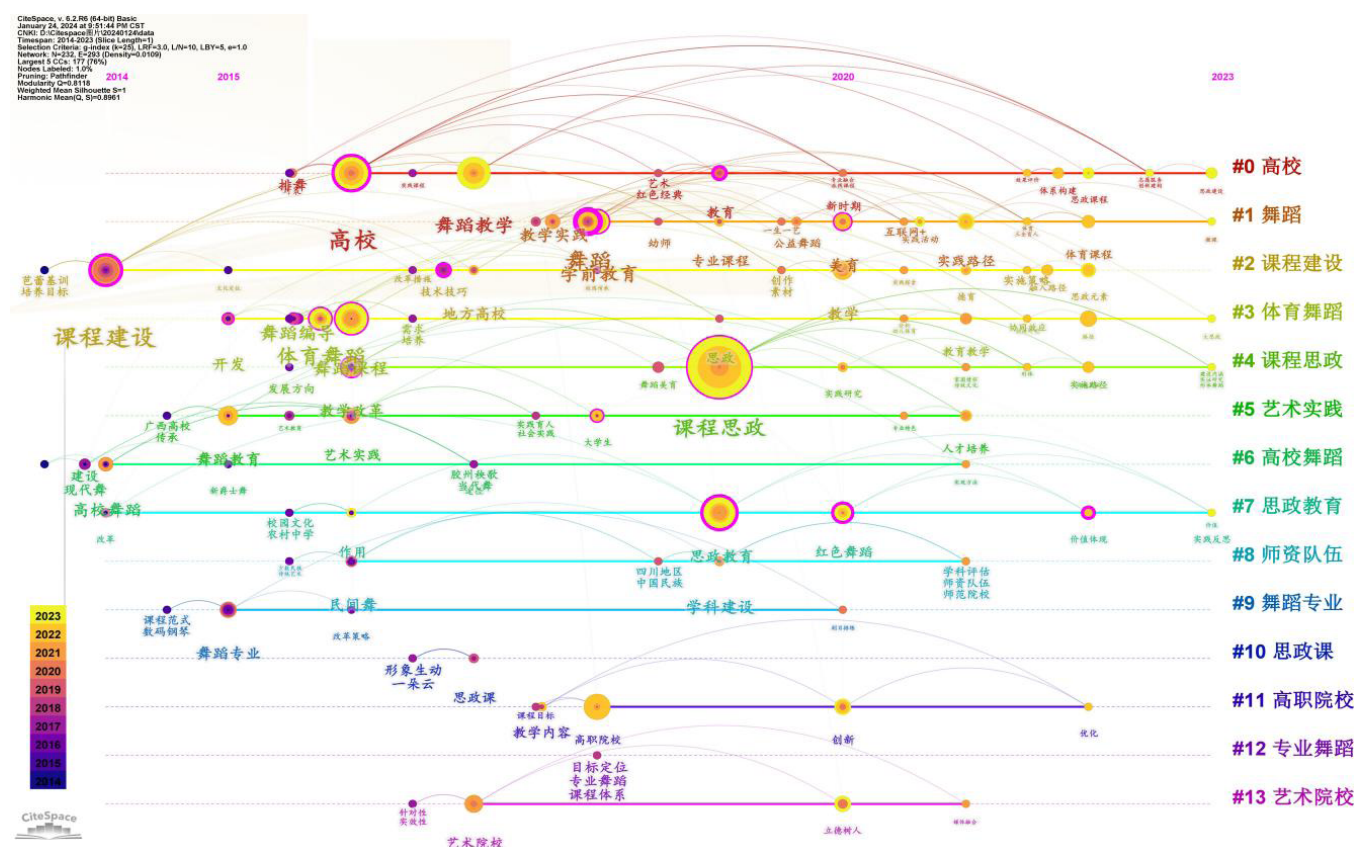
4.2. Evolution trend analysis

In Table 5, we list 10 keywords, burst strength, and burst onset time in this research field. The word “Curriculum construction” popped up earlier in 2014. After “Ideological and political education in curriculum” was proposed by the Shanghai Municipal Party Committee and Municipal Government in 2014. In 2014–2017, the word “Construction” appeared. From 2014, the concept of strengthening the ideological and political construction of curriculum has not been reduced in dance courses; from 2015 to 2018, the emergent word is “Dance major.” In 2014, the concept of “Curriculum ideological and political education” was introduced, which emphasized the art education as a part of the “Five education,” pursued the all-round development of education, and accelerated the integration of dance majors and curriculum ideological and political education. From 2016 to 2019, the emergent words were “Folk dance,” “Ideological and political courses,” “Local colleges and universities,” and “Dance.” During this period, local colleges and universities focused on the integration and penetration of local stories or folk culture into dance courses. From 2018 to 2023, the emergent words were “Teaching practice” and “Dance education,” among which the emergent word of “Dance education” has continued to this day. This is consistent with the requirements put forward by the Ministry of Education in 2020.

Table 5. A list of keywords that appear

Keywords	Year	Intensity	Start	End	2014-2024
Curriculum development	2014	3.56	2014	2020	<div><div></div></div>
Construction	2014	1.57	2014	2017	<div><div></div></div>
Dance Major	2015	1.81	2015	2018	<div><div></div></div>
Folk dance	2016	1.38	2016	2019	<div><div></div></div>
Ideological and political education	2017	1.04	2017	2019	<div><div></div></div>
Local colleges	2017	0.87	2017	2019	<div><div></div></div>
Dance	2018	1.85	2018	2019	<div><div></div></div>
Teaching practice	2018	1.17	2018	2020	<div><div></div></div>
Art schools	2017	2.21	2020	2021	<div><div></div></div>
Dance education	2015	0.93	2021	2023	<div><div></div></div>

As shown in **Figure 6**, the prominent vocabulary is divided according to the keyword timeline map. In the first stage, the dominant stage (2014–2017), the high-frequency vocabulary in the ideological and political research of dance courses from 2014 to 2016 has not yet been formed. In the relevant literature, the terms “Aesthetic education” and “Practical exploration” are often mentioned. These are hot topics in the research at this stage. This stage focuses on how to integrate curriculum ideology and politics into dance courses in a scientific and orderly manner, which lays a foundation for subsequent research.



The second stage, the development stage (2018–2023) stage is the prominent period of research. On the one hand, the subject words of this stage are “Ideological and political course,” “Teaching practice,” etc. Figure 6 shows that during this period, there were also some key words such as “Value embodiment,” “College students,” and “Three-round education,” this study not only carries out educational practice and multi-dimensional collaborative curriculum ideological and political work, but also focuses on the Chinese spirit and cultural literacy to make the talent training system more comprehensive. Through the above analysis, before 2018, the two types of keywords “Construction” and “Dance” have the greatest intensity, and the academic circles mainly focused on the basic theories, such as “What is” of ideological and political courses in dance. After 2018, the highlight words are “Teaching practice,” “Dance education,” and other key words, which shows that the academic circles may continue to deepen the research from theory to practice, the overall perspective of the research focus has turned to the strategy of “How to do” in ideological and political education in dance courses.

5. Conclusion

This study uses CiteSpace software to analyze the journal literature of the theme of dance ideological and political courses included in CNKI from 2014 to 2024, and draws two conclusions:

From the perspective of the overall distribution, the annual number of articles on ideological and political research in dance courses is slow at first and then fast, and it is on the rise. From the perspective of high-yield institutions, the number of articles issued by each institution is quite different; in addition to some well-known institutions have close cooperation links, the rest of the research institutions lack cooperation and exchanges. Exchanges should be increased to promote the quality of the research paper, the more papers are published, the stronger the sense of group cooperation is, but the overall situation is in the form of “doing it alone.” At the same time, the core author group in this field has not yet formed, and the overall research strength is scattered.

Secondly, from the perspective of keyword co-occurrence and keyword clustering, the keyword themes in recent years mainly focus on “Curriculum ideological and political education,” “Universities,” “Curriculum construction,” “Moral education,” etc. From the timeline of ideological and political keywords in dance courses and the list of keywords highlighted, the development of ideological and political research in art courses can be divided into a dominant stage (2014–2017) and a development stage (2018–2023). The focus of ideological and political research in 2018 has shifted from “What is” to “How to do.”

Disclosure statement

The authors declare no conflict of interest.

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Self-Exploration and Reconstruction: Three Role Contradictions and Pornography Mentality of Chinese College Students

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Abstract: This study explores how Chinese college students navigate self-exploration and role contradictions related to pornography consumption. In a society with traditional norms and limited sex education, pornography serves as a key, though controversial, source of sexual information. Using a phenomenological approach, the study identifies three main conflicts: gender, media, and inter-role conflict. Gender differences in pornography consumption reflect societal expectations, with men showing more acceptance and women experiencing more shame. Media conflict arises from the tension between conservative traditional media and more open new media. Inter-role conflict highlights the psychological stress students face balancing liberal social attitudes with conservative family values. This research provides insights into the complexities of pornography use in China.

Keywords: Self-exploration; Role contradictions; Pornography; Chinese college students; Gender; Media conflict; Inter-role conflict; Sex education

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1. Introduction

The rapid development of information technology and changing social norms have sparked global debates on pornography. In China, pornography consumption has become increasingly prominent among college students, despite the continued influence of traditional sexual norms^[1] and strict regulation of the industry^[2]. Public discussion remains limited, and sex education is lacking^[3], yet pornography persists through innovative channels^[4].

This study investigates how Chinese college students perceive and reflect on their pornography consumption. Born in the 2000s with limited sex education, this group often turns to pornography for information and excitement, facing internal conflicts related to gender, media exposure, and social roles. As active Internet users, their views both mirror and influence contemporary sexual culture.

Through phenomenological research and semi-structured interviews, this study applies thematic and conversation analysis^[5], using gender role theory and inter-role conflict theory to explore identity formation and psychological tensions.

By focusing on a Chinese context, the research addresses gaps in existing literature and offers culturally grounded insights into the complexities of youth sexuality in the digital age.

2. Literature review

2.1. Scarcity and specificity in the Chinese context

Pornography studies mostly focus on Western contexts, with limited research in China^[1]. Chinese college students' attitudes toward pornography can be influenced by traditional culture, lack of sex education, and the country's strict regulations on the pornography industry.

In China, cultural conservatism constrains sexual discussions, leading many to avoid such topics^[1,3]. Studies have shown that higher collectivism correlates with a lower acceptance of premarital and extramarital sex in China, compared to more individualistic places like Hong Kong and Taiwan^[6]. Confucianism and Taoism contribute to negative attitudes toward sex, including pornography^[7].

Although sex education reduces risky behaviors^[8], China lacks effective sexual health communication^[1]. Puberty education exists but lacks appeal, prompting youth to turn to online sources, where pornography is prevalent^[3]. Zhang *et al.*^[9] found that the influence of pornography on Chinese youth's sexual awareness has been steadily increasing.

Despite the ban, pornography persists via mobile access to platforms like Twitter in China^[4]. The regulatory context and cultural limitations make pornography studies in China especially challenging. While media studies on sexuality have been conducted, cultural studies in China remain underexplored.

2.2. Gender differences in pornography

Research shows that male consumers of pornography outnumber female consumers^[10]. Gender differences exist both in how women are portrayed in pornography and their motivations for consumption. Women in pornography are typically objectified as sexual bodies, subjected to either active or passive manipulation^[11]. Some women also experience violence in pornography^[10]. These portrayals contribute to gender differences in attitudes toward pornography.

Studies show that women have lower rates of pleasure-seeking motivations compared to men^[12,13]. These differences suggest that gendered motivations and imagery may shape the mentality of Chinese college students toward pornography.

2.3. Twofold impacts of pornography use

Excessive pornography consumption is linked to negative mental health outcomes, such as compulsive sexual behavior disorder and depression^[14]. Higher frequency of pornography consumption has been associated with increased likelihood of engaging in condomless sex^[15].

Some studies, however, highlight the positive aspects of pornography consumption. For example, Sommet and Berent^[16] found that moderate use of pornography was beneficial for sexual self-competence and sexual satisfaction, particularly for women. In relationships, pornography consumption was found to improve sexual behaviors and enhance intimacy between couples^[17,18].

While most studies focus on negative impacts, recent research explores psychological motivations such as emotional avoidance, sexual curiosity, and pleasure-seeking^[12,13]. This study explores how Chinese college students perceive and analyze their pornography consumption and its psychological motivations.

3. Theoretical framework

3.1. Gender role theory

Gender role theory examines how social structures shape gendered behavior and attitudes, critiqued through social

expectations. Mead ^[19] introduced this theory, analyzing gender differences from a social perspective rather than a biological one. Social expectations, stereotypes, and traditional culture influence men's and women's attitudes toward pornography, shaping their perceptions and behaviors. This theory explains how societal norms and gender roles lead to differing attitudes toward pornography among men and women.

3.2. Inter-role conflict theory

Inter-role conflict theory addresses conflicts that arise when an individual occupies multiple roles that require different responses. Studies show that individuals with multiple roles experience conflict and resolve it by shifting between or withdrawing from roles ^[20]. For Chinese college students, roles like media consumer, pornography viewer, and family member contribute to inter-role conflict, especially when faced with cultural shock. This theory helps us understand how students' attitudes toward pornography reflect the tension between these conflicting roles.

Extending the mentality analysis under the gender role and inter-role theories, we developed the research questions below:

RQ1: How do social expectations and role allocation cause the difference in male and female mentality toward pornography?

RQ2: How does a person embody the cultural shock and integration brought about by pornography in different social roles?

Our goal is to explore how Chinese college students' attitudes toward pornography reflect role contradictions and shift the focus from Western sexual media studies to cultural studies in China.

4. Methodology

This study used a phenomenological approach to examine how Chinese college students experience self-exploration and role conflict related to pornography, focusing on lived experiences and subjective meanings ^[21]. Empirical data were collected through semi-structured interviews and participant observations. Interviews enabled in-depth discussion with consistent guiding questions, while observations added contextual depth. All interviews were audio-recorded and transcribed with consent.

Twenty students aged 18–22 were purposively selected for diversity in gender, sexual orientation, and educational background, including 17 from joint programs. Recruited via university networks and social media, participants provided informed consent under strict confidentiality. Interviews were held in private settings, either online or in person, and lasted around 60 minutes. Data were analyzed using thematic and conversation analysis ^[5], with open and axial coding to identify themes and relationships. Reflexivity was maintained to reduce bias. Life histories and field notes offered further insight into how pornography relates to identity, social norms, and psychological experiences.

5. Findings

5.1. Theme 1: Gender conflict

The study reveals significant gender differences in attitudes toward pornography. Men generally exhibit higher levels of acceptance and lower levels of shame when discussing and viewing pornography. This is linked to societal beliefs that encourage male sexual exploration. Men tend to view pornography as a normal social activity. For example, Haunter stated,

"I watch pornographic movies with my friends regularly. It's a normal social activity for us. We discuss the plot or actors afterward, and it helps strengthen our friendships by sharing opinions and interests."

In contrast, women show more ambivalence and shame due to societal expectations of chastity. Many female

participants expressed internal conflict about consuming pornography because it conflicted with their self-image and social expectations. As Susan said, she felt guilty when viewing pornographic films because she was worried that such behavior would affect her reputation in her family and society if others knew about it.

"I rarely watch porn, but feel guilty. I'm 18, from a traditional family, and afraid of being judged, so I watch in secret and delete everything."

This gender disparity is deeply influenced by traditional Chinese cultural values, where men are expected to be sexually active, and women are expected to remain pure and submissive. This cultural framework reinforces different attitudes and behaviors toward pornography.

5.2. Theme 2: Media conflict

Our study reveals that college students hold paradoxical attitudes toward pornography due to the shift from traditional to new media. The rise of new media has increased the speed and scope of information dissemination, exposing students to more pornography. However, differences in content presentation and values between traditional and new media lead to conflicting attitudes.

New media, especially social media and video-sharing platforms, make pornography more accessible. College students are exposed to diverse pornographic content, which leads to more open attitudes. Key factors include the immediacy and convenience of new media, allowing access anytime and anywhere via smartphones and computers. Additionally, the variety of content, including short videos, live streams, and virtual reality, meets different interests, encouraging acceptance. Lastly, the interactive nature of new media enables discussions in online communities, reducing shame and fostering openness.

In contrast, traditional media like television and magazines present more conservative content. This approach influences some students, causing confusion when they encounter the openness of new media. Traditional media's strict censorship emphasizes privacy and moral constraints, while new media's openness creates value conflicts. Some students, influenced by conservative norms at home and school, expressed confusion when exposed to explicit content online. One interviewee remarked, "TV rarely shows sexual content, but it's everywhere online."

Despite the growing influence of new media, traditional media's impact remains significant for some students^[6,12]. These students tend to revert to the values instilled by traditional media when confronted with new media pornography, causing internal conflict. One interviewee explained that, despite frequent exposure to explicit content, he felt it should not be widely disseminated due to its contradiction with family and educational values.

In summary, our study highlights the paradoxical attitudes of college students toward pornography, shaped by the contrasting influences of traditional and new media. While new media fosters diverse attitudes, traditional media's conservative values continue to shape students, reflecting the complexities of sex education and media influence.

5.3. Theme 3: Inter-role conflict

Our study observed inter-role conflict among college students, illustrating the impact of culture shock and the integration of pornography. College students play different roles in varying environments, and the conflict between these roles is particularly evident when confronted with pornography.

In open social circles, students described watching and discussing pornography as a normal social activity. Haunter shared,

"My friends and I watch pornographic movies together all the time, and we feel like it's a way to promote friendship, and it feels natural to everyone."

However, when returning to more conservative family environments, students feel guilt and stress, as this behavior is seen as immoral. Coco, an 18-year-old student, explained,

"I'm an 18-year-old college student with no sexual experience, and my traditional family would be very disappointed if they knew I watched porn."

This conflict highlights cultural shock and the challenge of balancing modern and traditional values. Students feel open-minded in school but revert to traditional values at home, causing confusion. As some interviewees noted, at school, they felt freedom, but at home, they had to present a more conservative image, which left them disoriented.

These findings provide insights into the psychological and behavioral challenges students face during cultural conflict and integration. They offer valuable references for educational and counseling approaches to support students navigating these cultural tensions.

6. Discussion

This study identifies three core conflicts—gender, media, and inter-role—that influence college students’ engagement with pornography. These reflect the powerful role of cultural norms and social expectations in shaping individual attitudes and behaviors. Gender differences highlight the persistence of traditional roles; media conflict illustrates how contrasting values in traditional and new media create confusion; inter-role conflict shows the inner tension students face while navigating liberal peer environments and conservative family expectations. These conflicts stem not only from external cultural shifts but also from internal struggles with identity and self-exploration.

The findings offer insights for research and practice. Educators and counselors should address students’ psychological needs in sex education and help them cope with cultural contradictions through inclusive strategies. The study also contributes to understanding how gender, media, and cultural roles shape behavior, offering directions for future research and policy development. Moreover, the methodology can inform broader social behavior studies. By understanding the roots of these conflicts, we can better support students’ mental health and promote a more inclusive society.

7. Conclusion

This study identifies three key conflicts in college students’ attitudes toward pornography: gender, media, and inter-role. Gender conflict reflects persistent traditional roles in male-female perceptions; media conflict arises from tensions between conservative traditional media and liberal new media; inter-role conflict reveals struggles between modern social values and familial expectations. In China’s shift from traditional to digital media, these tensions expose a paradox of coexisting values. Findings offer insights for improving sex education and counseling to better support students. However, the study is limited to one university, with mostly heterosexual, joint-program students, and many participants had limited sexual experience. Future research should include more diverse samples, consider sexual history, and adopt cross-cultural and longitudinal approaches to inform inclusive education.

Disclosure statement

The authors declare no conflict of interest.

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The Effect of the Popularization of Jiacao Dance Education on the Cultivation of Youth Consciousness of Ethnic Community

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Abstract: Jiacao dance is a traditional dance with rich ethnic culture, which plays a crucial role in cultivating the sense of national community among young people. This article studies the ethnic cultural value of Jiacao dance and its important role in cultivating the awareness of the ethnic community among young people. At the same time, research has been conducted on the existing problems in the popularization of Jiacao dance education, and measures have been proposed to improve teaching content, strengthen teacher training, and enhance communication effectiveness through innovative media means, in order to provide guidance for further building the national community awareness of young people.

Keywords: Jiacao dance education; National community consciousness; Teenagers; National cultural identity; Education popularization

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1. Introduction

In today's society, cultivating a good sense of national community among young people plays an important role in the harmonious development of the nation. The Jiacao dance, a national dance with rich historical and cultural heritage, has become a friendly way of cultural exchange among multiple ethnic groups. Incorporating Jiacao dance teaching into the youth education system is beneficial for enhancing one's affirmation and pride in national culture and strengthening the sense of community of the Chinese nation. This article intends to conduct a comprehensive analysis of the educational value and strategies of Jiacao dance education for young people, in order to promote national unity and development.

2. The national cultural value of Jiacao dance

As a folk dance, Jiacao dance has a long and rich history behind it, containing rich and colorful cultural information. In its composition, rhythm, and clothing colors, it not only showcases the production and lifestyle of various ethnic groups, but also shows respect for nature and society^[1]. Jiacao dance encompasses the spiritual elements of unity, cooperation, joy, and harmony, with a clear commonality of collectivization and ritual. As a symbol of national identity, it can play a

positive role in promoting the inheritance of ethnic culture, enhancing cultural confidence, and showcasing the diverse and integrated structure of the Chinese nation.

3. The positive effect of Jiacao dance education on the cultivation of youth consciousness of the ethnic community

3.1. Promoting the youth's sense of identity with the national culture

Jiacao dance is the main representative of a certain ethnic minority dance, with its history and logo. By comprehensively explaining its origin, skill movements, clothing characteristics, and the national spirit it embodies, it enables young people to deeply understand the values upheld by this nation and enhance their sense of identity with its culture. In addition, the dance teaching of Jiacao dance also involves integrating ethnic music, language, customs, etc. into curriculum practice, guiding young people to experience the charm of ethnic culture in a comprehensive cultural atmosphere. Immersing oneself in interactive teaching to learn dance and experience the historical heritage of the nation can not only avoid a singular and superficial cultural identity, but also build a strong foundation of national culture for young people on the basis of cognition, emotion, and values ^[2]. From the perspective of psychological identity, the basic model of cultural identity can be expressed as follows:

$$C_i = f(K_i, P_i, E_i) \quad (1)$$

Among them, C_i represents the level of ethnic cultural identity of individual adolescents, K_i is the degree of mastery of ethnic cultural knowledge, P_i is the frequency of participation in ethnic cultural practice, and E_i is the environment for receiving ethnic education. Jiacao dance education can effectively promote the improvement of C_i by improving K_i , increasing P_i , and optimizing E_i .

3.2. Promoting exchanges and integration among multi-ethnic youth groups

The education of Jiacao dance is not only aimed at specific ethnic groups of young people, but its transparency and compatibility provide interactive and collaborative channels for young people of different ethnic groups. In the process of learning together, young people from different ethnic groups can break cultural boundaries, deepen mutual understanding and respect for each other. It is based on cultural and artistic interpersonal communication, which is conducive to alleviating subjective biases of different ethnic groups and enhancing emotional cohesion between ethnic groups. Jiacao dance performances usually require the participation of multiple members, requiring neat movements and attention to overall coordination. In the process of collaborative practice and performance, teenagers from various ethnic groups have established a network of mutual trust and formed stable spiritual bonds through continuous adaptation. In their spare time, they will further expand the intersection of life around dance topics, in order to promote in-depth communication among young people from different cultural backgrounds, and ultimately achieve the development of moving from art to the soul and promoting national unity. The following models can be used to describe the degree of closeness between adolescents and different ethnic groups:

$$I_{ij} = \alpha \times T_{ij} + \beta \times S_{ij} \quad (2)$$

Where, I_{ij} represents the intensity of communication between ethnic groups i and j , T_{ij} represents the total amount of time spent jointly participating in a Jiacao dance activity, S_{ij} represents the score of emotional interaction in communication, and α and β represent the weight coefficients. By increasing T_{ij} and S_{ij} , the education of Jiagu dance significantly improves the intensity of communication among young people of various ethnic groups and promotes national unity.

3.3. Inspiring young people's sense of belonging to the Chinese national community

Jiacuo dance is one of the essences of the diversity of excellent traditional Chinese culture. Its teaching content not only focuses on dance techniques, but also emphasizes the education of unity and cooperation concepts and profound connotations. In this process, teenagers use the historical origins, skill knowledge, and national spirit carried by dance as a starting point to understand the interdependence and integration between different ethnic groups, so as to more intuitively feel the integrated cognition of “you have me, I have you” among the people of different ethnic groups^[3]. In addition, Jiacuo dance performances usually focus on collective formation changes and movement displays, requiring teenagers to cooperate and help each other. This highly collaborative behavior can help them cultivate a sense of collective consciousness and a spirit of group honor. During this process, teenagers not only cultivate a sense of belonging to their own ethnic culture but also gradually form a high degree of identification with the entire Chinese national culture. Secondly, the teaching and inheritance of Jiacuo dance are often a form of integration between ethnic festivals and campus activities. Through participating in various cultural activities, young people gain an interactive platform for communication, learning, and reference. Through regularly participating in such activities, teenagers have come to understand that the Chinese nation is a multi-ethnic community, thus cultivating the concept of “diversity and unity, shared destiny” and enhancing their sense of identity and belonging.

4. The main problems existing in the popularization of Jiacuo dance education

4.1. Limited Jiacuo dance education coverage

From the perspective of existing education in various regions, there is an imbalance in the popularization of Jiacuo dance education. With sufficient resources and policy support, a relatively large proportion of urban schools offer Jiacuo dance education courses; Rural schools and remote areas are severely limited by factors such as teacher resources, funding, and facility construction, resulting in a serious lag in education development. In addition, some schools do not attach enough importance to it and do not make it a regular course, resulting in its limited popularity and affecting young people's exposure and understanding of their ethnic culture (**Table 1**).

Table 1. Comparison of education coverage in different regions

Area type	The proportion of dance classes offered	Teaching staff situation	Policy support	Proportion of participating students
City school	85%	Full-time teachers, adequate resources	High	78%
County school	55%	Some part-time teachers lack training	Medium	52%
Rural school	25%	Basically no professional teachers	Low	21%

The data in the table shows that the enrollment rate and student participation rate of Jiacuo dance courses in rural and remote areas are significantly lower than those in cities, reflecting the urgent need to solve the problem of uneven education coverage.

4.2. Lack of systematicity in the curriculum system and teaching content design

At present, the main problem with the Jiacuo dance education curriculum system is the lack of scientificity and rationalization. Many schools do not have fixed and authoritative textbooks and teaching syllabi for Jiacuo dance education. Most of the teaching materials are organized by teachers themselves, resulting in a chaotic distribution of teaching content and uneven levels. In addition, most courses only teach basic movements and do not extend to the historical background, cultural connotations, art, and other aspects of Jiacuo dance. Students' understanding of Jiacuo

dance is only superficial, but cannot truly rise to a sense of national cultural identity. The level and progression of teaching are relatively low, and it is not possible to analyze and plan reasonably for the age characteristics, knowledge acceptance ability, and learning interests of adolescents, which is not conducive to the stable improvement of learning outcomes.

4.3. Lack of teachers

At present, the overall teaching staff of Jiacao dance education is relatively weak, with few professional teachers, and most teachers have not received specialized training, resulting in a lack of professionalism^[4]. At present, teachers are mainly engaged in part-time jobs and job transfers, resulting in a significant gap in teaching ability and a lack of true understanding of the Jiacao dance culture. These problems seriously affect the steady improvement of education quality (Table 2).

Table 2. The current situation of the teaching staff of Jiacao dance education

Index	Current data	Major problem
Proportion of full-time teachers	30%	There is a serious shortage of professional teachers
Teacher training participation rate	40%	There are few training opportunities, and the training system is not perfect
Level of cultural literacy	60% have basic dance skills	Lack of a systematic grasp of the national cultural spirit and historical background
Innovation of teaching method	Low	Tradition is simple, with a lack of interest and interaction

From the table, it can be seen that the current shortage and low level of teacher construction are prominent issues, and it is necessary to strengthen the training and exercise efforts.

4.4. Young people's inactive participation

It is precisely due to the uninteresting course content, as well as inadequate promotion, that many teenagers lack a certain understanding and interest in learning Jiacao dance. With the increasing promotion of foreign cultures, they are gradually replacing the traditional dance culture of our own ethnic group; their proportion in the hearts of young people is decreasing (Table 3).

Table 3. Current situation of teenagers' interest in dancing education

Participation intention classification	Proportion (%)	The main reason
Highly motivated	20%	The school attaches great importance to the teaching content and parents support it
General interest	45%	The classroom content is simple, and lack innovative activities
Little interest	25%	Lack of awareness and understanding of national culture
Definite disinterest	10%	Preference for foreign culture, lack of propaganda

According to the survey, the level of student participation is low. In order to improve students' enthusiasm for participation, it is necessary to change the teaching methods, organize rich activities, etc., to enhance students' sense of identity and increase their interest.

5. The optimization path to enhance the awareness of the ethnic community among young people based on the education of Jiacao dance

5.1. Constructing a multi-level education curriculum system of Jiacao dance

Establishing a reasonable and scientific multi-level Jiacao dance education curriculum system is the most fundamental method to enhance the awareness of the ethnic community among young people. The system should arrange relevant courses at different levels and stages based on the physical and mental characteristics and cognitive abilities of adolescents at different stages, to ensure the coherence and completeness of teaching. **Figure 1** is a flowchart of the construction of a multi-level curriculum system for Jiacao dance education.

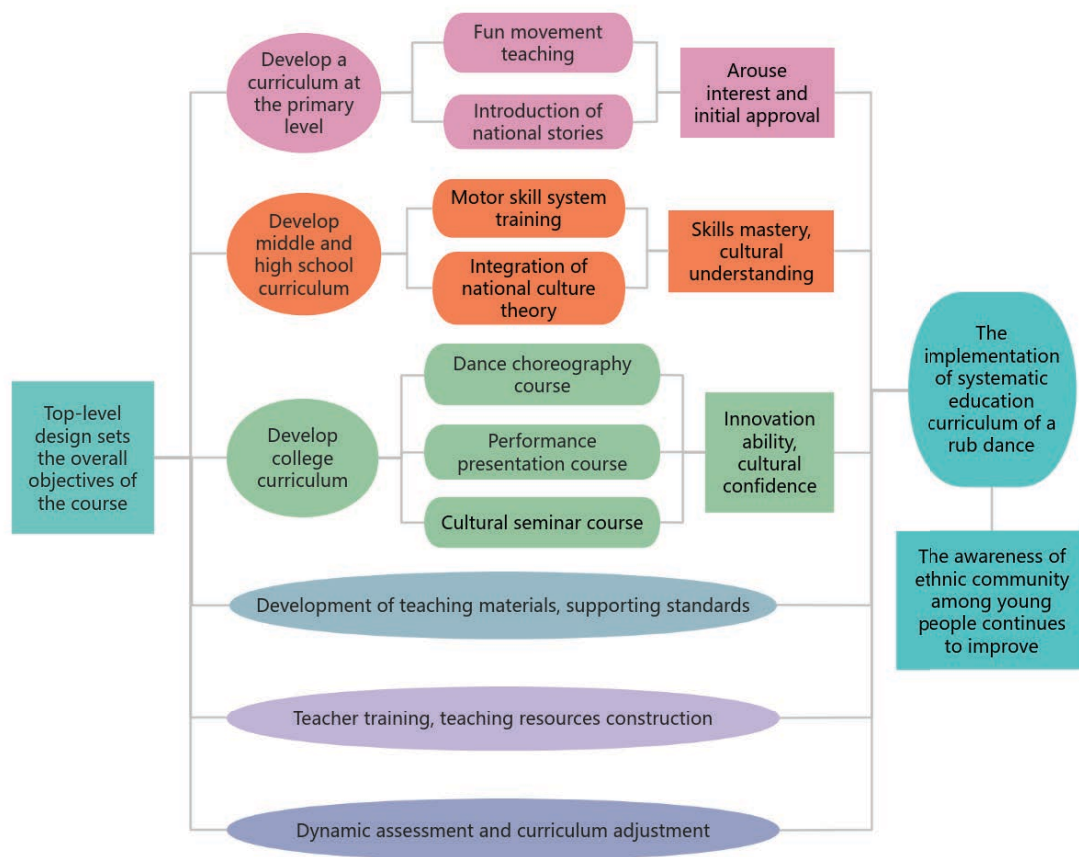


Figure 1. Flow chart of constructing a multi-level curriculum system of Jiacao dance education

This diagram comprehensively presents the entire process of the Jiacao dance curriculum system, clearly indicating the important teaching content and cultivation goals for different age groups, in order to achieve the realization of young people's national community consciousness from initial understanding to deep mastery, and then to self-identity and cultural innovation improvement.

5.2. Strengthening the teaching staff training mechanism

The teaching staff is a key factor in improving the quality and effectiveness of Jiacao dance education. Therefore, we should establish a scientific and comprehensive teacher selection mechanism, which includes teaching skills, ethnic and cultural literacy, and psychological guidance abilities. It is also possible to establish education majors or courses in Jiacao dance through universities to ensure the cultivation of high-quality, skilled talents with comprehensive theoretical knowledge, thereby achieving long-term talent supply for the development of Jiacao dance education. In addition, by creating diversified training mechanisms, including pre-job training, on-the-job training, group discussions, on-

site teaching, etc., the actual teaching level of teachers and the dissemination effect of ethnic culture can be improved. It is necessary to establish an incentive and development mechanism for teachers, and incorporate the Jiacao dance into teachers' performance evaluation, professional title promotion, and honor evaluation, so as to mobilize teachers' enthusiasm, make the teaching team continue to choose the best among the best, develop and grow, and provide strong support for cultivating the awareness of youth national community.

5.3. Utilizing innovative carriers and communication channels of Jiacao dance education activities

School classroom teaching plays a crucial role in inheriting Jiacao dance. We must try to develop more entertaining and creative educational equipment and channels to increase their appeal and achieve better teaching results. We should vigorously promote the linkage education between campus and society, such as forming interest groups for Jiacao dance on campus, holding ethnic festivals, ethnic discussion classes, and other activities, so that students can learn dance techniques and increase their understanding of ethnic culture in a relaxed and entertaining way. On the other hand, we will promote Jiacao dance to step out of the classroom, connect with social institutions such as communities, intangible cultural heritage protection bases, museums, etc., hold on-site observation and social performances, and expand the scope of practical experience for young people^[5]. Utilizing the advantages of modern technology, develop a Jiacao dance online teaching system, virtual exercises, and an interactive application to achieve simultaneous learning inside and outside the classroom. At the same time, we will actively use video websites, official account, live classes, and other forms to carry out online competitions, excellent works display, lectures on ethnic cultural knowledge, and other activities, further expand the impact of Jiacao dance education, expand its coverage space, and deepen the awareness of youth ethnic community.

5.4. Establishing a mechanism for promoting diverse and coordinated development

The development of Jiacao dance education is an important means of spreading ethnic culture and cultivating the sense of community among young people. Therefore, it is necessary to break down barriers in multiple fields, coordinate excellent resources from all parties, and establish an educational mechanism jointly led by the government, educational institutions, families, and communities. Led by the government, corresponding support policies will be formulated to establish a special fund for Jiacao dance education, providing financial and policy support for teacher training, teaching content development, and activity implementation. In addition, cross-disciplinary collaboration mechanisms should be established to integrate resources in education, culture, ethnic minority affairs, and other fields, jointly building specific policies suitable for local implementation, and achieving a model of policy, funding, and resource integration. Secondly, schools should actively collaborate with cultural departments, intangible cultural heritage protection organizations, ethnic groups, and community institutions to carry out a series of themed activities to bring Jiacao dance courses to campuses, communities, and families, in order to expand the number of participants and public support. At the family level, it is also necessary to strengthen communication and interaction between family and school, encourage parents to participate in their children's Jiacao dance learning and related activities, and form a good family cultural atmosphere. It is also necessary to establish a dynamic feedback mechanism, regularly conduct research on educational effectiveness and social situation, adjust the implementation plan in a timely manner based on the evaluation results, ensure the sustainability and orderliness of the joint assistance work of Jiacao dance education, and effectively promote the cultivation of the awareness of national community among young people.

6. Conclusion

The role of Jiacao dance education in promoting the awareness of ethnic community among young people is very important. It can strengthen their sense of identity with their own ethnic culture, and on this basis, enhance their multi-ethnic integration and strengthen their sense of belonging to the Chinese national community. However, there are still problems such as an incomplete curriculum system, a shortage of teacher resources, and uneven teaching coverage.

Corresponding changes need to be made in curriculum design, teacher training, and dissemination methods to promote the efficient development of Jiacao dance education, ultimately achieving national unity and the intergenerational transmission of Chinese culture.

Disclosure statement

The author declares no conflict of interest.

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Theoretical Construction and Practical Pathways of Visual Communication Design in Art Education

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Abstract: This paper, based on the developmental background of the integration of visual communication design and art education, explores the innovative value of theoretical construction and practical pathways in this field and reveals its significant importance in the reform of art education. The final part of this paper forecasts and discusses the future development trends of visual communication design in art education, revealing the transformative opportunities, challenges, and possible directions it brings. This study, through interdisciplinary theoretical and practical exploration, reveals the potential boundaries of visual communication design empowering art education, aiming to promote teaching transformation and innovation in the education field and lay a solid foundation for future related research.

Keywords: Visual communication design; Art education; Theoretical construction; Practical pathways; Development trends

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1. Introduction

The rapid development of information technology is changing the operational patterns and development structures of various fields in human society at an unprecedented speed, providing significant support for the comprehensive digitalization and intelligentization of modern society. Against the backdrop of global economic integration and technological sharing, industries have gradually achieved data-based information exchange and in-depth analysis, thereby realizing the optimal use of resources and a significant improvement in production efficiency. However, with the rapid growth of data resources, the processing capabilities of various fields in dealing with these massive datasets appear to be stretched thin, especially in decision-making, where there is still a certain degree of lag and uncertainty. This, to some extent, restricts the value development of data as a production factor. Meanwhile, the numerous technical bottlenecks in existing big data management systems in terms of privacy protection, security, and processing efficiency further exacerbate this issue. In response to this situation, this research project has emerged in a timely manner. Given the important guiding significance of the research objectives for the efficient use of data, the project can not only optimize the accuracy and reliability of the data mining process at the technical level but also provide strong theoretical and tool support for related practices. This is not only one of the important steps to promote industrial upgrading and transformation, but also an effective means of responding quickly to social needs ^[1].

2. Theoretical construction of visual communication design in art education

2.1. The educational theoretical framework of visual communication design

Visual communication design, as an interdisciplinary subject, requires a systematic theoretical framework to support its application in art education. This section aims to explore the educational theoretical basis of visual communication design and provide a theoretical basis for its in-depth teaching in the field of art. Broadly speaking, the practice of visual communication design involves the integration of knowledge from fields such as information aesthetics, semiotics, behavioral psychology, and cognitive neuroscience. In art education, the educational theory should be based on an interdisciplinary research framework, emphasizing the interrelationship between visual media and audience experience. Visual communication design is not only the application of technical means but should also be regarded as a communication strategy that combines emotional resonance and rational communication. From the perspective of semiotic communication studies, the educational theory should focus on the interactive mechanism of the encoding and decoding process of visual symbols, guiding learners to develop critical observation skills at the teaching level. At the same time, the symbolic practice in the educational process must also take into account the variables of cultural context and aesthetic cognition, training students' artistic sensitivity and professional thinking skills in dynamic interactive design tasks ^[2,3].

2.2. Theoretical expansion of visual communication design based on art education

Visual communication design, as an important part of art education, plays a significant role in promoting the integration and mutual learning between disciplines. In the process of theoretical construction and expansion, it is essential to emphasize the intrinsic connection between the basic theory of visual communication design and the methodology of art education. By exploring the intersection of visual language interpretation and semiotic perspectives, we can identify common ground that can be leveraged to enhance the dynamic relationship between technology and art within visual arts education ^[4,5].

Moreover, with the evolution of cultural contexts, the emergence of new media within the field of visual communication has given rise to new theoretical dimensions and practical strategies. This development presents an opportunity to re-examine and reshape the visual communication system in art education. By constructing a theoretical framework that embraces digital technology applications and cross-disciplinary creative thinking, art education can effectively meet the needs of interdisciplinary talent cultivation. This approach not only enables students to develop cross-media expression skills but also guides them in understanding the diversity and value system of visual culture. On this basis, further exploration of the social roles and aesthetic values in visual design can be conducted, providing students with a comprehensive cognitive platform oriented towards technological innovation, social demand, and cultural significance ^[6].

2.3. Key elements and principles in theoretical construction

In the theoretical construction of visual communication design in art education, identifying and establishing key elements and fundamental principles is an indispensable theoretical prerequisite. These elements and principles directly influence the establishment of design education goals and the effectiveness of practical operations. First and foremost, the theoretical framework is built upon a thorough understanding of the essential attributes of visual communication design elements. These elements, which include but are not limited to color, lines, shapes, and spatial relationships, are not only tools for designers to convey emotions and creativity but also crucial instruments for educators to impart skills and concepts. By mastering and interpreting the diverse yet systematic language of composition, visual communication design courses can help students develop rigorous observation and analytical skills during their theoretical studies, facilitating a transition from intuitive aesthetic perception to rational cognition ^[7].

Secondly, the principles dimension provides specific operational pathways for teaching practice. These principles include the priority of functionality, which emphasizes practicality while also considering artistic expression; the principle of systemic integration, ensuring that the teaching plan is centered around the overall knowledge of the discipline; the principle of teaching according to individual aptitude, focusing on the individual development of students and meeting

their diverse needs; and the principle of innovation orientation, which encourages open and creative learning methods while respecting traditional culture and existing rules. These fundamental principles interact with each other, providing students with an effective path to build a systematic design thinking model through the teaching of design language and innovative thinking training^[8].

3. Practical strategies of visual communication design in art education

3.1. Methods and models of practical teaching

In the process of art education for visual communication design, practical teaching is both a core component and a crucial pathway. Therefore, research on relevant methods and models holds significant value. This section first explores the studio-based teaching model, which combines academic training with creative development. This model cultivates students' abilities to identify problems and provide comprehensive solutions within real-world application scenarios. The open and collaborative environment of the studio offers students a space that simulates the professional ecosystem, allowing them to experience the entire process of a project, from the initial concept to its final realization^[9].

Case-based teaching is another widely adopted method. This approach centers the curriculum around classic examples or current hot cases, integrating complex theoretical knowledge into the analysis of specific creative cases. By using task-driven methods to stimulate students' curiosity and participation, this model deepens their core understanding of the composition of visual elements and the principles of communication. Additionally, thematic teaching methods are employed, where teachers guide students to conduct research and design development tasks based on specific topics within a particular field. This method not only broadens students' knowledge boundaries but also encourages them to create personalized design concepts in response to real needs^[10].

3.2. Design and implementation of practical projects

In the field of visual communication design practice, scientific design and implementation strategies are crucial for ensuring the effectiveness of educational outcomes. This section aims to explore the methodology and practical value of developing and implementing targeted practical projects for different groups of learners. The design of visual communication teaching should first clarify its goal orientation. By thoroughly examining students' existing knowledge levels and skill mastery, specific and hierarchical learning milestones can be established. Therefore, in the early stages of a project, factors such as curriculum design, allocation of teaching resources, and the professional collaboration capabilities of the teaching team should be comprehensively considered to form a systematic goal system. This phase particularly emphasizes a practice-oriented learning path, focusing on the integrated design of the entire process from conceptual understanding to application implementation^[11].

Secondly, the implementation of projects focuses on stimulating creative potential through a variety of activities. These include case analysis, simulation practice, and cross-disciplinary exchanges. The selection of cases should cover the entire process from theoretical guidance to the actual presentation of creative outcomes, facilitating students' observation of the patterns in which visual design principles are applied in specific designs. Simulation projects emphasize students' full participation based on real design processes. By setting up scenarios such as client backgrounds and market strategy design, students gradually learn to balance commercial environments with client demands. Additionally, the teaching process should appropriately integrate digital tool courses to enhance efficiency while also promoting a shift in design concepts.

The teaching team should also dynamically adjust teaching strategies and project pace according to students' characteristics. For example, for student groups with significant differences in learning progress, a group task collaboration mechanism can be implemented. This allows students to complement each other's strengths and improve communication skills, thereby fostering a positive learning community atmosphere. Moreover, the establishment of teaching evaluation indicators should be more refined, providing feedback on learning progress and design practice effectiveness in diverse

forms. This dynamic adjustment and evaluation process not only enhances teaching efficiency but also plays a positive role in the sustainable development of students' creativity and comprehensive application skills^[12].

3.3. Assessment and feedback in the practical process

In the actual teaching process of visual communication design, the design of an assessment and feedback system is particularly critical and runs throughout the entire cycle of educational implementation and skill development. An effective assessment mechanism should start from students' cognitive levels and their learning goal settings, capturing the development of students' abilities in the educational process through diversified methods. This assessment is not limited to the consideration of outcomes but integrates the concepts of formative and summative assessment, aiming to capture the ways in which students continuously adjust and deepen their understanding during the learning process. In terms of specific measures, targeted portfolio reviews should be arranged at each key point in the course. A customized evaluation framework should be provided for each student, and multi-dimensional criteria should be used to measure factors such as design creativity, the accuracy of design execution, and the effectiveness of information delivery^[13].

Furthermore, the feedback mechanism implemented during the practical phase of the course not only helps to promptly correct technical errors in students' visual expression but also promotes the benign development and optimization of the creative process. It is important to note that when providing feedback, assessors should pay special attention to the artistry of language, adopting an encouraging tone rather than overly critical remarks, to reduce students' psychological barriers and resistance. At the same time, an interactive teaching atmosphere should be actively fostered to encourage mutual learning and exchange among students. By organizing regular seminars and portfolio sharing sessions, teachers and peer experts can jointly guide students in self-assessment and cross-year comparative summaries, thereby achieving a higher level of professional feedback loop^[14].

4. Future development trends and prospects of visual communication design in art education

4.1. Opportunities and challenges of future development

The rapid development of modern art education has increasingly highlighted the importance of visual communication design as an interdisciplinary field, both in academia and practice. The evolution of this field, driven by technological upgrades and social demands, presents unprecedented possibilities and multiple challenges for future teaching and innovation. As digital media and cross-media content increasingly dominate cultural production mechanisms, visual communication design has broken through the traditional framework of graphic design to become a more comprehensive visual language system. This transformation, on the one hand, brings unprecedented teaching opportunities to art education, especially in curriculum design and resource integration, which can promote the cultivation of multiple skills through interdisciplinary integration. On the other hand, it also intensifies the tension between the standardization of design courses and the diversity of practice, leading to issues of uneven resource allocation. Secondly, the multicultural exchanges under the globalization backdrop have further created an urgent demand for professional designers who can adapt to international aesthetic needs. This, in turn, will positively stimulate the setting of course goals and the construction of faculty capabilities. However, this process is also restricted by issues such as cultural identity, educational costs, and imbalances in the speed of technological innovation, which require practitioners to maintain a forward-looking strategic vision within the rapidly updating professional skill framework^[15].

4.2. Forecast and analysis of development trends

Visual communication design, as an important part of art education, reflects not only the visions of academia and practitioners for the future but also carries the demands of social and cultural changes. With the rapid development of information technology, digital tools and platforms are profoundly changing the traditional landscape of visual

communication design, further guiding the transformation and upgrading of educational methods and disciplinary construction. Future visual communication design education will place greater emphasis on interdisciplinary and cross-cultural collaboration, especially in a global context, where students need to have an international perspective and innovation capabilities, as well as proficiency in the application of diverse media and technologies.

Predictions indicate that artificial intelligence and generative design will be important areas of development in future visual communication education. With the support of big data, intelligent teaching resources can provide students with customized learning paths and instant feedback, helping them to quickly grasp complex design logic and creative patterns. In terms of tools and technologies, the application of three-dimensional modeling to virtual reality technology will push visual education from a two-dimensional plane to a more immersive experience. At the same time, discussions on design ethics and aesthetic values will also become more in-depth. Visual communication design practice will not only need to meet market demands but also take on social responsibilities and reflect cultural connotations^[16].

4.3. Impact on art education and future prospects

With the rapid development of the field of visual communication design and changes in the technological environment, its profound impact on art education continues to expand and shape future educational pathways. This transformation is mainly reflected in the significant innovation of visual education methods and concepts. First, technological empowerment has embedded the concepts of visual communication design into the overall planning of art education. From digital drawing tools and virtual reality modeling to design modeling software, these technologies have become important carriers for stimulating creative learning experiences. This not only optimizes traditional art teaching models but also provides more possibilities for cultivating students' practical innovation capabilities. In addition, the increasing multidimensionality and interactivity of visual content expression have made learning and interaction more complex and diverse. Art disciplines have evolved from simple technological applications to a more comprehensive exploration of human behavior patterns.

At the same time, the dual development of the theorization and application of visual communication design has driven the dynamic improvement of the art teaching system. Emerging fields such as interactive analysis in visual design, mechanisms of communication psychology, and adaptation to media contexts are gradually guiding art majors to achieve cross-disciplinary integrated education and encouraging students to explore the relationship between visual semantics and socio-cultural contexts. This trend not only strengthens the educational attribute of integrating art with practical knowledge but also deeply integrates interdisciplinary research concepts into the design of educational models.

Disclosure statement

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“Acceptance” and “Recreation”: The Works of Jon Fosse in China

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Abstract: This study examines the development and influence of Jon Fosse’s works in China from the perspectives of reception and reinterpretation. By analyzing the translation, performance, and dissemination of his works, the study explores audience feedback, identifies the characteristics and challenges of his creations, and discusses how cultural, aesthetic, and historical differences impact the reception of his works. It also investigates the barriers in cross-cultural communication and cases of cultural misinterpretation, as well as the diverse pathways of reinterpretation in drama, literature, and film adaptation. Furthermore, the study highlights the cultural value and social significance of the dissemination of Fosse’s works, emphasizing their inspiration for Chinese drama and the construction of cultural interaction. The research aims to provide a comprehensive understanding of the relationship between Fosse’s works and Chinese aesthetics, and to promote the dissemination and localization of Nordic literature in China.

Keywords: Jon Fosse; Acceptance studies; Recreation; Cultural exchange; Dramatic adaptation

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1. The acceptance of Jon Fosse’s works in China

1.1. The translation of Fosse’s works in China

Since Jon Fosse’s works were introduced to China, their unique literary expression and narrative style have attracted considerable attention from Chinese academia. In recent years, Chinese academia has gradually constructed a basic framework for the study of Fosse’s works through translation and commentary. In terms of translation, Fosse is renowned for his poetry and drama. The translations of several of his plays and poems by Yu Zemin were among the first to be introduced to China, enabling more Chinese readers to initially experience the Nordic minimalist aesthetic style and the complex emotions and philosophical reflections it conveys through linguistic mediation. These translations generally adhere to the original text, striving to represent the author’s unique creative vocabulary and narrative strategies. Within the academic publishing system of universities, studies such as “Autumn Harvest and Autumn Wind: A Study of Jon Fosse’s Works” and “A Preliminary Exploration of the Translation of Fosse in the New Nordic Literary Horizon” have provided important references for the accumulation of Fosse’s literary translations in the Chinese context. Additionally, some Chinese translators have adopted a dual approach of “preservation and reconstruction,” accurately reproducing the original meaning while adapting it to the Chinese context. They reinterpret the works by incorporating traditional Chinese art and

dramatic techniques, attempting to find intersections and expressive tensions between Eastern and Western narratives. This has become one of the core paths for translating Fosse's works in recent years ^[1].

1.2. The performance and dissemination of Fosse's works in China

In recent years, Jon Fosse's works have gradually gained attention from the Chinese theatrical and academic communities, achieving varying degrees of acceptance and recognition in performance and cultural dissemination. His texts, characterized by their minimalist language style and unique rhythm, present a quiet power and deep artistic infectiousness, becoming increasingly familiar to Chinese audiences. Domestic theater groups and universities have successively adopted his works as important case studies and practical materials for cross-cultural research, exploring and analyzing them from both stage practice and theoretical interpretation. In particular, the translation of Fosse's representative works, such as "Someone Is Coming" and "Autumn Past," began in the early 21st century within the literary domain and has since developed into practical applications with the acceleration of Sino-Norwegian cultural interactions. Since 2016, several Chinese theaters have hosted "Small Theatre" units and international contemporary drama exhibitions, which have included Fosse's original Nordic stage aesthetic works to present the depth of his ideological dimensions and the simplicity of his expressive forms ^[2].

1.3. Chinese audiences' reactions to Fosse's works

Chinese audiences' reactions to Jon Fosse's works reflect the unique process and cultural reinterpretation of this Nordic dramatic system as it integrates into the Chinese context. In-depth analysis of various performance feedback and discussion data shows that Chinese audiences exhibit distinct understandings of the sense of stagnant time, minimalist language style, and symbolic expression in Fosse's works. The majority of Chinese audiences believe that Fosse's works, through the repetition and pauses in language, reinforce a profound sense of alienation in everyday life. This approach subverts the traditional Chinese emphasis on narrative and functional storytelling, bringing a new sensory experience. The portrayal of characters' destinies and existential philosophy in Fosse's works has also sparked extensive philosophical discussions, especially as he tells tragic stories in a plain tone, allowing Chinese audiences to resonate emotionally with existentialist reflections on life. On the other hand, some viewers indicate that the significant cultural differences may create barriers to understanding the deeper meanings of the works, particularly the abstractness of some symbolic scenes and backgrounds, which causes hesitation between aesthetic and emotional experiences. Overall, Chinese audiences' reactions to Fosse's drama encompass both an interest in and acceptance of Nordic aesthetic culture, as well as a focus on individual identity and universal significance in cross-cultural exchanges ^[3].

2. Factors influencing the acceptance of Jon Fosse's works in China

2.1. The impact of cultural differences on acceptance

Jon Fosse's works enjoy international acclaim, yet this global attention has not fully translated into comprehensive understanding and research within the Chinese academic community. Cultural differences are a primary reason for this situation. Firstly, in terms of literary form and style, his creation tends towards minimalist narration and repetitive structures. This narrative strategy, innovative at the linguistic and rhythmic levels, offers a novel experience for Chinese readers. However, its formalistic characteristics may pose comprehension challenges for Chinese literary recipients accustomed to traditional structures and plot development. Secondly, in terms of cultural context, his works are rooted in the Scandinavian social and cultural milieu, where the modes of emotional expression and thematic content often diverge from Chinese philosophical concepts. This is particularly evident in his exploration of human indifference and alienation, which contrasts with the Chinese emphasis on collectivism and interpersonal relationships. Additionally, Fosse's language, influenced by the Nordic literary tradition, often carries profound and implicit historical and cultural significance, which can lead to barriers in cross-cultural understanding ^[4].

2.2. Differences in literary traditions and aesthetic concepts

When examining the acceptance of Jon Fosse's works in China, it is essential to consider the profound differences between the literary traditions and derived aesthetic concepts of Norway and China. As one of the most influential new realist playwrights and literary figures in contemporary Europe, Fosse's works are deeply embedded in their unique cultural context. His creative language and narrative style often exhibit a minimalist yet symbolic quality. His literary sensibility frequently embodies the cultural characteristics and geographical background of the Norwegian region, which contrasts sharply with the Western linear narrative that emphasizes clarity and logical progression. This mode of expression poses certain obstacles for Chinese readers accustomed to the traditional Chinese chapter-based narrative style and the structural technique of introduction, development, turn, and conclusion^[5].

In comparison, Chinese culture has long valued the aesthetic of linguistic rhythm and parallelism. The narrative structure in Chinese literature tends to favor gradual unfolding over the emotionally direct and tightly structured Western approach. This cultural tradition influences the Chinese perception of concise and abstract language, making the interpretation of Fosse's creative intentions more challenging. Additionally, the symbolic imagery in Fosse's novels and the use of pauses in his plays require interpretation within their cultural context. Unlike Western readers, who may more readily grasp the text's meaning due to greater cultural familiarity, Chinese readers may experience a greater deviation in understanding. From an aesthetic perspective, Chinese literary works often pursue overall harmony and emotional richness in narration^[6,7].

2.3. The role of social background and contemporary factors

The dissemination of Jon Fosse's works in China has been significantly influenced by the complex interplay of social background and contemporary changes. As China rapidly urbanizes and its cultural life diversifies in the twenty-first century, the audience's aesthetic reception of foreign cultural products has become increasingly pluralistic. On one hand, economic globalization has facilitated the exchange of cultures between China and other countries, providing convenience for the introduction of Fosse's works and leading some viewers to develop high expectations for the "uniqueness of Nordic culture." However, this context also complicates the understanding of the texts. In the highly commercialized cultural market, dramatic and plot-driven narratives tend to attract the attention of the mainstream audience more easily. Moreover, the concise poetic expressions in Fosse's plays and his deep inquiries into everyday life and human existence may create a sense of alienation for viewers accustomed to grand historical narratives or strong stage impacts. On the other hand, the contemporary era has seen a renewed appreciation for avant-garde drama in the field of literary criticism, which has provided some cognitive and evaluative resources for Fosse's works. A group of scholars, through their interpretation of postmodern artistic concepts, have injected interpretative potential into his creations at the theoretical level^[8].

3. Forms of recreation in Jon Fosse's works in China

3.1. Recreation in dramatic adaptation

When exploring the forms of literary recreation of Jon Fosse's works in China, it is inevitable to focus on the crucial aspect of dramatic adaptation. Fosse's plays are renowned for their minimalist language style and intense emotional tension. Transplanting his original narratives to the stage is not only a profound interpretation of the intrinsic qualities of his texts but also a further shaping force in cross-cultural communication. Research indicates that Chinese directors, in their stage expressions of his works, have not simply copied the original plot structures. Instead, they have endowed the works with distinct Chinese cultural characteristics through delicate dramatic direction. Notably, they often reconstruct the implicit imagery in the dialogues, expanding the highly introspective narratives into collective mirrors associated with the times. This creative technique has shown unique effects in several successful practices.

The reorganization of dramatic language is not only an enrichment and development of the text, but also expands the cross-disciplinary dialogue space for Fosse's works. From the polyphonic discourse relationships of characters to

the cyclical metaphorical expressions in plot structures, Chinese adapters respect the original language aesthetics while introducing localized narrative grammar, thus achieving an artistic rebirth of the works in a localized context. For example, in one adaptation case, “dialogue” is shaped into a space for communication and collision among people from different cultural backgrounds, integrating Jon’s lonely individuals into a more universal thematic discussion. This change highlights the spirit of recreation in the global context of the text ^[9,10].

3.2. Borrowing and integration in literary creation

When examining the works of Jon Fosse and their recreation in the Chinese literary context, the borrowing and integration in literary creation hold unique and significant importance. Fosse is renowned for his minimalist language style and profound emotional tension, which greatly inspires and references Chinese writers and scholars seeking innovative narrative forms and the modern transformation of Chinese literary traditions. By absorbing and internalizing his works, some Chinese writers have begun to reconstruct Fosse’s narrative structure and linguistic style in their own language, achieving a dual transplantation and integration of form and concept. In numerous creative cases, writers often start with short plays and lyrical essays, reducing narrative redundancy and highlighting the tension of scenes to create emotional space. While maintaining the philosophical and ethical reflections of the original core, they incorporate discussions on Chinese society and human nature. When borrowing from Fosse’s works, writers focus on replacing narration with context, focusing on the subtle yet intense inner conflicts between characters, and using concise yet flavorful language to show the resonance of common human emotions. This process not only enriches the possibilities of modern Chinese literary forms but also expands the space for cross-cultural literary dialogue ^[11].

4. The significance of the acceptance and recreation of Jon Fosse’s works in China

4.1. Implications for the development of Chinese literature and art

Jon Fosse’s literary works, with their unique expressive techniques and artistic styles, hold significant value in promoting dialogue between Chinese and world cultures. On the one hand, in terms of literary creation, the high artistic sensitivity and ideological depth exhibited in Fosse’s works provide a mirror for Chinese writers. It reflects the contemporary exploration of core artistic issues such as linguistic minimalism, inner ideals, and the reshaping of the relationship between humans and nature in the creative process. His concise and highly suggestive writing characteristics point to a possible path for addressing the current issues in Chinese literature, such as the homogenization of narrative forms and superficial emotional expression in the context of globalization. It also prompts creators to consider how to convey infinite spiritual connotations with limited words. On the other hand, Fosse’s innovative artistic language not only deepens the aesthetic qualities of drama and novels but also offers valuable inspiration for the development of other art forms. Through cross-disciplinary attempts in visual and performing arts, his open-ended textual construction model inspires artists to establish multidimensional sensory experience fields and break through established creative boundaries. In a country like China, which has both a rich cultural heritage and a modern cultural context, the significance of Fosse’s works extends beyond a mirror; it acts as a catalyst ^[12].

4.2. Value in promoting cultural exchange and integration

The dissemination and acceptance of Jon Fosse’s works in China exemplify the unique significance of Sino-foreign literary exchanges. Their transnational and cross-cultural spreading makes the texts an important bridge for promoting multicultural exchange during cross-linguistic translation. The translational and performative recreation of his dramatic texts in the Chinese context allows these works to rejuvenate their artistic vitality within the local cultural soil. The narrative characteristics of Fosse’s works, such as minimalism, repetitive wording, and imagery, not only enrich Chinese audiences’ and creators’ understanding of contemporary Norwegian modes of expression but also inspire local literature and theater to explore new discourses and performance techniques. This two-way integration significantly amplifies the

complementary traits between Chinese and Norwegian cultures, forming a meaningful pattern of civilizational mutual learning. Further exploration in the field of cultural exchange reveals that the introduction and innovative practice of Fosse's works significantly highlight the intercultural complementarity. It provides a new perspective for global attention to Fosse. This mutual learning value encompasses not only the aesthetic function inherent in the textual works themselves but also the profound significance generated by cultural production methods in different contextual interactions. It injects more diverse content elements into the global drama and narrative aesthetics and offers methodological guidance for other transnational creative projects^[13,14].

4.3. Enrichment and expansion of audience aesthetic experience

Jon Fosse's works, since their initial introduction to China, have garnered significant attention due to their profound humanity and philosophical nature, particularly in shaping and enriching the aesthetic experience of audiences. Fosse's works are renowned for their concise language style and strong symbolic characteristics. Through seemingly mundane character dialogues and depictions of everyday trivialities, they actually convey deep inquiries into complex themes such as fate, society, history, and individual existence. This artistic approach breaks away from the traditional dramatic narrative reliance on event completeness and structural closure, focusing instead on the emotional changes within individuals. This allows audiences to not only experience the estrangement effect in the plot but also to deeply perceive the dynamic development of characters' spiritual worlds^[15].

This unique and challenging creative philosophy is indispensable in expanding the aesthetic horizons of modern readers, who are accustomed to clear narrative logic and visually splendid display modes. At the same time, Fosse's plays, by starkly presenting the universal dilemmas of individual life on stage, awaken the emotional resonance consciousness that has gradually faded in the context of fast-paced and consumerist backgrounds. Thus, his understanding and innovation of drama have made a significant contribution to exploring the diversification of contemporary Chinese drama and cultivating a more sensitive and delicate audience^[16,17].

Disclosure statement

The author declares no conflict of interest.

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The Development and Research Exploration of Today's Green Shipping Industry and Related Devices

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Abstract: With the booming development of the global shipping industry, the problem of pollutant emissions from water transportation is becoming increasingly serious. Statistics show that the annual emissions of SO_x (sulfur dioxide) from ships worldwide account for over 7% of the global total, while NO_x (nitrogen oxides) account for about 15% of the global total. These pollutants not only exacerbate air pollution but also pose a serious threat to the environment, ecology, and human health. Based on this background, the development of green shipping is particularly important today, and it is necessary to reduce marine pollution and prioritize the protection of the marine environment. Adhering to the six annexes of the MARPOL Convention, the country has also introduced relevant policies for the development of green shipping, contributing to the protection of the marine environment and the promotion of sustainable development.

Keywords: Green shipping; Pollutants; Development; Pollutant emissions

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1. Current status and causes of marine pollutants

The ocean, as a source of life, plays an increasingly important role in the process of human development. With the development of automatic control technology and the continuous growth of the robotics industry, various advanced ships have sprung up like mushrooms after rain, which will also cause marine pollution. Traditional ships are mostly propelled by electricity or rely on thermal energy generated by fossil fuel combustion, which has shortcomings such as high energy consumption and short endurance. This has also led to a gradual shortage of global energy, an accelerated consumption rate, and massive greenhouse gas emissions, exacerbating environmental pollution and climate deterioration on Earth. How to effectively develop green shipping and reduce consumption costs has become a focus of attention for many marine-related industries. Pollution from marine vessels today is shown in **Figure 1**.



Figure 1. Current status of pollution from major ships

2. The urgency of the development of green shipping

2.1. The severity of today's marine pollutants

Plastic accounts for 85% of marine litter and warns that the amount of plastic pollution flowing into the ocean will nearly triple by 2040, increasing by 23–37 million tons per year ^[1]. This means that there are about 50 kilograms of plastic per meter of coastline globally. As a result, all marine life—from plankton, shellfish, birds, to turtles and mammals—is at serious risk of poisoning, behavioral disorders, starvation, and suffocation. Corals, mangroves, and seagrass beds are also inundated with plastic waste, leaving them without access to oxygen and light.

2.2. The need for green shipping

The shipping industry has made great efforts to reduce emissions ^[2]. Statistics show that as of the beginning of June, the proportion of desulfurization towers installed in the global active ship capacity is about 22%; LNG (liquefied natural gas) powered ships accounted for about 21% of the new ship orders. However, the task of reducing emissions in the whole industry is still very arduous. Ship emissions are one of the major sources of pollution in ports and waters around the world. The demand for green and low-carbon technologies continues to expand, and new power and zero-carbon ships have become an important direction for the development of the shipbuilding industry. In addition, based on the current pollution situation, more anti-pollution ships and garbage disposal ships should be built, and more instruments and equipment for treating ship exhaust should be designed and studied, so as to achieve the purpose of green shipping, energy conservation and emission reduction, and pollution prevention.

3. Comparison and technology of anti-pollution equipment at home and abroad and research by our team

Based on the domestic perspective, as early as 2014, Pei ^[3] adopted low-temperature multi-effect distillation technology, using the waste heat of the ship's diesel generator as the driving energy, and proposed a complete whole-process scheme for the low-temperature single-effect distillation of seawater desalination device for the ship's waste heat, and first proposed the technical idea of using the waste heat of the ship's diesel engine flue gas to distill seawater and produce fresh water.

In 2015, Xu ^[4] designed a new type of seawater desalination device based on the low-temperature distillation seawater desalination method, which transformed the existing evaporator and condenser, so that the seawater was evaporated with high-temperature flue gas in the designed high-efficiency seawater desalination evaporator, and entered the shell-and-tube condenser to be condensed into fresh water, realizing the improvement of the waste heat desalination device. By 2019, He *et al.* ^[5] used atomizing nozzles to achieve seawater treatment, accelerate the vaporization process, and further improve the efficiency of the waste heat desalination device in combination with the heat exchange in the condenser. **Figure 2** shows advanced technology at home and abroad.

3.1. Domestic flue gas desulfurization technology

In 2011, Zhao ^[6] conducted a theoretical analysis and summary of the seawater flue gas desulfurization process, analyzed the design rules of key parts such as the absorption system, and corrected the parameters. In 2012, Ma *et al.* ^[7] conducted an in-depth study on the effects of various parameters on the desulfurization efficiency and pH value of seawater after desulfurization in the process of seawater desulfurization of ship flue gas, and provided quantitative suggestions for seawater flue gas desulfurization. Feng *et al.* ^[8] designed four rows of liquid nozzles and optimized the start and stop mode of the nozzles under different sulfur content conditions according to the sulfur content at the outlet, the pressure distribution in the tower, and the flow velocity distribution, which effectively reduced the operation cost of ship desulfurization.

3.2. Foreign technical equipment

Although Norway's seawater desulphurization technology (e.g. Flakt-Hydro process) has good application prospects worldwide, the high COD (chemical oxygen demand) of the external drainage of this technology may be difficult to meet increasingly stringent environmental requirements.

- (1) India may have high energy consumption in the application of seawater desulphurization technology, especially in the case of pre-coolers.
- (2) Regardless of the dedusting process, the final discharge of seawater may contain solid particulate matter such as catalysts, which may have an impact on the environment of the nearby sea.
- (3) Switzerland power turbine equipment requires high precision and high-quality manufacturing, so the equipment cost is relatively high. At the same time, maintenance costs can also be high due to the complexity and high technical requirements of the equipment.
- (4) Energy recovery efficiency: Although power turbine technology can improve energy efficiency, under some operating conditions, recovery efficiency may be affected by exhaust temperature, flow rate, and other factors, resulting in unstable recovery efficiency.
- (5) Finland technology integration complexity: This solution includes a variety of technologies, such as power turbines, waste heat boilers, steam turbines, etc., and the technology integration complexity is high, which increases the complexity of the system and the difficulty of maintenance.



Figure 2. Advanced technology at home and abroad

3.3. Development of a new type of device to create green shipping based on the current pollution situation in the shipping industry

Using seawater as the medium, seawater is evaporated and desalination by using the waste heat of the ship's smoke to obtain concentrated seawater, and the higher alkalinity of the concentrated seawater is used to neutralize the acidic gas. Compared to conventional scrubbers, this device is not affected by the salinity of seawater and does not require additional strong alkali reagents. In addition, this device is also very suitable for the flue gas purification of the island factory, which not only effectively solves the problem of island flue gas purification, but also reduces the cost of island flue gas treatment.

Feasibility verification of the flue gas cleaning system. Assuming that there is no loss in the ship's flue gas waste heat recovery desalination system, all the flue gas flow is sent to the flue gas purification system. The upper and lower two-stage spray devices inside the pneumatic emulsification desulfurization cylinder adopt 316L stainless steel spiral nozzles, and each spiral nozzle is equipped with a turbulent device with swirl blades to form a stable emulsion layer, improve the contact area between flue gas and concentrated seawater, and increase the efficiency of flue gas purification. The phase equilibrium equation for SO_2 at standard atmospheric pressure is:

$$Y = -2 \times 10^{12} X^4 + 7 \times 10^8 X^3 - 13490 X^2 + 0.7212 X + 6 \times 10^7$$

The molar expression of SO_2 in the exhaust area is:

$$Y_2 = Y_1(1 - \eta_a)$$

The formula for calculating the liquid-gas ratio of the actual flue gas cleaning system is:

$$\frac{V_g}{V_c} = 1.5 \left(\frac{Y_1 - Y_2}{X_1 - X_2} \right) \left(\frac{M_{1,12} / \rho_{g0,1,12}}{M_{2,12} / \rho_{g1,2,12}} \right) \times 100$$

The above formula is used to calculate and verify, and the spray amount can meet the concentrated seawater flow rate required by the pneumatic emulsion desulfurization cylinder, which verifies the rationality of the design. The dimensions of each partition of the flue gas purification system are shown in **Table 1**.

Table 1. The size of the flue gas cleaning system

Design parameters	Numeric value/m
Slurry pools	1.105
Air intake zone	1.6
Desulfurization cylinder	3.155
Secondary wash area	3.2
Scheduling area	0.6
The total height of the flue gas cleaning system	9.66

3.4. Economic analysis

- (1) The coupled flue gas purification device for ship flue gas waste heat recovery and dilution is to make full use of ship waste heat for ship exhaust gas treatment, which has a better treatment effect than other traditional devices under the same flue gas treatment capacity. Taking the flue gas flow of the diesel engine as the object of the design of this work, the actual flue gas volume is 110,000 m³/h, and the SO₂ content in the flue gas is 80.41 m³/h, and the treatment effect is shown in **Figure 3**.

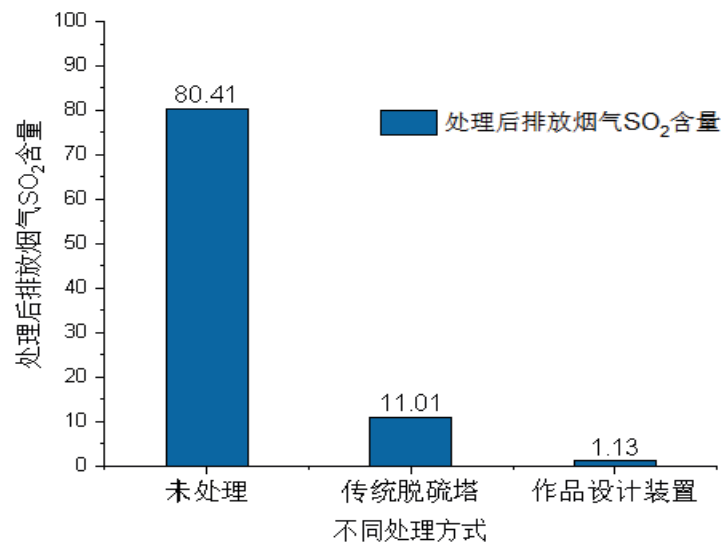


Figure 3. SO₂ content in exhaust gas after different treatments

- (2) This technology reduces the size of the purification system and saves space on the basis of ensuring functional efficiency. According to the initial flue gas purification system, the empty tower flow velocity is 3 m/s, then the residence time of flue gas in the tower is 3.22 s, and it is calculated that when the tower diameter is rounded to 4 m, the calculated tower spray density will meet the minimum spray requirements. As a result, the cargo capacity

of the ship is increased, which improves the economic efficiency.

4. The outlook for the development of this device and the shipping industry

The design device is mainly suitable for offshore ships, and its research or overall design plays an important role in reducing the energy consumption of the ship and reducing the exhaust gas generated by the ship. It has the advantages of easy installation, small size, saving ship space, and lower economic cost. At the same time, this work uses seawater as the medium, uses the waste heat of the ship's flue gas to evaporate the seawater to desalinate and obtain concentrated seawater, and uses the high alkalinity of concentrated seawater to neutralize the acid gas, greatly reducing the cost of treating exhaust gas, and achieving the effect of green emission reduction.

4.1. A vision of the installation designed by the team

The device has the effect of coupling desalination and neutralizing ship exhaust, and can also be applied to the port ship docking place to reduce the pollution of the environment near the port. In the future, a coupled purification device for industrial use can be studied and designed, which can purify industrial wastewater and neutralize nitrogen and sulfur compounds generated in industry by using industrial waste heat, thereby reducing industrial pollutant emissions and adhering to the purpose of "emission reduction."

The device is very efficient on its own, but in the future, with the rapid development of social science and technology, the industrialized industry will be more prominent, and the coupling purification device alone may achieve a result of low efficiency. The double-coupled purification device was designed to make its work efficiency more significant and in line with the process of industrialization.

4.2. Prospects for the development of green shipping

Optimizing the industrial structure: On the basis of rationalization, it is recommended to optimize and upgrade the industrial structure, and strive to develop a high-tech industry and service industry, promote a green environmental protection industry, encourage and support the development of tertiary industry.

Adjusting the energy structure: At present, the use of old fuel oil ships is an important cause of environmental pollution in shipping. Increase the power, transformation, and renewal of the ship, strengthen the clean energy of ships (hydrogen energy, electric energy, biofuel), green transformation of ships (new energy passenger ships, electric propulsion ships, etc.), implement ship type standardization projects, and actively promote pollution-free power ships.

Optimizing the way transportation is organized: At present, the transportation system is mainly waterway, road, and railway transportation, among which, the freight turnover of the water transportation mode is the largest, followed by road transportation, and railway transportation is the smallest. The adjustment of the transportation structure will effectively reduce the energy consumption and air pollutant emissions of ships, improve the shipping supply capacity by optimizing the shipping network, developing iron-water combined transport, and building a modern green port, effectively increase the proportion of shipping, and give full play to the natural green advantages of shipping.

4.3. National Policy for the Development of Green Shipping (See Table 2 for details)

Table 2. Implementation of national policies

Type	Release date	Filename
National policy	2017-02-03	The 13th Five-Year Plan for the Development of a Modern Comprehensive Transportation System
National policy	2015-08-27	Implementation Plan for the Special Action on the Prevention and Control of Pollutants in Ships and Ports (2015–2020)
National policy	2017-12-06	“Opinions on Comprehensively and Deeply Promoting the Development of Green Transportation”

5. Conclusion: An important element in the development of green shipping

Green shipping elements mainly include green waterways, green ports, green ships, green transportation organization methods, etc. ^[9].

- (1) Green waterway refers to the development concept of environmental protection, energy saving, emission reduction, recycling, and sustainability in the whole life cycle of waterway construction and operation.
- (2) Green port refers to the protection of the ecological environment and intensive utilization of resources, and at the same time, can ensure the normal production of the port and create economic benefits, so that the two can be coordinated and achieve sustainable development.
- (3) Green ship refers to the promotion of ship standardization, large-scale, new-type, and green development through technological upgrading in the whole life cycle of the ship, which can not only meet the requirements of ship operation at a lower cost, but also maximize energy conservation and carbon reduction.
- (4) The organization mode of green transportation refers to advocating advanced transportation organization and management, rationally adjusting the structure of ships and shipping capacity, improving the organization of water transportation, scientifically planning transportation routes and transit locations, optimizing the allocation of port resources, using modern information technology, giving full play to the advantages of water transportation energy conservation and environmental protection and the combined efficiency of various modes of transportation, maximizing transportation efficiency and promoting the green development of shipping ^[10,11].

Disclosure statement

The authors declare no conflict of interest.

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Discussion on the Impact Assessment of Hazardous Waste Municipal Environmental Risks under the Concept of “Waste-Free City”

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Abstract: Urban environmental management of hazardous waste is an important aspect of ecological civilization construction and ecological environmental protection, and an important part of winning the battle against pollution. The policy-driven characteristics of hazardous waste environmental management and utilization and disposal determine that institutional innovation should be emphasized in the construction of a “waste-free city.” This paper focuses on the environmental risk evaluation of hazardous waste cities, and uses the hierarchical analysis method to carry out empirical analysis using City A as an example. The results show that City A has a “high risk” due to the concentration of chemical and electronic industries, and high hazardous waste disposal volume and release rate. The study proposes to strengthen informationization supervision, implement regional joint prevention and control, improve disposal capacity, and other differentiated control countermeasures, in order to provide scientific support for the fine management of municipal hazardous waste and the construction of “waste-free city,” and help to improve the efficiency of hazardous waste treatment and reduce environmental hazards.

Keywords: “Waste-free city” concept; Hazardous waste; Urban environmental risk

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1. Introduction

With the rapid development of China’s society and economy, more and more hazardous wastes are generated in many fields and industries, such as industrial sulfuric acid, cyanide, pesticides, medical wastes, and other new chemical products, etc. ^[1]. These wastes are flammable and explosive, highly corrosive, toxic, and polluting, posing great risks to the environment. According to statistics, the annual generation of hazardous waste in the world has exceeded 4×10^8 t. According to the data released by the National Bureau of Statistics, the generation of hazardous waste in China in 2022 reached 95.148 million tons. After preliminary accounting, in 2023, China’s hazardous waste generation amounted to about 104.663 million tons. Environmental risks caused by hazardous waste leakage and disposal have occurred many times. In recent years, preventing and resolving environmental risks involving hazardous waste has become an important part of ecological environmental protection work ^[2]. The CPC Central Committee and the State Council attach great importance to ecological environmental protection and solid waste management, and in December 2018, the State Council issued a pilot program for the construction of “waste-free cities,” aiming to deepen the reform of comprehensive solid

waste management from the overall level of the city, and exploring the establishment of a system and technology for the construction of “waste-free cities.” The aim is to deepen the reform of comprehensive solid waste management from the overall level of cities, explore the establishment of systems, technologies, markets, and regulatory systems towards “waste-free cities,” and form a batch of replicable and generalizable demonstration models. Hazardous waste environmental risk prevention and control is one of the six major areas in the construction of a “waste-free city,” and its policy-driven characteristics determine that the construction of a “waste-free city” should focus on the issue of institutional innovation^[3]. However, there are obvious differences in the level of economic and social development of cities, with different needs for environmental management of hazardous wastes, and environmental risks are the result of the interaction of multiple compound factors such as risk sources, risk receptors, and risk control. Therefore, the results of the standardized assessment do not truly reflect the risk situation in cities, and there is an urgent need to carry out environmental risk assessment based on the economic and social development of cities and the current state of environmental management of hazardous wastes, so as to put forward targeted control measures and governance strategies, and to provide scientific support for the differentiated governance of cities and the refined management of wastes.

2. Overview of hazardous waste

2.1. Source

Hazardous wastes come from a wide range of sources, and are generated in all aspects of human production and life, summarized as organic and inorganic chemical wastes and radioactive substances generated in industrial production; corrosive and bacteriological wastes generated in the course of medical treatment; and used wastes containing heavy metals generated by people’s lives. Drawing on relevant domestic and international regulations and relevant technical information, the main sources of hazardous waste are analyzed in **Table 1** below.

Table 1. Sources of hazardous waste

Source	Industry type	Form of business enterprise	Types of hazardous waste
Industrial sources	Chemical industry	Fine industry	Waste acid, waste paint, waste resin, etc.
	Metal processing	Electroplating, machinery manufacturing, and other enterprises	Waste emulsion, electroplating sludge, waste mineral oil
	Oil industry	Petroleum and chemical industry, oil refining, mining enterprises, pharmaceutical, medicinal materials processing enterprises	Waste oil sludge, oil residue, pot residue, etc.
	Transportation and maintenance	Automobile, ship, train, aircraft, and other maintenance and repair enterprises	Waste oil, waste electrolyte
	Electrical appliances, electronics, and others	Electrical and electronic components enterprises	Waste solvent, waste electrolyte, etc.
	Pharmaceutical manufacturing	Pharmaceutical and herbal processing enterprises	Medical waste, etc.
Social sources	-	-	Waste pesticide, vehicle lead-acid battery, waste lamp tube, waste communication tools, waste paint, and so on
Other	Scientific research and education	Research institutes, colleges, and universities	Waste pesticides, vehicle lead-acid batteries, waste light tubes, waste communication tools, waste paints and other waste reagents, laboratory waste, scrapped research products, etc.

2.2. Feature

With the rapid development of the social economy and the improvement of people's quality of life, the waste left behind by production and life is increasing, and the accumulation of these wastes will produce certain chemical and physical reactions, thus generating toxic substances, posing a threat to the surrounding ecological environment and people's health. These harmful substances are called hazardous waste. The characteristics of hazardous waste determine the degree of environmental risk. Toxicity is one of the most common characteristics of hazardous waste, such as wastes containing heavy metals like mercury, cadmium, lead, etc., which will accumulate in soil and water after entering the environment, and then pass through the food chain, eventually endangering human health. Corrosive wastes, like strong acids and alkalis, can cause serious corrosion and damage to contacted biological tissues, buildings, and equipment, as well as lead to an imbalance in the pH of soil and water bodies ^[4]. Flammable wastes are easy to burn under certain conditions and may cause fires, which not only pose a direct threat to the safety of the surrounding environment but also generate a large amount of hazardous gases during the combustion process, polluting the atmospheric environment. Reactive wastes, on the other hand, have unstable chemical properties and, when subjected to external stimuli, may undergo violent chemical reactions, such as explosions and the release of toxic gases, causing instant and enormous damage to the surrounding environment and the safety of personnel.

3. Construction of urban environmental risk impact assessment system

3.1. Principles of index system construction

- (1) Principle of comprehensive integration: Due to the complexity and variety of hazardous wastes, the factors involved in the environmental risk assessment of centralized hazardous waste disposal enterprises are also multifaceted. Including material hazards, environmental hazards, production factors, management factors, and other factors. It is not possible to simply use a single indicator for evaluation. Therefore, in the process of establishing the evaluation index system of hazardous waste centralized disposal enterprises, we should comprehensively consider all the influencing factors, with high positioning, wide coverage, and strong comprehensiveness, in order to ensure the accuracy of the evaluation results.
- (2) Principle of scientificity: The selection of evaluation indicators involves professional knowledge in various fields; therefore, in the process of establishment, experts from various parties should be widely consulted and repeatedly demonstrated and improved, and the process of indicator selection is scientific, reasonable, and recognized by the public.
- (3) Principle of dominant factors: The environmental risk evaluation of hazardous waste centralized disposal enterprises has many influencing factors, and the factors are complicated, so the representative and typical dominant factors are selected as the comprehensive evaluation indicators.
- (4) Principle of operability: Hazardous waste disposal enterprises have many sources of raw materials and complex types. Evaluation indicators should fully consider the accessibility of data and the degree of difficulty in quantifying the indicators, combining qualitative and quantitative data. It can reflect the connotative characteristics of hazardous waste enterprises and make full use of the existing data and information. While most of the risk evaluation studies are for a single or fixed several substances or corresponding industry enterprises, the hazardous waste centralized disposal enterprises can only consider the main hazardous waste attributes or comprehensive attributes for the time being in order to have a strong operability. Each indicator should be objective and concise, as well as comparable.
- (5) Principle of mutual independence: There are many uncertainties in the environmental risk of hazardous waste disposal enterprises, and there are both links and differences between different indicators, which are independent of each other and do not have a mutually inclusive relationship. When constructing the indicator system, the uncertainty of environmental risk should be fully considered, and the status quo and development trend should be

comprehensively considered, so that it has certain universality and is convenient for prediction and control [5].

3.2. Establishment of risk assessment index system for hazardous waste

At present, when establishing the indicator system, the indicators chosen by domestic and foreign countries are mainly related to the following aspects: physical and chemical properties of hazardous substances; environmental persistence; high bioaccumulation; toxicity; detection frequency in environmental monitoring, migration and fate behavior, and environmental background concentration, and so on. In this study, the risk evaluation indicators of enterprises in the chemical and petrochemical industries were referred to, and based on the above principles, domestic experts were widely consulted, and finally the physical and chemical properties, environmental exposure indicators and environmental toxicology indicators were selected, and a risk evaluation system consisting of the target layer, the guideline layer, and the indicator layer was set up in this way (Figure 1).

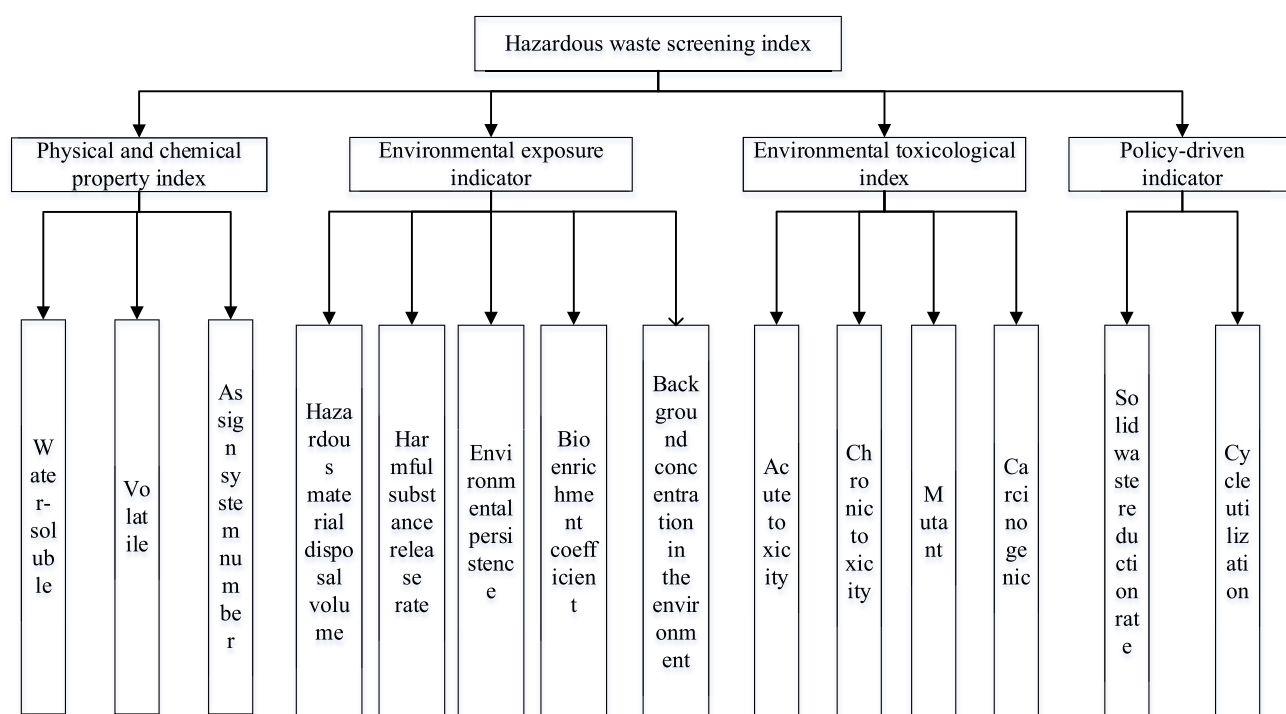


Figure 1. The framework of the established index system

Target level: The risk degree F of a selected harmful substance;

Criterion layer: It is the evaluation factor determined for calculating the risk degree of a certain harmful substance. Here, three evaluation factors are considered, namely: physical and chemical property index B , environmental exposure index B_2 , and environmental toxicology index B_3 . Indicator layer: It is the corresponding evaluation factor selected for each evaluation factor of the criterion layer.

3.3. Determination of the weight of evaluation indicators

Nowadays, two commonly used mathematical methods (Telfer's method and hierarchical analysis) are mainly used to determine the weights of indicators. The Telfer method is in the form of a distribution questionnaire that solicits expert opinion or judgement and then calculates the feedback results; the hierarchical analysis method is an effective way of addressing variables that are difficult to quantify for multi-criteria decision-making, and it provides a structured hierarchical thinking model suitable for multi-purpose, multi-criteria, multi-factor problems, with a wide range of applications. In the above indicators, although each indicator is quite important, the focus on different objectives, that

these indicators to the centralized disposal of hazardous waste enterprise environmental risk contribution value is not the same, in the specific screening score calculation must also determine the weight of each indicator. Therefore, the Analytic Hierarchy Process (AHP) was used to determine the weights of the indicators. Experts in the hazardous waste disposal industry were invited to score each indicator. The expert advisory team consists of 15 members, including environmental department managers, technical directors from hazardous waste disposal companies, and experts in environmental engineering from research institutes. Among them: Environmental Department Representatives have over 10 years of experience in formulating and implementing solid waste management policies and are familiar with the evaluation criteria for “waste-free cities”; Technical Directors from Enterprises come from typical industries such as chemical, electronic, and medical waste disposal, with experience in frontline technology research and operational management; Experts from Research Institutes specialize in areas like risk assessment of hazardous waste and environmental toxicology, and have led or participated in more than three national-level research projects. The weights of each indicator were calculated based on the experts’ statistical analysis. The relative importance of the indicators was scored using a 5-point Likert scale with the following criteria (**Table 2**).

Table 2. Scoring criteria

Value	Description of importance	Explanation of the meaning
1	It's not important	The indicators have no substantial impact on risk assessment
2	It's not that important	The impact of indicators is small and can be ignored
3	Medium importance	The index has a certain influence on risk assessment, but it is not a decisive factor
4	It's important	Indicators play a key role in risk assessment and need to be considered
5	be of prime importance	The indicators directly determine the risk level and must be included in the evaluation system

Experts scored the relative importance of each pair of indicators in the criterion layer (Layer B) and the index layer (Layer C) through anonymous online questionnaires, and calculated the weight of each index by experts. The basic calculation steps are as follows: First, the calculation of elemental weights; Second, consistency test: the consistency test is performed on the judgment matrix, and the consistency ratio CR is calculated. if $CR < 0.1$, the consistency of the judgment matrix is acceptable, and the weight of each indicator is calculated by the eigenvector method and other methods. Third, the calculation of the comprehensive weight of each indicator: the calculation formula is:

$$W_{\text{综合}} = W_{\text{权重}} \times W_{\text{指标}}$$

3.4. Risk assessment of hazardous waste

The risk F_j for a selected harmful substance is calculated as follows:

$$F_j = \sum W_i X_{ij}$$

In the formula, F_j represents the comprehensive risk score of the j th evaluation unit (such as a certain plant or region), which is a quantitative embodiment of the hazardous waste risk status of the unit. The higher the score, the higher the risk.

W_i : the comprehensive weight of the i th risk impact index ($i = 1, 2, n$), and represents that $\sum W_i = 1$ indicates the type of index.

X_{ij} : The quantified value of the i th risk influencing factor in the j th evaluation unit. For example, if i represents the toxicity of waste, X_{ij} is the quantified value of the toxicity of hazardous waste in the j th evaluation unit.

4. Case analysis

4.1. City overview

Taking City A as an example, it is an industrial city primarily focused on the chemical and electronics industries, with a high population density. The city's surroundings include important water source protection zones and ecological wetlands. Numerous chemical enterprises within the chemical park generate large amounts of hazardous waste annually, such as waste acids, waste alkalis, and heavy metal-containing sludge; the electronics industry produces electronic waste containing lead, mercury, and other heavy metals. In 2018, the city generated hazardous waste exceeding 1000t in 12 major categories, accounting for 99.3% of the total annual hazardous waste production. Among these, copper-containing waste, surface treatment waste, and incineration residue far exceeded other types of hazardous waste in quantity, making up 78.7% of the total production.

4.2. Environmental management

City A takes standardized management of hazardous wastes as a key to identify and make up for shortcomings through related work, and has achieved remarkable results in the treatment of organic solvents and medical wastes, prevention and control of environmental risks in enterprises, and improvement of the capacity of initial emergency response to environmental emergencies. At the same time, the environmental management of hazardous waste in the industry is constantly standardized through continuous enforcement and inspection actions and special rectification activities to combat environmental violations involving hazardous waste.

4.3. Analysis of results

The indicators were scored in relation to the specific situation in City A, and then a person involved in the environmental management of solid waste in City A was invited to check the results of the scoring of the indicators. The results of the evaluation of the indicators in the environmental risk assessment of hazardous wastes in City A are shown in **Table 3**.

Table 3. Evaluation results of various indicators in environmental risk assessment of hazardous waste in City A

Target level (Level A)	Criteria level (Level B)	A-B layer weight	Indicator layer (C layer)	B-C layer weight	A-C layer weight
Hazardous waste screening index	Physical and chemical property index B1	0.072	Water-soluble C1	0.649	0.047
			Volatile C2	0.279	0.020
			Assign system number C3	0.072	0.005
	Environmental exposure indicator B2	0.279	Hazardous material disposal volume C4	0.077	0.222
			Harmful substance release rate C5	0.435	0.121
			Environmental persistence C6	0.189	0.056
			Bio enrichment coefficient C7	0.189	0.056
			Background concentration in the environment C8	0.077	0.022
	Environmental toxicological index B3	0.649	Acute toxicity C9	0.069	0.045
			Chronic toxicity C10	0.037	0.024
			Mutant C11	0.298	0.193
			Carcinogenic C12	0.298	0.193
	Policy-driven indicator B4	0.349	Solid waste reduction rate C13	0.290	0.056
			Cycle utilization C14	0.276	0.049

The consistency test of each judgment matrix is as follows:

Criterion level (Layer B) judgment matrix: the maximum eigenvalue $\lambda_{\max} = 4.123$, the consistency index $CI = \frac{\lambda_{\max} - n}{n - 1} = 0.041$, the random consistency index $RI = 0.90$ (when $n = 4$), the consistency ratio $CR = CI/RI = 0.046 < 0.1$, passing the consistency test.

Criterion layer (C layer) judgment matrix: Taking environmental exposure index B_2 as an example, the maximum eigenvalue of its criterion layer judgment matrix is $\lambda_{\max} = 4.123 = 5.218$, $CI = 0.0545$, $RI = 1.12$ ($n = 5$), $CR = 0.0545/1.12 = 0.0487 < 0.1$, and the consistency is acceptable.

The results of risk evaluation are shown in **Table 4**.

Table 4. Environmental risk assessment results of hazardous waste in City A

Indicator layer	Level of risk
Water-soluble	2
Volatile	3
Assign system number	1
Hazardous material disposal volume	2
Harmful substance release rate	3
Environmental persistence	2
Bio enrichment coefficient	2
Background concentration in the environment	2
Acute toxicity	3
Chronic toxicity	2
Mutant	1
Carcinogenic	2
Solid waste reduction rate	1
Cycle utilization	2
Overall score	2.234
Order of evaluation	Greater risk

5. Conclusion

The risk assessment of hazardous waste under the concept of “waste-free city” is the core link to integrate the sustainable development and ecological safety of the city, so it is necessary to clarify the role of centralized treatment of hazardous waste, and combine it with its own hazardous waste emission status, construct evaluation indexes, and choose the appropriate method to realize the effective treatment of hazardous waste.

This study constructs a method for environmental risk assessment of urban hazardous waste. The method, for the first time, takes the city as a whole, and evaluates the environmental risk of hazardous waste in City A from three aspects, including physical and chemical properties, environmental exposure, and environmental toxicology, using hierarchical analysis. The results show that City A has a “greater risk” because of the concentration of the chemical and electronic industries, the higher amount of hazardous wastes disposed of, and the release rate. The results show that the overall risk level of City A is “higher risk” due to the concentration of chemical and electronic industries and the high volume and release rate of hazardous waste disposal, in which the risk level of volatile substances, release rate of hazardous substances,

acute toxicity and other indicators reaches level 3 (higher risk), which highlights the environmental hazards caused by the imbalance between the industrial structure and disposal capacity. Therefore, in the process of building a “waste-free city,” City A should actively adopt information-based supervision to construct a smart management system covering the entire lifecycle. For example, it can use a technology integration solution combining blockchain, IoT, and big data to build a digital supervision system that spans the entire chain of hazardous waste from “generation-collection-transportation-disposal-resource utilization.” Implement regional joint prevention and control: innovate cross-administrative collaborative mechanisms, referring to the “Yangtze River Economic Belt Solid Waste Joint Prevention and Control Implementation Plan,” it is recommended to establish a “regional hazardous waste emergency disposal resource pool” and other corresponding measures for optimization and adjustment, to improve the efficiency of hazardous waste treatment, thereby minimizing its impact on China’s environment and creating a comfortable and healthy living environment for the public.

This study is limited in not considering the impact of illegal hazardous waste transfer, regulatory blind spots for small and micro enterprises, and dynamic social factors on risk prevention. Future research could focus on developing an LCA-based coupled assessment model for environmental risks and economic costs of hazardous waste, exploring intelligent monitoring technologies for illegal transfer risks, innovating regulatory models for hazardous waste in small and micro enterprises, and constructing a socio-technical co-evolution model to improve the evaluation system and control strategies.

Disclosure statement

The author declares no conflict of interest.

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Research on the Development Strategy of Experiential Intangible Cultural Heritage in Macau under the Background of Cultural and Tourism Integration

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Abstract: This study takes the intangible cultural heritage tourism of the Macao Special Administrative Region as the research object. Through literature integration and analysis combined with comparative research methods, it investigates the cultural and tourism development paths of intangible cultural heritage resources of performance, skills, and festivals in the Macao region. The research suggests that there are still some contradictions in the cultural and tourism development model of the Macao region. The technological empowerment is insufficient, the in-depth exploration of culture is inadequate, and there is a mutual dissolution between the improvement of participation and commercialization. Therefore, in the future, the Macao region should enhance the integrated development of cultural and tourism products, strengthen the independent design of intangible cultural heritage tourism products, and increase the extension of cultural value and the nesting of economic benefits. It is necessary to innovatively incorporate intangible cultural heritage inheritors into the product design chain, create city IPs, develop the night economy, and reflect the urban characteristics of cultural and tourism products. This research is helpful in providing certain references for cultural tourism in high-density cities.

Keywords: Inheritance of intangible cultural heritage; Macao Special Administrative Region; High-density city; Integration of culture and tourism

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1. Introduction

1.1. Research background and significance

1.1.1. Global trends in cultural and tourism integration and the demand for intangible cultural heritage protection

At present, cultural tourism has become an important demand of tourists all over the world. The integration of culture and tourism can not only promote the development of the regional economy, but also meet the multi-level consumption demand of consumers. Currently, UNESCO has put the protection of intangible cultural heritage and tourism development on the agenda of sustainable development, which also indicates that the integration of culture and tourism industry has become an international consensus. The integration of culture and tourism industry is a reflection of the industrialized tourism mode, a response to tourists' psychological needs and emotional values, and helps to reconstruct the value chain of tourism. This kind of integration can go beyond the simple level of landscape display, but deeply integrate tourists with local culture,

and enhance tourists' sense of interaction and experience during the tourism process. When promoting the development of cultural and tourism integration industries, various regions need to pay attention to the advantages of cultural and tourism products and transform natural resources into sustainable product attractions ^[1].

1.1.2. Positioning of Macao as a world tourism and leisure center and the uniqueness of intangible cultural heritage resources

Macao is a special administrative region of China. It is a city built and developed with European culture as the background, and its history is a rare cross-civilization mixing process. Macao's urban strategy, taking leisure tourism as the core of the cultural tourism industry. This requires Macao to go beyond the traditional gambling tourism mode and seek a deeper cultural identity when developing its cultural industry, highlighting the uniqueness of Macao's cultural assets. At present, Macao has rich cultural blending achievements, such as servant cuisine, midway folk art, etc., all carry the practical achievements of cross-cultural exchanges. At the same time, Macao is also a city with high spatial density, there are 22 national intangible cultural heritages in the 30 square kilometers urban area, forming a vast open-air cultural museum with the city as the carrier. Macao is also rich in land and worship culture, and photovoltaic ancestral hall beliefs. These cultural resource characteristics can bring tourists a rich cultural experience, so the government needs to strengthen the in-depth development of cultural and tourism integration industries to avoid the problem of homogenization of tourism development. Based on the excavation of local resources, to further realize a diversified cultural tourism industry. Exploring the cultural and tourism transformation path of Macao's intangible cultural heritage is not only related to the protection of local cultural ecology, but also provides a reference for the sustainable development of global multicultural cities ^[2].

1.2. Literature review

In the field of tourism transformation research of intangible cultural heritage, Smith was the first to propose the theory of living heritage, emphasizing that the protection of intangible cultural heritage must achieve dynamic inheritance through community participation. This viewpoint was developed by Richards into the experiential cultural capital theory, pointing out that the core of the tourism of intangible cultural heritage is to transform cultural practices into consumable experiential value. Among domestic scholars, Wan constructed a three-dimensional model of intangible cultural heritage tourism development and proposed a balanced framework of authenticity, participation, and sustainability. Yuan found that, under the background of the integration of culture and tourism, the display of intangible cultural heritage faces a real predicament of being staged, that is, the alienation of cultural performance caused by tourism demand. Regarding the integration mechanism of culture and tourism, Yuan proposed a symbiotic model of culture and tourism, arguing that successful intangible cultural heritage tourism should form a positive feedback loop between cultural inheritance and tourism development. Song pointed out through empirical research that excessive commercialization would sever the relationship between intangible cultural heritage and its original context, and suggested establishing a cultural buffer zone mechanism. In terms of technological empowerment, Wu demonstrated the role of VR/AR technology in addressing the temporal and spatial limitations of intangible cultural heritage experiences, but also warned of the potential risks of sensory substitution that technology might bring ^[3].

Judging from the results of the literature research, current researchers have formed relatively systematic viewpoints on the study of cultural heritage, but the research on Macao, as the convergence of Chinese and Western cultures, is significantly insufficient. Most studies have followed the traditional theories of cultural heritage protection and failed to fully integrate the characteristics of cultural heritage manifestations in Macao. Moreover, there is a lack of argumentation for the balance mechanism between commercialization and living inheritance at the micro level. Based on this, this paper proposes a path for the development of intangible cultural heritage products in the high-density urban environment of Macao, which can enrich the research results to a certain extent and provide an innovative perspective.

2. Analysis of the current situation of experiential intangible cultural heritage resources in Macao

2.1. Resource classification and characteristics

The intangible cultural heritage of performing arts in Macao shows a dual-track development trend of traditional interpretation and modern innovation. Take Cantonese opera as an example: In addition to maintaining traditional performances at Yongle Theatre, the cultural and tourism department and other business entities have also developed an immersive experience theater that combines VR technology. Tourists can understand the cultural codes of singing and body movements through digital interaction. The traditional Portuguese dance breaks through the limitations of the stage, setting up impromptu performance areas at tourist attractions such as the front of the Legislative Assembly, and designing tourist participation sections, transforming the traditional Portuguese dance into an experiential tourist attraction. The core of this type of development model lies in maintaining the authenticity of art while lowering the threshold for appreciation through spatial reconstruction. There are still a large number of inheritors of intangible cultural heritage handicrafts in Macao^[4]. While passing on their skills, these inheritors are constantly developing and innovating, transforming from workshop production to an experience economy. For instance, the intangible cultural heritage technique of making almond cakes has developed into an experience workshop model with a front store and a back factory. Tourists can participate in the entire process from raw material grinding to mold forming, and ultimately receive personalized, customized food souvenirs. The Portuguese tile painting technique has given rise to micro-workshops. Under the guidance of professional artisans, tourists can complete tile painting creations using simplified materials. This participatory experience not only spreads Portuguese aesthetics but also creates unique travel memory points. Many inheritors of handicrafts have broken down the complex chain of handicrafts, designed modules that are convenient for tourists to participate in, and gradually formed a standard system during the development process. For instance, the Drunken Dragon Festival breaks through the limitation of single-day worship and extends a week-long series of activities, including dragon dance teaching, rice wine tasting, and other derivative experiences, enabling tourists to deeply understand the fishery cultural connotation behind the festival. The Nangma Dan festival creates a three-dimensional cultural landscape through the linkage of sea parades and land celebrations, and develops a series of souvenirs such as blessing boat models. The innovation of this type of development lies in breaking through the time constraints of the festival itself and building sustainable cultural consumption scenarios^[5].

2.2. Development status assessment

Macao's intangible cultural heritage tourism products present a composite development feature of technological empowerment and scene recreation. For instance, the Grand Prix Museum reconstructs historical event scenes through body-sensing simulation devices. Visitors can wear VR devices to experience the Grand Prix circuit races, transforming static exhibitions into dynamic and participatory memories. Similarly, the AR tour guide system of the Zheng Family House, through the superimposition of digital layers, enables visitors to see the evolution process of architectural patterns on their mobile devices, achieving a linked display of material heritage and intangible skills^[6]. The core of the development of such products lies in using digital technology to deconstruct the temporal and spatial limitations of intangible cultural heritage. However, some tourists who were surveyed also indicated that the updates of these facilities were relatively lagging, and the interactive devices were not updated in a timely manner, thus lacking the ability to continuously attract tourists. Some tourists also said that Macao has a wide variety of cultural and tourism products, but some of them lack cultural depth and show the feature of superficial consumption. Take the egg tart-making experience workshop as an example: To meet the immediate sense of gain of the general tourists, the workshop has simplified the process to the assembly of prefabricated raw materials and abandoned the traditional charcoal roasting technique. Some tourists think this is a kind of fast food-style consumption. On the contrary, the Cantonese Opera facial mask painting workshop adheres to the teaching of traditional mineral pigment techniques. Although it ensures the authenticity of the skills, the two-hour production time has deterred leisure tourists and led to a situation where it is well-received but not popular. This contradiction reflects the fundamental challenge in the revitalization of intangible cultural heritage: how

to ensure the convenience of participation while safeguarding the essence of the skills is a question that all inheritors need to consider. At present, the solutions for intangible cultural heritage (ICH) business entities in Macao mostly adopt a hybrid model of front store and back workshop. For instance, the Luhuan Shipbuilding Exhibition Hall not only has a quick photo area but also retains the traditional mortise and tenon craftsmanship study by appointment system, attempting to build a gradient experience system. However, the overall cost of this plan is relatively high, and its implementation is rather difficult. Some organizational structures have also begun to attempt to establish a symbiotic mechanism between commercialization and cultural inheritance. For instance, the intangible cultural heritage digital IP project launched by the Macao Science Museum is quite representative. It transforms the dynamic capture data of folk dances into virtual idol performances, which not only expands the channels for cultural dissemination but also nurtures the cultivation of inheritors through the sale of derivative products^[7]. During the Drunken Dragon Festival, in addition to maintaining the traditional sacrificial procedures, new cultural and creative booths and flash mob performances will be added to support the protection of the intangible cultural heritage of the ceremony with commercial revenue. These practices indicate that effective development of intangible cultural heritage tourism requires the establishment of a closed-loop system for the transformation of cultural value into economic value.

3. The development strategy system of experiential intangible cultural heritage in Macao

The product development of intangible cultural heritage tourism in Macao needs to adopt a multi-dimensional product stratification mechanism to enhance the refinement level of intangible cultural heritage product development. For the public experience level, the design principle of low threshold and high interactivity should be adopted. The participation difficulty should be reduced through modular activity units to ensure that tourists can obtain cultural cognitive satisfaction within a limited time. For the in-depth study tour market, it is necessary to build a systematic knowledge transfer system, design immersive courses including skill imparting and cultural decoding, and form tourism products with academic value. Ensure that the products developed in layers can reach a broader customer base and precisely target the value of intangible cultural heritage products. Developers need to establish a dynamic evaluation mechanism, continuously optimize the product experience of tourists, actively collect users' feedback, enhance tourists' experience perception, and increase the cultural concentration perceived by tourists^[8]. In terms of the specific implementation of intangible cultural heritage cultural tourism products, developers still need to innovate the forms of product implementation. Take the highly praised light show in Macao as an example: Developers should enhance the technical integration of the light show and aesthetically integrate digital means such as projection mapping and interactive sensing with traditional intangible cultural heritage elements. Reinterpret the cultural symbol system behind intangible cultural heritage through the language of light and shadow; By taking advantage of the dense urban texture of Macao, the historical districts are transformed into night cultural performance theaters. This integration not only extends the period of tourism consumption but also creates a new type of cultural space with the characteristics of urban memory^[9]. The cultural and tourism department needs to coordinate resources to not only protect the authenticity of Macao's intangible cultural heritage but also emphasize the expressive tension brought about by technological development, so that the light show, as a form of light and shadow expression, always serves the transmission of the city's culture. Managers should also establish a more flexible content production mechanism to provide a survival space for the innovative expression of intangible cultural heritage. Allow creators to offer different experience versions in a single intangible cultural heritage product project based on the needs of different tourists. Let tourists become participants and creators of the night light show. By creating a city-wide light atmosphere, let tourists empathize with the urban environment and form a continuous cultural consumption stickiness^[10].

4. Conclusion

The development of intangible cultural heritage tourism products in Macao presents a typical feature of the coexistence of multi-dimensional innovation and deep-seated contradictions. In the field of performing intangible cultural heritage, digital transformation represented by VR theaters of Cantonese opera and flash MOBS of folk dances has successfully broken through the spatial barriers of traditional art. However, the lag in technological iteration may lead to a decline in the quality of experience. Intangible cultural heritages of craftsmanship, such as the almond Cake Workshop and the tile painting workshop, have achieved public participation through modular decomposition, but they are facing the risk of cultural dilution caused by the simplification of the production process. The most enlightening aspect is the development of intangible cultural heritage during festivals. The Drunken Dragon Festival, through a layered design of core rituals and derivative experiences, has established a buffer zone between cultural protection and commercial development.

The three-dimensional solution proposed based on case studies has practical guiding value: establishing a zoning system of display–experience–study in the spatial dimension, such as the gradient design of the Luhuan Shipbuilding Exhibition Hall; Build an extended value chain of festival activities in the time dimension and transform single-day celebrations into sustainable consumption scenarios. In the technical dimension, a hybrid model of digital tools and physical inheritance has been implemented. The parallel operation of AR-guided tours and traditional craft demonstrations in Zhengjia Dawu is a successful example. It is particularly necessary to emphasize that the knowledge transformation ability of intangible cultural heritage inheritors is the core driving force for product upgrading, and their role should shift from performers to educators and design participants.

Disclosure statement

The authors declare no conflict of interest.

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Maud and the Dismembered Body

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Abstract: This paper argues that Tennyson's poem *Maud*, despite its title, presents the heroine not as a realistic character but as a fragmented, silenced figure subjected to violence through the speaker's language. Johnson's observation highlights Maud's significant silence throughout most of the poem and the paradox of her only gaining direct speech after death, conflating life and death as a form of "falsehood" linked to violence. The essay expands on this, asserting that Maud endures a deeper violence beyond mere silence. She is deprived of meaningful speech and simultaneously fragmented, both metaphorically and physically, into disparate body parts by the male speaker. This dissection is enacted through the very language the speaker uses to construct the poem itself. Furthermore, the analysis contends that this violence inherent in speech is not solely directed at Maud; it also impacts the speaker. Ultimately, the argument posits that speech within the poem transcends being a simple act of individual agency. Instead, it functions as a potent, tentative form of violence that actively dismantles and erases any possibility of certainty, affecting both the depicted characters and the poem's meaning. The speaker's words become the instrument of fragmentation and erasure.

Keywords: Linguistic violence; Female representation; Agency

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Although Tennyson's *Maud* bears its heroine's name in its very title, the character does not appear as a realistic, living figure. This idea is exemplified by Johnson's observation of the literary persona referred to as Maud, whose lips are 'clearly not meant for speech, and her silence is one of the most striking features of the poem' (Johnson 36). Therefore, it is no surprise that it is not until the final section, by which time Maud is dead, that she is paradoxically granted the power of direct speech (Johnson 36). Johnson's comment captures a central conflation in the poem—between death and life. He refers to this conflation as a sense of 'falsehood' and, by framing this paradox in such terms, connects it to the concept of violence. This essay expands on this idea by examining how the heroine is subjected to a deeper form of violence: she is not only deprived of clear, meaningful speech but is also fragmented into body parts—both metaphorically and physically—by the speaker, whose speech enacts this dissection as it constructs the very poem. This paper will also explore how this violence is directed not only toward Maud but also toward the speaker himself. This analysis aims to demonstrate that speech is not merely an action affirming an individual's agency but a tentative form of violence that erases every possible sense of certainty ^[1].

The poem is suffused with a sense of ambiguity. The myth surrounding Maud resembles layers of haze, mirroring the speaker's proclaimed madness, each instance of which intensifies the sense of delusion. It gradually erodes the sobriety that underpins personal agency, stretching it ever thinner. It becomes increasingly difficult for the speaker to perceive Maud as a cohesive, intact physical being, even though she is subjected to the forces of his imagination ^[2], as if she were

clay continuously molded by the invisible hands of his subjective, self-absorbed projections. For example, in XVI.i, he remarks:

*O beautiful creature, what am I That I dare to look her way;
Think I may hold dominion sweet
Lord of the pulse that is lord of her breast,
And dream of her beauty with tender dread. (XVI.i. 10-14).*

By isolating ‘the pulse’ and ‘her breast,’ the speaker reduces Maud to fragmented bodily elements, stripping her of the coherence and autonomy of a unified individual. The imagery of ‘the pulse’ evokes vitality and life but simultaneously suggests that her existence is confined, dominated, or controlled by a singular, imposed rhythm. The amalgamation of ‘the pulse’ and ‘her breast’ further suggests possession, with Maud’s emotions and physical being seemingly commandeered by an intangible, overpowering influence—one that is not necessarily her own, as the speaker refers to ‘the pulse’ rather than ‘her pulse.’ This dynamic replaces her sense of wholeness with fragmented impressions, shaped and controlled by the speaker’s gaze. The speaker’s wistful desire to master Maud’s splintered, anatomized parts is framed as an attempt to blazon her while simultaneously surrendering his sense of self to her overwhelming beauty—a beauty so formidable that he cannot confront it directly but can only ‘dream’ of it with apprehension. Dreaming serves a dual purpose: it is both an act of visualizing his impulse for conquest within a context that is at once romantic and violent, and a tacit confession of his own perilous proximity to submission. His own existence becomes dehumanized—‘what am I’—a state he consciously embraces by choosing to dream rather than to see (‘That I dare to look her way’). The lover’s body, depicted as a site of intense and aggressive dismemberment, transforms the anatomizing of Maud into an extension—or, more radically, a manifestation—of the speaker’s own disorientation. The blazon is so powerful that it blurs the distinction between the speaker’s internally conceived image of Maud and the externally formed vision, as suggested by the precarious proximity of the actions ‘look’ and ‘think.’ Transitioning from looking to thinking and ultimately to dreaming, he detaches himself from reality, rendering Maud less of a tangible figure and more of a creation shaped by his desires. Her wholeness becomes increasingly vulnerable, not only to his consuming gaze but also to the fragmentation of his own psyche^[3].

Although such images of dismemberment and subjugation are reiterated in the same section of the poem, where the speaker reflects on Maud being ‘fastened’ to this fool lord’ and implores his organs or emotions to refrain from betraying him (‘Catch not my breath, O clamorous heart’), the idea of disintegration and Maud’s being subjected to the dominance of someone else becomes more radical in part XVII:

*Go not, happy day,
From the shining fields, Go not, happy day,
Till the maiden yields. Rosy is the West,
Rosy is the South,
Roses are her cheeks,
And a rose her mouth (XVII.1-8)*

The first two lines reveal a troubling dynamic of coercion. The ‘happy day’ becomes an agent of the speaker’s desires, refusing to depart from the ‘shining fields’ until the maiden ‘yields.’ The verb ‘yields’ evokes connotations of surrender and submission, implying an underlying struggle of power or resistance. Though the language is subtly veiled, cloaking its intent in a tone of tender entreaty rather than overt control, the framing of time as contingent on the maiden’s (likely Maud’s) submission reflects a psychological or emotional dynamic where compliance or harmony is extracted through a subtle erosion of her volition. The ‘shining fields’ seem imbued with the speaker’s longing, and the maiden’s embodied self dissolves as she is fused with the external environment. This reflects a disturbing transformation: she is no longer concrete and autonomous in a bodily sense but instead becomes part of the speaker’s idealized vision of nature and beauty, losing her individuality on an alarmingly physical level. Maud is subsumed into the very fabric of the day and the fields. The descriptions in the last four lines—‘Rosy is the West, / Rosy is the South, / Roses are her cheeks, / And a rose her mouth’—intensify the process of fragmentation, pushing it to the extreme of absolute obliteration. Once anatomized as a

collection of body parts by the speaker's desire, Maud is now rendered unidentifiable as a human figure capable of even serving as the object of dismemberment: her cheeks and mouth are likened to roses, which blend indistinguishably into the surrounding landscape. The vastness spanning from 'West' to 'South,' juxtaposes with her physical features, evokes a sense of overwhelming diffusion as her body stretches across the landscape, rendering her indistinguishable from it—a scenario which suggests burial, decay, and, ultimately, death ^[4].

Such references to the macabre cast doubt not only on whether the speaker's infatuation with Maud harbors the potential for violence, but also on whether he is fully aware of the impossibility of his love, as his romantic worship emerges as its own perversion—an embodiment of death and decay. However, there is no explicit indication that the speaker actually murders Maud. Throughout part XVII of *Maud*, he does not directly implicate himself in the implied obliteration of her body. Instead, he envisions himself partaking in and enjoying a soothing effect eerily aligned with the untimely 'happ[iness]' that 'falters' from Maud's lips, conveyed through what seems like coerced consent. The phrase 'a rose her mouth' is particularly striking for its ambiguity. Unlike a more conventional construction ('a rose is her mouth'), this phrasing invites multiple interpretations: her mouth might *be* a rose, suggesting complete transformation; her mouth might *resemble* a rose, implying assimilation; or her mouth might be *stuffed with* a rose, evoking a violent, silencing image often associated with scenarios of rape.

This ambiguity intensifies the difficulty of defining her mouth's physical essence within language, rendering it something undefinable that oscillates between metaphor and literalness, beauty and violence ^[5]. Even the most intimate and defining part of Maud—her mouth, traditionally associated with speech and agency—is rendered unspeakable and ungraspable. This serves as further evidence of her speechlessness and disintegration affecting not only the speaker but also his language in the poem—the very instrument he uses to conquer her. The speaker seems preoccupied with enacting a violent act to the point of eschewing clarity and distinctions. The persistent imagery of 'rose,' 'blush,' and 'red' in later lines of part XVII presses so heavily on the speaker's consciousness that he feels compelled to repeat similar phrases:

*Till the red man dance By his red cedar tree,
And the red man's babe Leap, beyond the sea.
Blush from West to East,
Blush from East to West, Till the West is East,
Blush it thro' the West. Rosy is the West,
Rosy is the South,
Roses are her cheeks.
And a rose her mouth. (XVII. 17-28)*

Here, 'rose,' 'red,' and 'blush' are intertwined in a continuous, fluid imagery of redness that obliterates their individual distinctions. The 'blush' spreads relentlessly across directions, encompassing the land and people, allowing the 'red' to take on a dynamic through its action as it consumes the 'rosy.' This unification into a singular flux of redness creates an overwhelming, homogenizing force that subsumes meaning into the same dominating hue. The span of the 'field' is portrayed as a victim of the 'blush,' left passive and subdued, its vastness abruptly nullified by the undifferentiated redness ('West is East'), much like the maiden, whose mouth is ambiguously associated with a rose in a way that hints at an underlying violent intent on the part of the speaker, if not evokes the impression of death.

This association recalls a much earlier line in the opening stanza of the poem, which runs: 'And Echo there, whatever is asked her, answers "Death"' (I.i. 4). Here, the speaker addresses Echo, a presence capable of responding to his questions, even if only by repeating them. Although the speaker had once addressed his lover as 'Oread' (XVI.i. 8) not long ago, in part XVII, the speaker is no longer addressing any specific individual. He appears to be speaking into a void, not even to himself. Death, once only heard as an echo, is now enacted through Maud's dismemberment. The plea to the 'happy day' is quickly interrupted by the speaker's comment on the rose, which might initially seem like a digression, but these two ideas are intrinsically connected: The repeated reference to 'rosy' in the West and South mirrors the warm hues of a setting sun, implying the fleeting nature of both the day's light and the opportunity for the speaker's plea to succeed. The

imagery of blushing news spreading ‘thro’ the West’ and across the seas connects the act of blushing with both passion and the fading light. Everything seems to reinforce the sense of a hopeless ending, as the blush metaphorically transitions from vibrant hope to the dusk of unfulfilled desire. Even in her dismemberment and the speaker’s disorientation in part XVII, Maud’s presence echoes ‘death’ alongside the speaker’s speech of romantic infatuation in a manner reminiscent of Echo (the ‘Oread’). This dynamic exemplifies what Johnson describes as a state in which ‘our sense of the relationship between internal and external becomes irreparably confused’ (Johnson 42). However, Tennyson extends this notion further by introducing a third entity into the interplay between the speaker (internal) and nature (external)—Maud herself. Maud occupies a liminal space, existing simultaneously as internal and external. Her dismemberment mirrors the speaker’s internal chaos while also embodying the finality of the day through death imagery—a duality that makes her both real and unreal: she is at once an object of coercion and an object of diffusion, her physical presence is simultaneously constructed and deconstructed in manners that are equally urgent. Furthermore, as Maud’s existence becomes violently and intimately fused with the speaker’s interiority and the surrounding landscape, the confusion between the internal and external is not merely presented but subjected to doubt. Considering that the landscape itself does not operate as a concrete natural image but a site that is as vulnerable to the consuming power of redness as the speaker himself and Maud, the lyric suggests that the very conception of the internal and external is fundamentally uncertain. In other words, Tennyson’s work destabilizes not only the boundaries between the speaker, Maud, and the environment but also the assumptions underlying those boundaries.

The speechlessness and disintegration of Maud also explode into the erasure of spatial distinction. The ‘field’ is not so much a preexisting landscape serving as a backdrop to the speaker’s actions or Maud’s transformation and bodily decay as it is a fragile construct, created specifically for its ultimate erasure by the ‘blushes’ relentless presence—a scenic dramatization of violence that operates in two directions, deforming first Maud’s body and then the speaker’s poetic language. This effect is evocative of Ruskin’s pathetic fallacy, a conception that hinges on the projection of subjective emotions onto the natural world, where objects or landscapes appear to take on qualities that reflect the inner life of the observer. For Ruskin, the pathetic fallacy involves the attribution of a ‘true appearance’ to these projections—an illusion of natural harmony with human feelings. But Tennyson’s lyric seems to undermine this premise. The verisimilitude between Maud and the ‘field’ now emerges as the product of human interiority on two distinct planes: bodily, through the dehumanization of Maud, and mentally, through the speaker’s disorientation—both shaping and dissolving the landscape. The plea made to the ‘happy day’ initially appears to convey the speaker’s fervor to the ‘shining field,’ but the phrase (‘Go not, happy day’) is not an example of pathetic fallacy. Instead, the ‘field’ subverts this technique; constructed from the potentially grotesque, bodily interiority of a human, it lacks any true appearance upon which human emotions can be projected and detached. Under the shadow of violence, everything in Part XVII exists in a state of uncertainty.

Indeed, the bodily and spatial obliteration can also be attributed to the speaker’s degree of madness as he grapples with what Ricks describes as a kind of romantic affection that has not yet turned into a ‘more mature phase of love’ (Ricks 238), behaving like someone whose central fear is ‘not that he cannot be loved but that he cannot love’ (239). This observation partly explains why the speaker’s desire and affection toward the persona of Maud are eerily marked by both beauty and violence: his primary desire is not to love but to impose love. Consequently, love becomes subjugated and incorporated into the mechanisms of violence—a violence that flows in both directions, dismembering both Maud (the object of the speaker’s love) and the speaker himself (the one who conceives this affection), though in slightly different ways.

But love is not the only vehicle for the flux of violence, and moreover, the enactment of violence does not necessarily lead to ultimate chaos, as Part XVII exemplifies with its imagery of blush and rose. The speaker, in a moment of earlier sobriety, seems to acknowledge that violence can arise from his accusatory and condemnatory tone, which extends to the eradication of potentially destructive passions. Even if this violence is metaphorical—intended to expose moral failings rather than assert dominance:

This broad-brim’d hawker of holy things,

*Whose ear is cramm'd with his cotton, and rings Even in dreams to the chink of his pence,
This huckster put down war! can he tell
Whether war be a cause or a consequence? Put down the passions that make earth Hell!
Down with ambition, avarice, pride, Jealousy, down! cut off from the mind The bitter springs of anger and fear;
Down too, down at your own fireside, With the evil tongue and the evil ear, For each is at war with mankind.
(X. iii. 5-15)*

The speaker conflates external events with internal experiences through the concept of 'war.' On the surface, he critiques a preacher's simplistic call to 'put down war,' as though war were merely a discrete, external phenomenon that could be easily resolved. However, his invocation of 'war' soon shifts inward, transforming it into a metaphor for internal human passions and vices. The 'passions that make earth Hell'—ambition, jealousy, anger, and fear—are portrayed as bitter internal springs that feed and sustain external conflict. The final lines of the passage dramatize this internal war by fragmenting the self. The 'evil tongue' and the 'evil ear' symbolize parts of the speaker's own body waging war against humanity, functioning almost autonomously from his conscious self. Human agency is no longer unified but fractured, distributed across body parts that become agents of 'war' against the speaker's moral and social belonging. This fragmentation echoes the Shakespearean trope of the body politic in *Coriolanus*, where Menenius observes: 'There was a time when all the body's members / Rebell'd against the belly.' But Tennyson's case is far more radical than Shakespeare's, rejecting any possibility of reconciliation or interdependence within the body. Here, rebellion is not a dialogue between body parts but an authoritarian denunciation by the speaker, framed as a purge where individual and collective vices are personified and metaphorically 'cut off.' The speaker's aggression—even violence—stands in contrast to that in Part XVII, where integration is at least implied. Instead, this rejection of integration results in a loss of volition and heightened ambiguity as the speaker vilifies and externalizes the 'evil tongue' and the 'evil ear.' This externalization blurs boundaries to such an extent that it becomes unclear whether he is estranging these parts from his physical being, relegating them to an external force of 'war,' or peeling himself away from his own body—a body capable of waging war 'with mankind.' The only certainty in both cases is that the tongue and ear—tools of communication and perception—mercilessly betray the speaker's will and internal values, as suggested by the rhyming of 'tell' and 'Hell.' Even though the tone at this point in *Maud* is notably more rational than in Part XVII, the accusatory speech-violence aimed at destructive passion ultimately deflects inward. The only conceivable way to break this vicious cycle is, perhaps, through silence, discouraging the huckster's fantasy of 'put[ting] down war.' Yet, even silence fails to purge the evil that contaminates the tongue and ear as it leaves the war unresolved. Just as the external world is marred by conflict, the interior realm remains fractured by warring impulses and passions, undermining any attempt to quell violence through speech.

In a perpetual state of war, it is unsurprising that the speaker's reflections on his body parts ultimately lead him to an extremity of violence: death. However, this is not necessarily death as total obliteration but as an inevitable fate, prefigured by the condition of being human with a body, as though death is the only possible outcome of being alive:

*Ah God, for a man with heart, head, hand, Like some of the simple great ones gone For ever and ever by,
One still strong man in a blatant land, Whatever they call him, what care I, Aristocrat, democrat, autocrat—one
Who can rule and dare not lie (X.v.1-4).*

The presence of an individual ('a man') evokes a profound yearning for unity and purpose is sharply contrasted with the fragmentation and alienation inflicted by war. The focus on 'heart, head, hand' isolates essential parts of the human body, implying that the individual is being reduced to components and stripped of volition, even while maintaining an acknowledgment of his physical integrity. The reference to Maud's 'chivalrous battle-song' (X.iv.2) situates this moment in a world ravaged by violence yet imbued with an austere grandeur that the present struggles to replicate. But the speaker's wistful call can only remain unanswered, as the 'strong man' he longs for has 'gone / For ever and ever.' The double meaning of 'lie,' however, suggests that he is not completely oblivious to the impossibility of his desire. What renders his call even more futile is the fact that the hero (whether 'Aristocrat, democrat, autocrat') from the past is also dehumanized by war.

Tennyson uses synecdoche and metonymy in tandem to underline the destructive effects of time and the reduction of individuals to mere functional roles. He is reduced to functional or symbolic elements through a series of synecdoche—a soldier’s hand for killing, a head for strategizing, a heart for courage—forever confined to chivalric legends in the past, unable to retain his full humanity. Similarly, political labels in the metonymies of ‘aristocrat, democrat, autocrat’ simplify individuals to the ideologies or roles they represent within the social hierarchy. The speaker dismisses these labels (‘what care I’), suggesting that no matter the system or ideology, individuals are subjected to the same utilitarian demands. Their personal identities are subsumed under their societal functions and affiliations, similar to how soldiers are dissected into body parts in the synecdoche only a few lines earlier. Whether fragmented into functional parts or unified into collective societal roles, individuals are subjected to the relentless violence of time and utility through temporal and functional reduction. The past and the present seem indistinguishable, as soldiers (‘strong man’) on battlefields share the same fate. But this implied similarity does not erase the contrast between the absent hero and the superficiality of the contemporary world, where no one embodies their greatness. This dynamic convolutes death and life: the dead are idealized as more vibrant and meaningful than the living, creating a paradox in which death preserves an elevated existence while life becomes diminished and hollow.

Following the thread of inward shifting that runs through *Maud*, the speaker moves from this convolution to express a desire for self-transformation that verges on self-destruction:

*And ah for a man to arise in me,
That the man I am may cease to be! (X.vi.1–2).*

The plea represents a yearning to annihilate the current self in favor of a new, stronger identity, constituting a form of invited death—both literal and figurative—as the speaker seeks the complete effacement of his inadequate self. In the context of other parts of the poem, this self is portrayed as both morally flawed and physically fractured to the point of being unsustainable.

The longing for self-destruction can also be interpreted as an embrace of annihilation, a desperate attempt to escape the disillusionment of living in a ‘blatant land’ devoid of meaning. But since the man who might survive, if not salvage, the ‘blatant land’ is already depicted in the previous stanza of Part V as an anatomized specter, the speaker’s call for obliteration cannot lead to renewal but only to nonexistence. The fact that this couplet forms its own individual stanza and concludes Part V can also be interpreted as a final abandonment of truth, retreating into an ambivalence toward existence: an admiration for life’s potential greatness tempered by an acknowledgment of its corruption and a desire to escape it through the transformative power of death. The speaker’s yearning for unity and purpose does not rescue him from the violent imagery of dismemberment or his own disbelief; instead, it renders him even more vulnerable to the state of being dead.

Eventually, the speaker reaches a point where he dramatizes a profound loss of control over his own body, as his physical and emotional states are overtaken by intense internal conflict—a war between his alienated body parts:

*Catch not my breath, O clamorous heart, Let not my tongue be a thrall to my eye, For I must tell her before we
part,
I must tell her, or die (XIV.iii.1–4).*

The speaker’s heart is personified as a separate, ‘clamorous’ and unruly entity, threatening to overwhelm his ability to remain composed. The term ‘thrall’ in the next line implies enslavement, as though his ability to articulate might be dictated entirely by the sensory and emotional impact of seeing the woman he loves—who also functions as a romanticized signifier of war—reducing him to a passive participant in his own experience. In the final line, the urgency of the speaker’s declaration emphasizes the high stakes of his predicament. The speaker’s identification of his life with the ability to speak suggests that speech is his last vestige of agency in a moment when his body is otherwise consumed by violence. By ‘telling her,’ the speaker attempts to impose order on his chaotic inner world, to wrest control from the overpowering forces of desire and despair that have rendered his heart and tongue unmanageable. This again conjures the image of a dismembered body, with each body part pulling in different directions against the speaker’s volition. But rather than being merely a

grotesque spectacle of disunity, the dismembered body transforms into an event—a site of urgency. The extreme pressure placed on speech (‘I must tell her, or die’) elevates it beyond simple communication. Speaking becomes performative, a decisive act that determines the speaker’s fate, turning the confession (‘I must tell her’) into an embodied struggle. The body itself enacts the drama of impending separation. In this context, speech takes on existential weight—it is no longer a tool for conveying falsehoods or trivialities but a desperate attempt to assert truth and meaning in the face of overwhelming inner violence.

But with a disjointed body incapable of fulfilling its purpose, the speaker’s chance for success is slim. Death once again spreads its wings over this moment of tension. The wish to ‘tell her’ is as pressing as the desire to avoid death, yet the two are inextricably linked: failure to confess love would render life unbearable, making death a preferable alternative. This equivalence collapses the binary opposition between life and death, as both states become contingent on the same act. The act of confession is both a life-affirming necessity and a potential gateway to the end of suffering. The speaker’s crisis of selfhood, most vividly embodied in the depiction of a dismembered body, blurs the boundary between existence and nonexistence, presenting them as interconnected dimensions of the same emotional experience^[6]. Ultimately, this frames the act of speech and the speaker’s poetic language as a mimesis of violence—a destructive force leading to erasure of distinctions and hence absolute obliteration.

Disclosure statement

The author declares no conflict of interest.

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Exploration of the Application of Artificial Intelligence in Standardized Training of Laboratory Medicine Residents

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Abstract: With the rapid development of artificial intelligence technology, its application in the medical field is becoming increasingly widespread. Standardized training for residents in laboratory medicine is crucial for cultivating qualified talent in this field. This article explores the application of artificial intelligence in standardized training for residents in laboratory medicine, analyzes the opportunities and challenges it brings, and aims to provide new ideas and methods for improving training quality and effectiveness.

Keywords: Artificial intelligence; Laboratory medicine; Smart education; Talent cultivation

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1. Introduction

Artificial intelligence (AI) is a technology that uses computers to simulate human intelligence. Through algorithms such as machine learning, deep learning, and natural language processing, machines can automatically handle complex tasks, make decisions, and perform predictions. In recent years, artificial intelligence technology has made breakthroughs and demonstrated powerful capabilities in image recognition, data analysis, and other aspects. It is gradually penetrating various industry sectors, and the medical industry is no exception ^[1].

Laboratory medicine occupies a central position in the modern medical diagnosis and treatment system, providing indispensable objective evidence for clinical diagnosis, treatment monitoring, and prognosis evaluation. From routine blood and urine tests to complex genetic testing, the accuracy and efficiency of laboratory medicine directly affect medical quality. As a key link in cultivating professional talents in laboratory medicine, standardized training for residents aims to enable medical students to smoothly transition from theoretical learning to clinical practice and master solid professional skills and knowledge. However, the traditional training model exposes shortcomings such as insufficient flexibility and low personalization when facing the current massive and rapidly updating laboratory medicine knowledge, as well as complex and changing clinical testing scenarios.

The combination of artificial intelligence and standardized training for residents in laboratory medicine has great potential. On the one hand, artificial intelligence can integrate various laboratory medicine data, including test results, case information, and imaging, to build a rich digital resource library for training. Through virtual laboratory testing, intelligent simulated cases, and other forms, it provides residents with an immersive and repeated practice learning environment. On the other hand, with the powerful analytical capabilities of artificial intelligence algorithms, personalized learning programs can be tailored according to the learning progress and ability characteristics of residents, achieving precise teaching^[2]. Simultaneously, the auxiliary diagnosis model constructed by artificial intelligence can help residents improve their ability to interpret test results and strengthen clinical diagnostic thinking. This combination is expected to break through the limitations of traditional training, innovate the standardized training model for residents in laboratory medicine, comprehensively improve training quality, and cultivate professional talents in laboratory medicine who are more adapted to modern medical needs.

2. Advantages of artificial intelligence in standardized training for residents in laboratory medicine

2.1. Enriching training resources

With its powerful data integration and processing capabilities, artificial intelligence can aggregate massive and dispersed data in the field of laboratory medicine. These data cover various test results, from routine blood and urine tests to complex genetic and immunohistochemistry tests. It also includes rich case materials containing detailed clinical cases of different disease types and stages. In addition, there are various imaging techniques such as ultrasound images and molecular images related to testing. Through deep mining and organization of these data, a comprehensive and dynamically updated digital training resource library is constructed.

In this resource library, virtual cases are presented in a highly simulated form. Residents can access virtual cases from different regions and hospitals with various complex conditions and testing features. For example, virtual cases for blood system diseases not only show patients' blood routine and bone marrow puncture test data but also simulate patients' medical history, symptom evolution, and changes in test indicators after treatment. Simultaneously, simulated test operation videos record the operation steps and precautions from sample collection, transportation, pretreatment, to various advanced test instrument operations. Taking the operation of an automatic biochemical analyzer as an example, the video will clearly show the entire process of instrument preheating, sample loading, parameter setting, detection process monitoring, and result reading, allowing residents to watch and learn repeatedly as if they were on the scene^[3]. The virtual laboratory created using artificial intelligence technology is a major highlight. Here, residents can freely choose different types of testing instruments for virtual operation practice. Whether it is detecting cell surface markers with a flow cytometer or the complex operation process of a high-throughput gene sequencing instrument, it can be accurately simulated in a virtual environment. This learning model, which is not limited by time and space, greatly enriches residents' learning paths and allows them to quickly improve their operational skills through repeated practice.

2.2. Personalized learning support

Like an intelligent learning mentor, artificial intelligence algorithms can precisely track and analyze the entire learning process of resident physicians. They collect various data in real-time during their daily learning, including online course learning duration, answer accuracy, operational proficiency, and interaction behavior with the learning platform. Through deep mining and analysis of these multi-dimensional data, the intelligent system can accurately determine the current level of knowledge mastery and ability of resident physicians^[4].

For example, when the system analyzes a resident physician's answering performance in a microbiology laboratory course and identifies frequent errors in topics related to Gram staining result interpretation, it immediately recognizes this knowledge point as a weak area. The system then automatically selects targeted learning content from its vast resource

library for delivery. This content may include high-definition video courses that detail the principles of Gram staining, operational essentials, and result interpretation techniques, interspersed with numerous practical case studies to aid understanding. Additionally, the system pushes a series of practice questions related to Gram staining result interpretation, with difficulty levels progressing from basic to advanced. Each question is accompanied by detailed answer explanations to guide deep thinking and strengthen knowledge application. Based on feedback from the resident physicians, the system dynamically adjusts subsequent learning plans to ensure that the learning pathway always aligns with their personalized needs, truly implementing individualized teaching and significantly improving learning efficiency.

2.3. Intelligent assisted diagnosis training

In clinical laboratory practice, accurate interpretation of test results is a critical bridge between laboratory data and clinical diagnosis. Through deep learning of massive clinical case data, artificial intelligence constructs powerful intelligent assisted diagnosis models. These models integrate multiple test indicators, uncover potential correlations and patterns among them, and provide valuable references for disease diagnosis ^[5,6].

Taking the common diagnosis of diabetes as an example, the artificial intelligence system not only analyzes routine test indicators such as fasting blood glucose, postprandial blood glucose, and glycated hemoglobin but also considers relevant test data such as insulin release tests and C-peptide levels. By combining this information with clinical case data from a large number of diabetic patients, including age, gender, family history, symptoms, and other information, the system rapidly and accurately suggests the presence of diabetes and its possible type through complex algorithmic calculations. During training, resident physicians can use these intelligent assisted diagnosis models to analyze and interpret specific test results. By comparing their own diagnostic thinking with the model's suggestions, they can deeply consider the differences between them. For instance, if a resident physician initially suspects type 1 diabetes based on test results but the model suggests type 2 diabetes, the resident would further review relevant materials to understand the basis for the model's judgment, such as the patient's insulin secretion curve characteristics and physical features. Through this continuous process of comparison and learning, resident physicians can deepen their understanding of disease diagnosis, gradually master comprehensive and accurate methods of interpreting test results, and effectively improve their diagnostic abilities.

2.4. Improving training efficiency

In the traditional standardized training model for resident physicians in laboratory medicine, the instructor bears a heavy teaching load. From repeated explanations of basic knowledge to multiple demonstrations of laboratory operations, the instructor needs to spend a lot of time and energy on repetitive tasks. The introduction of artificial intelligence technology is like having a capable assistant for the instructor, which can share many teaching tasks.

The intelligent question answering system is one of them. It utilizes natural language processing technology to understand questions raised by resident physicians in real-time and quickly retrieves accurate answers from the knowledge base. Whether it is a question about testing principles, such as "What is the principle of double antibody sandwich method in ELISA?" or a confusion about testing operations, like "How long must samples be tested within after collection during blood gas analysis?," the intelligent question answering system can provide detailed answers in a timely manner. This significantly saves the instructor's time, allowing them to devote more energy to more targeted clinical practice guidance. Instructors can have more time to lead resident physicians to the forefront of clinical practice, participate in the testing and analysis of actual cases, and provide on-site guidance on issues such as interpretation of test results and selection of test items in complex conditions. At the same time, when facing complex problems encountered by resident physicians in clinical practice, instructors can use the saved time to discuss solutions to the problems more deeply with resident physicians, helping them improve their ability to solve practical problems, thereby comprehensively improving overall training efficiency.

3. Challenges faced by artificial intelligence in standardized training of resident physicians in laboratory medicine

3.1. Data quality and security issues

In the field of laboratory medicine, data sources are extremely wide-ranging, covering various medical institutions at different levels, testing instruments of different brands and models, and diversified sample collection methods. This complexity makes it difficult to ensure the accuracy, completeness, and consistency of data. For example, when different hospitals' testing instruments detect the same indicator, due to differences in calibration methods, detection principles, and reagents, there may be large deviations in the numerical results. Simultaneously, irregular operations during sample collection, such as inaccurate blood collection time, insufficient sample size, or contamination, can lead to incorrect or unreliable test data. In terms of data integrity, information systems in some medical institutions may have loopholes, resulting in missing key information in patient records, such as family history and complete treatment process records, which is extremely unfavorable for building a comprehensive and accurate artificial intelligence model.

Additionally, medical data involves a large amount of private information about patients, from basic personal identity information to detailed disease diagnosis and treatment records. Once leaked, it will severely infringe on the privacy rights of patients. In the data collection process, if there is no strict patient authorization process, there may be a risk of illegal data collection. As the amount of data continues to grow, the security of storage devices is tested. Situations such as hacker attacks or damage to data storage media may lead to data leakage or loss ^[7]. During data usage, the participation of multiple departments and personnel complicates data access rights management. If the permissions are not set properly, it can easily lead to data misuse. How to ensure reliable data quality and guarantee data security while fully utilizing laboratory medicine data to promote the development of artificial intelligence has become an important problem that needs to be solved urgently in the process of applying artificial intelligence to the standardized training of resident physicians in laboratory medicine.

3.2. Model reliability and interpretability

Although artificial intelligence models have demonstrated potential in assisting diagnostic tests in medical laboratories, many current models' decision-making processes resemble a "black box," lacking clear interpretability ^[8]. In the field of laboratory medicine, where accuracy and reliability are paramount, resident physicians find it difficult to trust a model whose decision-making basis they cannot understand. For instance, when certain deep learning models analyze complex genetic testing data to predict disease risks, they can quickly produce results but fail to articulate the specific genetic features and logical relationships upon which their judgments are based. This leads resident physicians to doubt the model's results and hesitate to use them as a strong basis for clinical diagnosis.

Moreover, the performance of these models is highly susceptible to various factors. Data bias is a common issue. If the dataset used to train the model contains a disproportionately high percentage of data related to a certain disease or feature, the model may overlearn that feature, leading to misjudgments in other scenarios. Disease heterogeneity also poses a significant challenge for the models. The same disease can manifest with vastly different clinical symptoms and laboratory test variations in different patients, and it is difficult for models to fully and accurately capture these differences ^[9]. Additionally, as medical technology continues to evolve, testing methods and standards are constantly changing. If the model is not updated and optimized in a timely manner, its reliability will be significantly reduced. Errors or deviations in the model during training or clinical practice can mislead resident physicians' learning and potentially have serious consequences for patient diagnosis and treatment.

3.3. Inadequate teaching faculty construction

The deep integration of artificial intelligence technology into the standardized training of resident physicians in laboratory medicine poses higher demands on mentors. Mentors need to not only be proficient in traditional laboratory medicine knowledge and skills but also possess a certain level of artificial intelligence knowledge and application ability. They

should be able to skillfully guide resident physicians in the correct use of various artificial intelligence technologies and tools. However, most mentors in laboratory medicine currently have a relatively limited knowledge base in the field of artificial intelligence. They may have a superficial understanding of the principles of core artificial intelligence algorithms such as machine learning and deep learning, but they lack practical experience in building and optimizing artificial intelligence-assisted diagnostic models.

In terms of teaching methods, mentors often adhere to the traditional knowledge-based teaching model and lack the ability to integrate artificial intelligence technology with traditional teaching methods. For example, when explaining the interpretation of test results, it is difficult for them to use artificial intelligence models for vivid and intuitive demonstrations and analyses, thereby failing to fully utilize the advantages of artificial intelligence in enhancing teaching effectiveness^[10]. This lag in teaching faculty construction severely limits the widespread application and in-depth promotion of artificial intelligence technology in the standardized training of resident physicians in laboratory medicine. Without timely strengthening of mentors' training and ability improvement in artificial intelligence, it will be difficult to meet the requirements of cultivating laboratory medicine talents who can adapt to the medical needs of the new era.

3.4. Adaptation of resident physicians to new technologies

Some resident physicians have long been exposed to traditional training models and have become accustomed to relatively fixed learning methods and knowledge acquisition pathways. They may have an instinctive aversion to the introduction of artificial intelligence technology as a new training model. They may fear that the new technology will increase the difficulty of learning, disrupt their original learning pace, and lead to poor learning outcomes. Moreover, the learning and application of artificial intelligence technology require resident physicians to have a certain foundation in computer science and data analysis. However, in reality, some resident physicians have a relatively weak foundation in this area and feel overwhelmed by complex artificial intelligence algorithms, data processing software, and the operation of intelligent learning platforms.

For example, when using intelligent assisted diagnostic models, some resident physicians may be unable to accurately interpret the results provided by the model due to unfamiliarity with its input and output rules. When participating in artificial intelligence-based virtual laboratory experiments, their unfamiliarity with the computer-simulated environment may lead to frequent errors during the experiment, affecting the learning experience and effectiveness. This inadaptation to new technologies often requires resident physicians to spend a significant amount of additional time and effort learning and exploring during the initial stages of training. This process may further exacerbate their aversion to artificial intelligence technology, which is not conducive to the smooth progress of artificial intelligence in the standardized training of resident physicians in laboratory medicine.

4. Coping strategies

4.1. Enhancing data management and security

To ensure data quality, it is necessary to establish a comprehensive and multi-level data quality control system. At the source of data collection, for medical institutions at various levels and types, uniform and strict standard operating procedures (SOPs) for sample collection should be developed. These SOPs should specify detailed specifications for the time nodes, operational techniques, and sample size requirements for various types of sample collections, such as blood and urine collections. Simultaneously, training and assessment of collection personnel should be strengthened to ensure operational standardization. For testing instruments of different brands and models, regular instrument calibration and comparison work should be carried out, and unified calibration reference standards should be established through third-party authoritative institutions to reduce deviations in test results between instruments. In the data entry process, advanced automatic data entry and verification technologies should be introduced, such as optical character recognition (OCR), to reduce manual entry errors. Multiple logical verification rules, such as numerical range verification and required field

verification, should also be set to ensure the accuracy of entered data.

In terms of data security, advanced encryption technologies should be adopted to encrypt the collected medical data throughout the entire process. During data transmission, encryption protocols such as SSL/TLS should be used to prevent data theft or tampering. In the data storage phase, encrypted storage algorithms should be used to encrypt and store data, making it difficult to crack even if the storage medium is lost or attacked. At the same time, a comprehensive data access control system should be constructed for fine-grained management based on roles and permissions. For example, personnel roles can be divided into residents, teachers, data administrators, etc., and corresponding data access permissions can be assigned to different roles. Residents can only access anonymized case data related to their own training, teachers can access teaching data within a certain range, and data administrators have the highest level of data management permissions, but their operations are subject to audit tracking. Additionally, relevant laws and regulations, such as the Health Insurance Portability and Accountability Act (HIPAA), should be strictly followed to establish detailed data usage norms and clarify the legal and compliant processes for data collection, storage, sharing, and application, thus ensuring data security from the institutional level.

4.2. Improving model reliability and interpretability

Developing interpretable artificial intelligence models is key. On the one hand, visualization techniques can be used to intuitively present the decision-making process of the model. For example, in image-based testing models, heat maps can be used to showcase the key areas that the model focuses on when analyzing test images, allowing residents to clearly understand the basis of the model's judgments. On the other hand, knowledge graph technology can be utilized to combine medical knowledge with model decision logic, constructing an interpretable knowledge reasoning network. For analysis models of genetic testing data, the knowledge graph can clearly display the correlation paths and causal relationships between genes and diseases that the model relies on.

In terms of model validation and evaluation, a multi-center, large-scale clinical data validation platform should be established. By collaborating with medical institutions of different regions and sizes, diversified clinical case data can be collected to comprehensively test the model. Besides evaluating conventional indicators such as accuracy, sensitivity, and specificity, clinical practicality evaluation indicators should also be introduced, such as the degree of influence of the model on clinical decision-making and the impact on medical costs. The model should be regularly updated and optimized to timely incorporate new testing technology standards, disease diagnosis and treatment guidelines, and the latest clinical case data. For example, as novel coronavirus detection technologies continue to be updated, related artificial intelligence-assisted diagnosis models should be promptly optimized based on new detection methods and clinical features to ensure that the models maintain high reliability and clinical applicability.

4.3. Strengthening the construction of teaching staff

Develop a systematic and tiered AI training course system. Based on the different foundations of medical laboratory science teachers, offer introductory, intermediate, and advanced courses. The introductory course mainly introduces the basic concepts of AI, commonly used algorithm principles, and the current application status in the field of medical laboratory science, providing teachers with a preliminary understanding of AI. The intermediate course delves into the practical application of core algorithms such as machine learning and deep learning in medical laboratory data processing and auxiliary diagnosis model building. Through practical case analysis and operational drills, it enhances teachers' application abilities. The advanced course focuses on the latest research achievements and development trends of cutting-edge AI technologies in medical laboratory science, cultivating teachers' scientific research and innovation abilities.

Encourage teachers to actively participate in AI-related scientific research projects and teaching practices. Medical institutions and universities can establish special scientific research funds to support teachers in conducting research projects on AI-assisted medical laboratory science teaching. For example, studying how to utilize AI to optimize the teaching content and methods of medical laboratory science and improve teaching effectiveness. Simultaneously,

organize teachers to participate in domestic and international academic exchange activities, facilitating communication and cooperation with experts and scholars in the field of AI, broadening their horizons, and learning from advanced experiences. Furthermore, invite senior experts in the field of AI to regularly give lectures and guidance to medical laboratory science teaching units, providing professional technical support and theoretical guidance to the teaching staff and accelerating the overall improvement of the teaching staff's level in AI.

4.4. Facilitating residents' adaptation to new technologies

Strengthen publicity and education work for residents in the early stages of training. Through special lectures, online courses, and other formats, introduce the application prospects, advantages, and positive impacts of AI technology in the field of medical laboratory science on their professional development to residents. For instance, demonstrate practical cases of AI-assisted diagnosis models improving diagnostic accuracy and reducing diagnostic time, allowing residents to recognize the value of new technologies, thereby changing their mindsets and actively embracing new technologies.

Develop a tiered teaching plan based on the varying computer and data analysis foundations of residents. For residents with weak foundations, offer introductory courses on basic computer skills and data analysis, providing systematic training from the basic use of computer operating systems, office software operations, to simple data statistical analysis methods. For residents with a certain foundation, provide advanced courses on AI technology applications, such as introductions to AI algorithm principles and advanced applications of intelligent learning platforms. In the initial stages of training, arrange for teachers to provide one-on-one or group guidance to residents. When using AI tools, teachers can demonstrate operational procedures on-site, answer questions, and help residents quickly get started. Simultaneously, establish study groups to encourage residents to exchange learning experiences, share operational tips, and collectively overcome difficulties encountered in adapting to new technologies. Gradually enhance residents' proficiency and application abilities in AI technology, ensuring the smooth implementation of AI in the standardized training of medical laboratory science residents.

5. Conclusion

AI technology has broad application prospects in the standardized training of medical laboratory science residents, offering numerous advantages such as enriching training resources, providing personalized learning support, assisting in diagnosis training, and improving training efficiency. However, its application also faces challenges such as data quality and security, model reliability and interpretability, inadequate teaching staff construction, and residents' adaptation. By adopting strategies such as strengthening data management and security, enhancing model reliability and interpretability, strengthening teaching staff construction, and promoting residents' adaptation to new technologies, we can effectively promote the application of AI in the standardized training of medical laboratory science residents, improve training quality, and lay a solid foundation for cultivating high-quality medical laboratory science professionals. In the future, with the continuous development and improvement of AI technology, its application in the standardized training of medical laboratory science residents will continue to expand and deepen, bringing new changes to the field of medical laboratory science education.

Disclosure statement

The authors declare no conflict of interest.

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Wolfdog

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Abstract: Wolfdog is a quiet and heartbreaking story that follows Lucas, a film director grappling with grief, love, and the blurred boundaries between cinema and real life during the chaotic production of a film adapted from a novel co-written with his long-time collaborator, Mei. As changes to the script, casting, and even the dog actor unfold, the film shoot becomes a site of emotional confrontation—both between collaborators and within Lucas himself. The arrival of a new assistant, Wilson, introduces unexpected intimacy, forcing Lucas to reckon with past loss and present desire.

Keywords: Fiction; Short story; Queer intimacy; Memory

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“We stood there, gazing at each other, unmoving. I had no idea how long this quiet looking could hold us together, but the arrival of new life, somehow, allowed the days to keep going.”

Lucas furrowed his brow and underlined the sentence and raised his voice toward Mei, who was across the room on the phone. “The atmosphere at the end of your novel is beautifully rendered,” he said. “But I don’t think that kind of tone really translates on screen. Can we end with the two of them embracing instead?”

“You’re the director,” Mei replied, pressing her hand briefly over the mic before speaking to him. “You can design anything you want for the film.” She was caught in a long-winded call with a prop rental company and turned swiftly, walking away in the opposite direction without waiting for a response.

Lucas’s gaze trailed after her, then fixed on a man stepping through the door—a stranger, wearing a baseball cap just like his own. Mei pulled a picture frame from a prop crate and handed it to the man, pointing to a spot on the wall behind Lucas. As the man came closer, Lucas froze.

Even with part of his face obscured by the cap, Lucas could say—without exaggeration—that the man might as well have shared the same face as Mei’s ex. The only difference was the gender. Startled, he turned to Mei—only to find her already looking back at him with the same expression of disbelief. Anyone else on the crew might have missed the subtle shift in Mei’s face. But Lucas could read her—just as clearly as he could read what the man was holding: a childhood photo of Lucas and Mei at age three. Mei, her hair in two bouncing pigtails, stood laughing directly at the camera, gleeful and unguarded. Beside her, Lucas sat on the ground, gripping the edges of a tiny, ill-fitting girl’s hat perched on his head. The same gentle smile played at his lips, but his eyes weren’t on the camera—they were on her. Lucas thought: if this moment and that photo ever appeared together in a film, they’d be dismissed as cliché.

“Director Lin, hello, I’m the new art assistant, Wilson.” Lucas snapped back to the moment only when the man spoke.

“Oh, just call me Lucas,” he replied, then gestured at the photo. “Why are we hanging this up? The main characters

didn't know each other as kids, and they didn't raise the children either."

Lucas's question was directed at Wilson, but his eyes were on Mei.

Mei was still on the phone, her voice tight with negotiation. Without a word, she pointed again at the wall, this time more insistently.

Lucas could read her, just as he always could, ever since the day this photo was taken. Her gestures were sharper than Serena's, her pace quicker. Especially when she was upset, her turns had the speed and precision of Ruby, the lovable Labrador raised by Serena and Zoe in the novel. The thought made Lucas smile, despite himself.

As Wilson prepared to hang the frame, Lucas reached out and snatched it from his hands—a gesture more decisive than his thoughts had been.

"Have you ever thought about acting?" Lucas asked, excitement flaring as he scrolled through Wilson's resume on his phone, Lucas noticed there was indeed no photo—but two brief student film acting credits were listed. His excitement was unmistakable.

"I can?" Wilson's eyes lit up, and his tone lifted, noticeably brighter than it had been when he was hauling props.

"I think you'd be a great Zoe." Lucas said.

"The script's changed a bit, I'll send you the shooting script. For now, maybe set the novel aside." Lucas passed the printed copy in his hand to Wilson while still scrolling for the digital version.

Zoe's been changed into a man. Lucas and Wilson said it almost in unison. Indeed, making a film in a country where queer representation is strictly banned felt like walking a Labrador past someone with a deep fear of dogs. No matter how gentle or adorable the dog might be, that person would still flinch and flee.

It wasn't until the sun slipped past the top of Wilson's head and hit Lucas square in the eyes that the clatter of his typing finally stopped—only then did he realize that evening had already arrived. Strangely, the light now was heavier than at noon, thick enough to catch in the rising dust, each speck visible in the golden air. Lucas lifted his heavy laptop in one hand and, with the other, brushed through those dust particles—weightless, almost suspended—as he made his way toward the hotel where the crew was staying.

"You're pulling my assistant right before we shoot—what the hell does that mean?" Mei burst into Lucas's room not long after, her voice sharp with fury. Lucas can feel it—Mei has been holding a quiet resentment toward him ever since last year.

"We don't have much time left," Lucas said, keeping his tone even. "Do we really have a better option?"

He sat down in the chair near her, picked up a pomegranate, and focused entirely on peeling it, letting the red juice stain his fingers rather than meeting her gaze. Mei didn't respond. She walked to the window and lit a cigarette.

"I already asked the producer to find you another assistant. I know you didn't know what he looked like either," Lucas said. "I chose him for the sake of the project. Don't overthink it." Lucas finally looked up at her, chewing a ruby-red seed.

"I remembered you didn't eat pomegranate," Mei said after finishing her cigarette, stepping forward to take a few seeds Lucas had already peeled.

"You tell me every day how delicious it is. The producer happened to buy some, so I figured I'd give it a try," Lucas replied with a grin.

Lucas was a little surprised that Mei hadn't stayed quietly upset—neither about Wilson, nor the changes to the ending. "A life enters another life, and both are altered," she said before leaving the room. Lucas wasn't sure whether she was talking about the two of them, the script, or perhaps both. Maybe their two lives had already reached a kind of balance, one where they no longer changed each other. And yet, something had shifted in Lucas today, a faint tug of movement beneath the surface.

There are usually only two outcomes of conflict—either it brings people closer or it hastens their separation. Was there really no third possibility? It was already the first day of shooting, and Lucas was still obsessing over a character's line. But time never waits. It pushes everyone forward, evenly, indifferently—whether they're ready or not.

Between lighting changes and set adjustments, Lucas chose to stay with the actors. He had come to notice that most

of the crew were good at disguising themselves, slipping easily into roles of efficiency and detachment. He found it especially irritating that Mei continued to call him “Director Lin” on set. Lucas had always preferred living honestly in a fictional world to pretending in the real one. But as the director, he too had a part to play. The only comfort was this: he could always tell when someone was faking—and none of them could see through him. That meant his own performance, at least, was working.

“Is this the dog we’re using?” Wilson asked during the lunch break, holding up a photo on his phone. It was a picture Mei had sent him—of a strong, almost intimidating wolfdog. Lucas stared at it, puzzled. Even if the lesbian couple in the novel had been rewritten as a heterosexual pair for the film, he had assumed they’d at least keep a sweet Labrador, or maybe a gentle Golden Retriever. Was this even a dog? It looked more like a wolf.

“Does Mei think this works?” Lucas didn’t raise his voice at Wilson, but his irritation was obvious. Why had Mei sent the photo to Wilson first, instead of discussing it with him directly? The thought flashed through Lucas’s mind and startled him—yet almost immediately, his focus shifted back to the more pressing concern: the choice of the dog actor.

“I was just about to show you. It’s the only dog that’s actually pregnant,” Mei said quickly, stepping in.

“If we use a wolfdog to play the novel’s Labrador, no one’s going to buy it,” Lucas said. “What if we switch to a non-pregnant dog? Maybe we can add puppy sounds in post.”

“There’s no time now,” Mei replied, visibly frustrated. “You insisted earlier that the dog had to be genuinely pregnant. All the other trained dogs are booked. Unless... we change the plot again?”

“No,” Lucas said, exhausted. “Let’s go with the wolfdog. We’ve already started filming. Let’s not change the script anymore.”

“The Russian film adaptation of *War and Peace* was rewritten during the shoot,” Mei said, giving Lucas a pat on the shoulder^[1].

“But we’re not shooting a war,” Lucas interrupted, though he returned the gesture, patting her shoulder in encouragement.

The weather doesn’t take heart from human reassurance. That afternoon, heavy rain fell without warning, forcing the entire crew to cancel the outdoor shoot. The lighting team hurried inside to set up for an interior scene, and the call sheet was pushed back by an hour. Another unlucky coincidence—yet another cliché. Serena and Zoe will never fight in the rain. Lucas thought.

“I heard your dog passed away last year.” Lucas was startled—first by Wilson’s sudden appearance, then by the question itself.

“Mei told you?” Lucas replied, his voice measured. He had a habit of asking questions when confronted with grief; they worked like an umbrella, shielding him from the downpour while giving him space to study the shape and sound of the rain.

He knew Mei still hadn’t forgiven him for what happened. His dog, Mia, had died right before one of his short films was set to shoot. He had chosen euthanasia. Mei had stayed with him through those final days, keeping him company in the quiet, unbearable stillness of his apartment.

It was Mei who named her—Mia. She said it made the dog feel more like hers. But a name is just a name. Things that are written down are never as cruel as the ones that happen by chance in life. Grief is a terrible thing; it’s like black ink that seeps into all other colors and turns them dark. Back then, Mei poured that ink into her palette by the handful. Every time she looked at Mia for too long, she’d turn away and cry.

Lucas always wondered if she did it so he wouldn’t see her unravel, or if she herself was trying to avoid the weight of what she felt. As for him—he did everything he could to keep his palette clear. He needed to stay composed, needed to make sure everything for Mia’s last days was handled gently, correctly.

He still wasn’t sure if the decision to euthanize Mia had been the right one. But when even the most gluttonous version of Mia began refusing food and water, Lucas thought—she’s made her choice.

Most people fear the unknown, and then use sorrow and blame to chase that fear away. But Lucas didn’t want to reject

anything Mia made him feel. He simply lifted his chin toward the days ahead and tried to breathe a little deeper.

"I'm not sure I understand death any deeper than I did last year," Lucas said to Wilson, "but I know my life has moved a little farther since then."

Wilson pulled him into a warm embrace. Lucas didn't lift his arms to wrap around Wilson's waist—instead, he let them hang loosely by his sides, allowing himself to be held. His breath, soft and warm, landed on the curve of Wilson's neck, and Wilson, in turn, gently warmed the edge of Lucas's ear with his own breath. Two warm bodies, drawn close, made even the damp, cold air of the rainy afternoon feel less cruel. Before the cameras rolled, they gently stepped apart—as if to prevent any third person from stealing that warmth.

By the time the lights were fully set, the rain still hadn't let up. Life, unlike film, couldn't be cut and stitched together at will, and Lucas knew he couldn't rearrange time. So he had no choice but to skip the easier outdoor scene and move straight to a heavy interior one.

On the director's monitor, Serena sat alone on the sofa. Then Wilson entered the frame, his voice low and measured: "Thank you for forgiving me." His tone was subdued, agreeable.

Lucas frowned. The scene from the script rose vividly in his mind: Serena had grabbed Zoe's hand; Zoe had pulled her into an embrace and kissed her—impulsive, raw. And then, the two of them were meant to cry together.

"Cut," Lucas called out suddenly, his voice slightly hoarse.

Wilson, who had just reached out to hug Serena, turned toward the monitor. "What's wrong?"

"You're playing him too flat," Lucas said, rising to his feet and walking onto the set. "The scene happens right after their dog gives birth. Both of them should be moved by the arrival of new life. Their reconciliation should feel more intense. Otherwise, the audience won't feel it."

Wilson didn't respond with the same easy agreeableness he'd shown during the break. "But he knows that once something breaks, it doesn't just disappear. Even if you glue the mirror back together, the cracks remain. I think what he's feeling is more a kind of resignation toward life."

"Acting is about showing action, not just emotion!" Lucas's tone grew firmer. "Do it my way—one more take."

Lucas had to admit, he was impressed by Wilson's skill. Even when performing in a way he didn't fully believe in, Wilson could still make it come alive. So during the second take, Lucas's brow gradually eased—until the moment Wilson's lips met Serena's. Only then did a faint furrow return, so subtle he didn't even realize it himself.

"We got it," he murmured.

Outside, the rain had stopped. A red maple leaf, still clinging to beads of rainwater, drifted slowly down. If it had landed randomly on either Wilson's side or Zoe's, it might have tipped an invisible balance. Mei caught the leaf mid-air and handed it to Lucas. He took it gently and pulled her over to the monitor so they could watch the playback together. Lucas knew that no matter what kind of conflict had passed between them, Mei would still be the one to hand him the leaf that could tip the balance—and he, in turn, would always do the same for her.

To avoid the risk of more rain, Lucas, following Mei's suggestion, decided to film the scenes involving the dog ahead of schedule.

The next day, Ruby—the wolfdog version—arrived on set in the back of a black cargo van. Her mood was volatile. The moment the back door swung open, she lunged out with alarming aggression, charging straight at Mei.

Lucas ran forward in panic, but Wilson was faster—he grabbed Mei and pulled her out of harm's way just in time. The trainer scrambled out after, finally managing to restrain Ruby. Lucas's eyes fell on Wilson's hand, still gripping Mei's arm. Without a word, he called the trainer over, then turned sharply toward the set.

When Mei and Wilson walked in a few moments later, Lucas merely asked Mei with concern. What fault was Wilson's to begin with? Lucas no longer wanted to wrestle with the tangle of emotions inside him. He could feel how these scattered thoughts were interfering with his filmmaking. So he pushed them down with force—and called for everyone to get ready for the next shot.

Soon, Ruby was led to the center of the living room set, now styled to look deliberately chaotic. Once the camera and

lights were in place, the trainer unhooked her leash and moved quietly to a spot just outside the frame, gesturing commands with practiced precision. But Ruby wouldn't follow. Instead, she curled into herself on the floor, restless, almost anxious.

The trainer looked baffled. He walked over to Lucas and said, "She's usually an excellent performer. I've never seen her disobey like this."

Just as Lucas was about to step forward, Ruby suddenly convulsed, then collapsed onto the floor. A stream of blood pooled beneath her tail.

"Call the animal hospital—now!" Lucas shouted. Mei was already dialing the number the second the words left his mouth.

On the way there, Lucas and Mei sat on one side of the van, Wilson on the other. Mei held Lucas's hand tightly. Lucas felt the cold and tremble of Mei's hand. But she didn't cry; instead, she stared at Ruby with quiet intensity, her body alert, ready—just like Lucas—to offer help the moment it was needed.

At the second-to-last intersection before the clinic, Lucas felt his eyes sting. This was the same road he had taken from home to the vet the day Mia was put down. He recognized every ivy vine scaling the walls, every patch of weeds Mia had once nosed through, every stalk of foxtail grass swaying by the roadside. These weren't like props on a film set—disassembled and packed away once shooting wrapped. These stayed. They endured, unaffected by who left or who stayed behind. They held the traces of lives once lived and the memories those lives left behind.

"She's gone."

It was the second time Lucas had heard that sentence from his vet. No Doctor ever said the word died, not even when it was a dog. But death was a fact—just like life.

A life enters another life, and both are altered. Lucas said to Mei, But when death enters a life, only the latter is changed.

The dead don't care what words a person uses to describe them. Only the living wrap themselves in grief and language—as if words might soften the blow.

If they had followed the original shooting schedule, the wolfdog Ruby would never have entered their lives. Maybe they would have met a Husky Ruby, a Shiba Inu Ruby, or even a Schnauzer Ruby—each a gentler possibility, each one altering their paths in softer ways. But life is a crueler storyteller. In the battle between film and life, film always loses.

A camera's reflecting mirror can shatter and be replaced with a new lens. But when life's mirror breaks, all one can do is piece it back together with trembling hands.

"Do you know the phrase *heure entre chien et loup*?" Wilson asked Lucas after they returned to the hotel. Lucas opened his mouth, wanting to respond, but only a breath came out. No sound followed. He simply shook his head.

Wilson didn't cry either—not once. If there were a competition for holding back tears, their crew would probably take the gold. People tend to focus on the outcome of a contest, not the process. Just like how, in the face of grief, those who don't cry are often seen as cold—but few ever wonder what's happening inside them. Mei must have thought that way too.

Lucas's thoughts spun in every direction. He also found himself thinking back to the scene Wilson had performed earlier—the take he'd initially rejected. It wasn't perfect, not technically. But wasn't it closer to life? Lucas gave a small nod, almost to himself.

"It's that hour right before the sun sets," Wilson explained, and Lucas's attention was drawn back. "When outlines blur, shadows grow uncertain. You can't tell whether the figure walking toward you is a loyal dog... or a wild wolf." He paused. "Maybe the line between life and death blurs in the same way."

The fading light of the sunset, blood-red and thick, streamed through the window, casting halos across both of their faces.

"Have some pomegranates?" Lucas finally managed to speak, though his voice was faint, and he stumbled over the word pomegranate. He tried to peel a pomegranate, but failed—whether from his own exhaustion or the fruit's stubborn toughness, he couldn't tell.

"They lived and died in their mother's womb," Wilson said gently, then took the pomegranate from Lucas's hands and

peeled it open. “They never had a chance to be hurt by the world.”

“But they also never had the chance to take it in with a deep breath.” Lucas said and buried his face in Wilson’s belly. His tears soaked through Wilson’s shirt, and he knew these tears weren’t only about Ruby. It was also about his Mia, and all the change she had left behind. Would Wilson cry for Serena too, after the shoot had wrapped?

The end of a film shoot is like the birth or death of a life—people mark their attachment to it in days and in photos. A baby has been alive one day, ten days, a hundred days. The beloved one has been gone one day, ten days, a hundred days. People scroll through baby pictures or the photos of the dead, again and again.

Lucas’s thoughts were a tangled mess. Images of Wilson and Serena’s intimate scenes kept flashing through his mind. He had no reason to feel uneasy about them—but he did. Suddenly, something smooth and cool pressed against his lips: a pomegranate seed. Wilson was holding it between two fingers, firm.

Lucas parted his lips, taking in both the seed and Wilson’s fingers, and began to suck—on both.

Wilson cradled Lucas’s head and ran his fingers through his hair. Lucas pressed himself in tighter, curling into the closeness until he could barely breathe. Wilson gently lifted him up. As he turned, he tripped over a suitcase on the floor. Lucas caught him just in time.

Wilson kicked the suitcase aside and quietly led Lucas to the bed.

The lives of the living must go on—and films, even more so. In the cinematographer’s room, Lucas replayed the footage of Ruby’s difficult labor over and over again. His fists clenched tightly to stop his hands from shaking. But revising this part based on the footage they already had didn’t seem like it would affect the film too much. If the birth of a new life could move Serena and Zoe and allow them to carry on, then somehow, the end of a life might achieve something similar. Lucas thought.

“Film can extend a life threefold,” the cinematographer said. “The wolfdog Ruby can go on living in the film.”

“That’s a complete cliché,” Lucas cut him off. “But don’t replace her. Let’s finish the remaining scenes.”

“This way of shooting—don’t you think the plot might end up too slow?” Mei said. By the time Lucas arrived on set, she was already there.

“Maybe we’ll accidentally make the next Uncle Boonmee Who Can Recall His Past Lives and win the Palme d’Or,” Lucas joked. But in truth, Apichatpong had somehow inspired him ^[2].

Many people think feeling sleepy—or even falling asleep—during a film is a bad thing ^[3]. But doesn’t life require sleep too? Lucas wasn’t trying to imitate Apichatpong. He had come to understand, more clearly than ever, what kind of film he wanted to make. And he sensed that Mei felt his certainty, too.

She didn’t ask any more questions—just turned and began leading the art team to set up the hotel room where Serena and Zoe would be on vacation. When Wilson arrived with his makeup done, Lucas walked into the scene with him, ready to shoot. The wallpaper was a pale gray, nearly white. Exposed beams ran across the ceiling like the ribs of a forest cabin. A chipped ceramic cup sat on the nightstand, with tea leaves still floating inside.

Lucas gave Mei a small smile and nodded. “Let’s roll,” he said.

“Zoe’s hands were full. He knocked on the door twice using his knee, but no one answered. He had no choice but to set down the thick stack of document folders in one hand, then fished the key out of his bag and unlocked the door.

Once inside, he saw Serena sitting on the couch, reading.

Zoe: You didn’t hear me knocking?

Serena: Do you really have to go to New York?

Zoe: And you really can’t come with me? You could find a new job there.

They both fell silent and looked away. Zoe walked into the study and shut the door behind him.”

“Cut.”

Even though Lucas had removed the original scene from the novel—where Zoe emerges from the study to find Serena bleeding out on the living room floor—his eyes still shimmered with tears. For a moment, he felt dazed, as if the conversation he’d had with Wilson the night before had somehow been replayed in front of the camera. Mei gave him a

small nod, and only then did Lucas snap out of it and signal for her to begin prepping the next scene.

Lucas noticed the same pot of foxtail lilies placed in the corner of the room—just like it had been in every take of this scene. They looked almost identical to the ones at the animal clinic. Most people admired lilies like these for their longevity. Mia had died. The wolfdog had died. But the lily was still alive. Few ever stop to wonder what happened in between. Maybe the soil had been changed. Maybe the flower had been moved to a pot that only looked the same. Maybe the original lily had already died, and the nurse had simply bought a new one that happened to look similar.

In truth, the period of blooming is short—far shorter than the lifespan of the plant. Just as a film’s runtime is short compared to the shoot, and the shoot short compared to a human life. But those indifferent to life rarely care what happens to a flower outside its moment of bloom.

“Did Mei write Serena’s suicide because of Mia? Was she holding something against you—for choosing to put Mia down?” Wilson asked softly. He was lying on his side, facing Lucas. Lucas’s right hand held Wilson’s right hand.

“I don’t know what Mei had in mind. But for me—both you and Mei gave so much to these characters in this film.” Lucas replied.

“Who gave more?” Wilson asked, teasingly. His eyes lingered on Lucas’s lips.

“Who can measure the weight of a life?” Lucas said, turning to face him.

It was a harder question than the wolfdog. A wolfdog could still be judged—does it look more like a wolf, or more like a dog? But could two lives, equally important, ever truly be compared? How was Lucas supposed to choose between two lives so completely different from each other?

Wilson didn’t respond, nor did he move. Lucas reached up cautiously, wrapped an arm around Wilson’s neck, and kissed him. Maybe Wilson, too, carried a sorrow he couldn’t speak of, which was why he was drawn to film. But Lucas, at that moment, wasn’t trying to uncover the sadness in Wilson’s past. He simply wanted to stay with the Wilson who was here now, the one living this brief day beside him ^[4].

There is no such thing as a film crew whose life isn’t brief. Is that why every crew seems to love working overtime? Lucas wondered this as they shot the final scene. When someone knows in advance that life is short, it’s like discovering there’s only one pomegranate left at the bottom of the fruit crate. It might not be the freshest one—but still, one wants to take a big bite.

The final scene the crew shot was, in fact, the beginning of the film’s story: the moment Zoe and Serena first meet, at the memorial service of an elder friend of both their families. One death entered two lives and changed them. Then two lives entered each other, and changed one another in return.

The scene wasn’t filmed with grandeur or solemnity. The deceased was never the main character of this story. When Lucas finally called out “It’s a wrap,” there wasn’t the kind of excitement or sorrow one might expect. The crew simply stood still for a beat, then began quietly packing up. Lucas saw Wilson standing in the corner, his suitcase already packed. He looked more downcast than he had on any day before. Lucas knew—they were about to part ways. Wilson had already booked his flight to New York for the day after tomorrow. Lucas didn’t know whether, if he didn’t go with Wilson now, they’d ever find each other again. But for now, what he wanted most was to stay with Mei, finish the post-production together, and see the film through to its very end.

No matter what, he would begin to measure his longing for Wilson in days and in photos—the same way he measured his love for Mia.

Disclosure statement

The author declares no conflict of interest.

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